

Analysis of content, services, and resources available and accessible on websites of academic libraries

Digital Library
Perspectives

De-Graft Johnson Dei

Department of Information Studies, University of Ghana, Legon, Ghana

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Abstract

Purpose – This study aims to review the content of academic libraries’ websites with specific reference to the general information, services, information resources, features and functionalities, instructional tools to support teaching, learning and research for the patrons and users, and the visibility or activeness of the navigational tools on the websites.

Design/methodology/approach – The study focused on six categories of tertiary institutions: public universities, technical universities, chartered private universities, university colleges, colleges of education and nursing and midwifery schools. From each category, the researchers purposively selected five different institutions with library websites. Thus, 30 library websites were reviewed and analyzed for this study.

Findings – The review disclosed a generally low content and information on the websites in terms of the availability of information resources and collections; the types of services available at the libraries via the websites; the features and functionalities of the websites; the instructional tools to support teaching, learning and research for the patrons and users; and the visibility or activeness of the navigational tools on the websites. Despite this, the public universities displayed more and above average information, services, information resources, instructional tools and navigational tools on their library websites, followed by the technical universities, chartered private universities and university colleges. Conversely, the colleges of education and nursing and midwifery schools were to a large extent unable to provide information relating to electronic resources, instructional tools and navigational tools.

Research limitations/implications – The study was limited to 30 library websites from all six categories of tertiary institutions in Ghana. From the study, the management of the universities and the libraries must appreciate the significant role of websites in providing information and resources in support of teaching, research and learning at the institutions. In this regard, they need to provide the necessary support and resources for the effective deployment and operationalization of websites.

Originality/value – To the best of the author’s knowledge, this study is the first of its kind as no study seeks to provide a comprehensive analysis of the content of academic libraries’ websites with specific reference to the general information, services, information resources, features, functionalities, instructional tools to support teaching, learning and research for the patrons and users, and the visibility or activeness of the navigational tools on the websites.

Keywords Libraries, Websites, Universities, Information resources, Services, Navigational tools, Navigational links

Paper type Research paper

Introduction

Access to library products, resources, books and services had been through face-to-face or physical visits to the libraries. This is because most of the materials and resources had been manual or hardcopy. With the proliferation of e-resources and library patrons’ demand for



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electronic resources, libraries and librarians face lots of challenges in meeting the needs of their patrons. It has also become difficult for libraries and librarians to meet the increasing demand of the needs of the new generation of tech-savvy users due to the convenience, and dynamic nature of information technologies. In this case, the emergence of the internet and advancements in information technology have changed how users of libraries seek information and access information and resources to meet their information needs. Libraries, as hubs of information and knowledge resources have for years sought to deploy technologies to make the library services and resources easily available, accessible and useable by the patrons of the libraries. When compared to physical libraries and physical access to library services and resources, the use of technological systems has more benefits (Dei, 2020). Key to this technological system is the use of websites and the internet as a virtual system for patrons to access library services and resources. Again, libraries worldwide are putting in more effort to provide services and make these services accessible via the website to users with high-quality online experiences. An effective academic library website serves as a reflection of the physical library and its offerings. They make available varieties of digital products such as images, videos and Web pages (Mensah and Bosire Onyancha, 2022).

Thus, with the emergence of e-resources and services, libraries have started to offer virtual access and entrance to the libraries through technological systems (Acheampong and Dei, 2020). Websites have become academic library platforms for communicating with their patrons and users. Academic libraries tend to develop and use websites to offer access to online catalogs, information about their services and other library resources. Library websites continue to evolve as a gateway for providing library and information services and resources to students, lecturers and other users of libraries. Again, academic library websites act as the information gateway to the libraries of academic institutions since the users may do database searches, make online requests for interlibrary loans, get reference requests and get academic publications electronically (Kehinde and Tella, 2012). They serve as open platforms for the community and represent the resources available to its patrons. Any institution's library website is essential to provide the materials and services found within the library. When creating a website, libraries must adhere to these standards. Through remote access, users can search the library's online catalog, use a subject guide or database to obtain an online citation or view full-text articles of Web-based journals, peruse an e-journal, submit an interlibrary loan form, e-mail a reference question using the ask-a-librarian service or borrow an e-book (Bilson and Markwei, 2019).

As far as the library website is concerned, it is the face of the library resources for its patrons and acts as an open forum for the library community. A well-equipped library website is the mirror of the library and its services (White and King, 2020). Nowadays, academic libraries use their respective websites to extend their services and resources. The library website of any institution plays a vital role in providing the services and resources available in the library. The content of websites can be presented in different forms, the most common and accessible being text and graphics. The content and its presentation play an important role in increasing the usability of the library. The stronger the content of any library website, the more users will be attracted. The library website sometimes plays a crucial role in publishing information about the activities of the mother institution. It may provide details or direct links to courses, admissions, curricula, exams, fees, faculty, policies and procedures, placements, publications and research, library resources and services (Agyemang, Boateng, and Dzandu, 2015).

While some academic libraries in Ghana have developed and designed websites to facilitate the dissemination of information, services and resources, others and yet to develop websites. That is, it is not all academic libraries that have been able to reach out to their patrons via websites. Even for those with websites, a search shows scanty information and

resources accessible to library patrons. Furthermore, in-depth studies relating to the evaluation of academic websites have been undertaken (Devi and Verma, 2018; Baber, Mairaj, and Khan, 2020; Richardson, 2023; Manjunatha, 2016; Mohammed, Garba, and Umar, 2016; Rahman and Batcha, 2020; Chua and Goh, 2010). Related studies in Ghana exist. White and King (2020) investigated the development of a research portal as part of an academic library website for scholarly communication guidance in a Public University in Ghana. Agyemang *et al.* (2015) also conducted a study on dialogic communication on universities in Ghana libraries' websites. None of these studies conducted a content analysis and service delivery of libraries' websites. As a result, the real impact, relevance, accessibility and information about the resources accessible and available on academic library websites in Ghana is yet to be known.

This study, therefore, seeks to conduct an in-depth content analysis and review of general information available on the websites, the availability of information resources and collections, the types of services available at the libraries via the websites, the features and functionalities of the websites, the instructional tools to support teaching, learning and research for the patrons and the visibility or activeness of the navigational tools on the websites.

Literature review

Libraries and websites

The 1990s saw the beginning of libraries' Webpages embracing the internet. The majority of academic libraries had websites since then (Ali, Shoaib, and Abdullah, 2023; Agyemang *et al.*, 2015). A website is a collection of digital resources such as photos, videos and Web pages (He and Huang, 2023). Usually, it is devoted to a certain goal, such as news and education. Library websites may be divided into four categories: homepage, directional (including policies and hours of the library), reference (including collections and resource guides) and combination (Aharony, 2012).

Over time, new design and assessment concepts have emerged (Agyemang *et al.*, 2015). In light of this, Farid, Warraich, and Iftikhar (2023) recommended that conventional Web management concepts should cover library websites and website evaluation. Websites for educational institutions serve as a main source of information for prospective students seeking information about academic programs and institutions throughout the admissions decision-making process and are highly significant for college fraternities (Mogaji, Anyogu, and Wayne, 2020). They also provide information on courses, admission, syllabi, exams, fees, faculty, rules and regulations, placements, research and publications, library facilities, resources and services, which is one of the most significant tools for publishing the college's activities (Rahman and Batcha, 2020).

Regarding the library website, it serves as an open platform for the community and is the public face of the materials available to library customers. The library and its services are reflected on a well-designed website. Libraries' websites serve as their "virtual presentation to the world; gateways to information that supports faculty and students' research and educational needs" (Chow, Bridges, and Commander, 2014). These days, libraries expand their materials and services through their websites. Any institution's library website is essential to offering the materials and services that the library has to offer (Faulkner, 2018; Agyemang *et al.*, 2015).

Library websites serve as information portals for both teachers and students (Chen, 2015). They offer information about libraries and library services, as well as access to online catalogs, electronic databases, digital collections and other library tutorials (Singh, 2020). These days, students may use databases for research, submit online requests for interlibrary loans, ask inquiries for references and seek scholarly papers electronically (Stachokas, 2016).

While academic material on library websites has improved over the years, they still have competition when it comes to consumer preferences (Al-Qallaf and Ridha, 2019). Library patrons appear to have more power, convenience and enjoyment while seeking information because of the rapid expansion of online resources and new technologies for sharing and searching. Libraries also have to contend with a new generation of tech-savvy patrons who use information in many areas of their lives (Aharony, 2012). Instigated by this competition, library websites ought to captivate and inspire patrons; offer practical, innovative and dynamic services and products; and foster frequent visits (Al-Qallaf and Ridha, 2019). To manage the website that presents the library to its clients, library authorities must choose professionals with experience in Web design, assemble a Web team and ensure the functionality of the websites (Wilson, 2015; Rodriguez, 2016).

Website functionality is gauged by system quality. It has four components: privacy, ease of access, responsiveness and usability (Orhionkpaiyo and Momodu, 2021). The structure, labeling and navigation of websites that facilitate browsing and searching have an impact on usability (Silvis, Bothma, and de Beer, 2019). It speaks to how simple and fast consumers may navigate the website. Web analytics, which analyzes server log data, may be used to better identify usability concerns by revealing trends in Web traffic and user information-seeking behavior (Vu, Proctor, and Hung, 2021). The speed at which data is retrieved and downloaded from websites is referred to as responsiveness. Previous experiences with download speed have an impact on users' decisions to return to a certain website (Akgül, 2021). The degree to which websites may be quickly found using popular search engines is referred to as ease of access. Indicators like search engine rankings might be used for this goal. Protecting personal information from disclosure and putting policies in place to stop identity theft are two aspects of privacy (Das, 2021).

The measure of the value that information offers to a user is known as information quality (Lee, Sung, and Jeon, 2019). Four factors may be used to conceptualize information quality overall: soundness, reliability, utility and simplicity of use (Guo *et al.*, 2021). The degree to which data is accurate, comprehensive and consistently provided is referred to as soundness. Reliable information is provided promptly, securely and up to date. Usefulness is determined by how comprehensible and how much information is given. The accessibility and manipulation of information are factors that contribute to its ease of use (Chua and Goh, 2010). Since library services are mostly information-intensive, information quality is especially crucial when evaluating library websites (Daraz *et al.*, 2019).

One way to think about service quality is to compare users' expectations with the services that libraries provide (Afthanorhan *et al.*, 2019). Physical layout; atmosphere and furnishings; dependability of librarians (whether they deliver on promised services consistently and accurately); responsiveness of librarians (whether they offer prompt assistance); assurance from librarians (whether they inspire trust and confidence); and empathy displayed by librarians (whether they provide individualized attention to library patrons) are among the aspects of service quality that are relevant to libraries (Chua and Goh, 2010). When assessing library websites, service quality encompasses four additional aspects: empathy, fun, esthetic appeal and interaction, in addition to the system quality and information quality dimensions (Mamakou, Zaharias, and Milesi, 2023).

Empirical review

Kumar (2023) revealed that a user-friendly library website is vital for accessing electronic resources efficiently, and while electronic resources have many profits, their limitations should also be acknowledged. Welch (2005) examines an additional facet: the possibility and actuality of using the websites of university libraries to promote their services, resources and

other special events, particularly in light of tightening finances. Usability tests were created as a way to assess user awareness of a website and as a model for assessment. These tests often offer a sampling of the kinds of content that people look for on websites.

[Lyudmila \(2020\)](#) further disclosed that behavior models and the use of Web analytics have led to the emergence of solutions that improve the usability and functionality of the State Public Scientific-Technological Library of the Russian Academy of Sciences website. These are identifying user tasks as they are developed and conducting user testing to better understand the event. Tracking data and collecting additional data to verify the effectiveness of the changes made. According to [Lyudmila \(2020\)](#), examining data on the duration of the session and the number of visits will help determine the goals of user visits and develop new recommendations. Usability analysis and testing will make it possible to compare the data obtained using Web analytics and the perception of the library site by the users themselves.

Similarly, [Chow, Bridges, and Commander \(2014\)](#) developed the library website usability checklist, which they used to assess the information architecture, Web design and navigational elements of 101 public library websites and 102 academic websites in the USA. Five parts comprised the 67 questions on the checklist:

- (1) general data, including the name, URL and webmaster e-mail of the library;
- (2) design components, like search tools and graphic usage;
- (3) Web content, like online public access catalog (OPACs), library news and policies;
- (4) where to put Web features; and
- (5) information architecture and usability considerations.

According to the authors' results, both academic and public library websites offered "a large portion of the basic content and features typically called for by patrons and as identified by previous research."

The findings of [Ullah \(2024\)](#) indicate the design of medical college library websites is generally inadequate in Pakistan. The websites are not performing a useful role in communicating with faculty and students. The findings point to inadequate website design skills among librarians or the lack of cooperation with professional website designers. [Kumar et al. \(2009\)](#) evaluated the content of the websites for the Indian Institute of Management libraries and discovered that each of the libraries had organized information about the library on their website and a site map. [Vasisha \(2013\)](#) analyzed the content of the websites of technical universities in North India and discovered that while all the universities have library websites, only four of them provided information about print periodicals. Analysis of Bangalore's university library's website also revealed limited content useful to their patrons.

[Sushma \(2023\)](#) examined and evaluated the content and functionality of university library websites at universities in Karnataka with 90 checkpoints to assess the content of a library website, including credibility, elements, features, Web-based resources, management, research support services and links to open-access resources/courses. The findings of the study indicate that university libraries have a strong foundation, with a primary focus on credibility, core library resources and services. The study found that university libraries scored 84% in terms of meeting the checklist criteria which were based on a checklist designed to evaluate the content of the websites. To this, university libraries should improve and upgrade their website features to increase the use of Web-based resources and services.

A model for library websites was developed by [Wijayaratne and Singh \(2015\)](#) and has two components: Web content and design. There were four unique subdimensions for each dimension, totaling 140 characteristics. The features were divided into three priority levels

by the authors: 30 features were classified as pretty helpful at level two, 11 features as relatively useful at level three and 99 features at level one, which were considered extremely beneficial. Two tools were developed from this model: an evaluating tool with just 117 content and design aspects, and a checklist with all 140 features for website designers. According to [Wijayaratne and Singh \(2015\)](#), library websites might be designed or redesigned using their instruments, and library websites could be evaluated for institutional or research objectives using their instruments.

A worldwide approach for website evaluation was developed by [Rocha \(2012\)](#). Three aspects of website quality were included in his model: services, content and technological excellence. There is a set of particular evaluation criteria for each dimension. [Hernández et al. \(2009\)](#) offered methods for assessing the websites of various kinds of libraries. These include content, services, navigation and design practices, and they developed website assessment tools in accordance with comparable principles. [Agyemang et al. \(2015\)](#) reviewed the contents of universities in Ghana libraries' websites and found the dialogic potential of the websites. They discovered that Ghanaian university libraries' websites provide only static information about libraries and their services. The libraries' websites are deficient in providing vital information on newspapers, print journals, frequently asked questions and dates of posts. Again, the findings of the study indicate that universities in Ghana libraries' websites have poor dialogic features.

Methodology

The study deployed the interpretivism paradigm, qualitative research design and case study approaches in this study. The interpretive paradigm facilitated the discovery and generation of a rich and deep understanding of the phenomenon and cases (academic libraries websites) being investigated. This is closely associated with the qualitative research design used for this study. Qualitative content analysis was also deployed to analyze the text through a systematic process of coding and identifying themes of patterns. This enabled the researchers to conduct an in-depth review of the content of the websites of the selected academic libraries.

The selection of the cases went through two main stages. In the first stage, the study prepared a checklist of all tertiary institutions in Ghana with academic libraries. The researchers categorized them into the various groups or categories of tertiary institutions in Ghana based on the criteria by the Ghana Tertiary Education Commission. These include Public Universities (PUs), Technical Universities (TUs), Chartered Private Universities (CPUs), University Colleges (UCs), Colleges of Education (CoE) and Nursing and Midwifery Schools (NMS). From each category, the researcher randomly selected five different institutions. Thus, the researchers used a random generator to select five institutions from each category of tertiary institutions with websites for their academic libraries.

The second phase was to identify academic libraries with websites. Based on the scanning, the following academic institutions with academic library websites were selected for the study as shown in the table below, [Table 1](#).

The researchers accessed the selected academic libraries' websites directly, reviewed them and conducted an in-depth content analysis of the websites. Generally, the researchers focused on some key indicators such as the general information on the websites, information resources and collection available and accessible by users or patrons, general services provided by the library and accessible by users, general features of websites, instructional tools for users and patrons and navigation tools of the websites to access relevant links and information. Each of these indicators had subindicators to aid the evaluation and analysis. A table chart was then designed to facilitate the scoring and availability of the subindicators on

Table 1. Selected academic library websites

Category of institution	Institution selected	Library's website
Public universities	University of Ghana	https://balmc.ug.edu.gh/
	Kwame Nkrumah University of Science and Technology	https://library.knust.edu.gh/
	University of Cape Coast	https://library.ucc.edu.gh/
	University of Education Winneba	http://pilot.uew.edu.gh/new/library
Technical universities	University Mines and Technology	https://library.umat.edu.gh/
	Ho Technical University	https://library.htu.edu.gh/
	Accra Technical University	https://atu.edu.gh/library
	Kumasi Technical University	https://lib.kstu.edu.gh/
Chartered private universities	Sunyani Technical University	https://stu.edu.gh/index.php/library
	Tamale Technical University	https://tatu.edu.gh/library/
	Central University	www.central.edu.gh/library
	Methodist University	https://library.mug.edu.gh/
University colleges	Ashesi University	www.ashesi.edu.gh/academics/library.html
	All Nations University	https://anu.edu.gh/library/
	Valley View University	https://vvu.edu.gh/index.php/resources/current-student/library
	KAAF University College	www.kaafuni.edu.gh/e-resources/
Colleges of education	Heritage Christian College	https://hccuc.edu.gh/library/
	Garden City University College	https://lib.gauc.edu.gh/cauc_lib.html
	Christ Apostolic University College	https://epuc.edu.gh/epuc/publications/
	Evangelical Presbyterian University College	www.ofce.edu.gh/the-college-library/
Nursing and midwifery schools	Offins College of Education	www.wesco.edu.gh/the-college-library/
	Wesley CoEs	https://acce.edu.gh/library/
	Accra CoEs	https://sace.edu.gh/library.php
	St Ambrose CoEs	https://library.sedacoe.edu.gh/
Nursing and midwifery schools	Hohoe Nursing and Midwifery Training School	https://mtshohoe.edu.gh/nmtc_library.php
	Koforidua Nursing and Midwifery Training School	https://nmtckdu.edu.gh/library/
	Selkwa Nursing and Midwifery Training School	http://selkwanmnc.edu.gh/about-library
	Presbyterian Nursing and Midwifery Training School	https://pnmtc.edu.gh/index.php/library/e-library
	Ho Nursing Training School	www.ntcho.edu.gh/about_library.php

Source: Table by author

the library websites as a means of analyzing and assessing the library websites. The availability of these indicators on the website of the academic library attracts a score of 1. To which a score of 1 is assigned should the indicator (e.g. about the library, mission, working hours, etc.) be available on the library's website. Thus, each category has a maximum score of 5 if all the information is available on their website.

Findings

General information available on the websites

The study disclosed that the general information available on the websites includes about the library (general and background information about the library), mission and vision statement about the library, working hours of the library, staffing information (general information about the staff of the library), organogram of the library, library rules and regulations, library news and events, library calendar, donate to the library and contact information. From the assessment of the websites, it is clear that the library websites of the PUs provided adequate and in-depth background and general information about the libraries representing an average score of 86%. This was followed by the TUs (64%), CPUs (40%), UCs (38%), CoEs (30%) and NMSs (16%) being the least and indicating that the CPUs, UCs, CoEs and NMSs provided very scanty general information about the libraries on the websites. Concerning the specific general information, 93% of the institutions have information about the libraries, 73.4% have information about the working hours mission and vision of the libraries, respectively, 60% staffing information, 10% information on the library organogram, 43.4% information about library rules and regulation, 23.4% information about library news and events, 10% information on library calendar, 16.6% information on donation request to the libraries and 53.4% contact information of the library. Again, all five library websites of the PUs provided adequate and in-depth background and general information about the libraries. This was followed by the TUs, CPUs, UCs, CoEs and NMSs being the least. This is shown in the figure below, [Figure 1](#).

The PUs, TUs, CPUs, UCs and CoEs provided welcome information and notes about the library and welcome notes from the librarians. However, one out of the five institutions failed to provide information about the library welcoming note about the library. This means that the websites of the institutions contain adequate background information. Concerning the mission and vision statements available on the libraries' websites, the PUs and TUs provided information about the mission and vision statement whereas four out of the five institutions under the CPUs and UCs libraries provided information about the mission and vision of the libraries. Again, only one NMS and three CoEs provided information about the mission and vision of the libraries. This represents an average score of 7.34% of the institutions providing information about the mission and vision of the libraries. A similar discovery was made about the availability of working hours on the libraries' websites.

All five libraries' websites under the PUs and TUs provided information about the staff and portfolios whereas three institutions (60%) under the CPUs and three (60%) UCs libraries provided information about the mission and vision of the libraries. However, four libraries' websites under NMSs and four websites of libraries under the CoEs categories failed to provide information about the staff and portfolios of the libraries. This represents an average score of 60% of the institutions providing information about their staff and their portfolios and positions in the libraries.

Furthermore, only two PU libraries' websites and one TU library's website had information on the organogram and structure of the libraries. Thus, all the websites of the libraries under the CPUs, UCs, CoEs and NMSs had no information on the organogram

General Information



Source: Figure by author

Figure 1. General information on libraries' websites

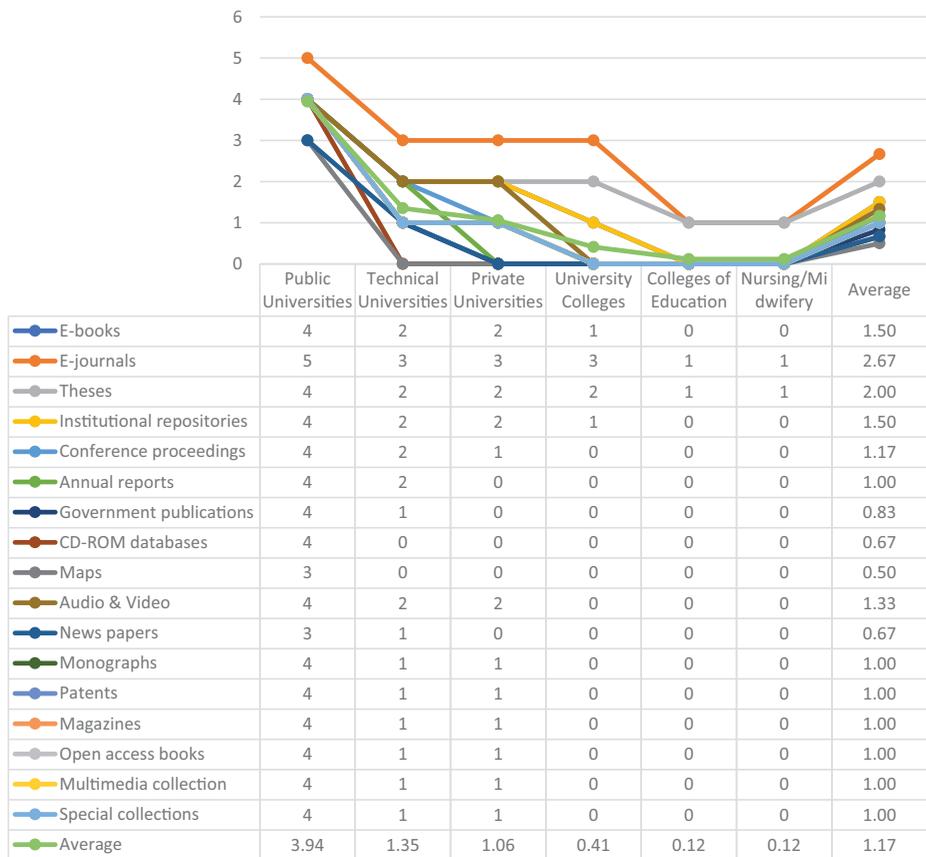
and structure of the libraries. Almost similar information was discovered about information on the availability of calendars of the libraries and requests for donations to the libraries. Information about library rules and regulations is available on all the websites of the PUs while four of the TUs also have information about the libraries' rules and regulations. Conversely, all the websites of the libraries under the CPUs, UCs, CoEs and NMSs had one institution with information on the rules and regulations of the libraries on their websites.

Information about news and events was available on four PUs, two TUs and only one PU library website. The rest, UCs, CoEs and NMSs had no information about news and events on their websites. Contact information on the websites of the libraries is available on all five PUs, four TUs, two CPUs, two UCs, two CoEs and just one NMSs, representing an average of 53.5% of available contact information on the libraries' websites.

Information resources and collection

From the review of the libraries' websites, there are scanty electronic information and resources available (23.4%). The main resources available via the libraries' websites are e-journals although all the PUs libraries websites have e-resources while three TUs, three CPUs and three UCs libraries websites also have e-journals and just one CoE and one NMS have e-journal information and resources. After the e-journals are e-books; institutional repositories; audio and video resources; conference proceedings; annual reports, monographs, patents, magazines, open access books, multimedia collections and special collections; government publications; CD-ROM databases and newspapers; and maps. This is shown in the figure below, Figure 2.

Figure 2 again revealed that, while the PUs provided lots of resources (78.8%) via their libraries' websites, the TUs libraries' websites revealed just 27% of resources. This was followed by CPUs (21.2%), and UCs (8.2%). Finally, the websites of CoEs and NMSs



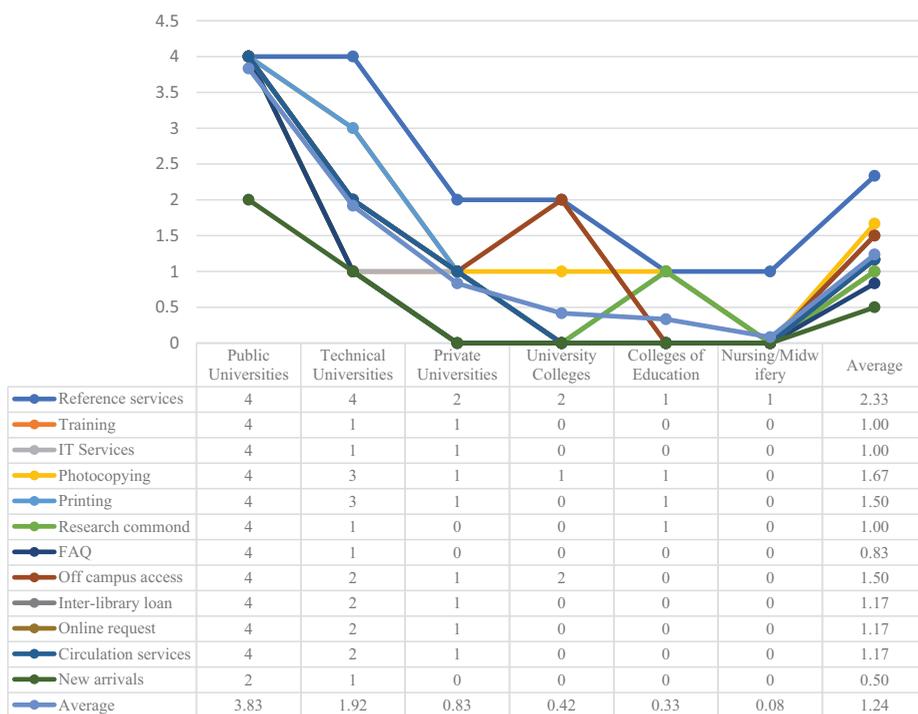
Source: Figure by author

Figure 2. Information resources and collection

provided virtually no resources except for e-journals and theses that are available on just one library website.

Library services

Available services discovered on the websites of the libraries include reference services, training, IT services, photocopying, printing, research commons, frequently asked questions (FAQ), off-campus access, interlibrary loans, online requests, circulation, services and new arrivals. On average, the PUs provided adequate information about the services of the libraries representing an average score of 76.6%. This was followed by the TUs (38.4%), CPUs (16.6%), UCs (8.4%), CoEs (6.6%) and NMSs (1.6%), respectively. This simply means that with the exception of the PUs, all the other categories of institutions/universities failed to provide adequate information on the services available on the libraries' websites. The details are shown in the figure below, [Figure 3](#).



Source: Figure by author

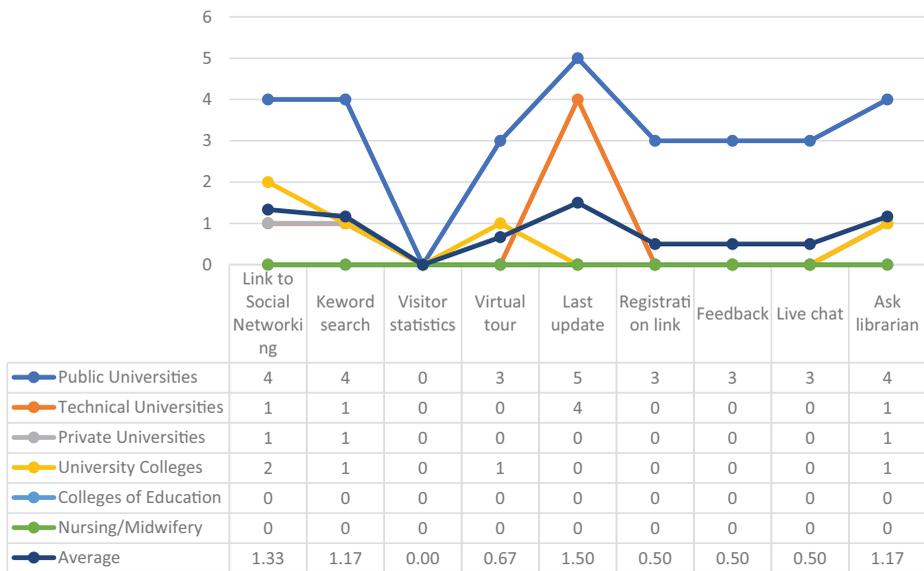
Figure 3. Library services

Features of websites

The features of websites are considered one of the fundamental criteria for a dynamic and useful website. The researchers reviewed features such as links to social media or networking sites, keyword searches, virtual tours, last updates, registration links, feedback, live chat and ask a librarian. On average, the features of the libraries' websites reviewed were scanty. "Last update" was seen to be the most available feature on the libraries' websites with all five PUs and four TUs displaying the "last update" feature on the libraries' websites. Four PUs libraries have "links to social networking sites" and "keyword search" while only one TU and one CPU have "links to social networking sites" and "keyword search." All the libraries' websites examined have no "visitor statistics" feature on their library website. Almost similar information was discovered on the review of the websites based on registration links, feedback and live charts except three PUs were able to have such features (registration links, feedback and live chart) on their library websites as shown in the Figure 4 below.

Instructional tools

Libraries seek to support teaching, research and learning. As a result, the researchers reviewed the availability of "instructional tools" such as research guides, plagiarism



Source: Figure by author

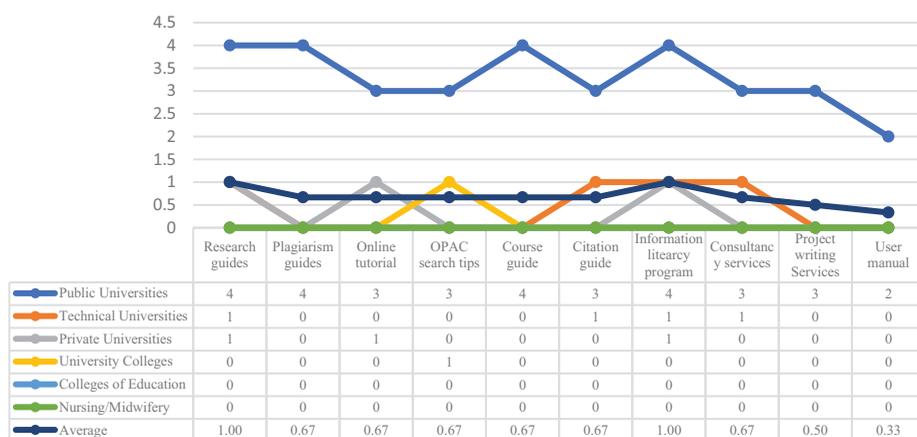
Figure 4. Features of websites

guides, online tutorials, OPAC search tips, course guides, citation guides, information literacy programs, consultancy services, project writing services and user manuals on the libraries’ websites. The review showed that the four PUs have research guides, plagiarism guides, course guides and information literacy programs as instructional tools on their libraries’ websites as shown in the figure below, Figure 5.

From the review as displayed in the figure above, Figure 5, it was disclosed that the UCs, CoEs and NMSs have no instructional tool information on the libraries’ websites. This is almost similar to the TUs and CPUs except for the one TU and one PU with research guide and information literacy programs information available on the libraries’ websites, respectively. Research guides were available on four PUs, one TU and one CPU but were absent in UCs, CoEs and NMSs. Project writing services and user manuals were only available in three PUs and two TUs.

Navigational tools

From the reviews of the libraries’ websites, it is clear that “Navigational Tools” are generally scanty on the libraries’ websites of the universities. Despite this, the PUs libraries’ websites contain more navigational tools (with an average of 73.4%) than the rest. This was followed by the TUs, CPUs and UCs. None of the websites of the CoEs and NMSs have a “Navigational Tool.” Four PUs have active links, visibility of navigational tools, site maps, help features, resources links and catalog links on the homepage as a navigational tool. The review as shown in Figure 6, shows that the CoEs and NMSs have no “Navigational Tool” information on the libraries’ websites.



Source: Figure by author

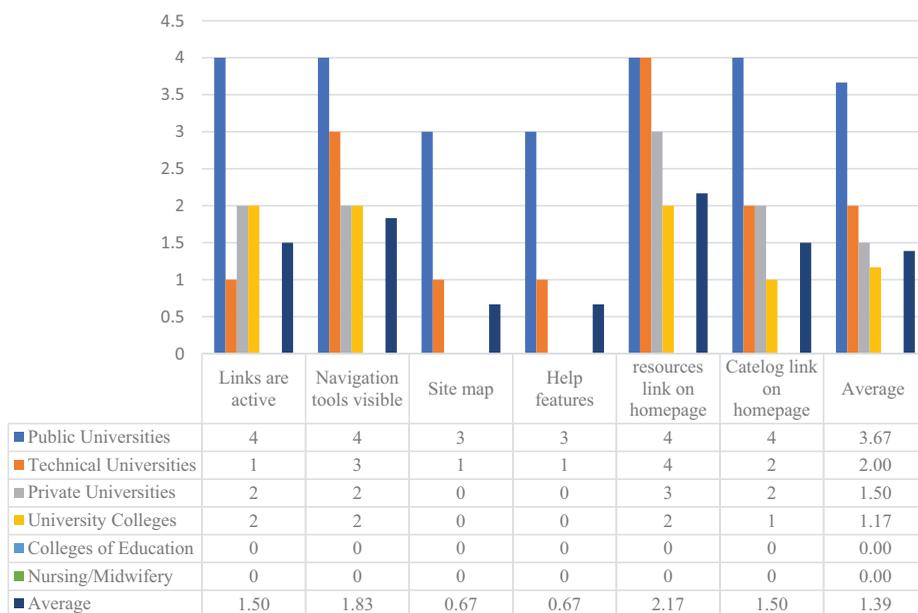
Figure 5. Instructional tools

Discussion of findings

General information

Researchers such as [Manjunatha \(2016\)](#) and [Agyemang et al. \(2015\)](#) have stated that library websites serve as a platform to disseminate information about the universities and services of the universities. The general information available on the websites includes about the library (general and background information about the library), mission and vision statement about the library, working hours of the library, staffing information (general information about the staff of the library), organogram of the library, library rules and regulations, library news and events, library calendar, donate to the library and contact information. The findings in this study generally suggest that less than half (45.6%) of the libraries' websites provided general information about the library on their websites. Despite this, the PUs and TUs libraries' websites displayed and provided adequate and in-depth background and general information about the libraries representing an average score of 86% and 64%, respectively. This means the scantiness of the general information on the libraries' websites are with the CPUs, UCs, CoEs and NMSs. This is similar to the findings of [Agyemang et al. \(2015\)](#), who disclosed that lots of libraries' websites provided mission statements and general information about the library on their websites although these general information and mission statements are available in other documents in the library. The implication of the findings in this study shows that less has been done to improve on the scantiness of the general information on the libraries' websites.

Again, all five libraries' websites under the PUs and TUs provided information about the staff and portfolios whereas three PUs and three UCs libraries provided 60% information about the mission and vision of the libraries, respectively. This represents an average score of 60% of the institutions providing information about their staff and their portfolios and positions in the libraries. [Manjunatha \(2016\)](#) and [Agyemang et al. \(2015\)](#) revealed that PUs in Ghana have adequate information about the library, library staff and operating hours. However, [Agyemang et al. \(2015\)](#) disclosed that not all libraries have mission and vision statements on their websites as also revealed in this study. Therefore, providing general information about the library and its activities should be the basic requirement of every academic library's website.



Source: Figure by author

Figure 6. Navigational tools

Information resources and collection

Having access to electronic resources is essential to any educational or information site. All the libraries' websites examined are deficient in providing vital information on electronic resources except the PUs and TUs. As revealed in the study, the main resources available via the libraries' websites are e-journals although all the PUs libraries' websites have e-resources such as e-journals, e-books; institutional repositories, audio and video resources, conference proceedings, annual reports, monographs, patents, magazines, open access books, multimedia collections, special collections, government publications, CD-ROM databases and newspapers; and maps. Thus, the CPUs, UCs, CoEs and NMSs lacked electronic resources on their libraries' websites. This supports [Vasisha \(2013\)](#), who discovered that just a handful of library websites of technical universities in North India provided information about periodicals and resources. However, the finding is in contrast with the finding of [Aharony \(2012\)](#) who disclosed the availability of electronic resources on the websites of 31 academic libraries websites. The findings reflect the need for university libraries to deploy more mechanisms in place to make information resources and collections available on the libraries' websites. According to [Wijayaratne and Singh \(2015\)](#), providing access to electronic resources and collection via the websites of libraries draws users to the libraries and facilitates easy access to the materials and resources.

Library services

Regarding the various services available on the websites of the libraries, there was a general lack of services on the libraries' websites (24.8%). With the exception of the PUs, all the other

categories of institutions/universities failed to provide adequate information on the services available on the libraries' websites. Available services discovered on the websites of the libraries include reference services, training, IT services, photocopying, printing, research commons, FAQ, off-campus access, inter-library loans, online requests, circulation, services and new arrivals. Meaning, that libraries are making frantic efforts to make their services available to their patrons despite the difficulty and challenges they face due to the scantiness of information on their websites. The findings of previous studies comparatively showed mixed feedback. While [Detlor and Lewis \(2006\)](#) revealed limited provision of services on libraries' websites, [Chow et al. \(2014\)](#) established the adequacy of library services via the websites.

Features of websites

Academic libraries provide features on the Web pages that facilitate interaction with their clients. They are considered one of the fundamental criteria for a dynamic and useful website. Similar to the other results of this study, the features of the libraries websites evaluated were scanty. However, the PUs and TUs libraries websites provided adequate features, unlike the other categories of library websites reviewed in this study. The researchers reviewed features such as links to social media or networking sites, keyword searches, virtual tours, last updates, registration links, feedback, live charts and ask librarian on the websites of the PUs and TUs libraries. The findings from the study (PUs and TUs Libraries websites) are similar to those of previous studies such as [Mahmood and Richardson \(2011\)](#), [Rod-Welch \(2012\)](#) and [Wilson \(2015\)](#). This is in contrast with other studies ([Rod-Welch, 2012](#)) suggesting that libraries do not adopt Web 2.0 tools making the websites not user-friendly and easily accessible. However, this supports the findings of this study from the CPUs, UCs, CoEs and NMSs libraries' websites reviewed.

Instructional tools

Technological advancement and incorporating these tools into websites make teaching and learning easy. Libraries seek to support teaching, research and learning. From the review, only the PUs libraries' websites have been able to add instructional tools such as research guides, plagiarism guides, online tutorials, OPAC search tips, course guides, citation guides, information literacy programs, consultancy services, project writing services and user manuals on the libraries websites. This virtual environment via the websites is important for libraries to appeal to their patrons and maintain the patrons' interest in a growing and more sophisticated technological world of teaching and learning. These tools provide channels for librarians to synchronously and asynchronously engage with the academic community whose information needs are to be fulfilled by the libraries and librarians. This, therefore, calls on the academic libraries in Ghana to redevelop their libraries' websites and add more instructional tools and make the libraries more accessible virtually and through their websites. Several studies, such as [Bottorff and Todd \(2012\)](#) and [Rothera \(2015\)](#) agree that instructional tools and activities when incorporated into websites can facilitate easy information retrieval. Based on this, [Thornes \(2012\)](#) developed and tested a set of virtual tutorials to be incorporated into websites to aid effective teaching, research and learning.

Navigational tools

Navigational tools are considered to be one of the main criteria for determining the usability of a website. [Chow et al. \(2014\)](#) discovered clear navigational tools on 88% of the websites of the academic libraries they evaluated. From the reviews of the libraries' websites in this study, it is clear that "Navigational Tools" are generally scanty on the libraries' websites of the universities. The CoEs and NMSs have no "Navigational Tool" information on the

libraries' websites. Despite this, the PUs libraries' websites contain more navigational tools (with an average of 73.4%). [Raward \(2001\)](#), [Fung *et al.* \(2016\)](#) and [Pant \(2015\)](#) also revealed some usability issues of academic libraries websites. The lack of links to the libraries' websites, as generally discovered in this study, contradicts the findings of [Al-Qallaf and Ridha \(2019\)](#) and [Wilson \(2015\)](#). [Al-Qallaf and Ridha \(2019\)](#) revealed in their study that the majority of the homepage websites of institutions have 85.5% links to the libraries' websites. [Wilson \(2015\)](#) also reported that 79.1% of private institutions and 85.7% of public institutions provided links to the library website on their institutions' pages. This finding simply means that the library websites of most academic institutions in Ghana need to create navigational links and tools. This can be problematic for patrons of libraries who may need added information and access to other resources; it, therefore, calls for websites of libraries to provide navigational tools and links on their websites and other relevant websites linking to the libraries' homepage.

Conclusion and recommendation

The study conducted an in-depth content analysis and review of general information available on the websites, the availability of information resources and collections, the types of services available at the libraries via the websites, the features and functionalities of the websites, the instructional tools to support teaching, learning and research for the patrons and users, and the visibility or activeness of the navigational tools on the websites. The review disclosed a generally low content and information on the websites in terms of the availability of information resources and collections, the types of services available at the libraries via the websites, the features and functionalities of the websites, the instructional tools to support teaching, learning and research for the patrons and users, and the visibility or activeness of the navigational tools on the websites. Despite this, the PUs displayed more and above average information, services, information resources, instructional tools and navigational tools on their libraries' websites, followed by the TUs, CPUs and UCs. Conversely, the CoEs and NMSs were to a large extent unable to provide information relating to electronic resources, instructional tools and navigational tools.

Based on the findings, it is recommended that:

- Libraries should provide information about the organigram, news and events, library calendar and how to donate and support the libraries.
- Develop collections of electronic resources and provide access to them via their websites, especially, the UCs, CoEs and NMSs.
- The libraries, especially, that of the UCs, CoEs and NMSs must be supported to develop systems that will support access to their information resources, services, electronic resources and instructional tools.
- Management of the universities and the libraries must appreciate the significant role of websites in providing information and resources in support of teaching, research and learning at the institutions. In this regard, they need to provide the necessary support and resources for the effective deployment and operationalization of websites.

The researchers, therefore, conclude that academic libraries should seek to keep updating their libraries' websites with new and relevant information and resources; use the libraries' websites as a major platform and medium to facilitate the dissemination of library resources; use libraries' websites to facilitate effective collaboration and interaction between the library patrons and library staff; and make the libraries websites more accessible and userfriendly.

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Corresponding author

De-Graft Johnson Dei can be contacted at: djdei@ug.edu.gh