Article

Use of electronic resources in research and learning in a health sciences library in Ghana: An analysis of awareness and perception of users

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Abstract

University libraries play a critical role by facilitating the use of their electronic resources and facilities available for students' learning and research activities. Health and medical students and professionals are expected to use the electronic resources provided for their academic and research work. This study, therefore, seeks to investigate the acceptance and utilization of electronic resources in research and learning among users of the College of Health Sciences Library of the University of Ghana. The study employed a survey research design along with a quantitative approach to collect data from 128 respondents. A questionnaire was used for data collection, and it was analysed using the Statistical Package for the Social Sciences version 22 (SPSS) software. The study found that a majority of the respondents were aware of the electronic resources provided by the library, and they used various types of e-resources such as Google, Wikipedia, ScienceDirect and PubMed electronic sources. Moreover, the study found that the computer literacy skills of users have a positive relationship with the awareness of e-resources. Furthermore, there is no significant relationship between gender and the perceived usefulness of the use of e-resources. Last but not the least, the high cost of personal internet data and low internet bandwidth were challenges encountered by most of the respondents when accessing e-resources. The study made the following recommendations, among others, regular training on the use of e-resources, and libraries must collaborate effectively with lecturers to create awareness in the lecture hall and also some of the e-resources should be part of teaching instruction.

Keywords

electronic resources, technology acceptance model, medical students, medical library, University of Ghana

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Introduction

The proliferation of digital technologies has led to rapid changes in collection management and development policies and practices. These include the acquisition of resources such as electronic journals (e-journals), electronic books (e-books), electronic theses and dissertations by libraries (Ankamah, 2019; Kato et al., 2021). These resources are termed electronic resources (e-resources) which are digital materials that are be accessed electronically (Ankrah and Atuase, 2018).

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In other words, they are information items in digital format that may be accessed over the internet.

Library users needs have shifted towards electronic content, compared to printed documents which can be assessed at anytime and anywhere. E-resources add value to the access of information by library users for their learning and research needs, since barriers such as availability of limited library materials and proximity of physical library to users are mitigated (Kato et al., 2021). E-resources also ensure better preservation of information since various forms of document deterioration that affect books or paper-based information materials such as mould, water, fire, acid, and pest do not affect digital content especially when they are stored in the cloud (Iyishu et al., 2013). Additionally, e-resources content can be accessed simultaneously by all subscribers either by reading or downloading (Ankrah and Atuase, 2018). E-resources also save the time of users and help users avoid wastage of finances (Habiba and Chowdhury, 2012).

These advantages derived from the use of e-resources have been explored by information centres especially academic libraries, which continually strive to provide their users with readily available information to thousands of their users across the many and different campuses they serve. Moreover, with the decreasing academic libraries budgets, the maximized usage of e-resources is easier to justify since user statistics are readily available compared to print resources (Ankrah and Atuase, 2018).

Academic libraries, particularly in developing economies, are increasingly adopting e-resources to provide information to their users with the least funds available. For instance, academic libraries in Ghana have come together in a consortium agreement (Consortium of Academic and Research Libraries in Ghana - CARLIGH) to subscribe to e-resources that can be accessed by its members at a reduced cost (Asamoah-Hassan, 2011). The University of Ghana Library System (UGLS) is one of the members of CARLIGH and has access to electronic resources such as Association for Computing Machinery (ACM) Digital Library, Cochrane Library, Wiley online library and Taylor & Francis Online (CARLIGH, 2021). These resources can be accessed by all its libraries which comprises satellites, residential/hall, departmental/college, and school libraries in the University of Ghana (UG). The College of Health Sciences (CHS) Library is one of the UGLS libraries (UGLS, 2021).

In a contextual setting, the CHS Library is a satellite library of the UGLS located on the Korle-Bu Campus. The library serves the college's students and employees, as well as other external users such as Korle-Bu Teaching Hospital and surrounding health institutes. The library's collection includes print and electronic resources, with a total of 11, 875 print books covering all health subjects (UGLS, 2021). Print materials, include but are not limited to, textbooks, World Health Organisation (WHO) publications, medical dictionaries, and anatomy atlases. Additionally, the library provides access to health electronic resources that the University of Ghana (UG) subscribes to. Access to wireless fidelity (Wi-Fi), reading areas, library orientation and teaching, software installation, plagiarism checking, and other services are provided by the library. The library is overseen by three medical librarians: the college librarian, two assistant librarians, and various paraprofessionals (UGLS, 2021).

The UG as part of its mission and vision seeks to become a research-intensive university recognized worldwide (University of Ghana, 2018). To achieve this objective, the University has invested huge sums of money through the UGLS to subscribe to e-resources that its community can access and use for its academic and research endeavours. However, available user statistics and research have shown low usage of e-resources which have led to huge financial losses to the University and difficulty for the University to achieve its goal (Ankamah, 2019). Thus, this study seeks to investigate the acceptance and utilization of e-resources in research and learning among users of CHS Library of UG.

The study was guided by the following objectives and hypotheses.

Objectives of the study

The study investigated the following specific objectives:

(a) To determine users' awareness and use of e-resources among users.
(b) To find out users' perception of the use of e-resources.
(c) To examine the relationship between users' computer literacy skills and awareness of electronic resources.
(d) To establish the relationship between users' gender and perception of the use of e-resources.

(e) To find out the challenges users' face in using electronic resources.

Study hypotheses

The study formulated and tested the following hypotheses:

(a) Hypothesis (H1): The computer literacy skills of users have a positive relationship with their awareness of the use of e-resources.
(b) Hypothesis (H2): Gender of users has a significant relationship with the perception of the use of e-resources.

Literature review

Awareness and use of e-resources among academic and research library users

The presence of computers and online services have paved significant ways for easy retrieval of information for research and academic purposes. Electronic resources have become one of the formats that help libraries to support their universal collections. Being aware that these e-resources are available is very important because, it creates many avenues for information to be accessed and utilized according to one's needs.

Awareness is explained as a state of knowledge concerning something that exists or an understanding of a situation or subject at the current time based on information or expertise (Ani and Ahiauzu, 2008). According to Ansari (2020), awareness can also be seen as knowledge or perception of a situation, facts, recognition, consciousness, realization, and acknowledgement of new development. Without the knowledge of e-resources available, a user cannot use them for his or her needs. It is therefore important for academic and research libraries to create awareness of e-resources available through frequent training for users by librarians and insisting on the usage of these resources to enrich academic and research work.

In a study conducted by Sivakami and Rajendran (2019) on awareness, access, and usage of e-resources among faculty members in arts and science colleges, they found out that majority of the male and female users were aware of the availability of e-resources. Many of the users used e-resources to supplement their lecture notes; hence, more research and academic work was carried out. Chandra (2014) in his results on the use pattern of e-resources among faculty members in arts and science colleges in Chennai, concluded that most of the respondents were aware of the e-resources available in their college library. Users have accessed e-resources for their study and research purposes and concluded that e-resources are useful.

The value and use of e-resources in academic and research libraries have increased in time with the advancement in technology globally. Makori (2015) studied the micro factors that influenced the usage of electronic information resources by postgraduate students in the institutions of higher learning in Kenya. The study revealed that electronic information resources are extremely important in the success of the research, teaching, learning, academic administration, and resource support in any university's library.

Kuri et al. (2016) surveyed to find the awareness and use of e-resources by the students, research scholars and faculty members of various disciplines of Vishveshwarya Technical University (VTU) of Karnataka State, India. In their results, they concluded that many students, research scholars and faculty members are aware of the available e-resources as they are user friendly and deliver informative literature with the least expenses and reduced time. They also suggested that scientific search engines should be designed based on individual disciplines and formal training/orientation programmes to overcome the obstacles and effective utilization of e-resources should be conducted by the university library.

Additionally, in a case study conducted by Singh (2019) on awareness and use of e-resources among the users of the Library of Punjabi University, Patiala, the results showed that the majority of the students are aware of e-resources and that use of e-resources is frequent among undergraduates, postgraduates, and research scholars. Further, he stated that research scholars rely extensively on e-resources to access relevant information.

Academic and research library users' perception of the use of e-resources

The use of e-resources varies from one user to the other. Many factors influence the acceptance of e-resources usage in research and learning. Users' acceptance to use e-resources depends on factors such as perception and ability to use these e-resources. The introduction and use of e-resources in the academic field have faced and continue to face challenges with users' acceptance, but there have been some positive results (Ngo and Eichelberger, 2019; Sahu and

Pandey, 2018). According to Adeoye and Olanrewaju (2019), many models and theories have been developed in a bid to properly conceptualize the way library users approach information systems for their various needs. These theories have inspired learning and research and facilitated the development of diverse solutions and frameworks designed to help both the information users and information service providers.

Technology Acceptance Model (TAM) is an information systems theory that explains in models how users accept and use new technology. This theory was pioneered by Davis (1989). The two major factors influencing the decisions for a user to adopt new technology in this model are Perceived usefulness (PU) and Perceived Ease of Use (PEOU). According to Davis (1989), perceived usefulness is the degree to which an individual believes that the usage of a particular system or technology would improve his/her job performance. Perceived ease of use explains the perception of a user to be able to utilize a system or technology without any effort.

In a study conducted by Adeoye and Olanrewaju (2019) on the use of the Technology Acceptance Model (TAM) to evaluate library electronic information resources used by undergraduate students at Lead City University, Ibadan, Nigeria, the results on the perceived usefulness revealed positive attitudes to perceived usefulness of electronic resources. Users find electronic resources very useful in their academic work. In the same study on perceived ease of use also, the results showed that users find electronic resources available to them easy to use for their assigned tasks.

Adetunla (2016), in his study on perceived ease and use of electronic information resources by undergraduate students at private universities in Oyo State, Nigeria, revealed that the majority of the undergraduate students could not understand and interact with the electronic information resources available. They perceived the use of e-resources complex which could be because of their level of competence in IT to interact with these resources for both academic and research works. Budu (2015), asserted that effective utilization of electronic information resources will increase if students are regularly trained on how to use them. He further suggested that information literacy skills should be developed and integrated into university courses to boost life-long learning behaviour in students.

Tamrakar and Garg (2016) observed in their study on user perception towards e-resources and services of Indian Institute of Technology Guwahati (IITG) Library that 59.89% of respondents were aware of the available e-resources on subject areas in the library whereas 40.10% of the respondents were not aware of these e-resources. They suggested that awareness programmes should be organized to educate users on the benefits of e-resources for academic and research works.

User's computer literacy skills and use of electronic resources

Computer literacy is essentially an indispensable skill to acquire when one wants to efficiently use electronic resources to meet informational needs in this technological evolving world today. Electronic resources are computer-based databases made up of books, journals, dictionaries, encyclopaedias, and other information resources (Odunewu and Aluko-Arowolo, 2018). Computer use competence is expected for a user to fully exploit electronic resources. Computer literacy skills are therefore the ability of a user to use a computer and its accessories to generate any form of data or to search through the internet for information. Computers provide speed, flexibility, and accuracy, and enhance efficiency and effectiveness. Having access to ICT and computer facilities could be a major driver in the use of electronic resources in university libraries (Abubakar and Cholom, 2017).

A study conducted by Abubakar and Cholom (2017), on the relationship of user education, computer literacy and ICT accessibility and use of e-resources by post-graduate students in Nigeria university libraries, showed that post-graduate students did not fully utilize the e-resources provided for their research needs due to lack of access to ICT and inadequate computer literacy. However, in a study by Ojeniyi and Adetimirin (2016) on ICT literacy skills and electronic information resources used by lecturers in two private universities in Oyo State, Nigeria, it was found out that lecturers were fully equipped or had high ICT literacy skills and computer browsing, hence a positive relationship existed significantly between ICT literacy skills and the use of e-resources.

Users' age and use of e-resources

The debate on the age differences in the adoption and use of e-resources by users have led many researchers to probe and conclude that there is a relationship between age and the ability to use ICT skills to find information

when it comes to the use of e-resources. According to Park (2010), younger people learn about technology more quickly than older people. Age influences the use of e-resources with younger users exhibiting more competencies. Machimbidza and Mutula (2020) concluded in their study that younger academics possess higher technological skills than older academics; hence, high usage of e-resources among the younger academics as compared to the older academics. Likewise, Quadri (2013) showed that younger users relied on electronic resources more heavily and rated themselves more adept at using them than the older users. They concluded that a significant relationship exists between the age of users and the use of electronic resources. However, researchers such as Ani (2013), Harle (2010) and Zhang et al. (2011), found that the age of users does not influence the use of electronic resources.

Users' gender and use of electronic resources

Gender influences many factors such as income, time constraint, education, employment, information technology skills, use of electronic resources and many others. In developing information technologies and the competency in using electronic resources, gender must be considered as both males and females need the necessary skills to navigate their way through the evolving information landscape (Oyeniyi, 2013). Further empirical studies have shown that both males and females, to a large extent, use electronic resources for the same purpose and face the same challenges accessing them (Ameyaw and Asante, 2018; Bamidele and Adekanmbi, 2019; Oyeniyi, 2013). They concluded in their results that there is no statistically significant difference between males and females on the use of electronic resources and that the gap is negligible. On the contrary, Bassi and Camble (2011) and Ikolo (2012) revealed a statistical difference between male and female students' attitudes, towards the use of electronic resources for their various information needs.

Challenges users face in using electronic resources

Despite the numerous benefits of electronic resources in libraries, there are problems relating to their acquisition, maintenance, management etc. which need collaborative efforts of professionals and stakeholders in the creation, distribution and use of electronic resources (Chandel and Saikia, 2012). Other factors such as the lack of awareness, computer illiteracy skills, unreliable internet connectivity, power fluctuations, the difficulty in identifying the right resources to meet one's information needs and many others hinder the use of electronic resources in libraries.

Most university libraries in Ghana are still making a great effort to provide unlimited access to electronic resources to support learning, research and teaching but are faced with financial constraints. Subscription to these electronic resources is expensive; hence, some libraries fail to subscribe. According to Kwafoa et al. (2014), due to the importance and usefulness of electronic resources, CARLIGH pays an average of 25 0000 US Dollars as a subscription fee to enable affiliated institutions to have unlimited access to selected scholarly electronic resources for their information need at a subsidy. Moreover, studies such as Akporhonor and Akpojotor (2016), Ameyaw et al. (2016), Ternenge and Kashimana (2019), found that unreliable power supply and poor internet connectivity are some of the challenges users face in accessing electronic resources in libraries.

In an investigation on e-resource utilization among university students in a developing country by Mawere and Sai (2018), the lack of awareness and ignorance, unavailability of relevant electronic resources, poor internet connectivity and low bandwidth were cited as hindrances to the utilization of electronic resources. Similarly, Mwantimwa et al. (2017) indicated that the challenges and problems that deter the effective utilization of e-resources included slow internet connectivity, inability to access full-text articles, unreliable power supply, inaccessibility of e-resources outside university premises due to IP address limitations, inadequate ICT infrastructure and inadequate skills and knowledge.

The advent of electronic resources in libraries is gradually changing library services from physical print materials to virtual entirely. There is the need for library professionals to make these resources attractive, through regular training on how to generate the right electronic resources to meet academic and research needs so that users can accept and utilize these resources, irrespective of their demographic backgrounds or the challenges that come with their use.

Theoretical framework

For decades, academics have been interested in the variables that influence the acceptance or rejection of new technology. Davis' Technology Acceptance

Model is one of the famous models that attempt to reflect the impact of technology on society. The study was guided by the Technology Acceptance Model (TAM). TAM is a frequently used model of IT adoption and uses today. However, it has been criticized for failing to provide practitioners with concrete recommendations (Venkatesh and Bala, 2008).

Fortunately, since TAM's debut in 1989 by Davis, there have been several advancements and expansions to mitigate its weaknesses. TAM has been extended to TAM2, which includes components that moderate perceived usefulness, and TAM3, which combines TAM2 with the model of the drivers of perceived ease of use. TAM3 is, in other words, a comprehensive and integrated model of the factors that influence perceived utility and perceived ease of use. Thus, it is a theoretical framework that represents the accumulated body of information from TAM research throughout the years.

In this study, adopting e-resources into one's research and studies is equivalent to accepting new technology. According to the Technology Acceptance Model 3, the behavioural intention to utilize technology is governed by two beliefs, namely:

- Perceived Usefulness (PU), is defined as a person's belief that utilizing a system would improve his work performance (Venkatesh and Bala, 2008).
- Perceived Ease of Use (PEOU), is defined as the degree to which a person feels that utilizing a system would be effortless (Venkatesh and Bala, 2008).

Subjective norms, work relevance, output quality, and outcome demonstrability are the drivers of PU, whereas computer self-efficacy, computer anxiety, computer playfulness, and perceptions of external controls are the factors of PEOU (or facilitating conditions). According to the theory, perceived usefulness is determined by perceived ease of use. The study, which was guided by the theory (TAM3), also sought to determine how perceived usefulness and ease of use affected the usage of e-resources in research and learning (Figure 1).

Research methodology

The study employed a quantitative approach and survey research design to investigate the acceptance and utilization of electronic resources in research and learning among users of the College of Health Sciences Library of the University of Ghana. The survey research design was employed because it allowed the researchers to collect a large amount of data within the shortest possible time, to generalise from the sample to the population. The target population size was 1032 medical students in the College of Health Sciences. A sample of 128 respondents was conveniently selected from the College of Health Sciences Library to participate in the study. A questionnaire was utilized to collect data, and it was self-administered by the researchers. Questionnaires were self-administered to all 128 respondents, of which 104 respondents agreed and participated which represents a response rate of 81.25 per cent. The Statistical Package for the Social Sciences version 22 (SPSS) was used to perform the statistical analysis. The questionnaire had four main sections. Section A was developed to obtain respondents' demographic details (that is, age, gender, and user category). Section B is comprised of questions used to ascertain users' level of awareness and use of e-resources. Section C included statements used to measure the perception of the use of e-resources of respondents which were adapted from the TAM3 model and were measured on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Section D consisted of questions used to determine the challenges respondents' face in the use of e-resources. The data collection lasted for four weeks. The data from the questionnaire were analysed using both descriptive (frequency, percentage, mean and standard deviation) and inferential statistics (chi-square and correlation). The results are presented under the following headings: User demographics; Awareness and use of electronic resources; Perception of the use of e-resources; Computer literacy and use of e-resources; Gender influences the perception of the use of e-resources; and Challenges faced in the use of e-resources.

Results and discussions

Out of a total of 128 respondents who were solicited to participate in the study, 104 respondents participated in the study representing an 81.25% response rate.

User demographics

The study collected demographic information from the user to understand the characteristics of the respondents, who participated in the study. Table 1 shows user demographics such as gender, age, and user category.

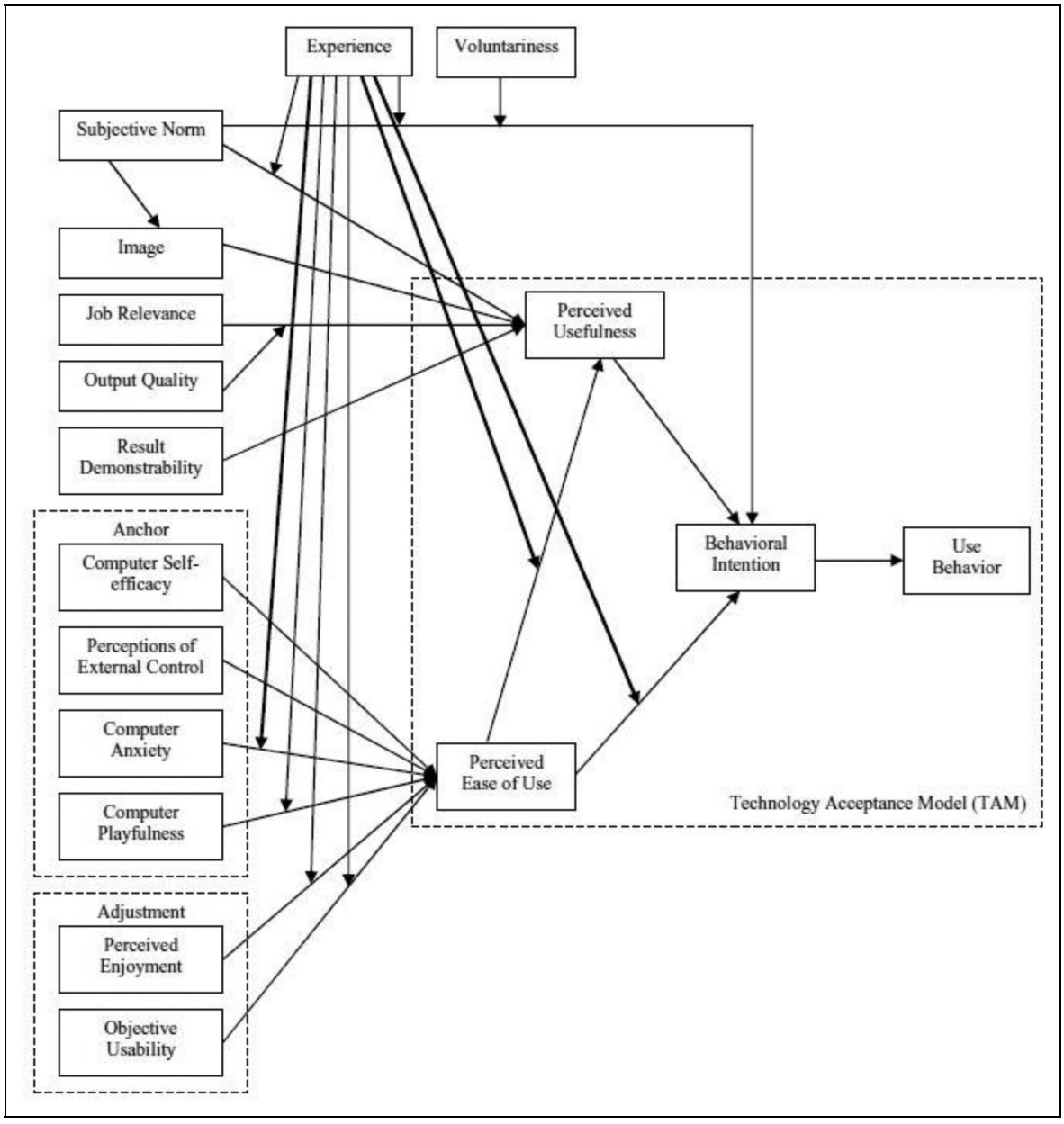

Figure 1. Technology acceptance model 3 (Venkatesh & Bala, 2008).

It can be realized from Table 1 that 58 representing 57.4% were male and 43 representing 42.6% were female, with a mean score and standard deviation of 1.43 and 0.497 respectively. Additionally, 71 (68.3%) respondents were in the age category of 20-30 years, 23 (22.1%) of them falls within 31–40 years, 7 (6.7%) of them were in the age category of 41 years and above whilst 3 (2.9%) of them fell below 20 years with a mean score and standard deviation of 1.37 and 0.52 respectively. Further, 53 (51.0%) were medical students, 17 (16.3%) were medical practitioners, 14 (13.5%) were others, 8 (7.7%) were Allied Health students, 6 (5.8%) were nurse practitioners whilst 2 (1.9%) each were pharmacist, faculty, and researcher with a mean score of 2.81 and standard deviation of 2.473.

Awareness and use of electronic resources

To determine users' awareness and use of e-resources among users, respondents were asked to indicate their awareness of e-resources, the channel of the awareness of e-resources, frequency of provision of

Table 1. Demographics of the user.

Variables	Frequency	Percent	Mean	Standard Deviation
Gender				
Male	58	57.4	1.43	0.497
Female	43	42.6		
Age				
below 20 years	3	2.9	2.33	0.645
20-30 years	71	68.3		
31-40 years	23	22.1		
41 years and above	7	6.7		
User Category				
Medical Student	53	51.0	2.81	2.473
Allied Health Student	8	7.7		
Medical Practitioner	17	16.3		
Nurse Practitioner	6	5.8		
Pharmacist	2	1.9		
Faculty	2	1.9		
Researcher	2	1.9		
Other	14	13.5		

Table 2. Awareness of e-resources.

Variable	Frequency	Per cent	Mean	Standard Deviation
Yes	67	66.3	1.34	0.475
No	34	33.7		

e-resources training, computer literacy, knowledge in ICT, and use of e-resources.

Awareness of electronic resources. Awareness is important because it facilitates the effective and efficient use of e-resources. Table 2 depicts the respondents' responses.

As indicated in Table 2, an encouraging number of respondents, a total of 67 (66.3%), stated that they were aware of the e-resources provided by the library, whilst 34 (33.7%) indicated otherwise with a mean score of 1.34 and a standard deviation of 0.475. It can be seen from the results that the majority of the respondents were aware of the e-resources provided by the library. This is in line with the results of Sivakami and Rajendran (2019) who reported on the "awareness, access and usage of e-resources among faculty members in arts and science colleges". They found out that most of the male and female users were aware of the availability of e-resources. Thus, many of the users used e-resources to supplement their lecture notes; hence, more research and academic work was carried out. Also, the results compare favourably with the views of some researchers such as Chandra (2014), Kuri et al. (2016) and Singh (2019) who revealed that most of the respondents were aware of the e-resources available in their library. The awareness of the e-resources was because of their user-friendliness, delivery of informative literature and reduced retrieval time during usage. It can therefore be established that e-resources have become popular and facilitate the academic work of the library user. The results contradict that of Kwafoa et al. (2014) who indicated that faculty and administrators had low patronage of the library's online databases due to lack of awareness. Therefore, it can be realized that marketing of library services is very important to make users aware of the resources and increase patronage.

Table 3. Channel of the awareness of e-resources.

Variable	Frequency	Percent
Librarian	18	25.4%
Lecturer	19	26.8%
Classmate	12	16.9%
Colleagues	17	23.9%
Notices	5	7.0%
Library website	7	9.9%
Library orientation	24	33.8%
Library instruction	2	2.8%
Social Media	1	1.4%
Other	2	2.8%

Channel of awareness creation of electronic resources. Awareness creation channels are important to promote effective use of the e-resources. Table 3 depicts their responses.

In Table 3, a follow-up question was asked on the earlier question (Table 2), a motivating number of respondents got to know about the e-resources through library orientation, 24 (33.8%); lecturers, 19 (26.8%); librarians, 18 (25.4%); and colleagues, 17 (23.9%). Further, 12 (16.9%) became aware through classmates and 7 (9.9%) got to know about the e-resources through the library's website. Also, 5 (7.0%) got to know about the e-resources through notices and 2 (2.8%) each became aware through library instructions and others. The least 1 (1.4%) of

Table 4. Provision of e-resources training.

Variable	Frequency	Per cent	Mean	Standard Deviation
Very infrequently	19	23.2	2.54	1.068
Somewhat infrequently	15	18.3		
Occasionally	35	42.7		
Somewhat frequently	11	13.4		
Very frequently	2	2.4		

Table 5. Use of e-resources.

Variable	Frequency	Per cent	Mean	Standard Deviation
Daily	15	21.1	3.07	1.417
Weekly	12	16.9		
Monthly	8	11.3		
Semesterly	25	35.2		
Yearly	11	15.5		

the respondents became aware through social media. It is an indication from the results that respondents became aware of the existence of the e-resources through various channels such as the library orientation, lecturers, librarians, colleagues, and other forms of information dissemination. This is in tandem with the results of Ankrah and Acheampong (2017) and Ankrah and Atuase (2018) who found out that the means of awareness of e-resources in the library was through colleagues, orientation, seminars or workshops and other forms of information dissemination. With regards to this, Kuri et al. (2016) suggested that formal training or orientation programmes should be used to overcome the obstacles of non-use of e-resources and to influence the effective utilization of e-resources.

Provision of e-resources training. Provision of training can affect the use of e-resources and as such, respondents were asked to indicate their responses. The provision of e-resources training is important because it has the possibility of increasing the use of e-resources. Table 4 shows their responses.

It can be realized from Table 4 that 35 (42.7%) of the respondents indicated that the library provides occasional training whilst 19 (23.2%) of them stated that the library provides very infrequent training. Also, 15 (18.3%) indicated somewhat infrequently provision of library training. Further, 11 (13.4%) and 2 (2.4%) indicated somewhat frequently and very frequently respectively with a mean score of 2.54 and standard deviation of 1.068. It can be inferred from the results that the majority of the respondents received training occasionally or irregularly. The results disagree with that of Sethi and Panda's (2012) results, who revealed that most of the respondents used e-resources frequently ranging between 2–3 times a week. Sethi and Panda (2012) users included faculty members, researchers, MPhil, and postgraduate students whilst in this current study most of the users who use the library were undergraduate students. It can be established from the results that the library must give attention to all categories of users. This will facilitate optimum usage of the e-resources no matter their levels.

Use of e-resources. The use of e-resources is important to ascertain whether the e-resources were meeting users' needs or not. Table 5 depicts respondents' responses.

It can be deduced from Table 5 that less than half of the respondents used the e-resources 'semester' 25 (35.2%) followed by daily 15 (21.1%). Another use of the e-resources is as follows: weekly, 12 (16.9%); yearly, 11 (15.5%); and monthly, 8 (11.3%) with mean score and standard deviation of 3.07 and 1.417 respectively. It can be seen from the results that most of the respondents used the e-resources semesterly. The semesterly use of e-resources can be attributed to the fact that students used the e-resources within the four months of being in school for their academic work. The results are inconsistent with those of Ankrah and Acheampong (2017) who said that most of the respondents 165 (30.6%) use the e-resources every week. Even though a lot of students indicated a weekly basis, it is worthwhile to also know that 116 (21.5%) indicated different times including specific periods which may or may not be ascribed to semesterly.

Computer literacy. For the optimal use of e-resources, the researchers asked questions to solicit their skills in computer literacy. Their responses are seen in Table 6.

It was revealed in Table 6 that an increasing number of 101 (98.1%) stated that they were computer literates whilst 2 (1.9%) stated they were not computer literates with a mean score of 1.02 and standard deviation of

Table 6. Computer literacy.

Variable	Frequency	Percent	Mean	Standard Deviation
Yes	101	98.1	1.02	0.139
No	2	1.9		

Table 7. Rating knowledge in ICT.

Variable	Frequency	Per cent	Mean	Standard Deviation
Basic	11	10.9	2.50	0.757
Intermediate	33	32.7		
Competent	52	51.5		
Expert	5	5.0		

Table 8. Type of e-resources.

Variable	Frequency	Per cent
PubMed	54	53.5%
Hinari	8	7.9%
Epocrates	1	1.0%
Google	89	88.1%
Micromedex	1	1.0%
Wikipedia	65	64.4%
ScienceDirect	55	54.5%
Jaypee digitals	5	5.0%
ClinicalKey	12	11.9%
UpToDate	26	25.7%
Google Scholar	45	44.6%
CINAHL	2	2.0%
Scopus	9	8.9%
PDFdrive	39	38.6%
Other	10	9.9%

0.139. It can be established from the results that most of the respondents were computer literates. This is not quite surprising since the use of e-resources requires basic computer literacy skills to ensure optimum use of e-resources. This is consistent with the results of Ojeniyi and Adetimirin (2016) who revealed in their study that lecturers were fully equipped or had high ICT literacy skills and computer browsing. This implies that students and lecturers will fully utilize the e-resources if they have the requisite computer literacy skills. The results disagree with that of Ankrah and Atuase (2018) who revealed that a total of 158 (62.1%) of the respondents indicated that they did not have enough skills in the use of a computer. The difference in results is attributed to the fact that in the Ankrah and Atuase (2018) study, the postgraduate mostly relied on librarians for searching and retrieval than in the current study where students/users searched and retrieved their materials. On the other hand, Abubakar and Cholom (2017) showed that postgraduate students did not fully utilize the e-resources provided for their research needs due to a lack of access to ICT tools and inadequate computer literacy skills. It can be deduced that computer literacy knowledge is a requisite for students to fully utilize the e-resources for their academic and research work.

Knowledge in ICT. Knowledge in ICT helps to know the respondents' level of use of e-resources. Table 7 represents their responses.

A follow-up question was asked for respondents to rate their knowledge in ICT. As depicted in Table 7, more than half of the respondents indicated 'competent', 52 (51.5%) followed by 'intermediate', 33 (32.7%). Further, 11 (10.9%) indicated that their level of knowledge in ICT was 'basic' and 5 (5.0%) indicated 'expert' with a mean score of 2.50 and standard deviation of 0.757. It can be deduced from the results that the majority of the respondents were competent in ICT usage. This is also an indication that respondents have ICT proficiency to effectively use the e-resources. The results disagree with that of Ankrah and Acheampong (2017) who revealed that most of the computer literate respondents were at the intermediate level. This means respondents of the current study were more competent than respondents in Ankrah and Acheampong's (2017) study since the institution of the current study organizes computer literacy training for their students.

Type of e-resources. The type of e-resources used by respondents were relevant to inform library staff on the e-resources for awareness creation. Table 8 indicates their responses.

From Table 8, an inspiring number of respondents presented Google, 89 (88.1%) as the topmost used e-resources. This was followed by Wikipedia, 65 (64.4%); ScienceDirect, 55 (54.5%); PubMed, 54 (53.5%); Google Scholar, 45 (44.6%) and PDFdrive, 39 (38.6%). Also, 26 (25.7%) indicated that they used UpToDate whilst 12 (11.9%) and 10 (9.9%) indicated ClinicalKey and others. Additionally, 9 (8.9%), 8 (7.9%) and 5 (5.0%) stated they used Scopus, Hinari and Jaypee digital respectively. Finally, 2 (2.0%) of the respondents used CINAHL whilst 1 (1.0%) each used Epocrates and Micromedex. It can be realized from the results that the majority of the respondents used various sources of e-resources including both

Table 9. Perception of the use of e-resources.

Constructs	Measurement Statements	Mean	Standard Deviation
Perceived Usefulness (PU) of the use of e-resources	I think that using e-resources will be free of effort.	3.79	4.272
	My instructors, librarians, peers, or colleagues advise me to use e-resources during my research and studies.	4.05	0.845
	I think the use of e-resources makes me feel prestigious among my classmates or colleagues or its use elevates my social status.	3.00	1.155
	I believe that e-resources have relevance or apply to my studies and research.	4.52	0.560
	I believe that e-resources help me to perform well in my studies and/or improve my research work.	4.25	0.793
	I think that I get better results from using e-resources during my studies and research.	4.06	0.862
Perceived Ease of Use (PEOU) of the use of e-resources	I think I have the skill or ability to perform literature searches using the computer.	3.98	0.860
	I think the University's libraries and ICT units exist to support the use of e-resources.	3.59	1.008
	I become afraid or anxious when faced with the possibility of using computers.	1.59	0.815
	I believe that using computers and their interactions is full of fun.	3.77	0.843
	I think using e-resources for literature searching is enjoyable.	3.91	0.637
	I think that e-resources' search functionalities are easy to use to complete basic and advanced searching and browsing for literature.	3.92	0.833

internet (such as Google, Wikipedia) and electronic sources (such as ScienceDirect, PubMed, Google Scholar). Google internet sources were mostly used by respondents because it is regularly updated, provides links to multiple websites, and it is very fast covering all fields of knowledge (Asemi, 2005) whilst ScienceDirect electronic sources were used because it provides scholarly information relevant to academic work and most of the information covers health. It is quite surprising that students used more internet sources such as Google and Wikipedia than academic databases such as ScienceDirect. The use of academic databases by students may be due to the awareness created by the library.

The results conform with those carried out by Gyesi (2020) on the information-seeking behaviour of graduate students at the University of Professional Studies, Accra. In his study, he indicated that the majority of students used Google internet sites (87.0%) for their course work. On the other hand, the results are contrary to what Ankrah and Acheampong (2017) and Gyesi (2020) revealed, that most of the respondents use the Emerald academic database. It is important to note that the differences relating to the use of the Emerald database can be ascribed to subject areas. Most of the students in the current study were science students whilst students in Ankrah and Acheampong's (2017) and Gyesi's (2020) studies were pursuing business as such Emerald database was relevant to them rather than ScienceDirect which was more of a health-related database. It is an indication from the result that the CHS Library must create more awareness of the use of the journal databases and deter students from using Google since it is not 100% reliable. According to Ankrah and Atuase (2018), the library should adopt more effective measures to improve the usage of the subscribed e-resources. The researchers in the current study think that the training programmes must include a comparison between Google and databases in relation to scope, access, content, authorship, editorial control, and reliability. These comparisons will help students to appreciate why they should use library's e-resources rather than Google. The awareness of the e-resources must be extended to all the health-related literature subscribed by the University of Ghana Library System.

Perception of the use of e-resources

Respondents were given the options to choose from a five-point Likert-type scale ranging from 1 to 5, where 1 = strongly disagree, 2 = moderately disagree, 3 = moderately agree, 4 = agree, and 5 = strongly agree. Respondents' responses are indicated in Table 9.

It can be seen from Table 9 that most respondents believed that e-resources have relevance or apply to their studies and research (mean = 4.52 and SD = 0.560). Others claim that they got better results from using e-resources during their studies and research (mean = 4.06 and SD = 0.862). The least perceived usefulness of the use of e-resources was that the use of e-resources made them feel prestigious among their classmates or colleagues or its use elevates their social status (mean = 3.00 and SD = 1.155). Inferring from the results, the majority of the respondents indicated that e-resources have relevance or apply to their studies and research. This can be attributed to the fact that users obtain useful information when they search the e-resources. The results are consistent with those of Adeoye and Olanrewaju (2019), which revealed positive attitudes to the perceived usefulness of electronic resources. Thus, users find electronic resources very useful in their academic work. It is an indication that the library needs to acquire more health-related literature relevant to their field of study. The results contradicted the previous study that the undergraduate students perceived e-resources as very complex to use and not flexible (Adetunla, 2016). The difference in Adetunla (2016) results could be attributed to their level of IT competence which makes them perceive e-resources as complex, and not flexible to use. This implies that the use of e-resources requires technical assistance and lack of adequate training affect the perceived usefulness (PU) of the e-resources (Adetunla, 2016). Therefore, it can be realized from the results that there must be constant training in IT and the use of e-resources.

On the issue of Perceived Ease of Use (PEOU) of the use of e-resources, most of the respondents indicated that library users thought they have the skills or abilities to perform literature searches using the computer (mean = 3.98 and SD = 0.860). Additionally, other library users indicated that they believed that using computers and their interactions was full of fun (mean = 3.77 and SD = 0.843). The least "Perceived Ease of Use (PEOU) of the use of e-resources" is when "they become afraid or anxious when faced with the possibility of using computers" (mean = 1.59 and SD = 0.815). It can be explained that the majority of the respondents had the skills or abilities to perform literature searches using the computer. Information literacy skills are therefore recognized as important to the user. The results support that of Adeoye and Olanrewaju (2019) who indicated that e-resources are easy to use, thus, students find it easy to get the e-resources to do their assignments. Therefore, information literacy skills should be developed and integrated into university courses to boost lifelong learning behaviour in students (Budu, 2015).

Challenges in the use of e-resources

Using the internet to access resources comes with a lot of challenges. Therefore, library users were asked to indicate the challenges they face in using electronic resources. A summary of the responses has been presented in Table 10.

From Table 10, the study indicated that the major challenge in the use of e-resources was 'high cost of personal internet data', 82 (82.0%) and 'low internet bandwidth' 77 (77.0%). In addition, 46 (46.0.0%) of the respondents indicated 'too much information (information overload)' and 43 (43.0%) indicated 'staying up to date with e-resources'. Subsequently, 30 (30.0%) and 25 (25.0%) indicated 'lack of time' and 'poor user interface designs of e-resources', respectively, as challenges in the use of e-resources. 'E-resources expertise development' was the least challenge encountered by respondents 15 (15.0%) in using e-resources. It is obvious from the results that the majority of the challenges encountered by respondents in the use of e-resources were the high cost of personal internet data and low internet bandwidth. It is not surprising that students encountered a lot of challenges in the use of e-resources, and this can be

Table 10. Challenges in using e-resources.

Variables	Frequency	Per cent
Low internet bandwidth	77	77.0%
Poor user interface designs of e-resources	25	25.0%
High cost of personal internet data	82	82.0%
Lack of time	30	30.0%
Too much information (information overload)	46	46.0%
E-resources expertise development	15	15.0%
Staying up to date with e-resources	43	43.0%

attributed to the fact that infrastructures concerning the use of e-resources have not been improved.

The results were supported by what Akporhonor and Akpojotor (2016), Ameyaw et al. (2016) and Ternenge and Kashimana (2019) found in their research studies. They revealed that users faced challenges in accessing electronic resources in libraries and they attributed the challenges to the unreliable power supply and poor internet connectivity. Mawere and Sai (2018) supported the view that lack of awareness and ignorance, unavailability of relevant electronic resources, poor internet connectivity and low bandwidth are hindrances to the utilization of electronic resources. These challenges or hindrances according to Mwantimwa et al. (2017) deter the effective utilization of e-resources. Further, they attributed the challenges to slow internet connectivity, inability to access full-text articles, unreliable power supply, inaccessibility of e-resources outside university premises due to IP address limitations, inadequate ICT infrastructure and inadequate skills and knowledge (Mwantimwa et al., 2017). These challenges affect Ghanaian university libraries in serving it users better and as such Kwafoa, et al. (2014) indicated that due to the importance and usefulness of electronic resources, the CARLIGH pays on average of 250000 US Dollars as a subscription fee to enable affiliated institutions to have unlimited access to selected scholarly electronic resources for their information need at a subsidy. This will take some of the challenges from the libraries and go a long way to facilitate learning, research, and teaching. On the other hand, as CARLIGH are trying their best for affiliated institutions to have access to the e-resources, there is the need for the library staff to promote the use of the e-resources and the institution must also cater for infrastructure challenges that can hinder the use of the resources.

Table 11. Computer literacy and use of e-resources.

H1	Pearson Correlation	Sig. (2-tailed)	Outcome
The computer literacy skills of users have a positive relationship with the awareness of the use of e-resources	0.204*	0.042	Positive

*Correlation is significant at the 0.05 level (2-tailed).

Hypothesis (H1): The computer literacy skills of users have a positive relationship with the awareness of the use of e-resources (Table 11).

The results show that the computer literacy skills of users ($p = 0.204$) have a positive relationship with the awareness of the use of e-resources. This suggests that an increase in the computer literacy skills of users will cause an increase in awareness of the use of e-resources among users. It could be said that the computer literacy skills such as hardware, software, internet, and related technology did, in a major way, have an impact on the awareness of the use of e-resources. Therefore, the CHS Library must liaise with the University of Ghana Computing System (UGCS) to train users in the basic and advanced course in computer and information literacy. Thus, UGCS will teach users about computer literacy skills whilst the CHS Library will concentrate on information literacy skills to create awareness of the use of the e-resources thereby making users competent in computer literacy.

The results agree with Ankrah and Acheampong's (2017) study on students' use of electronic resources in University of Professional Studies, Accra (UPSA) which revealed that students' computer literacy skills relate significantly to their extent of use of e-resources. This implies that having access to ICT and computer facilities could be a major driver in the use of electronic resources in university libraries (Abubakar and Cholom, 2017). Also, the results are in tandem with those of Abubakar and Adetimirin (2015) and Ojeniyi and Adetimirin (2016) result that a positive relationship existed significantly between computer literacy skills and the use of e-resources. This means users will fully use e-resources if they have the requisite computer literacy skills to access the resources. Thus, the more computer-literate the students are, the more leverage for them to meander in the digital environment to retrieve and use e-resources (Abubakar and Adetimirin, 2015). It can therefore be realized that increasing competencies in computer literacy will go a long way to affect the usage rate of the e-resources.

Hypothesis (H2): Gender of users have a significant relationship with the perception of the use of e-resources (Table 12).

The results show that there is no significant relationship between gender and the perceived usefulness of the use of e-resources. This indicates that gender

Table 12. Gender against perception of the use of e-resources.

Independent variable	Dependent variable	Determinants	Measurement Statements	P-value	Outcome	Remarks
Gender	PU of the use of e-resources	PEOU	I think that using e-resources will be free of effort.	0.824	Not Significant	Rejected
		Subject Norm	My instructors, librarians, peers, or colleagues advise me to use e-resources during my research and studies.	0.846	Not Significant	Rejected
		Image	I think the use of e-resources makes me feel prestigious among my classmates or colleagues or its use elevates my social status.	0.494	Not Significant	Rejected
		Job Relevance	I believe that e-resources have relevance or apply to my studies and research.	0.272	Not Significant	Rejected
		Out Quality	I believe that e-resources help me to perform well in my studies and/or improve my research work.	0.909	Not Significant	Rejected
		Result Demonstrability	I think that I get better results from using e-resources during my studies and research.	0.724	Not Significant	Rejected
	PEOU of the use of e-resources	Computer Self-Efficacy	I think I have the skill or ability to perform literature searches using the computer.	0.197	Not Significant	Rejected
		Perception of External Control	I think the University's libraries and ICT units exist to support the use of e-resources.	0.847	Not Significant	Rejected
		Computer Anxiety	I become afraid or anxious when faced with the possibility of using computers.	0.179	Not Significant	Rejected
		Computer Playfulness	I believe that using computers and	0.022	Significant	Supported

(continued)

Table 12. (continued)

Independent variable	Dependent variable	Determinants	Measurement Statements	P-value	Outcome	Remarks
			their interactions is full of fun.			
		Perceived Enjoyment	I think using e-resources for literature searching is enjoyable.	0.326	Not Significant	Rejected
		Objective Usability	I think that e-resources' search functionalities are easy to use to complete basic and advanced searching and browsing for literature.	0.572	Not Significant	Rejected

Note: Significant level is at $p < 0.05$.

does not have much impact on the perceived usefulness of the use of e-resources. It could be said that gender does not influence the determinants of perceived usefulness (PU) of the use of e-resources. These determinants include perceived ease of use (PEOU), subject norm, image, job relevance, out quality and result demonstrability. The results support the work of Letchumanan and Tarmizi (2011), who indicated that there is no significant relationship between gender and perceived usefulness. Thus, gender is not an important factor that influences respondents to perceive e-books as useful and easy to use. Therefore, training and awareness must be created no matter the gender.

On the other hand, there is no significant relationship between gender and most of the PEOU of the use of e-resources. This suggests that gender does not have much influence on the PEOU of the use of e-resources except computer playfulness. Therefore, it could be said that the determinants elements such as computer self-efficacy, perception of external control, computer anxiety, perceived enjoyment, and objective usability with exception of computer playfulness do not influence the gender of users. The results disagreed with previous studies that there is a relationship between gender and perceived ease of use of e-resources by students (Bassi and Camble, 2011; Ebijuwa, 2018; Ikolo, 2012). On the other hand, there is a significant relationship between gender and computer playfulness. This implies gender influences students' tendency to interact with computers. This result supports that of Oyeniyi (2013), who indicated that gender, thus, both males and females need the necessary skills to navigate their way through the evolving information landscape.

Theoretical interpretation of the study

This study makes use of the Technology Acceptance Model (TAM). Two important variables are considered as determinants to the use of electronic resources in TAM and these are the use of perceived usefulness (PU) and perceived ease of use (PEOU). The study provides some evidence of the application of the TAM theory to the use of electronic resources learning in a health sciences library in Ghana. It was postulated that the computer literacy skills of users are affected by the awareness of the use of e-resources. Also, it was hypothesized that gender is not affected by the perceived usefulness of the use of e-resources.

The theory is consistent with the results of the study. In a sense, the awareness of the use of e-resources is affected by computer literacy skills which is one of the external variables. Further, perceived usefulness and perceived ease of use do not influence gender. This implies that perceived usefulness and ease of use affected the usage of e-resources in research and learning but not with gender. Therefore, the current study contributes to the literature by adding empirical evidence of the use of electronic resources in research and learning in a health sciences library in Ghana with emphasis to the two critical variables in the TAM such as the use of

perceived usefulness (PU) and perceived ease of use (PEOU).

Conclusion and recommendations

The use of electronic resources for learning and research in university libraries has become ubiquitous and an important area of study. It is the vision of the University of Ghana to become a worldwide recognized research-intensive based university. However, statistics have shown low user patronage of subscribed e-resources in research and learning. It is no doubt that many users have become aware and have the knowledge in the use of e-resources, and their significance in enriching research work and learning. The willingness to patronize e-resources coupled with the high cost of internet data, low internet bandwidth, information overload and so on are the challenges that affect its usage. Thus, there is the need to critically look at these challenges and come up with solutions to boost usage and minimize the other challenges.

It is, therefore, recommended that regular training on the e-resources available should be conducted to increase its awareness and use by users. This will help users to make the right choices of selecting e-resources relevant to their field of study to meet their research and learning needs. Again, apart from library orientations which mostly serve as a channel in creating awareness for students, libraries must collaborate effectively with lecturers to create awareness in the classrooms and recommend some of the e-resources as part of teaching instructions. Moreover, e-resources' promotional products such as flyers, posters and notices should be posted on notices boards on campus.

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