

Impact of Internet Use on Biology Students' Academic Performance in Zaria, Kaduna State

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Abstract

In Zaria, Kaduna State, this study looked into the impact of the internet use on Biology students' academic performance. Three research questions and three research hypotheses were developed to guide the study's execution. A descriptive research design was utilized in this investigation, using 351 target respondents based on Krejcie and Morgan's (1970) sample size table as the sample size for the study. The study collected data using an instrument named "Impact of Internet Use on Biology Students' Academic Performance (IIUBSAP)," which has a reliability coefficient of 0.82. The Statistical Package for Social Sciences was used to conduct the analysis, which included a t-test with a significance level of 0.05. (SPSS version 22). The final findings revealed that students in senior secondary schools in Zaria, Kaduna State, have significant reasons for using the internet, that Internet-based technologies have an impact on academic performance of Biology students in senior secondary schools in Zaria, Kaduna State, and there are no substantial differences in too much online activity among Biology students in senior secondary schools in Zaria, Kaduna State, based on gender. Finally, the researcher advises Biology students in Zaria, Kaduna State, to exclusively use the internet for instructional purposes.

Keywords: Impact, Internet, Biology Students, Academic Performance.

Introduction

Nowadays, most firms rely on ICT (Zhang and Aikman, 2017). We know that ICT can increase human living standard when used properly for specific goals and situations. Education is a highly influenced public sector by technology (Kombo and Tromp, 2006). The internet is an important information technology in today's world (Siraj, *et al.*, 2015). Anyone who denies their children access to the internet loses their standing among other leaders (Olatokun, 2008). It is intended to be a platform across all ages (Akin-Adaeamola, 2014). Everyone uses the internet on a daily basis. In the mid-1990s, universities began using the internet to help students improve their academic skills (Ngoumandjoka, 2012). Internet connectivity is now available in homes, businesses, hotels, and schools (Ellore *et al.*, 2014).

Technologies in order to improve education across the curriculum and teacher-student interaction (Dawes, 2011). ICTs can assist professors and students move away from traditional techniques. Learners collaborate, construct shared practices, engage in relevant scenarios, and develop creative thinking and problem-solving skills. Saidu (2010) adds that technology can enhance face-to-face instruction.

Information access influences students' academic performance, study suggests (Adedotun, 2015; Akende and Bamise, in Yebowaah, 2018). Academia necessitates the use of reliable internet sources, especially in courses requiring a literature review (Sahin *et al.*, 2010). Kim (2011) finds that teen academic success depends on educational internet use. Internet access is practically universal among students (Ellore *et al.*, 2014). This expands students' academic knowledge, research, and assignments, and helps institutions communicate (Siraj, *et al.*, 2015).

Predictions, observations, and experiments are used to gather organized information about the natural and human worlds. Biology is one of Nigeria's three essential science subjects. In Umar (2011), biology is the study of life. That is, it describes how living organisms function, evolve, and interact with their environment. According to Peter (2015), biology prepares students for careers in basic science and engineering. A reasonable and efficient scientific mindset is part of the Biology curriculum in Nigerian secondary schools (FME, 2013). To teach Biology effectively, students must not only acquire the attributes listed in the curriculum, but also develop an interest in it.

The education sector's main achievement is equipping future workers with necessary skills and abilities (Lawler, 2016). Some students find it more enjoyable to learn Biology online (Bigler and Hanegan, 2011; Peterman, Pan, Robertson and Lee, 2014, Spornjak, Puhek, and Sorgo, 2010). Some say that employing internet-based tools to teach Biology or other subjects makes it less engaging for students, unless they accept the technologies (Cheung, Yen and Tsang, 2011).

However, Olatokun (2008) asserts that Nigerian secondary school students use the internet for entertainment rather than education. Olatokun says students use the internet for communication, fun, and pleasure (2008). A lot of college students, like Sahin *et al.* (2010), use email and forums/chat lines for personal reasons. Ngoumandjoka (2012) found that the internet is mostly utilized for fun. According to Singh *et al.* (2013), students choose non-academic uses of the internet including email, gaming, and social networking. Inconvenient for studying. So, the argument continues on the impact of internet use on student academic performance in Biology classes.

Academic performance is how well a student completes activities and studies (Scott, 2012). A student's academic performance is commonly measured by grades. Grades represent a student's total performance in classes. Most counties and schools use percentages from 1-100, lettering systems from A-F, and grade point averages (GPA) of 0-4.0 or higher. GRADE POINT AVERAGE (GPA) is an up-to-date weighted mean of the grade points.

Statement of the Problem

Despite the fact that internet usage has a significant impact on students' academic performance, there are a variety of negative consequences. The internet is used by some students for non-academic uses such as gaming and virtual communities, which causes them to fall behind on their study schedules. Furthermore, students use social networking sites for recreational purposes rather than instructional purposes, which might result in a drop in academic performance. Charting, downloading, viewing movies online, playing computer games, and online buying are the most popular uses of the internet among secondary students. Some secondary students do not receive adequate instruction in how to use the internet for academic purposes. If the internet is not used in a controlled manner, it can be a detrimental instrument in the pursuit of improved academic accomplishment. Because of this, the purpose of this study was to investigate impact of internet use on biology students' academic performance in Zaria, Kaduna State.

Research Objectives

Objectives of the study are to:

- i. Investigate the reasons why Biology students at senior secondary schools in Zaria, Kaduna State, use the internet.
- ii. Investigate the impact of internet-based technologies on the academic performance of Biology students in senior secondary schools in Zaria, Kaduna State.
- iii. Look into the gender differences in excessive internet usage among Biology students in senior secondary schools in Zaria, Kaduna State.

Research Questions

The following questions were derived to guide the study:

- i. What are the reasons that Biology students in senior secondary schools in Zaria, Kaduna State, use the internet?
- ii. What impact do internet-based technologies have on Biology students' school performance in Kaduna State's senior secondary schools?
- iii. What is the gender differences among Biology students in senior secondary schools in Zaria, Kaduna State, when it comes to excessive internet usage?

Research Hypotheses

The underlying null hypotheses was evaluated at a significance level of 0.05.

- i. Students at senior secondary schools in Zaria, Kaduna State, have no significant reason on the use of internet.
- ii. The academic performance of Biology students in senior secondary schools in Zaria, Kaduna State, is unaffected by Internet-based technologies.
- iii. There are no significant differences in excess internet usage among Biology students in senior secondary schools in Zaria, Kaduna State, based on gender.

Significance of the Study

The findings of this study will aid teacher education programs in developing curricula that will educate teachers to be relevant to students in the information age. The findings would specifically assist educational organizations such as the Nigeria Institute of Education (NIE) in determining if the existing curriculum allows instructors to effectively integrate ICT into teaching and learning. Because the review focused on enablers and impediments to ICT integration, the findings would be of interest to teachers. This would assist instructors in embracing enablers and overcoming obstacles, allowing them to be more productive in their work. The study educates students on the negative and positive consequences of network technologies, as well as how to use them to improve academic performance. This would greatly contribute to the advancement of knowledge in the areas of ICT integration and internet usage.

Literature Review

A wide range of information and communication technologies are accessible via the internet, according to Mahdi (2014). This global network of computer networks serves billions of users. Electronic, wireless, and optical communications devices connects these networks. This includes the World Wide Web's interconnected hypertext texts and email infrastructure. Internet originated out of Cold War-era US Defense Department endeavor, say Madu and Adeniran (2005). In 1969, ARPA contracted to connect major computers in Southwest US institutions. The internet grew out of 1960s research into resilient, fault-tolerant, and distributed networks. The NSF uncovered a new US backbone in the 1980s, and private funding for other commercial backbones prompted global network technology development and mergers. It has become pervasive in modern life as a result of commercialization of an international network by the 1960s.

The Internet Engineering Task Force (IETF) is a non-profit organization open to anybody with technical expertise. It's a worldwide network of linked computers that allows individuals and organizations to communicate easily no matter where they are. The internet is heavily used for research. Researchers can publish and access articles from anywhere in the country using the internet. The internet's major advantage is its willingness to teach others. A global village where people of all races can easily connect, talk, and share information, according to Shitta (2012).

Internet Usage and Students Academic Performance

Ngoumandjoka (2012) divided internet users into two categories: heavy and light. He claims that students and teachers use the internet for academic purposes. The internet is used for more leisure by heavy internet users than by light internet users. His research also discovered and the more the internet is used for academic reasons, the more beneficial it is seen to be. Torres-Diaz et al. (2016) agreed that using the internet helps students perform better in school. Students who use the internet for instructional purposes, they suggest, are less likely to fail. The problems of not having access to

the internet exceed the pros. Additionally, students who engage in active learning with teachers and peers, as well as those who use internet resources for course work, tend to do better academically (Torres-Diaz et al., 2016). Aitokhuehi et al. looked into tech knowledge and secondary school development in Nigeria (2014). They discovered that kids who were internet aware outperformed their non-literate peers. When Samual and Yebowaah (2018) looked at the impact of internet usage on Nigerian secondary school students, they found similar results. Lagos public schools use the internet at a lesser rate than other developed countries.

The majority of students use the internet on a daily basis. The internet's addictive features, on the other hand, make students who use it excessively prone to its negative consequences. It can affect sleep, social relationships, mental and physical health, and academic performance (Ngoumandjoka, 2012). According to Singh et al. (2013), utilizing the internet for social media and mailing can result in mood swings, changed behavior, retreat, and loneliness. They exist in a virtual world built on the internet. Turel and Toraman (2015) found that students' internet addiction reduces as their academic performance improves. This implies that internet addiction has an impact on students' grades. Aitokhuehi et al. (2014) also discovered that children who are not computer addicts do better than those that are. Internet addiction has been linked to academic performance and mental health, according to Kakkar (2015). In comparison to students who have used the internet moderately, he discovered that kids with severe internet addiction had a significant impact on the academic performance and health. Austin et al. (2011) divided internet users into three categories: mild, moderate, and intense. They discovered that students who use the internet (moderately) in school and at home perform better than those who do not. Additionally, students who use the internet only at school received lower marks than those who did not.

Utilization of the Internet-Based Tools in Teaching and Learning

In Nigerian schools and colleges, academic teachers are supposed to teach, help the community, and do investigation in their fields of expertise. As a result, they participate in additional academic endeavors to improve research and knowledge, such as publications, communication, and collaborations with peers. Many academic activities, such as e-books, e-journals, and online databases, can now be planned and carried out by academic personnel using Internet-based products and technologies. According to Babu, Sarada, and Ramaiah, the capacity to communicate properly with partners via Internet connections has impacted academics and scholars who are making full use of the facilities and assistance (2010). According to Mahmood, the most often utilized Internet services for collaboration and communication are e-mail, FTP, and Usenet (2010). Nasir in Suleiman and Joshua (2019) investigated the Internet usage of 218 academic staff at the University of Rasheshi in Bangladesh and discovered that (88%) used e-books and e-journals, (55.9%) utilized FTP, and (8.1%) used mailing groups.

Students are aware of and use online secondary sources such as Encyclopedia Britannica, Wiley Encyclopaedia of Life Sciences (Biology), and CRS Manual of Chemistry and Physics, according to Sharma (2011). In a similar vein, Negahban and Talawar (2009) discovered that the majority of Iranian social science faculty members use internet databases to plan and prepare lecture notes. Tenopir's (2003) research of over 200 libraries indicates how quickly e-books and e-journals (Internet resources) as well as e-mail, File Transfer Protocol (FTP), and Usenet (Internet services) have become popular in academic communities, albeit with differences from one subject to the next. Students used the Internet as a medium with their teachers, according to Brafi and Arthur (2013), because information can be produced, accessed, retrieved, and disseminated without restriction or boundaries. E-journals, online databases, e-mail, FTP, and Usenet are used by the majority of responders. E-journals, online databases, and e-mail are the most commonly used Internet services and services for academic engagement, according to Ajala, Adegun, and Oyewumi (2010). File Transfer Protocol

(FTP) was the most common Internet service used by engineering lecturers and students at the University of Edo in Nigeria, according to Ukpebor (2011).

In another study, Ukpebor (2011) looked at how teachers and students in Edo State, Nigeria, use Internet services and resources. Despite the lack of infrastructure, the poll indicated that Internet resources and services were being used effectively. This suggests that both teachers and students are successfully completing academic activities using Internet services and resources. Academic activities employ e-books, e-journals, and internet resources, while online services include e-mail, mailing lists, news groups, and Telnet, according to Aqil and Ahmed (2011). The accessibility of recent, relevant, and trustworthy information is the primary motivation for accessing these resources.

Time Spent on the Internet and its Impacts on Students Academic Performance

Today's students are said to spend a lot of time on the internet (Ogedebe, 2012; Singh *et al.*, 2013; Bragdon and Dowler, 2016). Routine, academic performance, and family ties have all been linked to excessive internet use (Rickert, 2011). Sophomores use the internet for academic and work-related purposes, whereas upperclassmen use it for mobile phone, online chatting, and social networking. As of 2008, many Nigerian secondary school students were utilizing the internet. According to Ogedebe (2012), Nigerian students enjoy night browsing. Each week, students used technology for 2570.6 (42.8) hours (Bragdon and Dowler, 2016).

Krischne and Karpinski in Yebowaah (2018) looked into Facebook and grades. An hour and a half maximum every day. But Facebook users had lower GPAs and studied less than non-users. Students waste time on the internet due to lack of focus (email, gaming, social networking) and information diversity (Singh *et al.*, 2013). Samuel in Yebowaah (2018) found similar behaviors (email, chatting, and web surfing) among secondary school students in Lagos State. Most students are responsible for submitting assignments late because they spend more time on social media than schoolwork, according to Denizli's studies (Yebowaah, 2018). Singh *et al.* (2013) found that motivated students use the internet for academic objectives. So, they prioritize search locations and use social networking sites sparingly. Surprisingly, Siraj *et al.* (2015) found that more access to knowledge benefits students.

Seoane *et al.*, (2020) found no link between online activity and student academic progress. People using the internet to understand the real world has had a noticeable societal effect. Some researches link excessive internet use to poor academic performance. A new study claims that online use harms certain people's life. The most typical problems with internet use are student binge drinking and academic/school dismissal/dropout. The main concerns of students are academic and developmental. Internet use is for enjoyment and education. Most students spend more time on internet than on academics, affecting their grades.

Methodology

A descriptive survey design was adopted for the study. The population for the study was made up of all secondary school Biology students of Zaria, Kaduna State. There are thirteen (13) secondary schools with a total population of four thousand nine hundred and thirty-seven (4,937). A sample of three hundred and fifty – seven (351) was sampled out from the population based on Krejcie and Moran (1970) table of sample size. An instrument called "Impact of Internet Use on Biology Students' Academic Performance (IIUBSAP)", with reliability coefficient of 0.82 was used in data collection for the study. In administering the questionnaire, a random sampling technique was used. The data collected were analyzed using t-test at 0.05 level of significance.

Results

Research Hypothesis One: Students at senior secondary schools in Zaria, Kaduna State, have no significant reasons on the use of internet.

Table 1. T-test analysis on the reasons for use of internet among Biology students in senior secondary schools in Zaria, Kaduna State.

Options	N	Mean	Std	Df	t-cal	t-crit	p-value	Remark
Agreed	245	2.98	1.04	342	8.499	1.96	.000	Significant
Disagreed	98	1.02	1.02					

Significant at $P \leq 0.05$

The p-value (0.000) is less than the 0.05 level of confidence, as seen in the table above. To put it another way, the calculated t (8.499) is higher than the t-crit (1.96). The null hypothesis, that Students at senior secondary schools in Zaria, Kaduna State, have no significant reason on the use of internet, is thus rejected. This implies that students at senior secondary schools in Zaria, Kaduna State has significant reasons on the use of internet.

Research Hypothesis Two: The academic performance of Biology students in senior secondary schools in Zaria, Kaduna State, is unaffected by Internet-based technologies.

Table 2. T-test analysis of the academic performance of Biology students in senior secondary schools in Zaria, Kaduna State, is unaffected by Internet-based technologies.

Options	N	Mean	Std	Df	t-cal	t-crit	p-value	Remark
Agreed	284	3.34	0.92	342	47.45	1.96	0.0121	Significant
Disagreed	59	0.66	0.12					

Significant at $P \leq 0.05$

As shown in the table above, the p-value (0.0121) is less than that of 0.05 level of confidence. In other words, the estimated t (47.45) is more than the t-criteria (1.96). The null hypothesis, that Internet-based technologies have no effect on academic performance of Biology students in public secondary schools in Zaria, Kaduna State, has been debunked. This suggests that Internet-based technologies have an impact on the academic performance of Biology students in public secondary schools in Zaria, Kaduna State.

Research Hypothesis Three: There are no significant differences in excess internet usage among Biology students in senior secondary schools in Zaria, Kaduna State, based on gender.

Table 3: T-test analysis on excess internet usage among Biology students in senior secondary schools in Zaria, Kaduna State based on gender.

Gender	N	Mean	Std	Df	t-cal	t-crit	p-value	Remark
Male	194	3.35	0.91	342	0.13	1.96	0.076	No significant
Female	149	3.29	0.95					

Significant at $P \leq 0.05$

The p-value (0.076) is greater than the 0.05 level of confidence, as seen in the table above. In other words, the computed t (0.13) is lower than the t-crit (1.96). The null hypothesis is accepted, stating that there are no significant differences in excess internet usage among Biology students in senior secondary schools in Zaria, Kaduna State, based on gender.

Discussion on Findings

Based on the analysis in Table 1, the finding reveals that students at senior secondary schools in Zaria, Kaduna State have a significant reason on the use of internet. This is in line with the study of Paul,

Baker and Cochran (2012), the study found a strong impact of social networking on students' academic performance. Ogedebe (2012) also found out that students completely utilize internet services, which has a favorable or bad impact on academic performance. The study by Salter (2010) found a negative correlation between Facebook usage and academic performance.

Table 2 shows that Internet-based technologies have an impact on the academic performance of Biology students at public secondary schools in Zaria, Kaduna State. This conclusion backs up Whattananarong's (2015) finding that internet-based learning and teaching systems have no negative effects on students. According to Suleiman and Joshua (2019), online databases and email are the most often used Internet resources and services. While Table 3 revealed that no significant difference between gender in internet usage among Biology students from Zaria, Kaduna.

Conclusion

The researchers found that biology students at public secondary schools in Zaria, Kaduna State, have important motivations for utilizing the internet based on the outcomes of this study. The adoption of Internet-based technology has had a significant impact on Biology students' academic performance in Kaduna State's senior secondary schools. According to the data, there are no significant differences in excess internet activity between male and female biology students in public secondary schools in Zaria, Kaduna State.

Recommendations

The researcher provided the following suggestions based on his findings:

- i. It is the responsibility of the federal and state governments to ensure that sufficient internet resources/tools are available in schools for teaching and learning.
- ii. In Zaria, Kaduna State, biology students should be using the internet for instructional purposes.
- iii. In addition, parents and teachers should always check their students' phones and internet-connected devices, as this will cause them to lose their academic concentration.

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