

**EFFECT OF INTERNET-BASED TOOLS ON PERFORMANCE OF SENIOR
SECONDARY SCHOOL STUDENTS IN BIOLOGY IN KADUNA STATE, NIGERIA**

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Abstract

This study was conducted in Kaduna State, Nigeria. The focus of the study is to access, analyse and identify the effects of internet- based learning approach tools for Biology in Secondary School Students. The study approach used was experimental research which was carried out in four schools (randomly selected). The t-test analysis of the post- test showed a significant difference in the performance of learners taught using internet- based learning tools. The result indicated that the use of the internet- based learning tools makes the teaching and learning of biology simpler to understand by students as against the cumbersome traditional/ analogue approach of learning which is tedious and imaginary. My findings concluded that the use of Internet- based learning tools facilities teaching and learning of Biology in Secondary Schools as it encourage easy assimilation by students. Thus, is recommended that competent authority in Kaduna State should make it accessible.

Keywords: Internet-based tools; Biology; Senior secondary school students.

Introduction

Recent technological innovations had altered the way educators' approach teaching and learning of Biology. Interactive Biology software programmes help to make Biology easier to understand. Professional development opportunities are provided where the pedagogy of learning and teaching relevant Biology and its digital representation are available for teachers. On the other hand, interactive technology encourages active learning; hence teaching should no longer centre around transfer of content from teacher to student.

Computer has virtually affected every aspect of human lives, business, banking, e – libraries, security and especially education etc. computer has led to the development of educational platforms which enhances the teacher to present his lecture in the revolutionary way, which Bako (2005) referred to as “Academic cyber freedom”,

Over the years Biology teachers have employed many teaching strategies in which some were successful while others were not. The development of computer software created an opportunity to reduce their frustrations. Recent distributions of computers to all secondary schools in Nigeria by

the Federal Government, Education Trust Funds (ETF), International organizations, philanthropists in support of education in Nigeria, State Governments etc and the provision of internet in some schools has created a platform for enhancing education by leveraging and employing the internet-based learning tools.

With the advent of Internet based learning tools, the features, functions, physiology of different organs, life styles of different animals, ecology etc could be seen life and in action, as some are viewed as Animation and Simulations. Example of these internet-based learning tools includes Firefox, Google, Twitter, Skype, Face book, e-mails etc.

These innovations answered what students assumed was impossible to be answered, are now being answered. The internet-based learning tools arouse learning, stimulate interest, motivate and promote the spirit of research among learners. The internet-based learning tools can provide students with examples of real-life situations with specific knowledge required in addition to sound, colour, and movements and stimulate the student's sensorial apparatus and bring a sense of enjoyment to the learning process. The Internet is celebrated by many educationalists as increasing the responsibility of individuals in terms of making choices with regards to education, as well as dealing with the consequences of their choice.

Joosten (2012) stated that, Biology is one of the subjects that involve all aspect of human lives and their environment it therefore requires the services of the internet regularly because of its complex nature. Every day the internet provides new discoveries and information about the world of Biology and its components. If used wisely the internet-based learning tools will empower students to take responsibility for their own learning.

Studies had shown that Student's Engagement with Internet-Based Tools provide excellent educational e-learning opportunities to the students for academic collaboration, accessing in course contents, and tutors despite the physical boundary (Gikas & Grant, 2013) and that it is positively associated with the student's academic performance. Internet-based tools enable their users to develop interest in learning and allows them to distribute and share new ideas, thoughts, and information in a more interactive and virtual environment (Esam & Hashim, 2016; Joosten, 2012).

In Nigeria many teachers have adopted the internet-based learning tools in their teaching. However, despite the opportunity provided the value and effectiveness of the internet-based learning tools has not yet been determined especially in Biology teaching in Kaduna State Nigeria. This attracted the researcher to undertake this study, which is to find out the value and the effectiveness of the internet-based learning tools in the improvement of students' performance in Biology in Senior Secondary Schools in Kaduna State, Nigeria.

The study centred on the evaluation of the effectiveness of Internet Based Learning Tools in the teaching of Biology in Senior Secondary in Kaduna State Nigeria.

The study specifically intends to:

1. Ascertain Internet-based tools effect on the interest of Biology students in Senior Secondary Schools in Kaduna State of Nigeria.
2. Find out the extent to which Availability of internet-based tools have affected the performance of Biology students in Senior Secondary School in Kaduna State, Nigeria.

In order to provide the research with sense of direction or focus, the following research questions are put forward:

1. How did internet-based tools affect the interest of Biology students in Senior Secondary Schools in Kaduna State of Nigeria?
2. To what extent has the availability of internet-based tools affected the performance of Biology students in Senior Secondary School in Kaduna State, Nigeria?

The following Hypotheses are postulated and will be tested in the course of study:

H₀₁: Internet-based tools have significant effect on the interest of Biology students in Senior Secondary Schools in Kaduna State, Nigeria.

H₀₂: Availability of internet-based tools have no significant effect on performance of Biology students in Senior Secondary School in Kaduna State, Nigeria.

This study is significant not only to students and teachers but to State government officials charged with the responsibilities of providing quality education, school administrators, parents, philanthropists and supporting agencies towards the advancement of education and invigorating secondary education in Kaduna State, Nigeria. The study will serve as another reference material for effecting reforms in the Value and effectiveness of integrating Internet Based Tools in teaching and learning of Biology in secondary schools in Kaduna State

Methodology

The design for this research is tailored largely around quasi experimental design and descriptive design involving questionnaires for the Biology teachers will also be applied. Quasi experimental research is a sort of experiment which was referred to as compromise design by Kerlinger (1970) is an apt description when applied to much educational research where the random selection or random assignments of schools and classrooms is quite impracticable.

The targeted population for this study is 7,704 senior secondary school Biology students (SS11 Biology students) and 231 Biology teachers. The choice of this population is informed by the fact that they are the key players upon whom the responsibilities and provision of effective teaching and learning of Biology rest on.

A sample size of 314 students and 41 Biology teachers were used for the study, which were purposively selected. Four intact Biology classes were used as Experimental and Control groups respectively. Biology students were used for the Quasi-Experimental study, while teachers were used for descriptive study.

A 25-item Biology Performance Test and a 10-item Questionnaire were used to collect data from the subjects of the study. The two instruments had a reliability index of 0.78 and 0.85, using PPMCC (r) and Cronbach Alpha (r) respectively.

The 25-item Biology Performance Test was administered before and after treatment, while the questionnaire was administered on the teachers. The study was conducted by the Researcher in the 2nd term of 2015/2016.

Both descriptive and inferential statistics were used to analyse responses to research questions and test hypotheses respectively. Means and Standard Deviations were used to describe the data

collected, while for the testing of hypotheses Chi square X^2 and the Independent t-test statistics were used.

Results

Data collected for study were analysed at two levels, via: - descriptive and inferential levels. At the descriptive level, Means and Standard Deviations were used to analyse responses to research questions and at inferential level, Chi square X^2 and the Independent t-test statistics were used to test hypotheses for the study. Summary of the computations are presented in what follows.

RQ 1: How did Internet-based tools affected the interest of Biology students in Senior Secondary Schools in Kaduna State of Nigeria?

This question was responded to using Questionnaire items 1-10. The analysis was done using Means and Standard Deviations. The summary is as presented in table 1

Table 1: Computation of Biology Teachers responses on how did Internet-based tools affected the interest of Biology students in Senior Secondary Schools

S/N	ITEMS	SA	A	D	SD	M	SD
1	Am a trained Biology teacher and computer literate	21	18	2	-	3.46	.027
2	Am very conversant with the Internet and its accessories	13	7	10	11	2.54	.203
3	Am very conversant with the Biology Curriculum which made the integration of the internet-based learning tools easier and simple.	17	8	7	9	2.95	.195
4	All the lesson notes are planned using the tools as current issues in biology are made available	28	7	5	1	3.51	.011
5	The integration of the internet-based learning tools in the teaching of Biology has increased student's attention and they are more motivated to learn.	32	7	1	1	3.71	.007
6	The integration of the Internet Based learning tools in the teaching of Biology has made it easier for students to relate what they have learnt with real life situation	18	12	11	-	3.17	.019
7	I use the Internet learning tools most of the time for my lesson plan, which enhances students' interest in Biology lessons	31	10	-	-	3.76	.003
8	Class management is much easier with the integration of the internet-based learning tools which promotes students' interest and learning	1	40	-	-	3.02	.000
9	Learning Biology is made lively with Internet-based tools, thereby increasing students' interest	32	4	2	3	3.59	.000
10	With Internet-based tools students are anxious in attending Biology class and always participate	33	5	3	-	3.73	.002

	actively						
	Cumulative					3.34	0.047

Decision Mean = 2.50

The table showed participants response frequencies, mean and standard deviations. The Cumulative Mean Response =3.34 and Standard Deviation =0.047. As shown the Cumulative Mean Response =3.34 is greater than the Decision Mean = 2.50. This is an indication that their responses are positively in agreement with most of the statements of the items. While Standard Deviation =0.047 showed that participants do not vary in their agreement on the items.

RQ 2: To what extent has the Availability of internet-based tools affected the performance of Biology students in Senior Secondary School in Kaduna State, Nigeria?

Descriptive analysis of students' scores on the Biology Performance Test was used to respond to this question and the outcome is as follows:

Table 2 Computation of students' performance after being taught Biology using Internet-based learning tool

Group	N	M	SD
Experimental	184	68.5	2.46
Control	130	32.9	2.59

Table 2 showed the summary of students' performance after being taught Biology using Internet-based learning tool. As shown the Mean performance of the Experimental group (68.5) is higher than that of the Control group (32.9). this is an indication that use of Internet-based learning tool was beneficial to the Experimental group. Their respective Standard deviations (2.46) and (2.59) indicated that there was no variation in their scores.

H₀₁: Internet-based tools have no significant effect on the interest of Biology students in Senior Secondary Schools in Kaduna State, Nigeria.

This hypothesis was tested using Chi-square (X^2) statistic. The summary is as presented in table 3 as follows:

Table 3: Computation of Chi-square (X^2) test on the effect of Internet-based tools on the interest of Biology students

N	M	SD	X^2 -Cal	DF	&	X^2 -Crit	P
41	3.34	0.047	37.11	40	0.05	26.05	0.000
Decision							
Rejected							

Table 3 showed the summary of the computation of Chi-square (X^2) test on the effect of Internet-based tools on the interest of Biology students. It showed X^2 -calculated (37.11) \geq X^2 -critical (26.05), while the p-value (0.000) \leq the α (0, 05). Thus the hypothesis which states that Internet-based tools had no significant effect on interest of Biology students in Senior Secondary Schools in Kaduna State, Nigeria is rejected. This implies that Internet-based tools had significant effect on the interest of Biology students in Senior Secondary Schools in Kaduna State, Nigeria.

H₀₂: Internet-based tools had no significant effect on performance of Biology students in Senior Secondary Schools in Kaduna State, Nigeria.

To test this Hypothesis, the Independent t-test was used. The summary is as presented in table 4 as follows:

Table 4: Computation of Independent t-test on the effect of Internet-based tools on the performance of Biology students

Gr	N	M	SD	t-cal.	DF	α	t-crit.	P
Exp.	184	68.5	2.46	2.73	183	0.05	1.96	0.000
Cont.	130	32.9	2.59					Rejected

Table 4 showed the summary of the computation of Independent t-test on the effect of Internet-based tools on the performance of Biology students. It showed t-calculated (2.73) \geq t-critical (1.96), while the p-value (0.000) \leq the α (0,05). Thus the hypothesis which states that Internet-based tools had no significant effect on performance of Biology students in Senior Secondary Schools in Kaduna State, Nigeria is rejected. This means that Internet-based tools had significant effect on the performance of Biology students in Senior Secondary Schools in Kaduna State, Nigeria.

Findings

The findings of the study revealed that:

1. Internet-based tools had significant effect on the interest of Biology students in Senior Secondary Schools in Kaduna State, Nigeria.
2. Internet-based tools had significant effect on the performance of Biology students in Senior Secondary Schools in Kaduna State, Nigeria.

Discussion of Findings

This study had revealed a good deal of experiences on the part of students about Internet-based tools usage in teaching and learning of Biology in Senior Secondary Schools. For instance, the study showed that Internet-based tools had significant effect on the interest of Biology students in Senior Secondary Schools in Kaduna State, Nigeria. As seen in the computation of Chi-square (X^2) test on the effect of Internet-based tools on the interest of Biology students X^2 -calculated (37.11) \geq X^2 -critical (26.05), while the p-value (0.000) \leq the α (0,05). Thus the hypothesis which states that Internet-based tools had no significant effect on interest of Biology students in Senior Secondary Schools in Kaduna State, Nigeria is rejected. This implies that Internet-based tools had significant effect on the interest of Biology students in Senior Secondary Schools in Kaduna State, Nigeria. This is in agreement with so many findings such as that of Esam & Hashim, 2016; Joosten, 2012, which found that Internet-based tools enable their users to develop interest in learning and allows them to distribute and share new ideas, thoughts, and information in a more interactive and virtual environment.

Likewise, the study showed that Internet-based tools had significant effect on the performance of Biology students in Senior Secondary Schools in Kaduna State, Nigeria. As seen in the computation of Independent t-test on the effect of Internet-based tools on the performance of Biology students. It showed $t\text{-calculated} (2.73) \geq t\text{-critical} (1.96)$, while the $p\text{-value} (0.000) \leq \alpha (0,05)$. Thus the hypothesis which states that Internet-based tools had no significant effect on performance of Biology students in Senior Secondary Schools in Kaduna State, Nigeria is rejected. This means that Internet-based tools had significant effect on the performance of Biology students in Senior Secondary Schools in Kaduna State, Nigeria. This agrees with so many findings such as that of Gikas & Grant (2013) who asserted that Internet-based tools is positively associated with the student's academic performance

Conclusion

The study concludes that the use of Internet-based tools facilitates teaching and learning of Biology in Secondary Schools and should be encouraged. Internet-based tools ease teaching and learning of Biology. Internet-based tools help teachers and students to access information which would have hitherto been difficult to obtain. And when and where schools provide Internet-based tools students would be more interested in learning Biology and would thus put in their best to excel in Examination.

Recommendations

Based on the research findings and conclusion reached, the study recommends that:

1. Kaduna state government should as a matter of priority put a policy framework in place that make it possible for Secondary schools to acquire ICT (Internet-based tools), so as to boost the morale and interest of study in learning Biology
2. School authorities should encourage Biology teachers to most often use Internet-based tools in their teaching in order to enhance and sustain study learning. This they could do by helping to provide all necessary facilities and equipment needed for utilization of Internet-based tools in Schools.

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