IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY IN TEACHING AND LEARNING OF INTEGRATED SCIENCE IN ILORIN KWARA STATE

BY

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CERTIFICATION

This is to certify that this research work was carried out by Nnadi Peace Udo **with Matric Number: KWCOED/IL/22/0117** of the department of Integrated Science / Biology Kwara State College of Education Ilorin, Nigeria.

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DEDICATION

This project is dedicated to Almighty God for His unconditional love, care and for the unfathomable favours He granted me throughout my academic pursuit.

ACKNOWLEDGEMENTS

All praises and adoration belong to Almight God the omnipotent, Omnipresent and the omniscience. the unchangeable changer, the creator of all creature who creates us and also gave strength, wisdom ability and also allows me to complete this Course successful may his excellent name be praise forever and the full grace to be opportune to run this three years programme Successfully.

My unreserved gratitude goes to my able Superursor Dr Mrs J.B Jubril for her untiveless effort from the beginning of this project, God bless you ma. Mrs, I also want to express my tremedous and sincere appreciation to my darling parent mr and NNADI. words (anits express my Immense gratitude to you than to say God bless you for me may almighty to continue to Shower and bestow this limitless blessing on you may you angis the fruits of Your labour alive

I am thereafter. Indebted to all my famly ifriends. all recognized and well wishers, you are

ABSTRACT

This research work was conducted to investigate the Impact of information and communication technology on effective teaching and learning of Integrated Science in selected Secondary Schools in Ilorin West LGA Kwara State.

A sample of three hundred (300) students and thirty (30) teachers were randomly selected from ten (10) stratified secondary schools in Ilorin West LGA, Kwara state. The data collected through the administered questionnaires on the sample subject was analyzed through descriptive statistics of frequencies and simple percentage while all hypotheses were tested at 0.5 level of significance through the use of Analysis of Variance (ANOVA) and t test statistics.

The findings of the study revealed that there is significant difference between students taught with information and communication technology and those taught without information and communication technology. Also, there is significant difference between pre-test scores and post–test scores of students taught with information and communication technology. However, there is no significant difference between post–test scores of male and female students taught with information and communication technology.

Based on the findings it was recommended that adequate information and communication technology should be provided for effective teaching and learning, also the government as a matter of policy should recruit more qualified teachers to teach at senior secondary school level most especially Biology.

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CHAPTER ONE

INTRODUCTION

Background to the Study

Science has been defined as a system of acquiring knowledge which uses observation and experimentation to describe and explain natural phenomena. Science is a systematic and logical approach to discovering how things in the universe work. Science is the methodical study of the organization and behaviour of the social, physical, and natural worlds through observation and experimentation. It is essential for innovation, increased global competition, and societal growth (Badmus & Omosewo, 2018). Science is one of the most significant subjects in senior secondary schools due to its relevance to students' lives and the widely applicable problem-solving and critical thinking abilities it fosters. These are abilities that students can use throughout their lives to come up with ideas, make informed decisions, and pursue new interests (Abanikannda, 2018; Badmus & Omosewo, 2018).

Attiji (2018) defined science as the energetic human activity concerned with understanding of the working of our world also stated that the word

science stands for a variety of informations, abilities and operations about the real environment. Science is more concerned with various investigatives processes and activities with regards to developing, acquiring and controlling, knowledge, skills, acceptability and attitudes about the natural factors of the environment. Science is a psychological activity through which many seek to understand nature. Science is typically divided into the natural science which studies the natural world, the social science which study people and society and the formal science such as mathematics, from classical antiquity through the 21st century, science as a type of knowledge was closely linked to philosophy.

In Nigerian senior secondary schools, there are three basic scientific disciplines offered, with Integrated Science being one of them. Integrated Science according to Mulkah and Femi (2020), is a natural discipline that studies the living world that provides explanations for the composition, operation, growth, and existence of living entities as well their interactions with the surroundings.The Integrated Science curriculum taught in senior secondary schools in Nigeria seeks to prepare students for the theoretical and practical aspect of itto enables them acquires meaningful and pertinent

information in the subject,and to develop a rational and practical scientific attitude (Federal Republic of Nigeria, 2009).

As Integrated Science is developing more rapidly than it was in the past,the traditional method of teaching would therefore be replaced by more contemporary educational approaches that call for the use of information and communication technology. Integrated Science teachers today must make use of information and communication technology inorder to execute tasks, to explore informations, analyze it, make decisions and gain new knowledge in order to function at their best. The teacher’s lessons Must be designed to incorporate the use of information and communication technology in the classroom to take more student-centered approach in delivery which actively involve the students in the creation of knowledge (Farhana & Chowdhury, 2019).

Wikipedia (2018), defined Integrated Science as a natural science concerned with study of life and living organisms including the structures, functions,growth, evolution, distribution, identification and taxonomy; It's a natural science concerned with the study of living things in our environment and apiculture of all studies in faculties of science education, health, pure or

applied science because It is a core subject compulsory to all science students in Nigeria secondary schools .

Integrated Science plays keys role in industrialization and other sectors of the economy. It is a practical subject which equips students with concepts and skills that are useful in solving the day-to-day problems of life. The study of Integrated Science, aims at providing the learners with necessary knowledge tocontrol and change the environments for the benefits of an individual, family or community and to have useful knowledge to face the challenges of life before and after graduation. Integrated Science is divided into main branches: Botany, (the study of plants) and Zoology (the study of animals).

Some of the usefulness of Integrated Science as appointed by Sarojini(2019) are as follows:

- It helps in dealing with ecological issues e.g food shortage, over population, erosion, diseases of plants and animals.

- Application in medicine, science, veterinary, horticulture, agriculture and dentistry.

- Biotechnology which includes field like genetic engineering and hydro technology.

- It help in scientific research and development of new tools.

Integrated Science teachers play a vital role in educating students about the natural world. However, the integration of ICT (information and communication technology) in the classroom is a relatively new development. And this study has exploredthe views of Integrated Science teachers'on integration of ICT facilities in teaching secondary schools in ILORIN kwara state with the goals of better understanding and supports using technology to enhance teaching and learning.

Integrating information and communication technology (ICT) in education means using all technologies that can process information and transmit it for the purpose of educational development and refinement. UNESCO 2006 defined Information and Communication technology as fashion of technology used to transmit, store, create, share or exchange informations. Owusu-Ansah(2015), ICT are technologies that are used to give rise to, reserve, split or transmit and exchange information. This broad definition of ICT includes such technologies as radio, television, DVD, video,

telephone (either movable or stationary), satellite, computer, network hardware and software, as well as the equipments and services associated with these technologies, such as video conference and electronic mail.

Information and Communication technology (ICT), refers to the use of computers, the internet, and other technologies to access, create, and communicate information. In the context of Integrated Science education, ICT can be used to help students understand complex biological concepts, to conduct research, and to communicate with other students and experts.

Tinio (2022), states the potentials of ICTs are increasing access and improving relevance and quality of education in developing countries. Also ICTs are instruments that facilitates the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems, improve policy formulation and execution, and widen the range of opportunities for business and the poor. In Watson's (2001) description, ICTs have revolutionized the way people work today and are now transforming educational systems. As a result, if schools train children in yesterday's skills and technologies they may not be effective and fit in tomorrow's world. This is a sufficient reason for ICTs to win global recognition and attentions. For instance, ICTs are dependable tools in

facilitating the attainments of one of the Millennium Developments Goals(MDGs), which is the achievement of universal primary education by the year 2015.

It is well acknowledged that information and communication technology is a potent tool for transforming education emerges for fresh and creative technological applications opens up to new avenues for science education. This rapid expansion has increased the expectations on educational professionals such as curriculum developers, evaluators, and teachers to keep up with 21st-century information technology tools (Ihejiamaizu & Ochui, 2019). It is undeniable that information and communication technology integration is crucial for raising the standard of instructional delivery both inside and outside of the classroom (Obielodan et al., 2020). The use of technology in education has the potential to enhance school management and effectiveness, teacher and student subject areas, and the standard of teaching and learning (Bhattacharjee & Deb, 2016).

The use information and communication technology (ICT) in education increases the ability of users to retain information and also, their level of engagement. Students are more interested in their work when information and communication technology is included into the classroom. This is due to the

fact that technology offers several chances to make it more engaging and exciting to teach the same thing in various methods. Thus, this study has assessed the views of Integrated Science teachers' on integration of information and communication technology facilities for teaching secondary schools, in Ilorin Kwara State.

Statement of the Problem

"The integration of ICT in Integrated Science education is a complex and rapidly evolving field and it is not well understood by many Integrated Science teachers. As a result, many Integrated Science teachers do not feel confident about using ICT in their classrooms, and were not aware of the benefits that ICT can bring to their teaching and their students' learning.

Information and communication technology is one of the tools that are greatly used to enhance the teaching and learning of Integrated Science in making instructions more interactive, engaging, and visually stimulating, leading to better understanding and retention of biological concepts. However, despite the potential benefits of information and communication technology facilities in enhancing teaching and learning of Integrated Science, much attention is still given to the traditional method (chalkboard and textbook) in

teaching in the classroom, rather than the use of ICT facilities. Against the back drop, the study examined the views of Integrated Science teachers' on integration of information and communication technology facilities in teaching secondary schools in Ilorin Kwara State.

Purpose of the Study

The purpose of this study was to investigate the views of Integrated Science teachers' on integration of ICT facilities in their teaching in secondary schools in Ilorin Kwara state. Specifically, the study found out :

- Views of Integrated Science teachers' on integration of ICT in teaching based on gender.

- Views of Integrated Science teachers' on integration of ICT based on age.

Research Questions

The following research questions were raised to guide the study;

- what are the differences in the views of male and female Integrated Science teacherson integration of Information and communication technology facilities in teaching secondary schools in Ilorin Kwara state?

- What are the differences in the views of Integrated Science teachers on integration of Information and communication technology facilities in teaching secondary schools in Ilorin Kwara state based on their age?

Research Hypotheses

H1: There is no significance difference between the views of male and female Integrated Science teachers on integration of Information and communication technology facilities in teaching secondary schools in Ilorin Kwara state.

H2: There is no significance difference between the views of Integrated Science teachers on integration of Information and communication technology facilities in teaching secondary schools in Ilorin Kwara State based on age.

Significance of the Study

The significance of the study is for all of the stakeholders involved, including students, teachers, school authorities, curriculum developers and future research.

This improves student learning outcomes, more engaging and effective learning environment . Also, it's of great benefits to students positive attitudes

and enjoying effective learning environment which ICTs would provide an invariable improves life-long learning skills and habits in them. By experiences and views of Integrated Science teachers, more effective strategies for integrating ICT in the classroom can be developed which would help change their mindsets about the potentials of ICTs, making teaching activities pleasurable for the teachers, by making them feels more confident and comfortable using ICT in the classroom.

For school authorities, ICT integration would support school policies and strategies.This findings would sensitive the school authority to go back to drawing board and re-plan ICTs policy in education by taking goals and vision of ICTs into cognizance to understand that policy making is not mere policy formulation, but includes provision of infrastructures,capacity building, and enhancing of attitude change. School Authorities can now influence the government to provide necessary logistics that would make ICTs policy in education implementable.

For curriculum developers, ICT integration would support the development of new and innovative Integrated Science curricula. The findings could be used to develop curriculum materials that are more aligned with the needs of Integrated Science teachers and students and would be of immense

benefits to the curricular for knowing the level to which teachers have accesses to ICTs, their attitude toward them and their level of proficiency, so that curricular would be able to put this knowledge into consideration in providing ICTs for secondary schools.

The findings also would inform future research on ICT integration in Integrated Science education. Specifically, to develop new models for ICT integration, or to identify best practices for implementing ICT in Integrated Science classrooms and serves as a springboard from which education researchers can pick their centre of interest. The study would add to the existing Nigeria/foreign literature that is available on teachers' access, attitude and proficiency in the use of ICTs and to knowledge by serving as a reference material to other researchers who may want to replicate the study.

Scope of the Study

The study focused on the views of Integrated Science teachers' on integration of ICT in teaching in secondary schools in Ilorin Kwara State.

The research covers both public and private secondary schools in Ilorin , Kwara state. And the variable considered are teachers' gender and age.

Clarification of Major Terms

Views: Refers to the opinions, perspectives, or attitudes of Integrated Science teachers regarding the integration of ICT facilities in teaching.

Integrated Science teachers: Refers to educators who specialize in teaching Integrated Science to students in secondary schools. They are the target group for this project.

Integration: Means the process of combining or incorporating ICT facilities into the teaching practices and curriculum of Integrated Science education.

ICT (Information and Communication Technology): Encompasses a broad range of technologies used to create, store, exchange, and manage information. Examples include computers, software, internet, and digital tools.

ICT facilities: Refers to the hardware, software, and network infrastructure available in schools to support ICT-based teaching and learning. Examples include computer labs, internet connectivity, and educational software.

Teaching: Refers to the process of imparting knowledge, skills, and values to students by Integrated Science teachers, using various methods and resources, including ICT facilities.

Secondary School: Refers to an educational institution that provides education to students typically between the ages of 11 and 18, corresponding to the secondary education level. This is the context where Integrated Science teachers teach and integrate ICT facilities.

CHAPTER TWO

LITERATURE REVIEW

The review of related literature for this study was presented under the following sub-heading:

- History of ICT in Education.
- Concept of Information Communication Technology (ICT).
- Objectives of ICT integration in Education.
- Factors affecting Integration of ICT in teaching.
- Overview of Integrated Science as a discipline.

- Benefits of information and communication technology to teaching and learning.

- Summary of Literature Review.

History of ICT in Education

ICT is an acronym that stands for Information and communication Technology. The first computers were introduced into schools in the 1970s, but it wasn't until the 1990s that ICT really started to take off in education. This was due to the rapid development of the internet and the emergence of new technologies like laptops, tablets, and smartphones. The first commercial computer was the UNIVAC I, developed by John Eekert and John W. Mauchly in 1951. It was used by the census Bureau to predict the outcome of the 1952 presidential election. For the next twenty-five years, mainframe computers were used in large corporations to do calculations and manipulated large amounts of informations stored in databases. Super computers were used in science and engineering, for designing aircraft and nuclear reactors, and for predicting world weather patterns. Minicomputers came on to the scene in the early 1980s in small businesses, manufacturing plants, and factories. In 1975, the Massachusetts Institute of Technology developed

microcomputer. In 1976,Tandy Corporation's first Radio Shack microcomputer followed; the Apple microcomputer was introduced In 1977.

Concept of information and communication technology (ICT)

Various definitions have been proposed by scholars to describe information and communication technology (ICT). Bas (2016) has suggested that ICT is a commonly used term that encompasses computers, programs, networks, satellite connections, and other related technologies that allow people to access and exchange information in various formats. The term is also commonly used to refer to computer use and related activities. Meanwhile, Bamidele (2016) has described ICT as the use of computers, the internet, and other telecommunications technologies across all aspects of human activity.

According to Ojo and Adu (2018), information and communication technology facilities encompass all available resources that enable the identification, creation, processing, storage, packaging, preservation, conservation, and transfer of information, without being restricted by time and location. These tools are used for creating, storing, processing, distributing, and exchanging information. Bayo (2016) defines information and communication technology as a means for students to observe real-life

events. Chassignol et al. (2018) suggest that information and communication technology refer to a range of activities and materials that are enabled by electronic methods for processing, transferring, and displaying information. All types of technology that make it easier to communicate, process, and transmit information electronically are therefore collectively known as information and communication technology.

Khan (2016) in his own terms defines information and communication technology (ICT) as the utilization of electronic computers and software to gather, process, store, transmit, and retrieve information. This term encompasses the collection, management, storage, and sharing of information, and refers to the tools and advancements that simplify the creation and use of knowledge and ideas across all areas of human activity. Alshmrany and Wilkinson (2017) assert

that ICT involves the ability to fully comprehend and possess a range of skills, including recognizing, identifying, evaluating, and effectively using information. Essentially, it involves the capacity to communicate, conduct research, and access information, as well as a basic understanding of computer usage. According to Eynon (2016), ICT has replaced information technology (IT) as a term because it is more appropriate and commonly used.

Seldon and Abidoye (2018) defined information and communication technologies (ICTs) in education as a range of rapidly evolving technologies that includes computers, laptops, digital cameras, local area networks (LANs), the internet, the World Wide Web (WWW), CD-ROMs, DVDs, and software such as spreadsheets, tutorials, simulations, electronic mail, digital libraries, computer-mediated conferencing, video conferencing, and virtual reality. The use of ICTs in education has made it possible to overcome the limitations of time, distance, and learning activities. Different information and communication technology tools such as computers, the internet, PowerPoint, television, overhead projectors, cameras, radio cassettes, videotapes, audio cassettes, audio CDs, the World Wide Web (WWW), telephones, and other devices are employed in teaching and learning.

In this research, information and communication technology refers to all digital devices that can be utilized for teaching, learning, and process improvement within and outside the school, including desktop or laptop computers, projectors, printers, scanners, video conferencing systems, interactive whiteboards such as SMART Boards, smart gadgets like iPods, Galaxy’s, digital cameras, video cameras, MP3 players/iPods, and DVD players.

Objectives of ICTs in Education

The federal government recently led the way with the launch of a new national policy on Information and Communication Technology (ICT) in the nation's education sector, in a bid to enhance modern teaching and learning in schools across the country. According to the minister of Education,at the lunch of the facility in Abuja, said the ICT policy would be integrated into schools curriculum. The policy objectives of ICTs in Education are **:**

***** To facilitate the teaching and learning process.

***** To promote long-life learning.

***** To ensure universal access to informations.

***** To foster research and development.

***** To support effective and efficient education administration.

***** To promote problem solving, critical thinking and innovative skills.

***** To enhance the various teaching/learning strategies required to meet the needs of the population.

Michael 2001, ICTs integration means using ICTs tools in teaching to do better than the corresponding traditional tools.

Factors affecting the Integration of ICT in Teaching.

The full integration of technology in education is crucial to enhance teaching and learning, however, various barriers impede this integration in the educational system. A study by Mulkah and Femi (2020) reveals that information and communication technology resources are inadequately available in schools for use by Integrated Science for teaching and learning. In a similar vein, Nwanaetal. (2017) contends that the factors hindering the efficient integration of information and technology tools into education are inadequate resources, technical support, and inadequate teacher preparation, as well as lack of teachers' encouragement to technology tools in lesson delivery.

Study by Alshmrany and Wilkinson (2017) also found that a major barrier to teachers' adoption of information technology tools was their resistance to change. Some teachers face difficulties in adjusting or adapting to the use of technological innovation, and as a result, they consistently reject anything that can cause them to feel a little stressed. Hajietal. (2017) argues most teachers are unable to practice independently because they are unfamiliar with the information and communication technology tools and gadgets used to make teaching simpler. This may not be unrelated to the lack

of information and communication technology training, expertise and experience on the part of the teachers (Amusa & Ainmo, 2016; Nkoyo & Egbe, 2016; Anietal, 2016). Mulkah and Femi (2020) found that the views of Integrated Science teachers' on information and communication technology capacity building workshops was low because they are not aware of the significance the capacity building workshop may afford them.

Ghavifekretal.(2016) argues that there are technical assistance challenges, low network connectivity and limited accessibility in using information and communication technology in teaching. Khokhar and Javaid (2016) stated that inadequate instructional time of usage affect the integration of information and communication technology facilities in the classroom teaching. Therefore, additional instructional time is required in order to use information and communication technology in education. Ayikoye (2017) list the following as additional barriers to the usage of information communication technology in teaching and learning:

Lack of funds

Lack of funds: Most secondary schools lack the necessary information and communication technology tools and resources for teaching and learning. This is due to the high cost of

Information and communication technology materials and equipment. Thus, the acquisition of all necessary technological facilities as well as their integration and installation become exceedingly challenging. Lack of access to fund does not allow the schools to purchase computers and its hardware and software. It also makes it difficult to connect to the internet and maintain those technological tools that have been purchased. Funding is therefore inadequate due to the high cost of purchasing materials and equipment for information and communication technology.

Lack of Adequate Facilities

Lack of Adequate Facilities is one of the challenges militating against the deployment of Information and Communication Technology in Nigeria secondary schools (Idowu & Esere 2013). This is evident in the fact that almost Nigeria secondary schools lack basic office gadgets and technologies like, computers, printers, faxing machines, photocopiers, binders, projectors, etc. This is appalling compared to other schools of the world, not to even talk

of internet connection. These basic facilities contributes to the challenges facing deployment of information and communication technology in Nigeria schools as no schools can function effectively in this modern trends of ICT without these facilities. It is important, in that apart from educational training, these office gadgets and Technologies are needed to students for corporate activities. In other developed countries, students while in school learn how to use these effectively as it is 'Do it yourself' curriculum. This means that although the students would be taught and guided at every step of learning, they are however expected to do things, printing, photocopying, binding, etc. However, this is not so in Nigeria as students constantly depends on commercial office services known as business centre for all their coursework's. This ends up not equipping them for corporate and general office work, as they cannot operate such gadgets after school without formally being trained. The government in collaboration with Nigeria schools Commission should make policy to ensure that each class-room have these basic equipment and Internet in good working condition at all times with trained staff to teach or guide students and new staff on how to operate them.

Computer Illiteracy

Computer illiteracy is another challenge of ICT in Nigeria schools. This is due to the fact that an average Nigeria schools is not computer literates, which is disappointing in this modern digital era (Idowu & Esere, 2013). No doubt that most of them may have at some point studied computer application or gone for basic computer training, but computer training without continuous practical is as good as nothing, as practice makes perfect. Computer in this current age of ICT boom is really a great threat to any establishment, talk more of an educational institution as almost all human activities depends on ICT (Anene, Imam & Odumuh, 2014).

Poverty

Poverty: Most people in Nigeria live in poverty and this prevents them from acquiring these modern technologies. Given Nigeria's current economic situation and the poor working conditions teachers are subjected to, the expense of information and communication technology hardware and software maybe burdensome for the average teacher. The teacher's ability to learn information and communication technology skills and knowledge acquisition is therefore challenged as they will not have easy access to the internet or other information and communication technology resources.

Inadequate Electricity (i.e. Power) Supply

Inadequate Electricity (i.e. Power) Supply: Lack of electricity or insufficient power supply to schools is a major challenge affecting the integration of information and communication technology in the acquisition of knowledge and skills. Adequate, regular, and stable power supply is necessary for the efficient functioning of technological tools utilized for teaching and learning. In Nigeria, most electronic devices are damaged as a result of power failures. Unfortunately, only a few Nigerians can afford to purchase standby generators to guarantee a steady power supply when the public power supply is disrupted. According to Nkoyo and Egbe (2016), some schools still lack access to electricity due to Nigeria's developmental status and the government's inability to connect the entire nation to the national electricity grid. Consequently, many schools, particularly those in rural areas, face limitations and may not be able to incorporate computers into their teaching and learning practices. Episodic power supply issues also remain a challenge in urban areas.

There are other factors affecting the integration of information and communication technology that have been discussed by scholars. These include online and virtual crimes, copy right challenges, unclear

organizational structures, disregard for potential users cultural backgrounds, and lack of information and communication technology policies, etc. (Barathietal, 2017; Shivakumar, 2017). Others include lack of political will on the part of the government to the school management (Onwukanjo & Joseph, 2017); lack of facilities and available facilities that are lying dormant (Nwanaetal., 2017). Additionally, internet failure can occasionally result in troublesome circumstances. For instance, a lesson may need to be cancelled or postponed if the internet connections to the information and communication technology devices are disrupted.

Overview of Integrated Science as a Discipline

Integrated Science is a distinct field of the natural sciences. However, just like other fields of natural sciences, it is concerned with the pursuit of a comprehensive understanding of natural phenomena and events. Two main subfields make up the Integrated Science discipline. One is functional Integrated Science, and the second historical Integrated Science, otherwise referred to as evolutionary Integrated Science (Mulkah & Femi, 2020). The functional aspect of Integrated Science is concerned with the physiological processes that make up the natural principles of physical sciences, particularly at the cellular and molecular levels. Historical Integrated Science on the other

hand serves as a platform for advancements in the study of extinct species, the history of life across geological time and seeks to promote a diversity of perspectives in this quickly developing discipline. There are three main recognized branches of Integrated Science which include botany, zoology and microIntegrated Science. Integrated Science is the science aspect that deals with the study of life and living organisms (Ihejiamaizu & Ochui, 2019). Abanikannda (2018) sees Integrated Science as the field of science that deals with physiochemical aspects of life.

The main objective of studying Integrated Science as a discipline is spelt out in the West African Examination Council Syllabus (2020). The syllabus is designed to assess candidates; understanding of the structure and functions of living organisms as well as appreciation of nature; acquisition of adequate laboratory and field skills in order to carry out and evaluate experiments and projects in Integrated Science; acquisition of necessary scientific skills for example observing, classifying and interpreting biological data; acquisition of the basic relevant knowledge in Integrated Science needed for future advanced studies in biological sciences; acquisition of scientific attitudes for problem solving;

ability to apply biological principles in everyday life in matters that affect personal, social, environmental, community health and economic problems; and awareness of the existence of interrelationships between Integrated Science and other scientific disciplines (WAEC, 2020).

Through the use of information and communication technology (ICT), which has immense benefits in the teaching and learning process, the aforementioned objectives might be accomplished by students offering Integrated Science at the end of the three-year course. However, this heavily depends on the competence of teachers in implementing teaching methods that use instructional aids that are driven by information and communication technology to achieve lesson the objectives at the classroom level (Ihejiamaizu & Ochui, 2019).

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Benefits of information and communication technology to teaching and learning

Studies have demonstrated that there are measurable benefits to utilizing information and communication technology in education that are superior to traditional teaching methods. The optimum utilization of information and communication technology tools by teachers and learners, for example, would lead to enhanced outcomes and efficacy in teaching and learning, as well as foster a learner-centric environment. This is due to the fact that information and communication technology tools enable students to

obtain information from a diverse range of sources and present it in various formats. Furthermore, it allows students to work independently and collaboratively (Ayikoye, 2017; Bhattacharjee & Deb, 2016).

According to du Boulay (2016), information and communication technologies are essential tools in education that can be utilized to meet the unique learning needs of individual students, promote educational equity, provide high-quality learning materials, enhance students' self- confidence and independence, and facilitate professional development for teachers. The integration of information and communication technology in education improves the learning environment by increasing engagement and reducing indifference towards individual differences (Fabunmi & Awoyemi, 2017).

Daudi and Nzilano (2019) argue that if used appropriately, various information and communication technologies can enhance access to education in the increasingly digital workplace by distributing information, utilizing learning management systems, managing educational services, and making them accessible at a reasonable cost whenever and wherever required. Online learning platforms such as e-learning and blended learning now provide access to higher education and other adult learning opportunities for

individuals and groups who were previously unable to enroll in traditional academic institutions.

Coleman et al. (2016) argue that the appropriate implementation of information and communication technology in the classroom changes the role of the teacher to that of a facilitator, knowledge navigator, and co-learner, and promotes a more interactive and engaging learning environment for both teachers and students. Yunus et al. (2021) suggest that information and communication technology provides users with the ability to participate in the library and information service process and access information in a flexible, cost-effective, and up-to-date manner. The use of information and communication technology tools is necessary, not optional, to promote economic, technological, and educational growth at all levels of schooling. Ghavifekr et al. (2016) assert that effective use of information and communication technology in schools ensures wider access to knowledge and experience in this era of globalization. According to Amusa and Atinmo (2016), institutions that encourage the use of information and communication technology by both teachers and students are more effective and productive in teaching and learning. Information and communication technology supports

teaching and learning by providing dynamic, interactive, flexible, and engaging content that enhances the pedagogical activities of teachers.

Information and communication technology can contribute to creating a more inclusive education system by aiding with assessment, evaluation, teaching, and learning processes. It has the potential to increase access to educational resources, improve learning outcomes, enhance teacher productivity, and close the digital divide between different socioeconomic groups. Furthermore, it can enhance student engagement, leading to improved academic achievement (Naji, 2017). Students who make use of information and communication technology are more likely to comprehend complex ideas and concepts, retain information better, and apply it to real- world situations beyond the classroom (Cantoni & Danowski, 2015). As a result, the integration of information and communication technology has enhanced the accessibility and relevance of quality education, making it available anytime and anywhere. Studies have found that ICT can enhance student engagement, promote active learning, and increase student achievement. The literature review will also include a discussion of the challenges of ICT integration, such as the lack of access to technology, the need for professional development, and the need for technical support. The review will then focus

on research that has explored the factors that influence Integrated Science teachers' views on ICT integration. This research has found that factors such as teacher attitudes, beliefs, and previous experiences with technology.

Summary of reviewed literature

Based on the reviewed literature, it is clear that most studies have focused on the effectiveness of information and communication technology (ICT) integration on the teaching Integrated Science with an emphasis on teachers. However, there has been less attention given to the views of Integrated Science teachers regarding the Integration of ICT for in senior secondary schools in Ilorin Kwara State. Furthermore, there have been only a few studies conducted on this topic in Kwara state, and the time period covered in these studies differs from the one examined in this research. Lastly, while previous studies have touched on this topic, they have not provided detailed strategies for improving the effective integration of ICT in teaching of Integrated Science in senior secondary schools as this study seeks to accomplish.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter describes the methodology that was used in this study. It covers research design, population, sampling design and procedure for Data, research instruments, reliability and validity of the research instruments, data collection and analysis procedures.

Research Design

The study was a descriptive research of survey type. The study investigated the views of Integrated Science teachers on integration of information and communication technology in teaching in secondary schools in Ilorin , Kwara State. Survey research involves collecting data systematically through distribution questionnaires.

Population, Sample and Sampling Techniques

The population of the study comprised of all the Integrated Science teachers in Ilorin Kwara State. A purposive sampling technique was used to select twenty-five (25) secondary schools both private and public schools in Ilorin Kwara State. A simple random sampling technique was used to select two (2) Integrated Science Teachers in each secondary schools.

Research Instrument

The instrument used in this study was a researcher-designed questionnaire entitled, “views of Integrated Science teachers on integration of information and communication technology facilities in teaching in secondary schools in Ilorin , Kwara State” The questionnaires as an instrument is divided into two sections; section A and B. Section A deals with the personal data of the respondents while section B contains research statement postulated in line with the research questions. Options were provided for each respondent to tick one of the options and the questionnaire was developed in line with the modified four-point Liker scale of strongly Agreed (SA), Agreed (A), Disagreed (D), and Strongly Disagreed (SD) in accordance with the research questions raise for the study.

Validation and reliability of Research instrument

The research instrument for the study was validate by the researcher supervisor, a lecturer from the department of science education, university of Ado Ekiti in Affiliated with Kwara State College of Education Ilorin for face validation.

Reliability of instrument was done using t-test method, by administering the instrument on a small sample of the target population twice with interval of

five weeks the Integrated Science teachers in the sample were not part of the study. The data collected was corrected and reliability index was found to be 0.05

Procedure for Data Collection

The researcher was permitted by principals in the sampled schools to distribute the questionnaire; the copies of the questionnaire were distributed and collected on the same day.

Data Analysis Techniques

The data collected were analyzed using descriptive and inferential statistics. The research questions were answered using frequency counts and percentage distribution, the main research questions were analysed using mean, standard deviation and rank order analysis. While t-test and ANOVA statistical were used to test the formulated hypothesis bases on the variables at 0.05 level of significance .

CHAPTER FOUR

RESULTS

Introduction

The study examined the view of Integrated Science teachers on the integration of Information and Communication Technology facilities in teaching in Ilorin Local Government Secondary Schools, Kwara State. Data analysis was done on a total of 50 questionnaire forms that were properly filled, accounted for and then used for this study. Descriptive and inferential statistics were employed in analyzing the collected data. The demographic data of the respondents were analysed using percentage distribution, main research question was analysed using mean, standard deviation and rank order analysis while t-test and ANOVA statistical tool were used to test the formulated hypotheses at 0.05 level of significance.

Demographic Data

This section presents the results of data obtained from the respondents in frequency and percentages.

Table 1: Percentage Distribution of Respondents Based on Gender

Gender	Frequency	Percentage
Male	21	42.0
Female	29	58.0
Total	**50**	**100**

Table 1 shows the distribution of respondents based on gender. The table reveals that 21 (42.0%) of the respondents were male, while 29 (58.0%) of the respondents were female. This indicates that female respondents participated more than male respondents in this study.

Table 2: Percentage Distribution of Respondents Based on Age

Year	Frequency	Percentage
20-30 years	25	50.0
31-40 years	16	32.0
41-50 years	7	14.0
Over 50 years	2	4.0
Total	**50**	**100**

Table 2 shows the distribution of respondents based on age. The table reveals that 25 (50.0%) of the respondents were between 20-30 years of age, 16 (32.0%) of the respondents were between 31-40 years of age, 7 (14.0%) of the respondents were between 41-50 years of age while 2 (4.0%) of the

respondents were over 50 years of age. This indicates that respondents who were between 20-30 years of age participated more in this study than other age groups.

Research Question One: What are the view of Integrated Science teachers on the integration of Information and Communication Technology facilities in teaching in Ilorin Local Government Secondary Schools, Kwara State?

Table 3: Mean, Standard Deviation and Rank Order Analysis of the Respondents' View on the Integration of Information and Communication Technology Facilities in Teaching

Item No.	**Items statement:**	**Mean**	**S.D.**	**Rank**
1	Integration of ICT ensures the integrity of global education and meaningfully improve Integrated Science students learning outcome	3.36	.598	1st
8	ICT knowledge influence teachers' method of teaching	3.22	.864	2nd
4	Integration of ICT in teaching Integrated Science supports studentsto engage academically and grow as learners	3.14	1.06	3rd
5	Knowledge of ICT will facilitate the fulfillment of	3.10	.707	

	teaching task.			4th
3	ICT makes Integrated Science teachers productive in teaching.	3.06	.843	5th
17	Computer networking exposes Integrated Science teachers' to diverse views	3.04	.832	6th
11	Integration of ICT into teaching should be made compulsory in all secondary schools	3.02	.915	7th
10	Integration of ICT improves teaching process.	2.92	1.12	8th
16	Inadequate provision of ICT resources affects the effective practical activities.	2.90	1.07	9th
14	Personal computers, projection system, mobile phone and audio equipment facilitate teaching process.	2.82	1.04	10th
18	Content of course allows utilization of internet in teaching process.	2.82	.800	11th
9	Under coverage of course content is precise able within a short-term with ICT	2.80	.948	12th
6	Using computer could supply information that ameliorate research decision	2.78	.996	13th
13	Using computer system will enhance effective teaching delivery.	2.76	.744	14th
15	There’s adequate ICT resource available in the school	2.47	.614	15th
12	In real practical aspect, the application of ICT in teaching is difficult.	2.42	1.14	16th

2	Integration of ICT in teaching process makes students feel less guided and suffer in term of education	2.28	1.08	17th
7	Computer is only useful for research	2.26	1.04	18th

Table 3 presents the mean, standard deviation and rank order of the respondents' view on the integration of information and communication technology facilities in teaching. The table indicates that items 1, 8 and4 which state that: integration of ICT ensures the integrity of global education and meaningfully improve learning outcome; ICT knowledge influence teachers' method of teaching; and integration of ICT in teaching and learning of Integrated Science supports students to engage academically and grow as learners ranked 1st, 2nd and 3rd with the mean scores of 3.36, 3.22 and 3.14 respectively. On the other hand, items 12, 2 and 7 state that: In real practical aspect, the application of ICT in teaching and learning is difficult; integration of ICT in teaching and learning process makes students feel less guided and suffer in term of education; and computer is only useful for research ranked 16th, 17th and 18th with the mean scores of 2.42, 2.28 and 2.26 respectively. Since 14 out of 18 items have the mean score that is above 2.50, this implies that Integrated Science teachers positively attested that integration of ICT ensures the integrity of global education and meaningfully improve learning

outcome; ICT knowledge influence teachers' method of teaching; integration of ICT in teaching and learning of Integrated Science supports students to engage academically and grow as learners and among others.

Hypotheses Testing

Two null hypotheses were postulated and tested for this study. The hypotheses were tested using t-test and ANOVA statistical methods at 0.05 level of significance.

Hypothesis One:

There is no significant difference in the view of Integrated Science teachers' on Integration of Information and Communication Technology facilities in teaching in secondary schools in Ilorin , Kwara State based on gender.

Table 4: Mean, Standard Deviation and t-value showing difference in the Respondents' View on the Integration of Information and Communication Technology Facilities in TeachingBased on Gender

Gender	N	Mean	SD	df	Cal. t-value	p-value

Male	21	49.52	6.570	48	1.75	.085
Female	29	52.76	6.323			

Table 4 shows that the calculated t-value of 1.75 with a corresponding p-value of .085which is greater than 0.05 level of significance. Since the calculated p-value is greater than the 0.05 level of significance, hence the null hypothesis one is accepted. This indicates that there is no significant difference in the view of Integrated Science teachers on the integration of Information and Communication Technology facilities in teaching in Ilorin Local Government Secondary Schools, Kwara State based on gender.

Hypothesis Two:

There is no significant difference in the views of Integrated Science teachers' on integration of Information and Communication Technology facilities in teaching in secondary schools in Ilorin , Kwara State based on age.

Table 5: Analysis of Variance (ANOVA) showing differences in theRespondents' View on the Integration of Information and Communication Technology Facilities in Teaching based on Age

Source	**SS**	**df**	**Mean Square**	**Cal. F-ratio**	**p-value**
Between	427.36	3	142.45	3.89*	.015

Groups			
Within Groups	1682.63	46	36.57
Total	2110.00	49	

* Significant, p<0.05

Table 5 shows that the calculated F-ratio of 3.89with a corresponding p-value of .015which is less than 0.05 alpha level of significance. Since the calculated p-value is less than level of significance, the null hypothesis two is rejected. Hence, there is significant difference in the view of Integrated Science teachers on the integration of Information and Communication Technology facilities in teaching in Ilorin Local Government Secondary Schools, Kwara State based on age.In order to ascertain where the significant difference lies, Scheffe Post-Hoc was carried out and the output is shown on Table 6.

Table 6: Scheffe post-hoc where the significant difference lies based on Age

Year	**N**	**Sub set for Alpha = 0.05**		
		1	2	3
41-50 years	7	46.14		
31-40 years	16		49.56	
Over 50 years	2		51.00	
20-30 years	25			54.08
Sig.		.217	1.000	1.000

Table 6 shows that respondents who were between 41-50 years of agehave the mean score of 46.14 (in subset 1), those who were between 31-40 years of age and over 50 yearshave the mean scores of 49.56 and 51.00 (in subset 2) respectively, while respondents who were between 20-30 years of age have a highest mean score of 54.08 (in subset 3) thus, contributed to the significant difference.

Summary of the Findings

The summary of the results were as follows:

1. The finding of the study showed that Integrated Science Integrated Science teachers positively attested that integration of ICT ensures the integrity of global education and meaningfully improve learning outcome; ICT knowledge influence teachers' method of teaching; iintegration of ICT in teaching supports students in learning to engage academically and grow as learners and among others.
2. There was no significant difference in the view of Integrated Science teachers on integration of Information and Communication Technology facilities in teaching in Ilorin Local Government Secondary Schools, Kwara State based on gender.

3. There was significant difference in the view of Integrated Science teachers on integration of Information and Communication Technology facilities in teaching in Ilorin Local Government Secondary Schools, Kwara State based on age.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

The study revealed that Integrated Science teachers positively attested that integration of ICT ensures the integrity of global education and meaningfully improve learning outcome; ICT knowledge influence teachers' method of teaching; integration of ICT in teaching Integrated Science supports students to engage academically and grow as learners.

The finding relates to the study of Hanif, Sneddon, Al-Ahmadi and Reid (2019) found that the use of ICT tools in Integrated Science teaching significantly enhanced students' understanding of complex biological concepts.

The researchers observed that interactive simulations and virtual laboratories allowed students to visualize abstract processes, leading to improved comprehension and retention of knowledge.

Similarly, Almerich, Orellana, Suárez-Rodríguez and Díaz-García (2016) demonstrated that teachers' ICT knowledge and competencies directly influenced their teaching methods and classroom practices.Hennessy, Ruthven, and Brindley (2020) found that the use of ICT tools in classrooms enables more interactive and student-centered learning experiences, which are crucial for fostering critical thinking and problem-solving skills. Such tools can include simulations, digital laboratories, and educational software that make abstract biological concepts more tangible and comprehensible.

Hypothesis one revealed that there was no significant difference in the view of Integrated Science teachers on the integration of Information and Communication Technology facilities in teaching in Ilorin Local Government Secondary Schools, Kwara State based on gender. This implies that male and female respondents' were not different in their view on the integration of Information and Communication Technology facilities in teaching. The result aligns with the research conducted by Ilomäki and Lakkala (2018) who indicated found that both male and female teachers showed similar attitudes towards the integration of technology in their teaching practices. Similarly, Tondeur, Aesaert, Pynoo, van Braak, Fraeyman andErstad(2017) who found

that gender did not significantly affect teachers' attitudes towards ICT integration.

Hypothesis two revealed that there was significant difference in the view of Integrated Science teachers on the integration of Information and Communication Technology facilities in teaching in Ilorin Local Government Secondary Schools, Kwara State based on age. This indicates that respondents across agegroupwere different in theirexpression on integration of Information and Communication Technology facilities in teaching. The result of Scheffe post-hoc revealed that respondents who were between 20-30 years of age contributed to the significant difference. The finding supports the study of Chigona (2018) found that younger teachers are generally more inclined to embrace technology in their teaching methods. This is often due to their higher exposure to digital tools during their teacher training and personal lives. On the other hand, older teachers might face challenges such as a lack of training, fear of obsolescence, and the additional effort required to learn new systems.

Conclusion

The study investigated the view of Integrated Science teachers on the integration of Information and Communication Technology facilities in

teaching Secondary Schools in Ilorin , Kwara State. It was concluded that Integrated Science teachers positively attested that integration of ICT ensures the integrity of global education and meaningfully improve learning outcome; ICT knowledge influence teachers' method of teaching; and integration of ICT in teaching Integrated Science supports students to engage academically and grow as learners. The study further revealed that there was no significant difference in the view of Integrated Science teachers on the integration of Information and Communication Technology facilities in teaching in Ilorin Local Government Secondary Schools, Kwara State based on gender but significant different was found based on age.

Implications of the Study

The Implications of the research topic "Views of Integrated Science Teachers on Integration of ICT Facilities in Teaching in Secondary Schools":

1. This study obtained that in considering integration of ICT facilities, both male and female teachers should be encouraged to embrace the use of the facilities ImprovedteachingmethodsandProfessionaldevelopment.

2. Seminars and workshops should be organized both male and female Integrated Science teachers on ICT to exposes them to more benefits and

potentials which ICT offers in academic fields inorder to rise their interests towards the use of ICT facilities.

3. Teachers should properly be trained to be able to give maximum attentions to invaded child and activities on students academic performance on ICT.

Recommendations

Based on the findings of the study, it was recommended that:

1. Schools should invest in upgrading their ICT infrastructure to ensure that teachers have access to reliable and up-to-date technology.
2. Government and School authorities should create a supportive environment that encourages the use of ICT in teaching.
3. There is need for continuous and comprehensive professional development programmes to be designed to enhance the ICT skills of Integrated Science teachers, with particular emphasis on age-specific training needs.

Limitation of the Study

The below factor pose the limitation findings the study.

The numbers of teachers used as sampled for this study was limited due to the costs of materials; hence they might not be a true

representation of the entire population under this study. This limited the scope of the work.

Suggestions for Further Studies

The study investigated the view of Integrated Science teachers on the integration of Information and Communication Technology facilities in teaching in Ilorin Secondary Schools, Kwara State. Further studies can extend the scope to:

4. Examine the challenges facing integration of Information and Communication Technology facilities in teaching Integrated Science in Ilorin metropolis.
5. Replicate this same study in another State in Nigeria.
6. Make the sample of the study to cover Nigeria.

APPENDEIX

EKITI STATE UNIVERSITY IN AFFFILIATION WITH KWARA STATE COLLEGE OF EDUCATION, ILORIN.

Dear Respondent

Request To Complete The Questionnaire

I am an undergraduate of the above-named school currently carrying out a research on**"Views of Integrated Science Teachers' on Integration of Information and Communication Technology facilities Facilities in teaching Secondary Schools in Ilorin , Kwara State"**. Your objective responses to the items in the questionnaire is highly needed to ensure the success of the research.

Thanks.

Yours' sincerely

Olabisi Grace Ronke

SECTION A

PERSONAL INFORMATION

Sex: Male ( ) Female ( )

Age: 20- 30 years ( ) 31-40 years( ) 41-50years ( )

Over 50 years ( )

Name of School:_____

Department: _____

SECTION B

In the following items please tick (√) in the appropriate column. The keys are Strongly Agreed (SA), Agreed (A), Disagreed (D) and Strongly Disagreed (SD).

S/N	ITEMS STATEMENT	SA	A	D	SD
1	Integration of ICT ensures the integrity of global education and meaningfully improve Integrated Science students learning outcome.				
2	Integration of ICT in teaching process makes students feel less guided and suffer in term of education				
3	ICT makes Integrated Science Teachers productive in Teaching.				
4	Integration of ICT in teaching Integrated Science supports students to engage academically and grow as learners.				
5	Knowledge of ICT will facilitate the fulfillment of teaching task				
6	Using computer could supply information that ameliorate				

	research decision				
7	Computer is only useful for research				
8	ICT knowledge influence Teacher’s method of teaching.				
9	Under coverage of course content is precise able within a short-term with ICT.				
10	Integration of ICT improves teaching process.				
11	Integration of ICT into teaching should be made compulsory in all Secondary Schools.				
12	In real practical aspect, the application of ICT in teaching difficult.				
13	Using computer system will enhance effective teaching delivery.				
14	Personal computers, projection system, mobile phone and audio equipment facilitate teaching and learning process.				
15	There's adequate ICT resource available in the school.				

16	Inadequate provision of ICT resources affects the effective practical activities				
17	Computer networking exposes teachers to diverse views				
18	Content of course allows utilization of internet in teaching process				

APPENDIX II

NAMES OF SCHOOLS SAMPLED

1. Alawon Oja Senior Secondary School

2. Al-salam Model College Balla.

3. Al-Rashid Model College Eyienkorin.

4. Ansaru Islamic Secondary School Aboto-Oja.

5. ILORIN Local Government Secondary School Bakase.

6. Ilorin Local Government Secondary School Budo-Egba.

7. Bolayemi Model Group of School Eyienkorin.

8. Bright Academy Eyienkorin.

9. Children Evangelical Ministry Int. Araromi-Eyienkorin.

10. Deeper Life High School Olorunda.

11. Divine Favour Model College Otte-Oja.

12. Government Day Secondary School Otte-Oja.

13. Government Secondary School Balla.

14. Government Day Secondary School Aboto-Oja.

15. Government Secondary School Laduba.

16. Government Secondary School Afon.

17. Government Secondary School Alapa.

18. Igboroko Afon Senior Secondary School.

19. Ipetu Senior Secondary School.

20. Lasoju Comprehensive High School.

21. Opeloyeru Secondary School Otte-Oja.

22. Radiat Model College Academy.

23. Senior Secondary foko-Oja.

24. Senior Secondary School Ogun-toyinbo.

25. Senior Secondary School Temidire.