



Effect of information literacy skills on university students' information seeking behaviour and lifelong learning

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ABSTRACT

This study investigated the influence of information literacy (IL) skills on students' information seeking behaviour and lifelong learning skills in Higher Educational institutions in Ghana, with particular reference to the University of Cape Coast (UCC). Using a mixed method approach, 278 students from the College of Education Studies, UCC were sampled for the study. The components of the American College and Research Library (ACRL) model was used to measure the information literacy competence level of the students. A content and bibliographic evaluation of students' research projects were conducted using document analysis. Pearson product-moment correlation coefficient was used to determine the association between information literacy skills and information seeking behaviour of students from data collected through questionnaires, interviews and document analysis. The results revealed that respondents had developed substantial skills in information literacy and lifelong learning skills and thus adopted positive attitudes in information seeking. The paper concludes that majority of the students were confident users of information. The study recommends that academic libraries should make available a wide array of information sources and deliberately run programmes to introduce students to those information sources as a way of building their competency levels in information literacy.

1. Introduction

The core mandates of academic libraries are to support teaching, learning, research and community services which the parent institutions usually strive to achieve. Specifically, they exist to serve the curricular needs of students and the professional interest of faculties as well as the entire staff of the institution [1]. Academic libraries are the bedrock in students' achievement of information literacy (IL) and lifelong learning skills; as they prepare students to be competent information seekers. According to Ref. [1], information literacy is seen as an important skill needed by students to survive in this information age. Consequently, most academic libraries offer research support and information literacy instruction as part of user education for students, which are intended to improve student's information seeking behaviour and lifelong learning skills. This is because the right amount of information is a vital resource for students' academic activities and successful living. Developing positive attitude in information seeking helps students to meet their ever-increasing information needs and thus grow to be lifelong learners. The information sources and resources students consult and use are dependent on their information-seeking behaviour [2,3], which is influenced by the amount of information literacy and lifelong

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learning skills they possess. In other words, the level of a student's information literacy skills influences his/her information seeking behaviour and ability to utilize information effectively in daily interactions and decision-making. A continuous growth in this regard results in achieving lifelong learning skills.

As part of its core mandate to help improve the information literacy skills, lifelong learning and information seeking behaviour of students, the Sam Jonah Library of the University of Cape Coast, assists students to select relevant learning materials including books, and electronic resources for academic and research work. Also, students are taught how to use Online Public Access Catalogue (OPAC) so that they can search the library's catalogue independently to locate information resources [4]. In addition, professional librarians offer Information Literacy course to all first-year students so as to develop their information literacy skills. In addition to the theoretical aspect of the course, students are taken through practical lessons in the form of tutorials and user orientation. The expectation is that students who have passed through the course would have developed requisite skills in information seeking and adequately prepared for lifelong learning. Practically, the development of these skills enables the students to develop positive information seeking strategies to find and use quality information for their academic work.

1.1. Problem statement

Despite these efforts by the library, a preliminary investigation conducted on students' access and use of information resources and services revealed that most students seem not to be independent information seekers and users, and thus require the assistance of others to access information. This relates to challenges identified by Ref. [5] concerning the increasing decline in students' use of the library and its resources which was attributed to the difficulties students encounter in accessing library resources and services, including the use of electronic databases. Similarly [6], also reported that students hardly use the electronic resources subscribed by the Balme library because of poor information literacy skills. Familiarity and use of Electronic Information Resources (EIR) is often a challenge to students [7] as they prefer to access information from Google databases more frequently than the databases subscribed by the library [8]. The problem in Ghana is that students encounter the concept of information literacy and retrieval skills for the first time in universities, since such skills are not taught as a subject in senior high schools [9]. This perhaps affects students' development of information literacy skills, information seeking behaviour and lifelong learning skills. A study in Ghana by Ref. [10] found out that the information literacy competence of high school students is poor [11]. recounted that faculty and librarians of higher education have raised concerns about fresh students' competence in information literacy skills, as stakeholders fault in ensuring that high school students acquire information literacy skills [12].

It was based on these developments that the researchers investigated the effect of information literacy skills on students' information seeking behaviour and lifelong learning skills at the University of Cape Coast. The objective was to assess the information seeking behaviour of undergraduate students at the University of Cape Coast, with focus on their level of competence in sourcing information, determine the association between information literacy skills and lifelong learning skills and also examine the possible challenges students encounter in seeking information for their research projects. An investigation into students' information literacy skills, lifelong learning and information seeking behaviour is crucial but past studies conducted in these areas within the academic setting examined only one or two of these concepts as compared to this study which examined all the three concepts.

1.2. Literature review

Several studies have investigated information literacy skills, lifelong learning and information seeking behaviour of students but no studies have been cited so far that addressed the three concepts in a single study. This has created a gap in the literature. Also, some information literacy studies have only examined the impact of information literacy skills at the end of training. Most studies span just a semester or two semesters but a more extended study was conducted by Ref. [13], which spanned four semesters to assess the long-term impact of training in information literacy by looking at students' term papers. Though it records IL skills over a long-term training period, the study did not follow up in subsequent years to assess the level of IL skills of students in their final year-long essays.

[14,15] studied the impact of information literacy instruction on current and past student's information skills respectively. Employing a similar sampling strategy but different data collection approaches [14,15] did not seek to assess how information literacy skills had affected students' lifelong learning and thereby examining their final year-long essays as a way of assessing how their first-year information literacy training had applied in their final year work, an area this study seeks to explore.

Another study investigated the relationship between lifelong learning levels and information literacy skills of students in teacher training colleges [16], employed the lifelong learning tendency scale and information literacy scale. The survey solicited students' opinions of the level of lifelong learning and information literacy skills on a six-point and five-point scale, respectively. It correlated the dimensions of the two concepts to establish the relationship. Unlike in this study where lifelong learning would be determined through qualitative approaches [16], used quantitative methods to determine students' tendency towards lifelong learning. Notable is the finding that as information literacy increases, approach to lifelong learning experiences at parallel increase [16]. This suggests that students with good information literacy skills have been adequately prepared to be lifelong learners and these students will be productive in the job market. This is imperative because in the present work environment, managers are interested in employees who possess information skills and are capable of manipulating information. Equally, graduates who have information literacy competence are overrated in the job market; they are believed to have the skills to solve problems [17,18]. Information literacy is currently used as a tool to achieve organizational excellence [19] but the manifestation of students' information literacy skills on the job market is largely dependent on the amount of information skills they have acquired in school through information literacy instruction.

As results of the above submission, information literacy instruction has gradually become an integral part of higher education in

that information literacy skills are necessary for developing good information seeking behaviour and lifelong learning skills. Factors such as feelings, affective and cognitive structures as well as technological factors and student's exposure to Information Literacy course promote their information literacy skills, information-seeking behaviour and lifelong learning skills. In information seeking, the motivation to sustain a search or quit is another element in information seeking that can affect individuals' information literacy competence. The competence builds up over time and requires perseverance to adopt a positive attitude towards searching, and keep practising the right searching behaviour, such as being prepared to reconstruct the search terms, modify the search or use different sources. A student's frequent use of information literacy skills and information seeking activities yields positive lifelong learning skills. The three concepts (Information literacy skills, information seeking behaviour and lifelong learning skills) are interwoven. The achievement of one is influenced by the other.

In higher education, students seek information from different sources and formats to undertake certain tasks, such as writing assignments, conducting research projects and discovering new knowledge for academic work. The information-seeking behaviour of students is affected by the way they seek, evaluate, select and use information by interacting with people and all kinds of information systems including print and electronic resources [2,3,20]. In pursuing academic work, students have to engage in information-seeking activities to enable them access the needed information. Students who are academically good have the ability to accomplish their academic goals because they possess solid information-seeking and retrieval capacity to find the right information for the right purpose [21]. Information-seeking demand certain skills levels to determine what information is needed and what resources to use, to evaluate the information found and use it to solve problems. Students need to learn suitable information seeking methods to increase their information literacy levels [22]. According to Ref. [22]: [23] positive attitude towards information seeking increases the chance of information literacy competence. This implies that students who perform better have the know-how to seek credible information for complex academic work [21].

[1] examined the effect of information literacy skills instruction on students' lifelong learning using random sampling. The study discovered that information literacy skills instruction had a positive significant impact on students' academic work. To investigate the relationship between information literacy and academic performance among students [24], sampled 265 Master of Arts students of the Isfahan University of Medical Sciences using stratified random sampling. Through inferential statistics, the study showed that students' information literacy level was higher than the average. A significant positive relationship was also established between students' information literacy skills level and academic performance. Regarding the implementation of information literacy skills on the job market [15], investigated how the learning of the course had equipped past students for socio-economic development. Results from the study pointed out that those past students were able to implement the information literacy skills obtained from school to accomplish job oriented activities. Using a descriptive survey design [25] examined the awareness and use of Electronic Information Resources (EIR) of College students. The results of the study showed low level of awareness and use of EIR. The study further indicated inadequate computers, irregular power supply and slow internet speed as challenges students faced. Another study by Ref. [26] investigated the information needs and seeking behaviour of students. The study employed quantitative approach to gather data from 260 students and findings revealed that most students' information needs were channelled towards academic work such as research activities and developing new knowledge, and for career development. The study did not consider how students' information seeking behaviour can be improved to attain lifelong learning skills.

Delving into why students needed information [27] reported that 48,6% needed information for their research task, 20% needed information to learn about current developments in their area of interest, and 19% needed it for their personal interests [28]. also found that majority of their respondents had information needs related to their academic engagements, like class assignments (62,4%), writing research projects (68,46%) and general academic matters (58,26%). Also, investigating the information needs and seeking behaviour of masters' students in the Faculty of Communication and Information Sciences at the University of Ilorin, Nigeria [29], found that 100% of the students used information for their academic work. However, 86,3% also used information for entertainment, 81,2% used information for political purposes, 72,6% for personal development, 67,5% for employment, 65% for global purposes and 60,7% for social purposes. The authors concluded that students needed information mainly for their academic work.

[30] discovered three areas in students information needs: (a) to score high marks in their academic work in their programme of study; (b) to be informed on current affairs and social issues around the world; and (c) to network and interact with people near and far [30]. deduced that students require information to satisfy specific information needs that make them embark on information seeking. This confirms that students' information needs affect their information-seeking behaviour, such that the extent to which student needs information determines the seeking behaviour that student will exhibit. For this [23,31], posited that students' information seeking success is connected to how they behave in order to locate information and noted that user education programmes organized by librarians shape the information-seeking behaviour of students, which enables them to eliminate anxiety and stress in the learning process. Also, the knowledge acquired in the library influences students' bibliographic awareness, as well as developing more appropriate search strategies and increased levels of computer competency [23]. Consequently, there is a need to plan continuous library instruction for students throughout the semester in order to balance the skills acquired and enable the students to do away with negative feelings, like stress and anxiety, and inappropriate search strategies, all of which inhibit access to relevant information.

[22] confirmed that a positive attitude towards information seeking increases the chance of information literacy competence. Negative information seeking and information use behaviour speaks volumes about one's information literacy competence [27]. explained that information literate students need to develop a positive attitude towards information seeking in their quest to find quality information to accomplish a specific task. A positive attitude is evident in the type of information behaviour displayed. In other words, attitude (an affective attribute deriving from the inner person) is a factor that affects information-seeking behaviour of the student [32].

Intervening variables described in Ref. [33] also have implications for the information literacy competence of an individual. The

coping strategies or mechanisms adopted in the search process are evidence of their information literacy competence and influence information-seeking behaviour. These variables can either support or prevent information seeking. Motivation to sustain a search or quit is another element in information seeking that can affect individuals' information literacy competence. The competence builds up over time and requires perseverance to adopt a positive attitude towards searching, and keep practising the right searching behaviour, such as being prepared to reconstruct the topic, modify the search or use different sources [34]. indicated that self-efficacy and optimism, both affective behaviour in information seeking, afford 'significant coping advantages in the face of negative effects of uncertainty in goal completion'. Furthermore, higher affective skills such as self-efficacy and optimism give people cognitive skills advantage. On the other hand, those with higher cognitive skills and low affective coping skills are more likely to experience less success and more stress. According to Ref. [35], one must learn to search for, collect, structure and compare information at different stages to become information literate. If consciously done, the information-seeking behaviour of the individual is influenced positively. For students in the university [22,35], concludes that to achieve success in university education, they need to learn suitable information seeking methods so as to increase information literacy levels.

1.3. Theoretical framework

The ACRL model was developed by the Association of College and Research Libraries in 2000 to serve as a framework for tertiary education [36]. The researchers adopted the five standards of the ACRL model to frame this study. This model was appropriate because it is largely developed as a tool to support information literacy instruction in higher education. Also, the Information Literacy Skills course at the University of Cape Coast is modelled after it and therefore, provides a reasonable basis for assessing the information literacy skills of the UCC students. In application of the model to this study, the relevant properties of the model were used to guide the design of the quantitative instruments used in data collection.

2. Methodology

Mixed methods approach underpinned the study because of its varying and multiple advantages. and design-based research guided the study. The population of the study was all final year students under the College of Education Studies at the University of Cape Coast who conducted their research projects within the 2018/2019 academic year. The population of the final year students was 1384 [37]. Proportionate stratified random sampling technique was used to obtain the sample size. The population was first grouped into strata according to the programmes in the College to ensure a fair representation of each stratum from the population. The sample was selected based on the procedure for determining sample size provided by Ref. [38]. Using 20% of the population, the sample size for each stratum was then determined proportionately (see Table 1).

In all, a sample size of 278 was arrived at while 14 programme representatives were interviewed to collect qualitative data. The 14 were selected purposively because of their leadership role. Questionnaire, interview guide, observation and document analysis were used to collect data for the study. For the purpose of this study where lifelong learning is a variable to be measured, the researchers also examined students research projects to determine the application of the acquired skills in their research. To achieve this, 14 programme representatives were taken through a one-day refresher course in information literacy as an experimental group; after which their research projects were subjected to bibliographic analysis in comparison with 14 other students who formed a control group and not subjected to the refresher course. The instrument for data collection used for the document analysis was teased out from established criteria (Information Literacy Grading Scale) used by Ref. [13]. This Information Literacy Grading Scale was adapted because its skill set is similar to what a student is expected to gain from the Information Literacy Skills course at the University of Cape Coast. Based on the scale, the higher the grade, the higher the quality of the work is (1 = very low, 2 = low, 3 = moderate, 4 = high, 5 = very high). Two criteria (authoritativeness and relevance) were added to Ref. [13] criteria for this study.

The use of multiple data collection tools was to contribute towards getting reliable data as they complement the weaknesses of one

Table 1
Sample size determination for college of education studies.

Programme	Population size	Sample size
B. Ed. (Computer Science)	30	6
B. Ed. (Science Education)	79	16
B. Ed. (Health Science Education)	8	2
B.Ed. (Maths Education)	146	29
B. Sc. (Psychology)	111	22
B. Ed. (Social Studies)	168	34
B. Ed. (Social Sciences)	68	14
B. Ed. (HPER)	32	6
B. Ed. (Management)	223	45
B. Ed. (Arts)	85	17
B. Ed. (Accounting)	180	36
B. Ed. (Basic Education)	87	17
B. Ed. (Early Childhood)	74	15
B. Ed. (Home Economics)	93	19
TOTAL	1384	278

another. This approach assisted to determine the difference in the impact of the library instruction given to first year students in relation to their lifelong learning and the probability of restructuring the Information Literacy course of the University. To elaborate on the findings of this study, the researchers used the explanatory sequential mixed methods approach; thus, first of all, the researchers collected quantitative data from 278 respondents and followed it up with a qualitative interview of 14 main programme representatives and 14 assistant programme representatives. The qualitative data obtained from interviews and the content analysis of research projects complemented the quantitative data collected on the information literacy skills and information-seeking behaviour of students. In other words, adopting this approach yielded more and more accurate data than would have been possible with either the quantitative or qualitative approach alone.

This researcher's obtained ethical clearance to collect data from the Department of Information Science Ethics Review Committee. By the approval letter from the Department of Information Science Ethics Review Committee, permission was granted by the College of Education Studies, University of Cape Coast to seek the consent of undergraduate students and also collect data. Data collection was guided by the [39].

Data was collected during lecture hours of the various programmes. All 278 questionnaires distributed were retrieved and valid for the analysis. Frequency, percentages and mean scores were calculated using SPSS version 22. Pearson Correlation co-efficient was employed to determine the statistical association of variables. The qualitative data were analysed using the thematic content analysis technique. Content of the students' research projects was analysed using pre-determined broad categories of the criteria for the analysis.

3. Results

3.1. Information seeking behaviour of undergraduate students

In finding out the information seeking behaviour of students, the purpose for which students sought for information was explored. The results in Fig. 1 revealed that, slightly more than (195) 70.1% of the respondents sought information 'to do assignment', (29) 10% wanted to 'to stay current', while (15) 5.4% sought information 'to write their research project'. See Fig. 1 below.

Students were asked to indicate sources of information consulted for their academic work. As Fig. 2 shows, about 50% (138) found information from the library and 48.2% (134) sourced theirs from the internet. Fewer than 2% of them got information from their course mates.

The researchers also sought to find out the sources respondents consulted for their research project which are expected to be cited and documented. The data indicated that majority of the respondents 35% (97) used online databases, 21.7% (61) used information provided by librarians while others used scholarly journals (20.2%) or internet resources.

It was observed from the interview data that generally, all the respondents consulted both print and electronic resources for their research project. Materials mostly consulted from print sources included textbooks, reference materials, journals, and previous research projects. Regarding the use of online sources, respondents indicated that they used the library's OPAC, JSTOR, online libraries, Google scholar, Yahoo search, Ix [quick.com](#), [Academic.com](#), catalogues, Wikipedia, Google François, fait facile, YouTube. A few respondents also used databases on CD ROMS, E-Books and DVD. Almost all the respondents said that they use search engines and academic databases that have been subscribed by the library.

3.2. Strategies and level of competencies of students in sourcing information for research project

Students' information seeking strategies was investigated. This was useful to identify the information literacy skills respondents adopted towards lifelong learning. A Likert scale of 1–5 (Never, 2 = Hardly ever, 3 = Sometimes, 4 = Quite often, 5 = Always) was used to measure the information seeking strategies students adopted to find information. Table 2 shows a summary of the data.

The study found out that majority of the respondents 130 (46.8%) were competent in differentiating between primary and

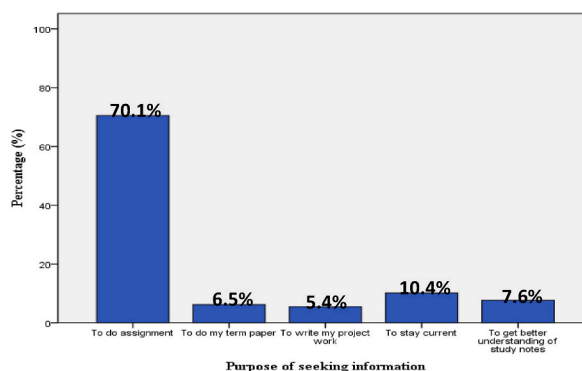


Fig. 1. Information seeking Behaviour Sources of information used.

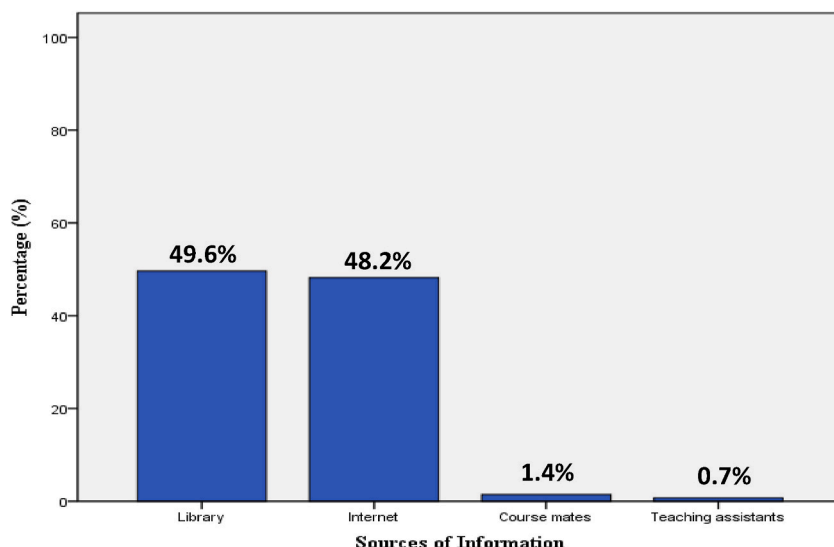


Fig. 2. Sources of information Used Sources consulted for research projects.

secondary sources. Similarly, 112 (40.3%) of the respondents were competent in identifying appropriate retrieval systems for accessing information as against 7 (2.5%) who were not. Also, 104 (37.4%) were competent in identifying the purpose of potential resources as against 11 (4.0%) who indicated otherwise. Again 122 (43.9%) of the respondents were competent in identifying different sources. With the overall mean and standard deviation of (3.79) and (1.02) respectively, respondents clearly demonstrated some level of competency in ‘Information Seeking Strategies’.

The qualitative data showed similarities with the quantitative data: students had good knowledge of information literacy skills and could apply them in information search strategy. For example, two of the respondents revealed these:

I am equipped with strategies to access needed information from many sources. For example, I know better ways of searching for information on the Internet as well as the library materials.

Another student added: “I know how to narrow or broaden my search for information on the Internet and even in the library.

3.3. Most Preferred Information Sources

The researchers also sought to determine the most preferred sources of information of the respondents. The results indicate that most of the respondents 78% (217) of them selected the Internet as most preferred source followed by physical resources in the library 15.7% (44) with just 2.9% (8) preferring information from their lecturers (Fig. 3 below).

3.4. Reasons for preference

The internet was the most preferred source because it was perceived to provide fast/quick information (83.4%), it is reliable source (10.1%), and gives current information (2.5%). See Fig. 4 below.

3.5. Accessing most preferred information source

The researchers further sought to identify the frequency of accessing the most preferred source. More than half (57.2%) always use

Table 2 Level of competency in information seeking strategies (N = 278).

Information Seeking Strategies	N	Level of Competency Freq. (%)					Mean	Std. Dev.
		1	2	3	4	5		
Differentiates between primary and secondary sources	278	7 (2.5)	23 (8.3)	44 (15.8)	130 (46.8)	74 (26.6)	3.87	0.984
Select appropriate retrieval systems/Source	278	8 (2.9)	24 (8.6)	57 (20.5)	112 (40.3)	77 (27.7)	3.76	1.014
Identifies different sources	278	5 (1.8)	35 (12.6)	49 (17.6)	122 (43.9)	67 (24.1)	3.81	1.027
Identifies the purpose of potentials resources	278	11 (4.0)	22 (7.9)	69 (24.8)	104 (37.4)	72 (25.9)	3.73	1.055
Overall							3.79	1.02

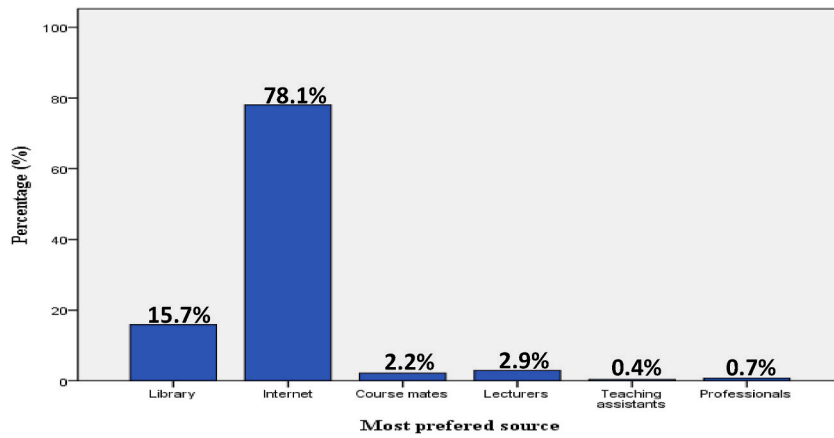


Fig. 3. Most preferred information sources.

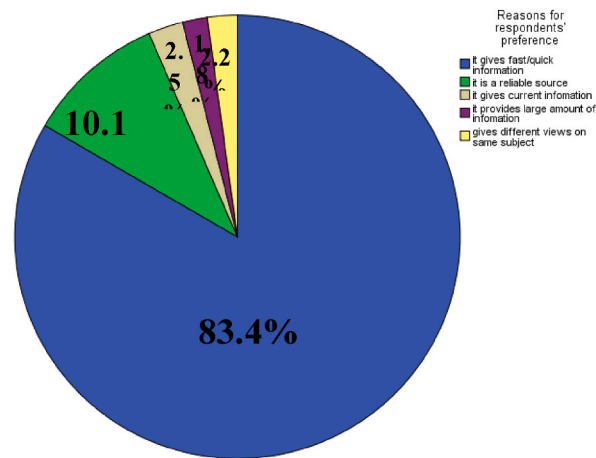


Fig. 4. Reasons for preference.

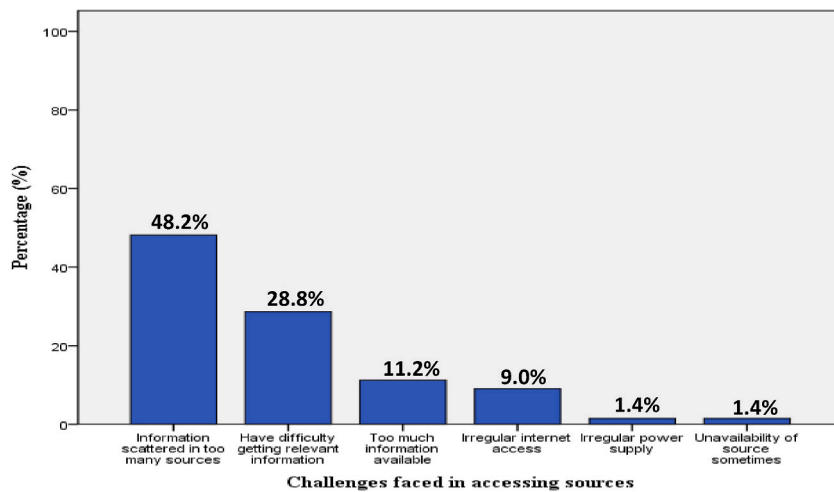


Fig. 5. Challenges in accessing information for research projects.

the Internet to access information while (37.4%) use it quite often.

3.6. Challenges in Accessing Information for Research Projects

Results in Fig. 5, reveal that majority 134 (48.2%) of the respondents had challenges mainly related to the scattering of the information in too many sources. About (29%) had difficulty in getting relevant information while (11.2%) shared the view that there was too much information available.

Majority (52%) of the respondents indicated that they do not have computers/laptops due to financial constraints. A few students who were interested in e-books and information on CD/DVD could not buy due to the same reason given above. Many of the respondents said they needed money to buy textbooks. The interview results revealed that inadequate Internet connectivity was a major challenge. This was a result of low internet bandwidth in the library. Another issue that came to light was that few students had challenges in evaluating information from both print and electronic sources. Other opinions respondents indicated were stress, limited time and fear as a result of inadequacy in using information tools to find relevant information. A couple of students had this to say:

some information I receive on the Internet at times were too foreign and bulky that lack simplicity. Network availability also hinders me from assessing information on the internet.

Another student remarked "Sometimes information obtained is not discrete i.e. a combination of needed and unneeded ones highly integrated into a weird form.

3.7. Influence of information literacy skills on students' information seeking behaviour

A correlation analysis was conducted to ascertain the association between students' information literacy skills and their information seeking behaviour using established criteria by Ref. [13]. To do this, document analysis was carried out on twenty-eight students' research projects of the two groups: 14 research projects of the programme representatives (Experimental Group) and 14 research projects from other students (Control Group). Furthermore, a bibliographic evaluation of their research projects was conducted, and the results compared. The issues considered in the document analysis covered students' 'Utilisation of quality resources', 'Variety of resources used', 'Citation format', 'Utilisation of information', 'Currency' of the materials used, 'Authoritativeness' and 'Relevance' of the information accessed.

The analysis revealed that the control group demonstrated a moderate level of information literacy skills in terms of their selection of information resources. In examining their references, some of the cited sources could not be traced on the internet; some contained information from unknown sources, and some in-text information had no citation. It was evident in the respondents' research projects that they made fair use of a variety of resources in their work and also cited few resources. Their work however lacked variety because most of their information was web-based. Furthermore, some of the research projects had incomplete references; some citations were copied and pasted from the web while some pages had one or no in-text citation, indicating inadequate references. The document analysis revealed that the respondents were able to analyse and synthesise gathered data in their own words, with a few instances of direct 'copy and paste' from the internet. The documents contained current materials, but a few outdated references were also observed, ranging from 1965 to 1989.

Sources that the researchers could trace showed that respondents used some credible authorities and information sources in their work. Relevant and useful information, which was in line with the subject of their project research, was observed in the document analysis.

On the other hand, the experimental group performed better. Respondents' research projects contained many high-quality resources, and most cited sources could be traced on the internet. Respondents were able to cite a variety of resources in their research projects. Most of them cited many sources that were closely related to the topic they were writing about. The research projects of respondents followed the acceptable APA citation format, and most of the cited online sources could be easily located. Respondents acknowledged the sources they consulted in-text as well as in the list of references. Respondents were able to analyse and synthesise collected information correctly, providing appropriate references. In a few instances, 'copy and paste' were observed. Most of the respondents cited current issues of information resources and that there was no use of outdated information in their research work. It was also observed that respondents considered the authoritativeness of the material they used. Most materials cited were from reputable authors, as an analysis of their search histories leads to the various acknowledged sites on the internet. Most materials used were relevant to the topics of their research projects.

The overall findings from the document analysis revealed that respondents who took the refresher programme (experimental group) performed better than those who did not take the refresher programme (This is not to say that the control group performed poorly). The findings indicate that the refresher programme had a positive influence on the experimental group in that they renewed their knowledge timeously. The findings from the experimental group interviews revealed that the refresher programme came just when the respondents needed it.

In addition to the document analysis, the mean score of students in the experimental group was computed. Pearson product-moment correlation coefficient was used to determine the association between information literacy skills measured as the ability to use quality and variety of information resources, ability to cite resources used properly, ability to utilize information with respect to its currency, authoritativeness and relevance and information seeking behaviour measured as how information users (students) conduct themselves when searching for information to accomplish a particular task for decision making.

Preliminary analyses were performed to ensure there was no violation of the assumptions of normality, linearity and homoscedasticity. As noted from [Table 3](#), there was a strong positive significant association between information literacy skills and information seeking behaviour ($r = 0.776$, $p = 0.003$). This implies the acquisition of information literacy skills to a very great extent improves information seeking behaviour and the quality of information resources students' use in their research.

4. Discussions of results

The findings of the study provided insight into the information literacy and information seeking behaviour and its influence on lifelong learning of students. Respondents generally sought information for their assignment rather than for research projects. This contradicts the finding of [\[27,28\]](#) that the majority of the sources students' uses for their studies are for the purpose of writing their research projects. This could be because research project is usually the last submission from students, and therefore they would want to complete other assignments before working on their research projects. Though this practice may not be the ideal because of limited time to effectively complete the project, the finding corroborates an observation by Ref. [\[13\]](#), that some students often delay assignments due for submission at the end of the semester.

In determining the most preferred sources of information, the qualitative data obtained revealed that most respondents preferred Internet resources to print resources. The quantitative results further confirmed that majority of the respondents declared their preference for Internet resources followed by library materials. These findings are in line with that of [\[27,40\]](#) which indicated that students preferred using the Internet over print resources. On the contrary, it disagrees with [\[41\]](#) study which reported that most students preferred printed books to Internet resources. It is possible to suggest that, students do not possess the requisite skills to access internet resources unless they receive appropriate training.

With regard to their reasons for most preferred sources, majority of the respondents indicated that the Internet provides information faster than other methods, qualitative data others indicated that the Internet provides more reliable information. These findings are consistent with that of [\[40\]](#), who observed that students preferred using the Internet because of the accessibility and their belief of its credibility. Students at this level should be more concerned about the reliability of information rather than the speed; and this should guide all stakeholders in higher education. In terms of frequency in accessing most preferred sources, more than half of the respondents indicated that they always access these information sources, while over a third often access these sources, showing that a large majority of the students have greater access to their most preferred sources. There is the natural tendency for students to get acquainted with information sources they are comfortable with and thus access it all the time. Also, the fact that the Internet provides timely and current information as compared to printed materials is another factor why students mostly consulted the Internet.

The findings also brought to light several strategies students adopt to source for information for their research. Many of the respondents consulted online databases, while some used other information sources in the library. This differed from observations by Ref. [\[28\]](#) who assessed the information literacy competency of undergraduate students of the University of Ilorin, Nigeria and found that majority of students consulted only the library for their research – an indication of students' inadequate information literacy skills acquisition.

Respondents consulted both print and electronic resources which were similar to the quantitative results gathered. The materials mostly consulted from print sources included textbooks, reference materials, journals, and previous research projects in the library. The interview also revealed that they consulted online sources such as the library's OPAC, JSTOR, online libraries, Google Scholar, Yahoo search, Ix [quick.com](#), [Academic.com](#), Wikipedia, google François, fait facile and YouTube. The interview revealed that they used academic databases subscribed by the library and a few respondents indicated that they used databases in CD ROMS and DVD. The findings are indications of students' exposure to the numerous resources of the library, and they are supposed to explore and use different sources for their research. These findings are in line with [\[14\]](#) who reported that their study subjects were able to use the KNUST OPAC, databases, Google Scholar and other electronic resources effectively.

Concerning challenges students encounter in finding information, respondents identified lack of bibliographic control as most common because to them the needed information are poorly organized as they are scattered in many sources which implies that the indexing services of the library need to be strengthened. A major hallmark of every library is to organize information for timely and easy retrieval, even though the new technology requires uninterrupted power supply which obviously constitutes a huge challenge for libraries in many developing countries across the globe.

We also found that students' information literacy skills had a strong positive significant association with information seeking behaviour, showing that the more students are engaged in information literacy activities the better their information seeking behaviour, and lifelong learning skills [\[16\]](#). had also observed that an increase in motivation and perseverance in information seeking correlate all the dimensions of information literacy positively. Similarly [\[24\]](#), had earlier found out that there existed a significant positive relationship between students' information literacy skills level and academic performance towards lifelong learning. Evidently therefore, information literacy skills acquisition is essential in determining the information search pattern of not only students, but to a very large extent their lifelong learning. This is not only relevant for the students but to all individuals that are interested in lifelong learning.

A comparison of the document analysis of the two groups (experimental and control) showed that those who took the refresher course (experimental group) performed quite better than those who did not take the course (control group). This indicates that the refresher course had a positive impact on the experimental group; implying that a periodic refresher course for students after the first year will help improve student's information literacy skills, lifelong learning skill and information seeking behaviour.

Generally, the findings of this study have revealed that students' lifelong learning skills continue to grow as a result of the information literacy skills they have developed and this can enhance their information seeking behaviour in their workplaces. This

Table 3
Correlation coefficient of respondents' information literacy skills and information seeking behaviour.

Information Seeking Behaviour	Information Literacy Skills	
	Pearson Correlation	0.776 ^a
Sig. (2-tailed)	0.003	
N	12	

^a Correlation is significant at the 0.01 level (2-tailed).

finding corroborates [15] study which indicated that past students believed that the information literacy training they had from the University of Cape Coast was useful and that it had had an impact on the work they did leading to improved lifelong learning skills.

5. Conclusions

This study investigated the influence of information literacy skills on students' information seeking behaviour and lifelong learning skills of undergraduate students at the University of Cape Coast. The results showed that respondents had developed an appreciable level of information literacy skills. Most of students get more information for their academic work from the library rather than the Internet. Very few respondents indicated that they used information from their course mates and teaching assistants. Considering information for their research projects, the findings showed that many respondents used online databases, information from librarians, scholarly journals, and other Internet resources. Sources that were not frequently consulted included professional magazines, newspapers, professionals, lecturers, and course mates. Results of this study established that students mostly preferred Internet resources because the Internet provided fast and current information. Importantly, the hypothesis tested confirmed that there exists a positive correlation between information literacy skills of students' information seeking behaviour and lifelong learning.

Based on the findings of the study it is recommended that.

- There is the need for policy change; that is, the Sam Jonah Library Management of the University of Cape Coast in collaboration with the Information Literacy Skills Unit of the University of Cape Coast should ensure the implementation of a refresher training or an extension of the Information Literacy Skills course beyond the one semester as this will assist students to have a better grasp of information literacy competency and lifelong learning.
- Irregular internet access and irregular power supply, among a host of other challenges, affecting students' IL competency should be addressed by the Sam Jonah Library Management of the University of Cape Coast to enhance delivery of services in the library.

Author contribution statement

All authors listed have significantly contributed to the investigation, development and writing of this article.

Data availability statement

Data will be made available on request.

Declaration of interest's statement

The authors declare no competing interests.

Additional information

Supplementary content related to this article has been published online at [URL].

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2023.e18427>.

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