



STUDENTS' ATTITUDE TO BIOLOGY IN INFORMATION COMMUNICATION AND TECHNOLOGY IN EKITI STATE SECONDARY SCHOOLS

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Abstract

This study investigated Students' Attitude to Biology in Information Communication and Technology in Ekiti State Secondary Schools. One research question was raised and one hypothesis was generated. The study adopted a descriptive research design in Ekiti State and the sample consisted 137 Students that was selected using multistage sampling. (BAS) was used to test the attitude of students. The validity of the instrument was established through face and content validity. Cronbach's alpha method was used to establish the reliability of the Instrument. The data obtained were analyzed using descriptive and inferential statistics tested at 0.05 level of significant. The results revealed that there was no significant gender difference in the attitude of students taught with ICT and those that were not taught. The result also revealed that the students cultivated positive attitudes to learning of Biology. This implies that the attitude of students to Biology is independent of their gender. Its recommended that the teachers should endeavor to take the Biology students to ICT rooms in Schools to teach the students.

Keywords: Attitude, Gender, ICT, Biology, Student, Teachers

Introduction:

Biology is a branch of science that deals with the study all living organism such as, plant and animal. Biology is the science of life. Its name is derived from Greek words "bio" (life) and "logos" (study). (Bagley 2017). Biology is the study of all life. (Oxford Dictionary 2014). According to Ugwu and Eze (2015), Biology education enables individuals to understand themselves, the different parts of their bodies, and their functions. It instills scientific skills and attitudes in individuals, shaping their approach to personal and social problems.

Biology as a school subject may be a factor in improving the lives of students and their immediate environment. Biology, a fundamental branch of science, delves into the study of life and living organisms, elucidating their intricate structures, functions, behaviours, and interrelationships. It plays a pivotal role in our understanding of the natural world and is indispensable to various scientific disciplines. Biology, often referred to as life science, encompasses the scientific exploration of living organisms and their interactions with the environment. It scrutinizes organisms at different levels, from molecular interactions within cells to the

complex ecosystems that sustain life. As described by Campbell et al. (2020). Biology elucidates the processes of life, emphasizing evolution, energy transfer, and the continuity of life forms (Campbell et al., 2020). Biology is very wide and voluminous in that it often overlaps with other science subjects (Adekunle 2018). Since nature of biology calls for a unique way of teaching it, thus, the teacher is saddled with tasks which include among others, choice and provision of materials and experience to meet learners' expectation and aid learning cited by Ezechi (2018).

This present age has witnessed technological development unprecedented in human history. The launching into space of satellites, the industrial revolutions, the inventions of cars, aircrafts, sophisticated machines and weapons, above all the amazing breakthrough in Information and Communication Technology, has changed every sectors and organisation around. Information and technology makes work and every human activity more effective and easy. Biology is a branch of science that deals with the study all living organism such as, plant and animal. Biology is the science of life. Its name is derived from Greek words "bio (life) and "logos" {study}. (Bagley 2017). Biology is the study of all life, as defines by the Oxford Dictionary. Biology is a widely studied subject. The knowledge of it, calls for a balanced secondary school education. Biology as a school subject may be a factor in improving the lives of students and their immediate environment. In a developing country like Nigeria, the use of ICT in the teaching of Biology should be promoted in all secondary schools, since the national policy on education states that "the broad aims of secondary education within overall National objectives should be preparation of students for higher education". In specific terms, secondary education should equip students so that they will be able to live effectively in our modern age of science and technology.

Biology is one of the important science subjects that focuses on plants and animals. It is one of the pre-requisite subjects in the field of learning that

contributes immensely to the technological growth of the nation (Ahmed, 2018). Biology is an inquiry-oriented subject to which practical activities is very essential. It is a subject that involves students in the acquisition of series of process skills such as observing carefully, classifying, interpreting, predicting, event, designing experiments, organizing information, reporting completely and accurately, generalizing among others.

The study of biology is essential for the nation's scientific and technological development, without sound knowledge and wholesome attitude towards Biology; the much needed and vouched technological breakthrough may not be achieved. For example, the knowledge of biology is brought to play in the area of manufacturing and processing industries, medicines, food production and pharmaceuticals among others.

The National Policy of Education (2014) says that 'the broad aim of Secondary Education within overall national objectives should be preparation on higher Education. In specific terms, Secondary Education should equip Students so that they will be able to live effectively in our modern age of Science and Technology. Information and Communication Technology (ICT) has positively transformed effectively every aspect of human lives, such as, aviation, agriculture, manufacture industries, banks, hospital, telecommunication companies etc. The penetrating influence of ICT is not only limited to these sphere of human endeavour but also to the field of education where it is perceived as transforming agent in Education delivery and education methodology.

ICT also refers to technologies that provide access to information through telecommunication. This includes the Internet, wireless network, cell phones, and other communication mediums (Techtarget, 2025). ICT is the infrastructure and components that enables modern computing among the IC technologies, tools and systems is to improve the way humans create, process and share data or information with each other (Kiravn.

Awati and Pratt 2025). ICT is a revolution that involves the use of computers, internet and other telecommunication technology in every aspect of human endeavour (Adebayo, Ayoku and Adeseko 2020). According to Baro (2011), he defines ICT as electronic or computerized devices assisted by human and interactive materials that can be used for a wide range of teaching and learning for public or personal uses. ICT, according to Ibe Bassey (2011) is regarded as a critical tool for preparing and educating students with the required skills for the global work place. Jimoh in Owolabi (2018) refers to ICT as the handling and processing of information (text, image, graphics and instructions) for use by means of electronic and communication devices such as computers, cameras and telephone. When ICT materials combine with internet, it creates a channel for students to obtain a huge amount of human experiences and guide students to enter the global community. In this way, the students will not only express their personal views, thoughts, and experiences, but also can learn to live in the real world.

Tella (2010) says that The use of ICT in teaching and learning is a relevant and functional way of providing education to learning in order to assist them in imbibing the required capacity for the world of work. Ajayi, Osagie and Ozima (2019) posited that with the aid of ICT, teachers can take students beyond traditional limits, ensured their adequate participation in teaching and learning process and create vital environments to experiment and explore. However, the application of ICT needs expensive hardware and software which becomes the big obligations for schools and parents. It is also necessary that both Teachers and Learners should have basic technology knowledge before they apply ICT. Chepkonga (2018) adds that a broad definition of ICT includes computers, the internet, telephone, television, radio and audio-visual equipment. Chepkonga further explains that ICT is any device and application used to access, manage, integrate, evaluate, create and communicate information and knowledge. Digital

technology is included in this definition as services and applications used for communication and information processing functions associated with these devices.

ICT enables researchers, students and teachers to have access to the best resources available in any discipline regardless of the location. This is to prove that the role of Teachers in teaching and learning process is changing and that in the future, schools will depend on their capability to join the new information society. The most worrisome of the utilization of these facilities by the students is their poor attitude towards the facilities: most of the students have abused the importance of ICT facilities to the detriment of their studies. Students have abandoned their studies for regular chatting on the internet, connecting with friends and irrelevant communication all over the world while utilizing the ICT facilities, academic libraries, even personal phones were not left out in this distracting act of the students to the extent that most of them lose their sleep and subsequently making them to absent themselves from the classroom.

In Education setting, ICT is a very useful tool which Student uses for improvement in their way of study. In this study the researcher will consider several important issues with respect to the use of ICT in educational setting including the effectiveness of ICT in the education, what measures are being taken to create ICT enhanced learning environments and the use of ICT in formal education.

Students' attitude towards a specific discipline will affect their learning. Shonfeld and Magen-nagar (2018) opined that Students attitude towards education significantly alter achievement in education, therefore identification and influence of attitude became to be an essential part of educational research. Attitudes are one of the most studied aspects of social functioning. An attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations to which it's related. Students learning experience affects their attitude

positively; increase their motivation for learning, as result which leads to higher achievement in learning. Several types of scales have been developed to measure attitudes. One of the most recognized scales for measuring attitudes is the Likert – type scale. The scale demands that individuals make decision on their level of agreement. It is hoped that the inclusion of ICT in the School curriculum, the training of man power, and hopefully the improvement in erratic power supply will go a long way in helping the School system achieve good attitude of students to learning science subject.

Students attitude to the use of ICT in the classroom have attracted the attention of many researchers. Attitudes to computers can be seen as significant determinants of behaviour that may influence computer utilization hence, attitudes are considered to be a good sign to determine whether students appreciate the utilization of computers in their learning.

The attitude of the teacher to using technologies in the classrooms is a major factor in how successful technology integration will be (Meyer 2012). The teachers who use technology extensively in their lessons tends to have a high level of confidence in pedagogical technology skills and focus on a learning centred approach according to Voogt (2010). They are more engaged in professional development activities and collaboration with colleagues that teachers who don't use technology very often. A number of factors must be accounted for during analysis of teachers' negative attitude to technology integration.

Teachers' fear of being replaced by technology also create negative attitudes (Saba, Ngepah and Odhiambo 2024). While most teachers believe technology integration in the classroom will enhance their instruction, many consider the training they receive technology in order to utilize new technology insufficient, and available technology in schools is limited (kazu 2011). The technology training is often offered at inconvenient times or at other locations on different computers than those used in the classroom. Although training experiences in themselves do not directly affect anxiety and attitude to

technology. They have indirect effects on anxiety and attitude through the medication of other factors such as a daily use of computers as a result of having training (Saba et al 2024)

Gender could be factors that influence the level of utilization of ICT in teaching and learning of biology. Gender issue is an important one in Science Education, many differences have been documented by researchers between male and female, Opera (2011) opined that boys performed better than girls. Roberts, (2016) asserted that boys and girls have differentiated abilities, boys being superior in numerical aptitudes and science reasoning while girls are superior in verbal fluency. Bello, Abimbola and Hamzat (2017) showed that there are no significant differences in achievement and interest of male and female Students in Biology, that both male and female achieve equally in Biology when exposed to the same treatment and given equal opportunity.

Statement of the Problem

Education worldwide is facing a significant challenge in preparing Students for “our future ‘knowledge – based’ society”. There are times when most students are not prepared to use ICT facilities in some schools that have them, because their teachers could not use it appropriately or applied them into teaching and majorly it is not existing in some Schools, they are not equipped to integrate the new information communication and technologies. The state of teaching and learning process in Nigeria secondary schools calls for reviews, as most of the teachers in the public secondary schools still believe in the conventional method of teaching in the classroom. The conventional method of teaching seems to have limited the extent to which teachers can move with trend of changes in the global world. However, the conventional method has been used for educational progress over the years. Nevertheless, it seems the method is fast becoming old as it makes the teachers the only source of knowledge with little or no contribution from the students.

Students' challenges and their attitude towards learning of biology lies on their inability to understand most of

the concept of the subject taught. Students attitude could either be a negative or positive attitude, depending on the method of the teacher and this determines their levels of interest in learning., hence the need for this study.

Purpose of the study:

The purpose of the study was to examine whether there will be any difference in the attitude of students taught with ICT and those taught without ICT in Biology.

Research question:

What attitude do students cultivate to learning of Biology in Secondary Schools?

Hypotheses:

There is no significant gender difference in the attitude of students taught with ICT and those that were not taught with ICT facilities

Methodology

The research adopted a descriptive design. The population of the study consisted of 19,603 SS11 Students offering Biology in Ekiti State Secondary School as at the time for this study. A sample of 137 was used for the study. Samples were selected from six Schools using purposive sampling techniques

Table 1: Mean Response of Attitude Students Cultivate Towards Learning of Biology in Secondary Schools (N=137)

Variables	Mean	S.D	Remarks
Students Attitude towards Biology	3.00	0.868	Positive

Table 1 shows that average response of the respondents on attitude cultivated by students towards learning of Biology had mean value of 3.00 above and standard deviation of 0.86. Since cut-off mean for positive attitude toward Biology was 2.50, it implies that students cultivate positive attitude towards Biology. However, there may be need to further subject the data to t-test statistical analysis to know whether there is a

which were selected from three Local Government area from one Senatorial district within the state. The instrument used for the study was Biology Attitudinal Scale, BAS was designed by the researcher to elicits some information's from the respondents. Two methods were used to validate the instruments, face and content validity. Cronbach's Alpha method was used to establish the reliability of the instrument BAS. The research question was answered using Mean and standard deviation while the Hypothesis was tested using ANCOVA. The hypothesis was tested at 0.05 level of significance.

Result:

This section contains the descriptive analysis of the data collected to answer the research question, as well as as hypotheses testing.

Descriptive Analysis

Research Question: What Attitude do Students' Cultivate towards Learning of Biology in Secondary Schools?

In order to answer the question, responses on items 1-20 of Biology Attitudinal Scale were obtained item by item and subjected statistical analysis involving mean and standard deviation. To determine positive or negative attitude, cut-off mean of 2.50 was used ($\frac{4+3+2+1}{4} = 2.50$).

Table 1: Mean Response of Attitude Students Cultivate Towards Learning of Biology in Secondary Schools (N=137)

difference in the attitude cultivated by those taught Biology with aid of computer and those taught without

Hypothesis Testing.

Hypothesis: There is no significant gender difference in the attitude of students taught with ICT and those that were not taught with ICT facilities.

Table 2: Analysis of Covariance showing gender difference in the attitude of students taught with ICT and those that were not taught with ICT facilities

Source	SS	Df	MS	F	Sig.
Corrected Model	251.917 ^a	3	83.972	2.364	.074
Group	152.442	1	152.442	4.291	.040
Gender	70.506	1	70.506	1.985	.161
Group * Gender	.692	1	.692	.019	.889
Error	4725.222	133	35.528		
Total	500941.000	137			
Corrected Total	4977.139	136			

Table 2 indicated that $F(1,133) = 0.019$, $p=0.889$. Since the p-value is greater than 0.05 level of significance, the null hypothesis is not rejected. Therefore, there is no significant gender difference in the attitude of students taught with ICT and those that were not taught with ICT facilities. This implies that the effect of treatment on the attitude of students toward Biology is independent of their gender. Similarly, the main effect of gender was not significant, $F(1,133)=1.985$, $p=0.161$. However, the main effect of the treatment was statistically significant, $F(1,133) = 4.291$, $p=0.40$.

Discussion

The findings from the study was that the average response of the respondents on attitude cultivated by students towards learning of Biology had mean value above the cut-off mean of 2.50 which implies that students cultivate positive attitude towards Biology. Thus, positive attitude of students towards learning of Biology underscore the role of effective classroom teaching.

The results indicated that there was no significant gender difference in the attitude of students taught with ICT and those that were not taught with ICT facilities.

This implies that the student's attitude to Biology is independent of their gender. Meanwhile, Ford, Miller and Moss (2017) discovered that females experience more difficulty while finding information on internet and those females feel competent and comfortable while using the internet, and that they use the internet less than their male counterparts.

Volman, Zijlstra, Liisette and Bonne (2017) further found differences on experience and attitude towards ICT with girls. Girls seem to be less positive on ICT attitude than boys. Males are suggested to have better ICT and computer skills compared to the females. However, with the findings from this study the researcher is of the opinion that gender attitude and students' performance in Biology remain inconclusive, there will be need for further research to establish whether the difference exist.

Conclusion:

Based on the findings of the study, it can be concluded that students' cultivate positive attitude to learning of Biology in some part of Ekiti state secondary Schools . The attitude of students to biology is independent of their gender.

Recommendation:

Based on the findings from the study its recommended that government should provide the public schools with ICT facilities along

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