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# University students' usage of the internet resources for research and learning: forms of access and perceptions of utility



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## Abstract

Most prior studies into the utilization of internet technology for learning purposes in contemporary educational settings in developing countries has largely dealt with its impact on academic performance, communication and general educational purposes. This paper investigates the place of the internet in academic research and learning of students, through both quantitative and qualitative research approaches, using 250 undergraduate students in three selected universities within North-Eastern Nigeria. To gain an in-depth understanding of the perception of the students' views, a focus group was conducted with 18 students. The students perceived that the lack of digital readiness among their staff and institution, the absence of electronic library for easy accessibility to journals from the scientific database, and inefficient cybercafé and internet facility within their university settings were the main issues discouraging the utilization of the internet within their institutions. Yet, they still strive to find ways through self-organization, resilience and resourcefulness to make use of the internet to facilitate their studies. Most of them stated that they depended on their smartphone/handsets to access the internet

through subscription from other internet providers and have become overly reliant on Google, Yahoo, and open access e-Journals. Nevertheless, the students believed that the use of internet enabled them to perform research ahead of time, tackle multiple homework, widens the scope of reading and learning, promotes self-learning, encourages and enhances peer learning as well as ameliorates student's examination preparation.

Keywords: Education, Information science, Computer science

## 1. Introduction

The internet has been defined as the communication superhighway that links, hooks, and transforms the entire world into a global village where a different individual can easily get in touch, see, or speak to one another, as well as exchange information instantaneously from one point of the globe to another (Shitta, 2002). This technology has reshaped the tertiary educational practice in terms of improving academic learning (Apuke and Iyendo, 2017; Manasijević et al., 2016; Iyendo and Halil, 2015) and will be more feasible in the future. Hussain (2012) reported that the internet and its usage in higher education have improved educational development and research and has encouraged virtual interactions for sharing research findings.

The rationale for internet utilization for academic and research purposes stems from the benefits derived, such as free access to online journals, magazines and other information resources. It has been theorized (i.e. Technology acceptance model) that the perceived usefulness or perceived utility is the major rationale for the acceptance of technological devices such as the internet. The perceived usefulness (PU) is described as the extent to which a person perceived that utilizing a particular technological device will improve a given job performance. Whilst perceived ease of use (PEOU) is the extent a person feels that utilizing a particular technological device would require less effort, or how well a technological device can fasten a work without necessarily putting much effort (Tezer and Soykan, 2017; Davis, 1989). In this regard, Sahin et al. (2010) pointed out that the use of internet in the educational setting has enabled easy access to many resources and information sharing. This conforms with Audu's (2006) claim that the internet is beneficial in several ways in the academic settings in terms of providing access to global sources of information and permitting researchers to discuss and share experiences. Bashir et al. (2008) noted that educators who advocated for technology integration into the learning process had the impression that it will improve learning and prepare students to effectively participate in the twenty-first-century workplace. It has been observed that new digital technologies have been widely used in higher education institutions (Dogruer et al., 2011), and this efficiently helps students to carry out substantial research work (Devi and Roy, 2012). Despite these possible benefits of the internet for

learning, instructing, and research, there is the limited provision of efficient internet services in most tertiary institutions (Ureigho et al., 2006) in developing countries. Muniandy (2010) comment that the adoption of the internet would be meaningless in the educational settings without appropriate internet facilities.

Like in any other higher institution of learning around the globe, Nigerian university undergraduate students are often required to conduct diverse research work as they progress through their final year. The qualities of a student's research and learning are largely dependent on the quality, quantity and current internet resources referred to (Ilo and Ifijeh, 2010; Mbofong, 2003). This has attracted research debate on the use of internet in contemporary educational contexts in developing countries such as Nigeria. However, most of these studies predominantly highlight its impact on academic performance (grades), communication, and general educational purposes (Ifinedo, 2017; Cerretani et al., 2016; Rashid and Han, 2016; Nwagwu et al., 2009; Adegboji and Toyo, 2006; Oduwole, 2004). This indicates that detailed studies that try to interpret student perspective on internet access and usefulness for research and academic learning are still in their embryonic phase (Emeka and Nyeche, 2016; Fasae and Adegbilero-Iwari, 2015; Adekunmisi et al., 2013; Nwezeh, 2010). It is worthwhile to mention that most of these documented researches based merely on students within Southern, Eastern and Western region (Afolabi, 2015; Otunla, 2013; Agboola, 2010; Ani, 2010; Nwagwu et al., 2009; Omotayo, 2006; Adogbeji and Akporhonor, 2005). This strong focus has led to a limited research conducted among students' in the North-Eastern part which is amid slower technological change (Ahmed and Bukar, 2016; Emeka and Nyeche, 2016). Though, there is evidence to show that a limited proportion of the population has access to the Internet at home, yet, little is known if students in this region incorporate this technology into their research and learning (Navaretti and Tarr, 2017; Hartnett and Russell, 2002). Poushter (2016) observed that technological development in universities within this region is not much advanced and very little research in the implementation of information and communication technology (ICT) has been undertaken as compared to research in universities in other regions of Nigeria.

This backdrop provides a scope for an in-depth research into the students' experience and perspective on the access and utility of electronic sources for academic research and learning. Thus, it is pertinent to research into how these students find ways to make use of the internet to facilitate their academic research and learning. This also calls for exploring the challenges facing the students in this region as it relates to internet usage for academic research and learning. It is believed that the outcomes of this current study will contribute to enhancing the empirical research results that are beneficial for informing teaching and learning practice in higher education. This will also provide an understanding of the application and appreciation of internet resources by students residing in this overlooked region.

## 2. Related works

In recent decades, research evidence has shown that the advances in information technology and the development of computers have affected student approaches to research and learning in the contemporary higher educational settings. Studies have shown that technology is one of the key modifiers of human behaviour (Gan and Li, 2018; Greitemeyer and Osswald, 2011), and this has now become a norm for social interactions (McLeod, 2008). In this view, computer and internet technologies have been indicated to influence human behaviour (Roudbaraki and Esfidvajani, 2011; Weimann, 2006), and this, in turn, has positively affected students' research and academic learning.

Several studies have supported that the internet utilization is most prevalent among younger, educated individuals (Poushter et al., 2015; Hoffman et al., 2000). For example, Ivwighreghweta and Igere (2014) investigated the impact of the internet on academic performance in selected tertiary institutions in Nigeria and found that most of the students were computer literate and merely access relevant academic materials through the Cyber Café. Most of the students disclosed that the internet usage improves their examination preparation. E-journals and e-books were among the resources often used. However, power outage, slow internet speed, lack of computer terminals, too many hits or information overload and insufficient computer were some of the problems impeding effective internet access or usage.

Studies have found that internet mobile learning among college/university students has brought about a profound and diverse pool of knowledge. For example, Ahmed and Bukar (2016) found that the majority of Adamawa state university students in Nigeria who utilize the internet for educational and entertainment purposes depended on their mobile devices for internet access. Fasae and Adegbilero-Iwari (2015) discovered that science students in Nigerian private universities who regularly access the internet facilities on their smartphones (such as e-mails, social media and search engines), utilize it for educational and communication purposes. However, poor internet connectivity and the high cost of data subscription were identified to be the major challenges confronting the students. According to Agboola (2010), there is a high level of mobile device dependency for internet access among agricultural science students in Nigeria. In the same survey, it was found that most of the students who utilize the internet for educational and entertainment purposes prefer to use textbooks among print materials and the essential electronic agricultural library (TEEAL) among the electronic resources. Otunla (2013) reported that a considerable number of undergraduate students in Nigeria accessed and use the internet through their mobile telephones and laptops using a modem as a router, whereas a few accessed the internet through the University digital centre and none accessed through the University Library. It was likewise shown that the internet made data retrieval easier, resulting in a positive impact on the student's educational development.

A more recent study that examined the use of smartphones among college students in Nigeria showed that 38.2 percent spent between 1 and 5 hours per day on their phones, 98 percent used their phones to communicate with family members and friends, about 75 percent used their smartphones for social networking, and only 24 percent use their smartphones for academic activities (Nwachukwu and Onyenakeya, 2017). This result suggests that some students do not use mobile devices to facilitate their studies. Another study conducted among Nigerian students, identified the positive effects of mobile use for education to include easy access to information, instructional usage and personal convenience (Mojaye, 2015). Shonola et al. (2016) study on two Universities in South-West Nigeria found that the students use their portable devices to exchange education-related messages and academic files with classmates, search the internet and library databases for academic materials, practice online quizzes or tests and hold discussions with classmates among others. Consistent with this result, undergraduate students at Igbinedion University, Nigeria reported that they primarily use mobile phones to search for academic materials and to consult scholarly articles for assignments. They also outlined that using the internet on their mobile phones enables them to search and access academic information instantly (Mamudu and Oyewo, 2015).

The usage of mobile phones among students has not only been experienced in the Nigerian context but also in western countries, where studies on mobile learning have been well documented. For example, a survey found that medical students in the University of Coimbra had a positive attitude towards the utilization of mobile learning and applications. Although, the authors demonstrated that students were willing to promote its utilization for learning, yet, they had an average willingness to adopt it due to social influence and behavioural intention, such as perception towards ease of use and the reliableness of this technology for learning (Briz-Ponce et al., 2017). A meta-analysis that summarizes the effects of mobile technology on students' attitudes, engagement, and achievement found that learning content quality, content design quality, interactivity, functionality, user-interface design, accessibility, personalization, responsiveness, including promoting of the collaborative learning environment to be the primary antecedents of internet mobile learning acceptance among students (Fabian et al., 2018). An earlier study conducted by Gikas and Grant (2013) on students from three universities across the US, established that Mobile computing devices and the use of social media provided opportunities for interaction, and collaboration, as well as allowed them to engage in content creation and communication. This result is consistent with a survey conducted among medical students at Johns Hopkins University, which revealed that mobile technology usage improved how they learn new material and preference for classes that incorporate information technology. This means that the perceived usefulness and simplicity of usage of mobile technology and the internet could enhance students' behavioural intention to use mobile application for learning which in turn improves learning and inquiry.

Reflecting these results in the Nigerian context, a more recent investigation on mobile learning disclosed that students' initial acceptance of internet mobile learning is due to gratifying factors, such as perceived self-efficacy, outcome anticipations and perceived support for enhancing social ties (Ifinedo, 2017). Similarly, Bashir et al. (2008) revealed that most students use the internet for course-related reading and research needs, due to its user-friendliness and time-saving. They also found Google and Yahoo to be the primary search engine used by the students. Adekunmisi et al. (2013) discovered that most of the students at Olabisi Onabanjo University, Nigeria use internet facilities, such as e-mails, web pages and search engines for chatting and academic activities. Omotayo (2006) reported that most of the students of Obafemi Awolowo University in Nigeria access the internet through cyber cafes, however, both male and female students used the internet differently. Although the rate at which the internet was utilized in both groups were alike. The male participants were more addicted to internet usage when compared with the female, although both genders lacked formal training on internet usage, as such they learn from friends. Nwagwu et al. (2009) affirm that most of the students of the University of Ibadan, Nigeria, utilize the internet for educational purposes, however, it varied with age, level of study and faculty. It was observed that those in the higher classes utilize the internet more often and have lesser time for leisure and entertainment. The students believed that the information derived from the internet is useful and trustworthy. This is consistent with Alshahrani et al. (2017) study, which concluded that the use of the internet has a profound impact on students' academic self-confidence, self-reliance and student lecturer connectedness.

There is research evidence to show that internet utilization has a profound impact on research and learning activities (Fasae and Adegbilero-Iwari, 2015; Adekunmisi et al., 2013; Nwezeh, 2010). Nwezeh's (2010) indicated that most of the academic staff and students in Obafemi Awolowo University in Nigeria, found the use of email and Web worthwhile for research and information retrieval. A similar empirical evidence proposed that the use of e-mail for academic-related activities should be encouraged among students in order to harness its full potential in improving academic performance (Nketiah-Amponsah et al., 2017). Afolabi (2015) remark that, although online learning tools are available at Adekunle Ajasin University in Nigeria, its usage has not been fully integrated into their curriculum. Yet, students and lecturers are willing to utilize it whenever it is implemented. In this regard, a prior study has proven that the internet enables Delta state university students in Abraka, Nigeria to access relevant and up to date materials for their research work without travelling to other places to source for research materials (Adogbeji and Akporhonor, 2005). Bankole (2013) remarked that students at Olabisi Onabanjo University, Ago Iwoye, Nigeria, access the internet from homes and commercial cybercafé. The survey also discovered that the daily usage of the internet facilities such as Google, Yahoo, and Google Scholar search engines were often employed

for communication purposes, research and updating of knowledge and this improved their academic activities. Yet, slow internet connection and inadequate institutional internet facilities were highlighted as the constraint to proper access and usage of the internet. Additionally, [Oduwole \(2004\)](#) argues that the internet has a great impact on the research outcomes of students in Nigerian Universities of Agriculture, as this enables them to have fast communication with their school-mates, as well as offer a platform for accessing and publishing papers online. Other evident studies conducted among Delta State University, Abraka, students in Nigeria reported that the internet contributed significantly to the easiness of research through downloading materials ([Adegboji and Toyo, 2006](#)), as well as enhanced the cognitive operation of data dissemination ([Kamba, 2008](#)). In contrast, [Ureigho et al.'s \(2006\)](#) study on the impact of the internet on learning, teaching and research in higher institutions found that students and staff use the internet primarily for on-line chatting and e-mailing, rather than accessing research materials. [Emeka and Nyeche \(2016\)](#) reported that the employment of the internet by the students of the University of Abuja, Nigeria enhanced the skill and capacity of students. Though, lack of computer skills, slow internet server and the problem of paying for online were found to be some of the problems encountered in the use of the internet.

Indeed, studies conducted in many regions of Nigeria, particularly in the western and southern states, have established that students extensively use the internet for their research work ([Ani, 2010](#)), and this has progressively improved students' academic performance in this region ([Ogedebe, 2012](#)). However, there has been very limited research conducted among students in the Northeastern part of Nigeria. It is worthwhile to note that, in this region, technological development in Universities is not much advanced and very little research has been carried out to show the implementation of ICT as compared to Universities in other parts of Nigeria. Thus, there is a need for a study to investigate how students in this region find ways to make use of the internet to facilitate their studies. This paper, therefore, explores the students' access and their beliefs about the academic benefit of utilizing the internet and digital resources for educational research and learning. To achieve this intention, this study considers four (4) fundamental objectives:

- To determine internet resources accessibility pattern among undergraduate students.
- To demonstrate the students perceived benefits from the use of internet resources for academic research and learning.
- To understand the search engines frequently used by the students for educational inquiry.
- To realize the challenges confronting the students regarding the use of the internet for educational research and learning.



### 3. Methods

#### 3.1. Research design

In an attempt to answer the research questions raised in this study, a mixed method approach was used. A quantitative survey that consists of the use of questionnaires (Creswell and Creswell, 2017; Babbie, 2012), were administered among 300 students to ascertain the place of the internet on their academic research and learning. Furthermore, to understand the students' perspective towards the influence of accessing and utilizing electronic resources for academic learning and research productivity more deeply, a focus group was conducted with 18 students. These dual methods were applied in this study because evidence has shown that they generate more data, explicate the issues raised, as well as provide an understanding of the underlying reasons and opinions from a small or large group in a study (Adogbeji and Akporhonor, 2005; Ndagi, 1999). Studies have similarly revealed that focus groups are widely used in academic research to examine attitudes, feelings, and experiences (Hamid et al., 2015), which permit students who participate to react and to build upon the responses of other members or to 'think synergically in a group setting' (Klein et al., 2007). In line with this, to support the survey in this investigation, a focus group is considered the most appropriate method.

#### 3.2. Study area and sampling/selection procedure

##### 3.2.1. Selection procedure for the quantitative survey participants

A total of 11 public universities exist in North – Eastern Nigeria. This includes Abubakar Tafawa Balewa University, Bauchi; Adamawa State University, Mubi; Bauchi State University, Gadau; Borno State University, Maiduguri; Federal University Gashua, Yobe State; Federal University Kashere, Gombe; Federal University, Wukari, Taraba State; Gombe State University, Gombe; Modibbo Adama University of Technology, Yola; Taraba State University, Janlingo; University of Maiduguri, Borno State; Yobe State University, Damaturu. Therefore, to select the institutions used in this study, the researchers applied a simple random sampling in a form of balloting technique. The institution was selected through pick without replacement to include Taraba State University, Jalingo; Adamawa State University, Mubi and the University of Maiduguri, Borno State. This study focusses on the North Eastern geopolitical zone of Nigeria because, until today, there are but limited studies carried out in this region which is still witnessing slower technological change. Though a moderate proportion of the population has access to the Internet at home, little is known if students incorporate this technology into their research and learning in their respective educational settings. Consequently, it is essential to explore this aspect to better understand the student's perspective as it regards to the internet access and utility for academic research and learning, as well as to reveal the challenges faced by students in this region.



Only the final year students of the Faculty of Arts and Social Sciences/Humanities where the targeted participants from the three universities, which comprised of around 1500 students (retrieved from the Registrar's office of the three Universities). This choice was because these faculties host the largest number of students in the selected universities. It was not easy to study the entire population due to time and financial constraint, so a part of the population was selected to represent the entire population. To obtain the study sampled size, a sample size calculator (calculator.net), with 95% confidence level, 5% confidence interval, and 50% population proportion was used and this entry generated a total number of (n = 306) participants. Thus, (n = 102) respondents were selected each from the three institutions under investigation. These participants fell within the Faculty of Arts and Social Sciences/Humanities, consisting of 'Languages and Linguistics'; 'Geography'; 'Political Sciences'; 'Sociology'; 'Mass Communication'; 'Public Administration'; 'Philosophy'; 'Theatre art, and History. The first to third-year students were excluded from this study because it is believed that students carry out their research projects in their final year. As such, only the final year students participated in this survey, because they have had a series of assignments such as classwork/homework as well as other research work from their first year to their final year and possess a fuller understanding of the rudiment and the challenges involved in the use of the internet for academic research. Hence, the investigators believed that the final year students will give a better response to the questions raised by this study.

### *3.2.1.1. Brief overview of the selected institutions' in North East Nigeria*

- **Taraba State University (TSU):** The Taraba State Government established Taraba State University, Jalingo in 2008, to widen access to University education for Taraba State indigenes and promote economic development in the country. Right from inception, the University set out for itself a goal that is captured in its motto – Harnessing Nature's gift. The University is guided, by the national and international manpower needs usually accredited by the National Universities Commission, Abuja (Retrieved from TSU website at <https://www.tsuniversity.edu.ng/brief-history/>).
- **Adamawa State University (ADSU):** Adamawa State University, Mubi was established in January 2002 by the Adamawa State University Law No. 10 of 2001. The University is located in Mubi town, in the Northern Senatorial District of Adamawa State, Nigeria. The University is the first State Government owned University in the North East sub-region of Nigeria. Since establishment, the University has graduated a total of four sets of students, 67 in 2005/2006 session, 200 in 2006/2007 session, 309 in 2007/2008 session and 353 in 2008/2009 session totalling 929 graduates. At present, the University has

4600 undergraduate students and 384 pursuing Postgraduate Diplomas and higher degrees. The total number of academic staff of the University is 229 supported by 52 visiting and 7 part-time lecturers. These are complemented by 166 senior non-academic staff and 281 junior staff of different cadres (Retrieved from ADSU website at <https://www.adsu.edu.ng/about-us/>).

- **The University of Maiduguri (UNIMAID):** The University of Maiduguri (UNIMAID) is located in Maiduguri, the capital city of Borno State in northeast Nigeria. The university was created by the federal government in 1975, with the intention of it becoming one of the country's principal higher-education institutions. It enrolls about 25,000 students in its combined programs, which include a college of medicine and faculties of agriculture, arts, dentistry, education, engineering, law, management science, pharmacy, science, social science, and veterinary medicine. With the encouragement of the federal government, the university has recently been increasing its research efforts, particularly in the fields of agriculture and conflict resolution, and expanding the university press. The university is the major higher institution of learning in the north-eastern part of the country (Retrieved from UNIMAID website at <http://www.unimaid.edu.ng/about.html>).

As at the time this investigation was conducted, the researchers observed that there was a lack of adequate internet facilities in the sampled universities, suggesting that the Cybercafé available was not functioning effectively, the information communication centre was debilitated, and there was no provision of Wi-Fi. As a result, the student device other means to access and utilize the internet for their studies.

### ***3.2.2. Selection procedure for the focus group participants***

For the focus group participants, the authors purposively selected a total number of 18 class representatives, six each from the Faculty of Arts and Social Sciences/Humanities in the three selected universities (See [Table 1](#)). This choice was based merely on their long time of service (first to final year) and have arrived at a fuller understanding of the influence of accessing and utilizing electronic resources for academic inquiry. However, there are factors that downsized the number of selected participants such as unwillingness to sign the consent form which prompted the researchers to use the available participants.

## **3.3. Procedure for data collection**

### ***3.3.1. Procedure for the quantitative (questionnaire) survey data collection***

Three hundred and six (306) copies of structured questionnaires were randomly administered to the students in their lecture theatres with the authorization and

**Table 1.** The focus group participants profile.

Institution (s)	Focus group code	Number of student/gender	Department/discipline	Age range
Taraba State University, Jalingo	TSU 1	6 in total (3 Male 3 Female)	Mass communication	23–29
	TSU 2		History	
	TSU 3		Sociology	
	TSU 4		Political sciences	
	TSU 5		Geography	
	TSU 6		Languages and linguistics	
Adamawa State University, Mubi	ADSU 1	6 in total (4 Male 2 Female)	History	23–29
	ADSU 2		Public administration	
	ADSU 3		Geography	
	ADSU 4		Political sciences	
	ADSU 5		Sociology	
	ADSU 6		Languages and linguistics	
The University of Maiduguri, Borno	UNIMAID 1	6 in total (2 Male 4 Female)	History	23–29
	UNIMAID 2		Mass communication	
	UNIMAID 3		Sociology	
	UNIMAID 4		Political sciences	
	UNIMAID 5		Theatre art	
	UNIMAID 6		'Languages and linguistics'	
Total	18 participants	3 groups (9 male and 9 female Participants)		

assistance of their lecturers. Two research assistants were also employed to facilitate this process.

The survey questions used in this study was developed by the authors. However, items were adopted from previous relevant studies (Ahmed and Bukar, 2016; Apuke, 2016; Ani, 2010; Afolabi, 2015; Bankole, 2013; Dogruer et al., 2011) and modified to suit into this present investigation. This was done to ensure content validity (Chang and Tung, 2008). Additionally, the questions were further reviewed by six experts, which include two each in the field of communication, educational technology, and computer sciences respectively. After thorough scrutiny of the questions in the questionnaire, the experts expunged irrelevant questions and further suggested questions that aid in answering the objectives raised in this investigation.

The data were collected within a period of 8 weeks during the 2017/2018 academic session. One hundred and two (102) copies of the questionnaire each were distributed respectively to the three selected universities under investigation. Of the 306 distributed questionnaires, 250 (UNIMAID = 84; ADSU = 83; TSU = 83) were duly filled and returned, given a response rate of 81.7%. The questionnaire covered five sections, including demographic characteristics of respondents; the internet resource accessibility pattern among the students; the students perceived benefits

from the use of internet resources for academic research and learning; the search engines frequently used by the students for educational inquiry and the challenges confronting the students regarding the use of the internet for educational research and learning. Additionally, the questionnaire comprised of both closed and open-ended questions, which was applied to understand the respondents' opinions/ views.

### **3.3.2. Procedure for the qualitative (focus group) data collection**

Three (3) focus group discussions with six members in each group were held at the students' universities without the presence of the lecturers. This was carried out to study in in-depth the student's attitudes and experiences. After the researchers got consent from the three universities under investigation, each student in the focus group completed a consent form giving them permission to participate in this study. The individual focus group discussion lasted for about 60–90 minutes to complete. The discussion was audio-recorded and transcribed manually. During these sessions, the second author took notes to have better and accurate results. The participants were assured of confidentiality and that only pseudonym, that is, a code would be used to represent individual students. For example, the code TSU 1 represent Student No. 1 from Taraba state university focus group, ADSU 4 represent Student No. 4 from Adamawa state University focus group and UNIMAID 6 represent Student No. 6 from the University of the Maiduguri focus group session. [Table 1](#) demonstrates further on how each group is composed and referred to in the analysis. In this regard, the focus group examined students' perspectives and experiences on the perceived effect of accessing and utilizing electronic resources for academic research and learning.

### **3.4. Ethical consideration and approval**

Ethical approval is needed for any research that involves human participants to ensure that the dignity, rights, safety and well-being of all participants are the primary consideration of the research project. In order to adhere to the sampled institution's policies on research involving human subjects, an application for ethics approval was submitted to the research ethics committee termed as the "research and promotion unit" through the Dean (s) of student affairs. The application consists of informing concerning to the aims of the study, length of the surveys, the information that would be gauged through the questionnaire survey, and how the data would be collected, stored, and accessed. Furthermore, the committee (s) were informed that the participants are assured of their confidentiality and that personal information such as names would not be used in the final analysis of the research. As soon as the committee reviewed the application which took about 2 weeks, the senior research ethics administrator (s) granted permission for the study to be undertaken.

## 4. Results

### 4.1. Data analysis

The data generated from the survey (i.e. administered questionnaire) were analysed using the 2016 Microsoft Excel statistical software using frequency counts and simple percentages presented in tables and graphs. In this study, the focus group responses were thematically analysed. This comprised of organizing and categorizing responses into patterns to generate various themes (Braun and Clarke, 2006). Consistent with Krueger and Casey (2002) notion, the focus group interviews were transcribed and the additional non-verbal behaviours identified during the discussion session were noted. This includes head nods, smiles, frowns, or signs of boredom and was aligned with the transcription where appropriate. Additionally, other notes such as student statements were written down to aid in drawing connections between the interviews and the research question. Rather than looking for differences, the analysis focused on identifying common and collective responses which were then categorized and discussed thematically as it regards to students' perception and experience of using the internet for academic uses.

### 4.2. Socio-demographic characteristics of the respondents'

Table 2 presents the combined data on gender distribution of respondents in the respective institutions. Overall, they were more male (56%), than female (43.6%) participants. This could be due to the fact that in the Northeastern region of Nigeria, the male gender is given more priority to enroll into tertiary intuition than female gender. Specifically, UNIMAID had more male (59.5%) participants when compared with ADSU (57.8%) and TSU (51.8%), while TSU (48.2%) had more female participants than ADSU (42.2%) and UNIMAID (40.5%).

Table 3 highlights the age distribution of respondents in the respective institutions. Overall, a slight majority of the respondents (58.4%) ranged between 23 and 29 years, (30.4%) were 29 and above, and only (11.2%) were between 16 to 22 years. This could be due to the fact that only final year students participated in this study. ADSU had more respondents (35%, aged 29 and above) when compared with UNIMAID (28.6%) and TSU (27.7%).

**Table 2.** Gender distribution of respondents in each institution.

Institution	Male	Female	Total
TSU	43 (51.8%)	40 (48.2%)	83 (100%)
ADSU	48 (57.8%)	35 (42.2%)	83 (100%)
UNIMAID	50 (59.5%)	34 (40.5%)	84 (100%)
Total	141 (56.4%)	109 (43.6%)	250

**Table 3.** Age distribution.

Institution	16–22	23–29	29 and above	Total
TSU	10 (12.1%)	50 (60.2%)	23 (27.7%)	83 (100%)
ADSU	8 (9.6%)	46 (55.4%)	29 (35%)	83 (100%)
UNIMAID	10 (11.9%)	50 (59.5%)	24 (28.6%)	84 (100%)
Total	28 (11.2%)	146 (58.4%)	76 (30.4%)	250

Generally, the participants across the three institutions came from Languages and Linguistics (n = 35) 14%, ‘Geography’ (n = 30) 12%, ‘Political Sciences’ (n = 30) 12%, ‘Sociology’ (n = 20) 8%, ‘Mass Communication’ (n = 40) 16% ‘Public Administration (n = 20) 8%; ‘Philosophy’ (n = 25) 10% ‘Theatre art (n = 30) 12%, and History (n = 20) 8%. Conversely, the focus group participant profile showed that (n = 9) 50% were female and (n = 9) 50% were male students with the age range of 23–29 (see Table 1).

### 4.3. Internet resources accessibility, and its perceived benefits for academic research and learning

Table 4 is derived from the quantitative survey carried out among the 250 students drawn from three universities in North Eastern Nigeria. It presents the responses of internet availability, utilization, and impact on the student’s academic research and learning. Results revealed that across the three institutions a total of (86.8%) students claimed they do not have adequate access to internet facilities on their campus. On the contrary, a trivial number of respondents (13.2%) asserted that they have adequate access to the internet on their campus. Compared to ADSU (12%) and UN-IMAID (11.9%), TSU (15.7%) had more students that claimed to have adequate internet facilities on campus. The survey also found that about (89.6%) of the students affirmed that they make use of the internet for academic purpose, whilst (10.4%) do not. The students of TSU were heavier users of the internet compared with the other two institutions because about (96.4%) use the internet for their academic purposes.

In view of how much they employ the internet for academic purpose, more than half (62%) of the students claimed to use the internet on a daily basis, followed by (18%) who use it 2 to 5 times a week, (9.6%) use it once in a week, while a trivial number (10.4%) maintained a neutral response (see Table 4). None of the students reported using the internet only when they have an assignment. It was also observed that TSU students (78.3%) use the internet more on a daily basis compared with ADSU (50%) and UNIMAID (40%).

With regards to the medium students use to access the internet in Northeastern Nigerian universities, results across the three sampled institutions showed that a slight majority of the students (52.8%) averred that they make use of their handsets/

**Table 4.** Internet resources accessibility, and its perceived benefits for academic research and learning among the students of Northeastern Nigerian Universities.

Item (questions)	Responses	Institutions			Total
		TSU	ADSU	UNIMAID	
Do you have adequate access to internet facilities on your campus?	Yes	13 (15.7%)	10 (12%)	10 (11.9%)	33 (13.2%)
	No	70 (84.3%)	73 (88%)	74 (88.1%)	217 (86.8%)
Use of internet for academic purpose.	Yes	80 (96.4%)	70 (84.3%)	74 (88.1%)	224 (89.6%)
	No	3 (3.6%)	13 (15.7%)	10 (11.9%)	26 (10.4%)
How often do you use the internet for academic purpose?	Everyday	65 (78.3%)	50 (60.2%)	40 (47.6%)	155 (62%)
	2–5 times a week	10 (12%)	15 (18.1%)	20 (23.8%)	45 (18%)
	Once in a week	5 (6%)	5 (6%)	14 (16.7%)	24 (9.6%)
	Only when I have an assignment	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	Undecided	3 (3.6%)	13 (15.7%)	10 (11.9%)	26 (10.4%)
What medium do you use to access the internet?	Handset/smartphones	40 (48.2%)	50 (60.2%)	42 (50%)	132 (52.8%)
	School Café	13 (15.7%)	8 (9.6%)	10 (11.9%)	31 (12.4%)
	Café outside school	20 (24.1%)	7 (8.4%)	14 (16.7%)	41 (16.4%)
	Modem and laptop	7 (8.4%)	5 (6%)	8 (9.5%)	20 (8%)
	Undecided	3 (3.6%)	13 (15.7%)	10 (11.9%)	26 (10.4%)
Has the use of internet improved or still improving your academic research and learning?	Yes	80 (96.4%)	60 (72.3%)	70 (83.3%)	210 (84%)
	No	3 (3.6%)	23 (27.7%)	14 (16.7%)	40 (16%)
Benefits of the use of internet in your academic research and learning.	Information is easily retrieved from the internet and this has been so beneficial to my academic research and learning	13 (15.7%)	8 (9.6%)	10 (11.9%)	31 (12.4%)
	The availability of numerous sources on the internet has brought a tremendous improvement in my academic research and learning	7 (8.4%)	5 (6%)	8 (9.5%)	20 (8%)
	Increased access to current and valuable research found on the internet has been so beneficial and has improved my research in addition to other academic learning.	40 (48.2%)	50 (60.2%)	42 (50%)	132 (52.8%)
	The internet has facilitated my research process, that is, a task that would be completed over a long period of time now takes a short period of time to execute.	20 (24.1%)	7 (8.4%)	14 (16.7%)	41 (16.4%)
	Undecided	3 (3.6%)	13 (15.7%)	10 (11.9%)	26 (10.4%)



smartphones to access the internet, which might be due to the lack of efficient internet facilities on their campus. This is not surprising as (16.4%) of the students asserted that they use the cybercafé outside their university premises, and (8%) make use of their laptop and modem to access the internet. Only (12.4%) claim to use school café and (10.4%) remain neutral to the query put forward. Of the three institutions, ADSU (60.2%) students relied more on their mobile phones to access the internet compared with UNIMAID (50%) and TSU (48.2%).

Most of the students (84%) who responded to the questionnaire believed that the internet has and is still improving their academic research. However, few students (16%) claimed that the use of the internet has not actually enhanced their academic research and learning. TSU students (96.4%) had a strong conviction that the internet has and is still improving their academic research than UNIMAID (83.3%) and ADSU (72.3%). With respect to the perceived benefits, students across the three institutions gained from internet utilization for their research and learning. A slight majority (52.8%) had the impression that increased access to current and valuable research found on the internet has been so beneficial and has improved their research in addition to other academic learning. Some of the students (16.4%) believe that the internet has facilitated their research process, that is, a task that would be completed in a long period of time now takes a shorter duration to complete. In addition, (12.4%) of the students acknowledged that information is easily retrieved from the internet and this has been so beneficial to their academic research and learning, while (8%) held the notion that the availability of numerous sources on the internet has brought a tremendous improvement in their academic research and learning, and (10.4%) maintained undecided response to the question raised. Of the three institutions, ADSU students (60.2%) had a stronger viewpoint that increased access to current and valuable research found on the internet has been so valuable, which in turn improved their research, as well as other academic learning.

#### **4.4. The search engine and internet sources mostly used by the students for their academic research and learning**

The types of the search engine used among the students varied across the institutions (See Fig. 1). About (52.8%) of students had more preference for Google and Google Scholar, followed by Yahoo search (16.4%), Bing (12.4%) and wink (8%), while (10.4%) were neutral. The findings demonstrated that ADSU students (60.2 %) were heavier users of Google and Google Scholar, followed by UNIMAID (50%) and TSU (48.2%). Whilst TSU (24%) students claim to use Yahoo search more than UNIMAID (16.7%) and ADSU (8.4%).

Another target of this present study was to determine the internet sources preferred by the students. As shown in Fig. 2, there were distinctive variations in their preferences. About (50.8%) of the students preferred online journals, followed by

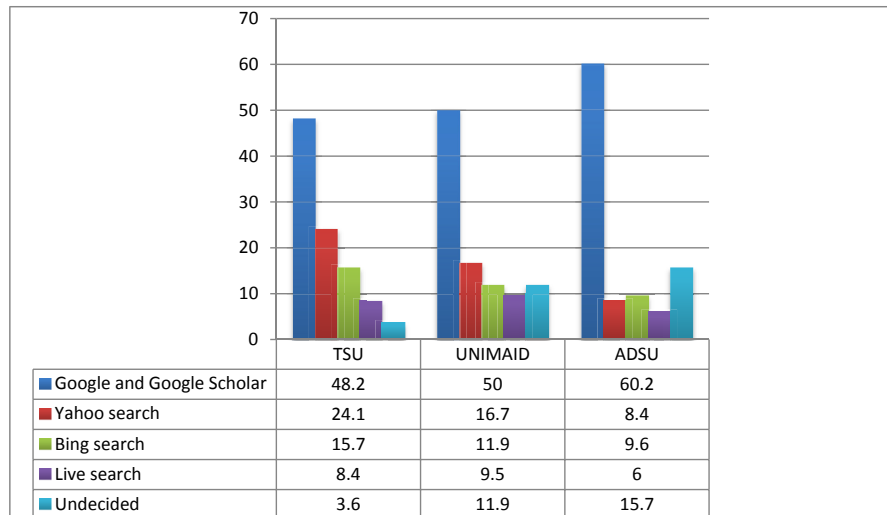


Fig. 1. Search engine used.

electronic books (18.4%), online projects or dissertation/thesis (12.4%) and conference proceedings online (8%). On the other hand, (10.4%) of the students remained neutral. Out of the three institutions, ADSU students (60.2%) had more preference for online journals compared with UNIMAID (50%) and TSU (42.2%). It was likewise observed that TSU students (30.1%) preferred electronic books compared with UNIMAID (16.7%) and ADSU (8.4%).

#### 4.5. The challenges faced by students in accessing and utilizing the internet facilities

Approximately 86% of students claimed that their universities do not have an efficient cybercafé and internet facility. This problem appears to be more reported in

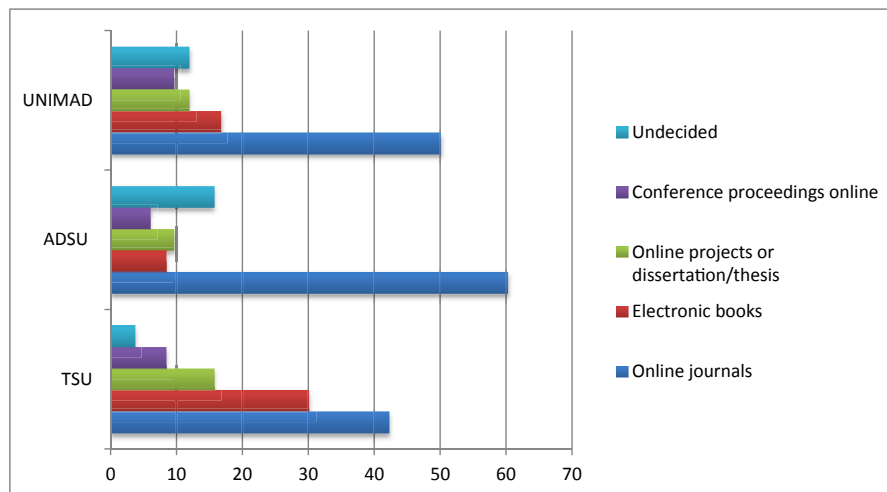


Fig. 2. Most used internet sources for academic purpose.

UNIMAID and ADSU than TSU, suggesting that TSU somewhat have internet facilities comparable to the other two institutions. However, most of the students believed that the inefficient and inadequate internet facility within their university premises might have limited their access. This has resulted in the over-dependency on their mobile telephone, as well as purchasing internet data plans from other service providers such as mobile telecommunication company (MTN Group), Globacom, Etisalat and Airtel telecommunications company. This is one major aspect that hinders the student's regular access and utilization of the internet, which likely slowed down the pace of carrying out assignments given to them in school. It was observed that the subscription of data plan is sometimes problematic, as there are time lags in the internet connectivity and slow access speed of these networks.

A considerable number of the students had the opinion that compared to the higher institution in developed countries, their institutions need an electronic library, where they can easily access scientific journals from databases such as Elsevier, Springer, Taylor and Francis, Wiley, SAGE and Emerald. They believed that this will lessen the reliance on Google, Google Scholar and open access journals as well as will provide a means to explore other related scientific papers, in order to elevate their academic learning and research beyond its current situation. Some of the students observed that they come across substantial and relevant scientific papers online but could not gain access to them, due to lack of subscription to scientific databases by their institutions. The students noted that most scientific papers cost from \$15 upward and this often restrict their access to scientific journals, as well as affecting their quality of research. The students also believed that the irregularity of power supply in their University premises, dormitory and homes, discourages internet accessibility for academic purposes, as sometimes they run out of power/battery on their mobile and Laptop devices. This submission means there is insufficient digital readiness among the sampled institutions. Nevertheless, the students still make it a priority to harness the essence of the internet through other self-generated means, and this has enhanced their research and learning to an extent.

#### **4.6. The effect of accessing and utilizing electronic resources for academic research and learning**

##### ***4.6.1. Students perceived benefits from the use of internet resources for research and learning***

This section presents the results obtained from the 18 focus group participants. See [Table 1](#) in the methodology section, which demonstrates how each group was composed and referred to in the analysis. The focus group considered the aspects

at which the internet has improved the students' academic learning and research. The students highlighted several benefits in which the internet has aided their learning and research:

#### *4.6.1.1. Enable students to carry out research in advance/ahead of time*

The students stated that the use of internet sources has brought about positive change in their academic activities in general. They reported that searching for materials via e-books and e-journals enabled them to carry out research ahead of time, thereby easing and improving their academic research and learning. In line with this view, a student from Taraba state University comment that:

I do not require moving a far distance to source for materials anymore, I find almost everything I need online within split seconds and this has enhanced my research work [TSU 6].

This view is consistent with a participant from the Adamawa State University who remarked that:

Indeed, the internet is a boon to us, its usage has brought some positive effects on my academic growth [ADSU 3].

Buttressing on this notion, a student from the University of Maiduguri believed that:

The emergence of the internet has changed the custom of travelling to other libraries and universities within Nigeria for the search of relevant materials to support research [UNIMAID 2].

#### *4.6.1.2. Tackling of multiple homework*

Most of the participants had the perspective that internet usage has helped them to tackle multiple and tasking or difficult homework that was given to them by different tutors. They also agreed that the advent of the internet has made it possible for them to source and download relevant materials required for their academic research and learning, and this has enabled them to conduct multiple assignments within a given deadline.

In this respect, a student from the Adamawa State University observed that:

On several occasions, our tutors give a series of assignments with deadlines, and this has been often tackled using the internet, which I believe has eased my burden. I only need to use up my time and search various databases available to retrieve relevant materials [ADSU 6].

Similarly, a student from the Taraba State University comment that:

Sometimes when I am given a series of an assignment I feel so worried and disheartened, yet, when I set out doing research using the internet I feel at ease as most of the materials I come across are related to what I require. This cuts down my burden and helps me in multitasking as well as enhancing my learning process [TSU 5]

In the same vein, students from the University of Maiduguri concurred that the utilization of the internet has assisted them in carrying out tasking assignment within a short period of time, which is believed to have improved their research capability as well as their Cumulative Grade Points Average (CGPA). As such, one of the students from this focus group advocated that:

The ‘tabs’ provided in Mozilla Firefox and Chrome enables us to open numerous pages simultaneously while navigating from one page to another to read pertinent materials. Before the advent of the internet, it was difficult to perform given multiple assignments in a lesser time, due to insufficient sources. As of then, students relied merely on printed sources in the library. Nowadays, the numerous electronic sources available have enhanced our research and academic output. Indeed, my CGPA has been enhanced when compared with my other classmates who do not frequently use the internet for their academic activities [UNIMAID 3].

From the above student’s responses, the utilization of various internet resources for an academic purpose has assisted them in conducting multiple and difficult assignments in a short period of time.

#### *4.6.1.3. Widen the scope of reading and learning*

Most of the students claimed that the role of the internet has also permitted comparing of different forms of literature that best conforms to each homework or classwork given to them by their respective tutors, this has inspired a broader scope of interpretation, reading and learning. In addition, they observed that the internet contributed to the easiness of research through downloading materials that support their study. They likewise believed that this has enhanced their academic research skills and learning.

One student from the Adamawa State University focus group emphasized that:

The internet as an online tool for research has widened our scope of reading and learning. It has made data retrieval easier, resulting in a positive impact on our educational research and learning development [ADSU 1].

A student from the Taraba State University focus group asserted that:

I do not need to depend on one source when utilizing the internet, I just move from one source to another, comparing and at the end, select the best and suitable source which I believe to have enhanced my academic research and learning [TSU 3].

Congruently, a student from the same focus group session commented that:

The use of internet resources such as Wikipedia, Google and Google Scholar has improved our access to information on various courses, which I feel has greatly upgraded our scope of reading and learning. This has also resulted in a more serious academic achievement [TSU 1].

#### 4.6.1.4. *Enhance self-learning*

It was found that the use of the internet enhanced most of the students' self-directed learning. The students claimed that there were able to discover new knowledge related to their courses on their own or together with their peers. They also opined that the availability of how-do-it online videos, such as YouTube tutorial videos, has extended their skills in research and has helped them to get conversant to certain practical and technical aspect of their various courses. One history student from the University of Maiduguri perceived that:

The online YouTube tutorial has exposed me to different prior and recent research trends and evidentiary findings of researchers, which in turn has infused and gave me the required knowledge for improving my research. For example, there are historical events that I watch on YouTube, which has really influenced my learning process. Courses such as Advanced History has been made easily understood through YouTube online Videos [UNIMAID 1].

Drawn from the students' responses, it could be deduced that the students in the sampled Universities believed that the use of the internet, most especially YouTube is improving their learning and research to an extent. Regarding the internet and class activities, the students alleged that although their individual institution has insufficient internet access and digital readiness, yet, they have become self-organized, resilience and resourceful using their mobile phones and other available means such as Cybercafé outside their university premises. These students believe that the use of the internet through the Google and Google Scholar search engine, improved their knowledge of research and learning at large, suggesting that the use of the internet stimulates the student-centred learning. Consistent with this view, a student remarked that:

Although subscribed scientific electronic databases are not yet available in our universities, moreover, some of our lecturers do not communicate with us via

email. Still, I can claim that I do learn a lot through the internet on my mobile phone, and Universal Serial Bus (USB) modem on my laptop. The availability of Google and Google Scholar search engine has enhanced my learning. I feel the internet is a platform to educate and acquire more knowledge, and this has improved my CGPA [TSU 4].

The comments derived from the students demonstrated that they were relatively more self-directed when using the internet. The students at the University of Maiduguri believed that the internet has promoted self-learning, thereby developing their abilities to think critically and exercise analytical skills. In line with this, a student within this focus group commented that:

The use of the internet which has enhanced self-learning enables us to be more critical thinkers as we are exposed to a plethora of information. The student added that there is a proverb which says knowledge is power, thus, the internet has made us powerful critical thinkers [UNIMAID 3].

Similarly, in the same focus group session, a student remarked that:

I now make constructive comments in class due to the numerous research I conduct online and this has increased my intellectual capability to imagine beyond my peers. Also, I now think carefully before leaving a comment, so in a way, I believe the usage of the internet has not only improved self-learning but promotes critical thinking [UNIMAID 4].

In the same way, a mass communication student at the Taraba State University ascertained that:

Through the internet, I have been able to learn more about graphic communication, motion graphic videos and 3D animations. Although our tutors teach us these subjects in class, yet, when I study alone via the internet, I get an in-depth explanation, which I feel betters my academic learning [TSU 01].

The above students' comment, suggest that the utilization of the internet to an extent has improved the quality of their overall learning outcome.

#### *4.6.1.5. Encourages and enhances peer learning*

It was found that all the students in the various focus group were affirmative that the advent of the internet helps them share information with their peers to support each other's learning. This is evident as students share knowledge with each other through email and other social technologies such as WhatsApp and Facebook. They likewise gained knowledge from their peers through materials collected for group assignment on wikis, including comments that other students make on their group chats. For example, a student in the Adamawa State University focus group claimed:



I am always online when compared to some of my classmates. This always prompts them to ask if I have found new relevant information to share. I always share useful information discovered on the Internet in our group chats, as well as post them on Facebook. It is now easier to share substantial information with my peers which I believe has enhanced my peer's knowledge [ADSU 4].

Consistent with this comment, another student in the same focus group stated that:

At large, a greater occurrence of both off-curriculum (informal) and curriculum-based interactions among students is enabled by the internet. I share the internet retrieved information with my fellow classmates through Skype and WhatsApp Video calls. I likewise post useful downloaded tutorial videos to them via the same medium. From their remarks, the access and use of the internet have greatly improved their academic growth [ADSU 2].

Similarly, a theatre art student at the University of Maiduguri asserts:

Through the internet, I and my course mates are able to communicate and collaborate on the course content by using mobile computing devices as well as laptops to text message and email. This has made it comfortable for us to share information that is vital and up-building. I recalled when we were given a very difficult assignment task, I searched the internet but could not find any related sources, one of my classmates who understood the utilization of the internet better, found a relevant material and emailed it to me. This material enhanced my assignment, which in turn improve my CGPA. With a smile on his face, the student exclaimed 'I had an A in that course' [UNIMAID 5].

These findings suggest the students perceived that informal interactions such as friendly chat among friends were often converted to academic debate on course topics. Additionally, the students claimed that they share knowledge with each other through internet technological devices such as email and social networking sites, including Facebook and WhatsApp.

#### *4.6.1.6. Ameliorates examination preparation*

Internet search engines such as Google and Google Scholar as well as electronic sources including E-Journals, E-books and E-Conferences were particularly helpful to the student in their preparations for the examination. Most of the focus group members agreed that they regularly utilize Wikipedia as it offers initial orientation and basic information that occasionally simplifies and clarifies certain topics. However, some of the students believe that it has limited knowledge or importance when compared with other sources such as library resources, including e-books, learning management systems, and academic literature databases. In addition, the entire students that participated in the focus group divulged that the use of internet has

bettered their examination preparations. For example, a student at the University of Maiduguri remarked that:

There are subjects or topics that I do not truly attain a better understanding in the class even when taught by our tutors, only with the help of the internet, I have been able to source extra and simplified materials that enhanced my understanding of a subject or discipline before the exam. This has enhanced my intellectual capabilities as well as eases my examination preparations with positive results.

Likewise, students at the Taraba state university felt that they had the opportunities to support their course material through the internet. For instance, one of the students mentioned that:

The materials I retrieve online are added advantages to the lecture notes given to us by our lecturers [TSU 3].

These established that students better prepared for their examination with the aid of the internet. This also suggests that the students believe that the use of the internet supports their study and serve as a tool to enhance their academic performance, growth, research skills and learning, thereby leading to better results.

## 5. Discussion and conclusion

This current study explores undergraduate students perceived benefit of using the internet and digital resources for research and learning in the Northeastern Nigerian Universities with a focus on TSU, UNIMAID and ADSU. The findings of this work indicated that female enrollment in higher education in Northeastern Nigeria was lower compared with the male gender. This could be attributed to different phenomena, such as culture, religion, traditional beliefs and tribal issues, which further research could look into. It was observed that about 86.8% of students across the three universities claimed that they do not have adequate access to internet facilities on their campus. However, in comparison to the other two universities (ADSU 12% and UNIMAID 11.9%), TSU (15.7%) had more students that claimed they have adequate internet facilities on their campus. These findings suggest that there is a lack of efficient and effective cybercafé and internet facilities within their respective institution. This is consistent with a prior study, which found that undergraduate students require the internet to do their research work, however, it was not feasible due to poor access in their libraries, departments and information and communications technology centres. The same study showed that a vast number of the students depended on private internet services and cyber cafés (Ani, 2010).

This current study also revealed that a large proportion of the students (89.6%) claimed to make use of the internet for their academic purposes, and more than half (62%) use the internet on a daily basis. However, there was a variation in the

usage of the internet among students within the three institutions. It was found that TSU students (96.4%) use the internet more and about (78.3%) use it on a daily basis for their academic purposes when compared with UNIMAID (40%) and ADSU (50%) students. This result is contrary to [Ureigho et al.'s \(2006\)](#) who establish that students use the internet mainly for online chatting (24.89%) and e-mail (24.16%) purposes, rather than for research materials (23.21%). Juxtaposing these results, it could be suggested that the internet can be used differently by students in tertiary institutions in terms of academic research and learning, as well as leisure/entertainment.

Our results ascertained that a slim majority of the students (52.8%) averred that they access the internet via their handsets or smartphones. Others students (16.4%) profess that they use the cybercafé outside their university premises, and (8%) make use of their laptop and modem to access the internet, which intimates that there is a demand for efficient internet facilities on their campuses. This conforms with the study results of [Ivwithreghweta and Igere \(2014\)](#) which found that students frequently access the internet through the Cyber Café outside their university premises and use it for retrieving relevant academic resources. It was realized in this present study that ADSU (60.2%) students depended more on their mobile devices to access the internet compared with UNIMAID (50%) and TSU (48.2%). This result substantiates prior investigations that found undergraduate students depended on their mobile devices to access the internet for educational and entertainment purposes ([Ahmed and Bukar, 2016](#); [Ogunla, 2013](#); [Agboola, 2010](#)).

Across the three universities, it was realized that a substantial number of the students (84%) believed that the internet has and is still improving their academic research. TSU students (96.4%) had a stronger conviction that the internet has and is still improving their academic research than UNIMAID (83.3%) and ADSU (72.3%). In respect to the perceived benefits of internet utilization among students in terms of research and learning, more than half of the students (52.8%) asserted that access to current valuable research found on the internet has been so beneficial and this has improved their research and other academic learning. Our findings also revealed that about (16.4%) students believe that the internet has facilitated their research process, that is to say, a task that requires a long period of time to complete, now take a short duration to accomplish. About (12.4%) of the students acknowledged that information is easily retrieved from the internet and this has been so beneficial to their academic research and learning, while (8%) held the notion that the availability of numerous sources on the internet has brought a tremendous improvement in their academic research and learning. It was noted that out of the three institutions, students of ADSU (60.2%) were more affirmative that increased access to current and valuable research found on the internet is beneficial and enhances research and academic learning outcomes. This result reflects other findings which demonstrate that the internet contributes to the easiness of research through downloading materials as

well as enhances the cognitive operation of information dissemination (Emeka and Nyeche, 2016; Adekunmi et al., 2013; Nwezeh, 2010).

Results obtained from this present study suggest that there was a slight variation in the search engine used by the students in the sampled institutions, although the rationale for this was not ascertained. Overall, across the three universities, results showed that a small majority of students had more preference for Google and Google Scholar (52.8%), and was followed by Yahoo search (16.4%). It was realized that ADSU students (60.2 %) were heavier users of Google and Google Scholar compared with the other two institutions. While TSU (24%) students claim to use Yahoo search more than UNIMAID and ADSU. Consistent with this result, Bashir et al. (2008) found Google and Yahoo search engine to be frequently used among students. Our study also showed that online journals were preferred by a somewhat majority of the students (50.8%) followed by electronic books (18.4%). However, it was noted that there was a variation in the students' preferences, ADSU students (60.2%) had more preference for online journals compared with UNIMAID (50%) and TSU (42.2%), while TSU students (30.1%) had a preference for electronic books compared with UNIMAID (16.7%) and ADSU (8.4%). This result conforms with a previous study which established that E-journals and E-books are among the resources that students mostly used in their research work (Ivwithghweta and Igere, 2014).

The insufficient digital readiness in the sampled institutions which appears to be more reported in UNIMAID and ADSU than TSU, prompted a considerable number of the students to assert that their institutions required an electronic library/database (e.g., Elsevier, Springer, Taylor and Francis, Wiley, and Emerald) where they can easily access scientific journals. They also feel that the irregularity of power supply in their dormitory, homes and University premises, discourages internet accessibility and usage for academic purposes. This result is similar to studies which found that internet server, the cost of paying for online services (Emeka and Nyeche, 2016), power outage, slow internet speed, lack of computer terminals, too many hits or information overload and insufficient computers as the major factors militating effective access to the internet within Nigeria tertiary institutions (Ivwithghweta and Igere, 2014).

Our study revealed that students in the focus group perceived that internet utilization has helped them in carrying out research ahead of time, and this conforms with Adegboji and Toyo (2006) who found that the internet contributed to the easiness of students' research through downloading of relevant materials. Also, the focus group participants think that the internet assisted them in undertaking multiple home works, as well as widen their scope of reading and learning. They alleged that the internet has permitted comparisons of different types of related literature that suits their respective homework or classwork, and that this has resulted in a broader scope of interpretation, reading and learning. This is in harmony with a prior study, which found that the internet enables students to access relevant and up to date

materials for their research (Adogbeji and Akporhonor, 2005). The focus group participant likewise claimed that the internet promotes their self-learning as well as encourages and enhances peer learning. These students believed that through the internet, they were able to discover new knowledge related to their courses, individually or as a group. They feel that the availability of how-do-it online videos, such as YouTube tutorial, has broadened their academic research and have helped them to be conversant with certain practices and technical aspect of their various courses. This result supports Hamid et al.'s. (2015) findings, which establish that internet utilization helped Australian and Malaysian students in sharing of materials for a group assignment, and this, in turn, improved their self-directed learning.

The focus group participants also think that the internet helps them in ameliorating examination preparation, which is achieved through sourcing materials from search engines such as Google and Google Scholar, as well as electronic sources including E-Journals, E-books and E-Conferences. This is in line with previous investigations suggesting that the internet plays a significant role in assisting students for better preparation of their continuous assessment and semester examination, which had a positive impact on their results (Ivwhreghweta and Igere, 2014; Ogedebe, 2012).

Conclusively, our study revealed that students of North-Eastern Nigerian universities, especially TSU, UNIMAID and ADSU perceived internet utilization to have a positive impact on their academic research and learning, despite the insufficient digital readiness by their respective institution. Regardless of the inefficient internet facilities on the sampled university premises, the students still attempt to be self-organized, resilience and resourceful. Therefore, further studies should examine to what extent students should be provided with help in terms of internet facilities, and to what extent they should rely on other means to develop their own strategies and resourcefulness.

### 5.1. Suggestions to improve internet access and usage in tertiary educational settings

Our study revealed that the students seem to do well with the help of their smart-phone, as well as a laptop and modem to access the internet facilities such as email, internet search engines (Google and Google Scholar) and communication platforms, despite the inefficient provision of internet facilities on their campuses. Yet, there are challenges raised by the students that require attention. Thus, this study proposes the following suggestions to improve internet access and usage for educational research and learning in the studied area.

- Tertiary institutions in developing countries should build efficient cybercafé as well as provide internet facility within their premises and subscribe electronic scientific database. This will enable more access beyond the use of smartphones

as well as the use of open access resources such as e-journals, e-conferences, e-thesis and dissertation.

- The sampled institutions need an electronic library where the students can easily access scientific journals from databases such as Elsevier, Springer, Taylor and Francis, Wiley, and Emerald. This will lessen the reliance on Google and Google Scholar as well as provide the means to explore other related scientific papers which will improve their academic research and learning.
- Network providers such as MTN, Globacom, Etisalat Telecommunications Company and their collaborators should make it a priority to improve their network as well as reduce their tariff to enable students' purchase data at an affordable price. This will encourage the faster and easier download of research materials.
- The irregularity of power supply in the sampled University premises should be improved to encourage internet accessibility for academic purposes. This will reduce the running out of power/battery on the students mobile and Laptop devices, which often interrupt their use of the internet. When this is resolved, it will improve their academic research and learning at large.

## 5.2. Limitations and directions for future research

The findings of our study explain how students view the usage of the internet for their academic research and learning. It also generated useful data to build more understanding and insight into the use of the internet among students. Although, our study only focused on North-Eastern Nigerian students, which seems to be a limitation as it regards to the wider transferability and generalizability of this study findings. Nevertheless, our study is founded on real-life students' experiences, as such, contributes to enhancing the empirical research results that are beneficial for informing teaching and learning practice in higher educational settings. Also, there is an absence of detailed and rigorous statistical analysis. Investigators have argued that interpretive research such as this current research is not suitable for detailed statistical analysis as it is based merely on reporting perception (Myers, 2013; Walsham, 2001). Nevertheless, a longitudinal and ethnographic study where a researcher spends a significant amount of time observing the students' use of internet resources would be valuable in providing richer insights about how internet resources impact students learning, research, and academic performance in general.

## Declarations

### Author contribution statement

Oberiri Destiny Apuke, Timothy Onosahwo Iyendo: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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## Additional information

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## References

- Adegboji, O.B., Toyo, O.D., 2006. The impact of the internet on research: the experience of Delta State University, Abraka, Nigeria. *Libr. Philos. Pract.* 8 (2), 1–8. <https://digitalcommons.unl.edu/libphilprac/84>.
- Adekunmisi, S.R., Ajala, E.B., Iyoro, A.O., 2013. Internet Access and Usage by Undergraduate Students: A Case Study of Olabisi Onabanjo University. *Library Philosophy and Practice (e-journal)*, Nigeria. Paper 848. <http://digitalcommons.unl.edu/libphilprac/848>.
- Adogbeji, O.B., Akporhonor, B.A., 2005. The impact of ICT (internet) on research and studies: the experience of Delta State University students in Abraka, Nigeria. *Libr. Hi Tech News* 22 (10), 17–21.
- Afolabi, A.A., 2015. Availability of online learning tools and the readiness of teachers and students towards it in Adekunle Ajasin University, Akungba-Akoko, Ondo State, Nigeria. *Proc. Soc. Behav. Sci.* 176, 610–615.
- Agboola, I.O., 2010. Use of print and electronic resources by agricultural science students in Nigerian universities. *Libr. Inf. Sci. Res.* 32 (1), 62–65.
- Ahmed, A., Bukar, M., 2016. Appraisal of internet usage for educational purposes by social and management science students in public universities and polytechnics in Adamawa state. *Int. J. Soc. Sci. Humanit. Rev.* 6 (3), 138–147.
- Alshahrani, S., Ahmed, E., Ward, R., 2017. The influence of online resources on student–lecturer relationship in higher education: a comparison study. *J. Comp. Educ.* 4 (2), 87–106.
- Ani, O.E., 2010. Internet access and use: a study of undergraduate students in three Nigeria universities. *Electron. Libr.* 28 (4), 555–567.



- Apuke, O.D., 2016. The influence of social media on academic performance of undergraduate students of Taraba state university, Jalingo, Nigeria. *Res. Humanit. Soc. Sci.* 6 (19), 63–72. <https://iiste.org/Journals/index.php/RHSS/article/view/33535>.
- Apuke, O.D., Iyendo, T.O., 2017. Two sides of a coin: revisiting the impact of social networking sites on students' performance in selected higher educational settings in Nigeria. *Sci. Int.* 29 (6), 1265–1275.
- Audu, C., 2006. Internet availability and use by postgraduate students of University of Nigeria, Nsukka. *Glob. Rev. Libr. Inf. Sci.* 2, 34–43.
- Babbie, E., 2012. *The Practice of Research*. Woodsworth, Belmont.
- Bankole, O.M., 2013. The use of internet services and resources by scientists at Olabisi Onabanjo University, Ago Iwoye, Nigeria. *Program* 47 (1), 15–33.
- Bashir, S., Mahmood, K., Shafique, F., 2008. Internet use among university students: a survey in university of the Punjab, Lahore. *Pakistan J. Libr. Inf. Sci.* 9, 49. <http://hdl.handle.net/10760/19027>.
- Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. *Qual. Res. Psychol.* 3 (2), 77–101.
- Briz-Ponce, L., Pereira, A., Carvalho, L., Juanes-Méndez, J.A., García-Peñalvo, F.J., 2017. Learning with mobile technologies—students' behavior. *Comput. Hum. Behav.* 72, 612–620.
- Cerretani, P.I., Iturrioz, E.B., Garay, P.B., 2016. Use of information and communications technology, academic performance, and psychosocial distress in university students. *Comput. Hum. Behav.* 56, 119–126.
- Chang, S.C., Tung, F.C., 2008. An empirical investigation of students' behavioural intentions to use the online learning course websites. *Br. J. Educ. Technol.* 39 (1), 71–83.
- Creswell, J.W., Creswell, J.D., 2017. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Sage Publications, California.
- Davis, F.D., 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Q.* 13, 319–340.
- Devi, C.B., Roy, N.R., 2012. Internet use among university students: a case study of Assam University Silchar. *Pratidhwani J. Humanit. Soc. Sci.* 1, 183–201. <https://www.thecho.in/files/abstract,-nil-ratan.pdf>.
- Dogruer, N., Eyyam, R., Menevis, I., 2011. The use of the internet for educational purposes. *Proc. Soc. Behav. Sci.* 28, 606–611.

- Emeka, U.J., Nyeche, O.S., 2016. Impact of internet usage on the academic performance of undergraduates' students: a case study of the university of Abuja, Nigeria. *Int. J. Sci. Eng. Res.* 7 (10), 1018–1029. <https://bit.ly/2L9asIU>.
- Fabian, K., Topping, K.J., Barron, I.G., 2018. Using mobile technologies for mathematics: effects on student attitudes and achievement. *Educ. Technol. Res. Dev.* 66 (5), 1119–1139.
- Fasae, J.K., Adegbilero-Iwari, I., 2015. Mobile devices for academic practices by students of college of sciences in selected Nigerian private universities. *Electron. Libr.* 33 (4), 749–759.
- Gan, C., Li, H., 2018. Understanding the effects of gratifications on the continuance intention to use WeChat in China: a perspective on uses and gratifications. *Comput. Hum. Behav.* 78, 306–315.
- Gikas, J., Grant, M.M., 2013. Mobile computing devices in higher education: student perspectives on learning with cellphones, smartphones & social media. *Internet High. Educ.* 19, 18–26.
- Greitemeyer, T., Osswald, S., 2011. Playing prosocial video games increases the accessibility of prosocial thoughts. *J. Soc. Psychol.* 151 (2), 121–128.
- Hamid, S., Waycott, J., Kurnia, S., Chang, S., 2015. Understanding students' perceptions of the benefits of online social networking use for teaching and learning. *Internet High. Educ.* 26, 1–9.
- Hartnett, T., Russell, R.R., 2002. Technological change, technological catch-up, and capital deepening: relative contributions to growth and convergence. *Am. Econ. Rev.* 92 (3), 527–548.
- Hoffman, D.L., Novak, T.P., Schlosser, A., 2000. The evolution of the digital divide: How gaps in Internet access may impact electronic commerce. *J. Comp. Mediated Commun.* 5 (3), 1–55.
- Hussain, I., 2012. A study to evaluate the social media trends among university students. *Proc. Soc. Behav. Sci.* 64, 639–645.
- Ifinedo, P., 2017. Examining students' intention to continue using blogs for learning: perspectives from technology acceptance, motivational, and social-cognitive frameworks. *Comput. Hum. Behav.* 72, 189–199.
- Ilo, P.I., Ifijeh, G., 2010. Impact of the Internet on Final Year Students' Research: A Case Study of Covenant University. *Library Philosophy and Practice (e-journal)*, Ota, Nigeria, pp. 1–7. <https://digitalcommons.unl.edu/libphilprac/403>.

- Ivwhighrehweta, O., Igere, M.A., 2014. Impact of the internet on academic performance of students in tertiary institutions in Nigeria. *Inf. Impact J. Inf. Knowl. Manag.* 5 (2), 47–56. <https://bit.ly/2C4RxGf>.
- Iyendo, O.T., Halil, Z.A., 2015. Computer aided design (CAD) technology versus students' learning in architectural design pedagogy — a controversial topic review. *Int. J. Develop. Res.* 5 (1), 3152–3158. <https://bit.ly/2SFwxen>.
- Kamba, M.A., 2008. The Changing Role of Resources in Nigeria: The Internet as an Alternative Future to Modernity. *Library Philosophy and Practice (e-journal)*. Paper 229. <http://digitalcommons.unl.edu/libphilprac/229>.
- Klein, E.E., Tellefsen, T., Herskovitz, P.J., 2007. The use of group support systems in focus groups: information technology meets qualitative research. *Comput. Hum. Behav.* 23 (5), 2113–2132.
- Krueger, R.A., Casey, M.A., 2002. Designing and conducting focus group interviews. *Soc. Anal. Select. Tools Tech.* 4 (23), 4–24. <https://www.eiu.edu/ihec/Krueger-FocusGroupInterviews.pdf>.
- Mamudu, P.A., Oyewo, A.O., 2015. Use of mobile phones for academic purposes by law students of Igbinedion University, Okada Nigeria. *Int. J. Libr. Sci.* 4 (4), 65–72.
- Manasijević, D., Živković, D., Arsić, S., Milošević, I., 2016. Exploring students' purposes of usage and educational usage of Facebook. *Comput. Hum. Behav.* 60, 441–450.
- Mbofong, U.I., 2003. Students' project write-up in the polytechnic: issues arising. Part 1. *Nigeria Libr. Inform. Sci. Rev.* 18 (1), 7–17.
- McLeod, S., 2008. Social Roles. <https://www.simplypsychology.org/social-roles.html>.
- Mojaye, E., 2015. Mobile phone usage among Nigerian University students and its impact on teaching and learning. *Glob. J. Arts Humanit. Soc. Sci.* 3 (1), 29–38. <https://bit.ly/2LaZJYb>.
- Muniandy, B., 2010. Academic use of internet among undergraduate students: a preliminary case study in a Malaysian university. *Int. J. Cyber Soc. Educ.* 3 (2), 171–178. <http://academic-pub.org/ojs/index.php/IJCSE/article/view/916>.
- Myers, M.D., 2013. *Qualitative Research in Business and Management*. Sage Publication, London.
- Navaretti, G.B., Tarr, D.G., 2017. International knowledge flows and economic performance: a review of the evidence. In: *Trade Policies for Development and Transition*, pp. 129–143.

- Ndagi, J.O., 1999. *Essentials of Research Methodology for Educators*. Ibadan University Press, Ibadan.
- Nketiah-Amponsah, E., Asamoah, M.K., Allassani, W., Aziale, L.K., 2017. Examining students' experience with the use of some selected ICT devices and applications for learning and their effect on academic performance. *J. Comp. Educ.* 4 (4), 441–460.
- Nwachukwu, C., Onyenankeya, K., 2017. Use of smartphones among college students in Nigeria: revelations and reflections. *J. Commun.* 8 (2), 171–182.
- Nwagwu, E.W., Adekannbi, J., Bello, O., 2009. Factors influencing use of the internet: a questionnaire survey of the students of University of Ibadan, Nigeria. *Electron. Libr.* 27 (4), 718–734.
- Nwezeh, C.M., 2010. The impact of Internet use on teaching, learning and research activities in Nigerian universities: a case study of Obafemi Awolowo University. *Electron. Libr.* 28 (5), 688–701.
- Oduwole, A.A., 2004. Impact of internet use on agricultural research outputs in Nigerian Universities of Agriculture. *Libr. Hi Tech News* 21 (6), 12–15.
- Ogedebe, P.M., 2012. Internet usage and students' academic performance in Nigeria tertiary institutions: a case study of university of Maiduguri. *Acad. Res. Int.* 2 (3), 334. [http://www.savap.org.pk/journals/ARInt./Vol.2\(3\)/2012\(2.3-41\).pdf](http://www.savap.org.pk/journals/ARInt./Vol.2(3)/2012(2.3-41).pdf).
- Omotayo, B.O., 2006. A survey of Internet access and usage among undergraduates in an African university. *Int. Inf. Libr. Rev.* 38 (4), 215–224.
- Otunla, A.O., 2013. Internet Access and Use Among Undergraduate Students of Bowen University Iwo, Osun State, Nigeria. *Library Philosophy and Practice* (ejournal), p. 964. <http://digitalcommons.unl.edu/libphilprac/964>.
- Poushter, J., 2016. Smartphone Ownership and Internet Usage Continue to Climb in Emerging Economies. Pew Research Center, Washington, DC, p. 22. <https://pewrsr.ch/1RX3Iqq>.
- Poushter, J., Bell, J., Oates, R., 2015. Internet Seen as Positive Influence on Education but Negative on Morality in Emerging and Developing Nations. Pew Research Center, Washington, DC. <https://pewrsr.ch/1B5jt1r>.
- Rashid, M.A., Han, X., 2016, May. Gesture control of ZigBee connected smart home Internet of things. In: *Informatics, Electronics and Vision (ICIEV), 2016 5th International Conference on* (pp. 667–670). IEEE. <https://ieeexplore.ieee.org/document/7760085>.
- Roudbaraki, M.Z., Esfidvajani, A.M., 2011. Dual role of the computer in human life. In: *International Conference on Humanities, Society and Culture IPEDR*, vol. 20.

Sahin, Y.G., Balta, S., Ercan, T., 2010. The use of internet resources by university students during their course projects elicitation: a case study. *Turk. Online J. Educ. Technol.* 9 (2), 234–244. <http://www.tojet.net/articles/v9i2/9224.pdf>.

Shitta, M.B.K., 2002. The impact of information technology on vocational and technology education for self-reliance. *J. VOC Tech. Educ.* 1 (1).

Shonola, S.A., Joy, M.S., Oyelere, S.S., Suhonen, J., 2016. The impact of mobile devices for learning in higher education institutions: Nigerian universities case study. *Int. J. Mod. Educ. Comput. Sci.* 8 (8), 43–50.

Tezer, M., Soykan, F., 2017. Acceptance scale of tablet computers by secondary education students: validity and reliability study. *J. Univers. Comput. Sci.* 23 (12), 1132–1146. [http://www.jucs.org/jucs\\_23\\_12/acceptance\\_scale\\_of\\_tablet](http://www.jucs.org/jucs_23_12/acceptance_scale_of_tablet).

Ureigho, R.J., Oroke, G.U., Ekruyota, G.O., 2006. The impact of internet usage: a case study of Delta State (Nigeria) tertiary institutions. *Sci. Res. Essays* 1 (2), 054–056. <https://bit.ly/2PxOEBg>.

Walsham, G., 2001. *Making a World of Difference: IT in a Global Context*. John Wiley & Sons, Inc, US.

Weimann, G., 2006. Virtual disputes: the use of the internet for terrorist debates. *Stud. Conflict Terrorism* 29 (7), 623–639.