# Awareness and Usage of Information Retrieval Functionalities Found in the Online Public Access Catalogue by Undergraduates at the University of Venda

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## Abstract

Calls for a shift from the Online Public Access Catalogue (OPAC) to discovery systems craft a need for recognising the information-searching behaviour of the current genre of library users. This study examined the undergraduate students' awareness and usage of information search functionalities that are embedded in OPAC at the University of Venda (UNIVEN) in Limpopo Province, South Africa (SA). Quantitative data were collected using a Google Form questionnaire, the link of which was e-mailed to the participants to complete. A systematic random sampling method was applied to arrive at 563 respondents. The findings revealed that most respondents rated their level of awareness of OPAC as average. Although some were familiar with OPAC search functionalities, such as author-and-title search entries, and preferred using simple search options on OPAC, there were respondents who were not familiar with Boolean operators, truncation and wildcard symbols, proximity operators, and field search. The major variables affecting their information retrieval on OPAC were poor internet connection and their lack of skills in searching for information from OPAC. This study recommends that librarians promote the importance of using all OPAC functionalities and train undergraduates to improve their awareness and optimal usage of OPAC.

**Keywords:** Online Public Access Catalogue (OPAC); OPAC functionalities; information-searching behaviour; undergraduate students, University of Venda

# Introduction

Fundamental and interrelated functions of academic libraries are the acquisition, organisation and dissemination of information sources to members of academia. In this paper, attention is focused on the function and organisation of information sources designed to facilitate easy access to the university library's collections through an information retrieval tool known as a library catalogue. A well-generated library catalogue provides means for an indexed collection of information sources found in libraries, which enables library users to discover which information sources are available and their location in the library (Monyela 2019). A library catalogue also provides library users with information pertaining to creators' names, titles, subject terms, standard numbers, publication areas, physical descriptions and notes that describe those information sources to facilitate easy information retrieval and access (Baca 2016). Library users must first consult a library catalogue to gain unmediated access to library information resources, without which it would be difficult for them to know where to find an information source on a given subject or by a specific author within the academic library.

However, the era of the traditional card catalogue (where the bibliographic descriptions of library resources were recorded and organised alphabetically in a filing cabinet) diminished as OPAC gained a reputation in almost all university libraries globally (Rowley and Hartley 2017). OPAC is regarded as a precise, effective, and efficient tool for easier and quicker access to library resources and services (Nwobu, Oyewole, and Apotiade 2016). Research in Library and Information Science (LIS) shows that the first OPACs as new Information Retrieval Systems (IRS) were executed in the mid- to late-1970s (Islam and Ahmed 2011). Later, LIS researchers became interested in projects to examine the usage of OPAC among diverse user groups in institutions of higher learning. Morupisi and Mooko (2006) provide an exploration of long-standing studies on the usage of online library catalogues in academic libraries across the world, while other studies measure the attitudes of library users towards OPAC (Clifford and Zaccus 2015; Vijayakumar and Manasa 2018).

Although OPAC plays a critical role for library users to locate available information sources from academic libraries effectively, there is evidence of a decline in students' usage of OPAC (Chilimo 2014; Rubin 2017; Song, Buba, and Song 2018). Most of these studies agree with the view that despite all advantages related to the usage of OPAC, and the time and money endowed on "building and maintaining catalogues according to accepted international standards" (Rubin 2017, 179), library users—specifically undergraduate students—seem to be inclined to circumvent and neglect the online library catalogue in favour of Google search (Fresnido and Barsaga 2019). Their approach to searching for information on OPAC appears to be more or less the same as how they would usually conduct their searches on Google; also expecting that OPAC will return results that are similar to that of Google search (Avhad 2022; Georgas 2014). It is for this reason that systems developers are recommending OPAC search

functionalities that are like those of Google. Monyela (2020) recommends the introduction of Artificial Intelligence (AI) in creating Fourth Industrial Revolution (4IR) library catalogues in SA, which have the potential to create online catalogues that are free of errors and enhance the quality of current era online catalogues. Yesmin and Ahmed (2015) compare university students' preferences for searching the library online catalogue via the university library OPAC, against its new discovery tools in Bangladesh, and recommends the consideration of new discovery tools as the solution. However, along with these recommendations and new innovations for improving the OPAC functionalities, there is a need to know more about the current genre of library users (Nahotko 2020). Any recommendations for OPAC developments should consider how these developments will affect user performance, their information search behaviour and system perceptions (Wakeling, Clough, and Sen 2014). A study of this nature may have the potential not only to allow academic librarians to better support undergraduate students' information-seeking, but also to assist system designers and OPAC interface developers in exploring new ways of making OPAC more effective and relevant to its users when they search for books, journals articles and other information resources provided by the academic library.

The University of Venda (UNIVEN), located in the Thohoyandou area of Vhembe District, is one of the two universities in Limpopo Province, South Africa (SA). Academics, students, and researchers at UNIVEN also depend on the academic library OPAC for information to support teaching, learning, research, and community engagement projects. Most of the students "who attend this university for the first time lack basic information-handling skills, including basic computer skills" (Tlakula and Fombad 2017, 863). By observation, when undergraduate students are tasked with their first assignments during the first term of the year, they usually approach the reference desk for basic information and enquiries that could be answered with the help of OPAC. This tendency, of course, defeats the concepts of self-help and independence. Sometimes, the books on the shelves are in disarray because of students who don't use OPAC to locate library materials. Subsequently, the information-searching behaviour of undergraduate students makes one wonder about their awareness and usage of OPAC. Their knowledge and usage of OPAC search functionalities become a cause for concern, which warrants empirical investigation; hence, this study with the following objectives:

- To assess the extent of familiarity with OPAC and its search functionalities amongst UNIVEN undergraduate students.
- To establish search functionalities employed by undergraduate students at UNIVEN when searching information from OPAC.
- To identify factors that influence the information-searching behaviour of undergraduate students on OPAC.

For the purpose of this study, OPAC search functionalities include search entries, search and search strategies/techniques, which library users exploit for interacting with OPAC as an IRS. Search entries are access points or fields through which users can search

information on OPAC, such as author, title, subject, keywords, International Standard Book Number (ISBN), call number, barcode, and accession number. Search options include simple, basic and advanced search or a combination of both (Sarma 2016), while search strategies/techniques refer to the application of Boolean operators and other search techniques such as truncation and wildcard symbols, proximity operators and field search (Lwehabura 2018).

## Literature Review

In this study, students' awareness of OPAC functionalities and usage thereof, is glanced at through the lens of Taylor's Question-Negotiation Model. Taylor (1962) provides an analysis of the nature of the interaction between human beings with the user's information needs and IRS. This model is used for the purpose of this study because it describes processes that users (including undergraduate students) must perform, consciously or unconsciously, to obtain information from an IRS (OPAC). Four levels of information needs (visceral, unexpressed, expressed, and compromised) identified by Taylor (1962) remain important factors in searching for information (Tyckoson 2015, 249). At all four levels of information needs, three categories of variables exist during the interaction between the enquirer and the IRS, which include: i) system organisation; ii) question type and complexity; and iii) the state of readiness of the enquirer.

### System Organisation

System organisation consists of five variables within any IRS, which may affect the question or query and its formulation by the information seeker. These variables are divided into five groups by Taylor (1962):

- **General aspects:** This is about whether the IRS is manual or electronic, as well as the geographical position or environment in which the IRS operates.
- **System input:** Includes indexed information sources in the IRS, which may include books, journals, reports, reference sources, and so forth.
- **Internal organisation:** Includes classification, indexing and subject headings that characterise the IRS and how they are arranged.
- **Question input:** Includes search terms presented to the IRS by the information inquirer that must match the IRS language.
- **Output:** Refers to the feedback provided by the IRS, which includes the number of hits or matches.

According to Eserada, Okolo, and Ideh (2019), OPAC as an IRS contains information sources that the library holds, such as (but not limited to) indexes and abstracts, periodicals, bibliographies, gazetteers, directories, textbooks, yearbooks, electronic books and journals, dictionaries, encyclopaedias, biographies and manuals, manuscripts, prints, photographs and maps. All these sources can be found on OPAC and can be searched through entries such as author, title, subject, keyword and other entries, which are the means that library users employ to gain access to the materials

that are available in the library (Atanda and Ugwulebo 2017, 115). Wells (2020) distinguishes between first and second-generation OPACs. First-generation OPACs are composed of a limited number of access or search key points, such as author, title, and class number only (Nahotko 2020). Therefore, searching the materials by the author or title is used when one wants to confirm the availability of an information source and its location in the library (Machet 2012, 141). The second generation OPAC added subject headings and keywords to the OPAC interface (Nahokto 2020, 111). Nemalili (2015, 16) outlines the simple and advanced OPAC search entries at the University of Venda library as title, author, subject, keyword, course, lecturer, call number, journal title, and ISBN/ISSN. Along these lines, Machet (2012, 31) notes that the trend in OPAC is to include an option to conduct a keyword search, which allows the information system to search the catalogue using different subject headings or keywords. Nahotko (2020) further reckons the third generation to the fourth generation of OPAC will be characterised by displaying search results in order of relevance and the use of WEB 2.0 tools, respectively. Recently, there have been debates around the application of AI in the improvement of IRSs (Harisanty et al. 2022).

## Question Type and Complexity

Question type and complexity include aspects such as the language of the IRS. OPAC has also revolutionised access to bibliographic information through search strategies such as Boolean operators searching, truncation, proximity searching, and item identity number searching, which were not possible in the traditional library card catalogue. Boolean operators consist of parts such as AND (which narrows the scope of a search), OR (which broadens a search), and NOT (to eliminate terms that are not required from a search) (Tella, Oyeniran, and Ibironke 2021). Boolean operators are grouped with proximity operators, truncation and wildcard symbols (Leung et al. 2019). Truncation marks broaden users' search by allowing them to use the symbol of an asterisk* to replace the last few letters of the word. Within a search, proximity is a search technique for finding two words that are next to, near, or within a certain distance of each other. Proximity operators consist of letters N or W (*near or with*), which are placed between the words that are searched. These search techniques provide results that are more relevant and satisfactory (Mehrad and Rahimi 2012). Shetty, Hedge, and Pai (2016) acknowledge that search strategies such as Boolean operators, truncation marks, wildcard marks, proximity operators, and field search can make information searching easier if appropriately used by information inquirers. Ferdows and Ahmed (2015) are also of the view that the application of these techniques can result in improved search performance by students. A study by Lwehabura (2018) at Sokoine University of Agriculture, Tanzania, found that a reasonable number of students demonstrated a significant deficiency in their skills for searching information and the application of various search techniques such as Boolean operators, use of truncation, proximity operators, synonyms, and concept maps.

**State of Readiness of the Inquirer**

The state of readiness of the inquirer has something to do with the user's level of education, experience, knowledge and skills in searching OPAC. Lack of education, experience, and skills in searching information affect the effective retrieval of relevant information sources from OPAC. Ferdows and Ahmed (2015) found that undergraduate students at Dhaka University lacked information search skills. Howlader and Islam (2019) also discovered a lack of ICT knowledge, slow internet speed, lack of knowledge on how to use OPAC, inability to access electronic resources due to a lack of expertise, lack of awareness of library resources, and lack of knowledge to formulate a search query at Dhaka University, Bangladesh. Hence, Ekenna and Mabawonku (2013) note that low undergraduate students' utilisation of resources is associated with a lack of information retrieval skills. Gohain and Saikia (2013, 7) also determined that respondents found it difficult to use OPAC due to a lack of skills at the School of Engineering at Tezpur University. The findings in these studies show a lack of skills to utilise OPAC and a lack of suitable supervision as key issues encountered when utilising OPAC. Knowledge of OPAC search options is, therefore, the first step to its utilisation (Song et al. 2018). Makun, Danjuma, and Dare (2019) note that "usage of OPAC search options by library users depends largely on the extent to which they are aware of their availability and their impact." Msagati (2016) notes that despite OPAC being the most effective tool for searching and retrieving information, there is a low level of awareness about it. Adeleke and Emeahara (2016) found that a low level of usage of electronic information resources is linked to a lack of awareness and lack of search technique skills among the University of Ibadan's undergraduate students. Adeyemi and Omopupa (2020) studied the perceived knowledge and readiness of Nigerian librarians' move from OPAC to discovery tools, and found that they were not yet ready to move from OPAC to discovery tools.

The literature review for this present study reveals that, although in Taylor's days, the IRS was in the form of information search tools of that time, such as card catalogues and printed indexes and abstracts, precisely some of the information retrieval tools, such as OPAC were anticipated in this model.

## Methodology

The study that informed this paper adopted the quantitative research approach and a descriptive survey research design guided by the positivist research paradigm, which emphasises numbers and figures in the collection and analysis of data (Frey 2018). The population for this study consisted of undergraduate students in all schools at UNIVEN. To select participants, a systematic random sampling method was adopted, in which the total number of all undergraduate students was established from the University of Venda Annual Report (2019, 47) as 6 193. The number of participants was arrived at on the basis of an interval, known as the kth or eleventh element (Maree 2016, 195), that is, by dividing the number of participants by 11, which resulted in a sample frame of 563 as the targeted number of participants, summarised thus:

*Students: (6 193) ÷ Interval (11) = (Target population) 563.*

Quantitative data were collected through a Google Form questionnaire that was distributed to the students via an e-mail link, which consisted of closed-ended questions in order to measure the extent to which respondents were aware of and familiar with OPAC search options such as keyword search, searching by title, author search, searching by subject, Boolean operators, truncation marks, and advanced search. A Likert scale or measurement of 1–5 was used as follows: 1= to no extent at all; 2= to an extent; 3= to some extent; 4= to a large extent; and 5= to a very large extent. Data were analysed using Microsoft Excel Spreadsheet. Before the major study was undertaken, the researcher confirmed the reliability and validity of the instrument used to collect data by conducting a pilot study with 10 undergraduate students at the same university. The results of the pilot study yielded a few changes in the first data collection instrument. This study ensured that ethical considerations were adhered to, by which ethical clearance certificates from the Turfloop Research Ethics Committee (TREC/107/2020PG) and the UNIVEN Ethics Committee (28 September 2020) were issued, giving permission to collect data.

## Results and Discussion

The results are presented using pie charts and bar graphs and then discussed and interpreted through comparison with the previous literature. Only the responses with the highest incidences are presented descriptively and in accordance with the objectives of the study, thus: awareness and familiarity with OPAC and its search functionalities; the search entries and search options used for searching information on OPAC; and factors that affect the information searching behaviour of undergraduate students. However, before presenting the results, it is important to dwell on the response rate per school.

**Response Rate**

Figure 1 depicts that the School of Human and Social Sciences achieved the highest number of respondents at 102 (18%), followed by the School of Mathematical and Natural Science at 76 (13%). The School of Agriculture achieved the third highest number of respondents at 73 (13%), followed by the School of Environmental Sciences at 67 (12%), and then the School of Management Science at 65 (12%), while the School of Education followed with 65 (11%), and the School of Health Sciences with 60 (11%) respondents. A minority of respondents were in the School of Law at 55 (10%) respondents.
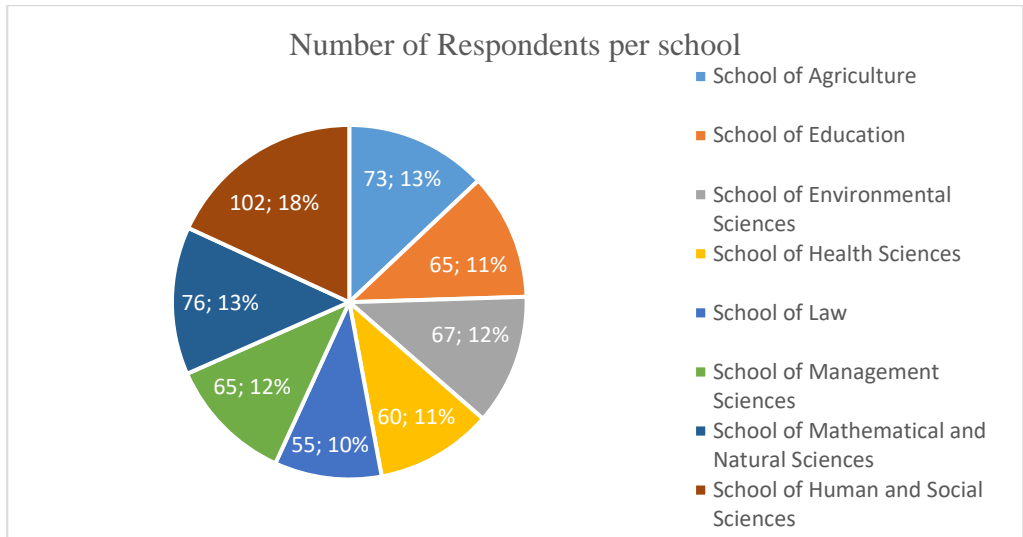
**Figure 1:** Number of respondents per school (N=563)

**Level of OPAC Awareness**

The respondents were asked to rate their level of awareness about the OPAC system in general in the library. They were requested to choose from the options: very low; low; average; high; very high. The results in figure 2 reveal the respondents who rated their level of awareness as average, with 221 (39%) respondents, followed by 108 (19%) respondents who rated their awareness of OPAC as low.
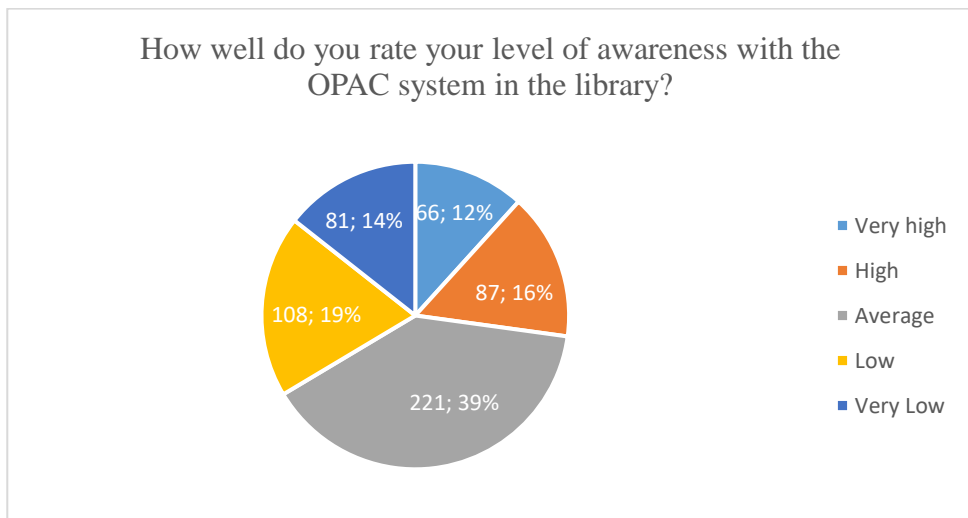


**Figure 2:** Respondents' level of awareness about the OPAC system (N=563)

Similar results by Msagati (2016) at the University of Tanzania indicated that most respondents had a low level of awareness of the OPAC facility, while on the contrary, Aju and Foti (2020) reveal that the undergraduates are aware of the existence of OPAC in public university libraries in Nasarawa State, Nigeria. A study conducted by Gana, Ajibili, and Abel (2019) at Bingham University Library, Karu, Nasarawa State, Nigeria, found that, out of 333 total respondents, 253 (76.0%) were aware of OPAC services to a very small extent. Therefore, as much as there are undergraduate students who may not know what to consult if they have an information need to satisfy, there are some who may know of a relevant IRS to approach.

**Extent of Familiarity with OPAC Functionalities**

The next question posed to the respondents was on the extent to which they were familiar with different OPAC functionalities, using the Likert scale of measurement. The findings showed that keyword, title, author, and subject searches were among the search entries that the respondents were familiar with. This was attested to by 150 (27%) and 111 (20%) respondents, who, to a "large extent" and to a "very large extent," were familiar with the title search option, respectively, while 159 (28%) respondents were to "some extent" familiar with searching by author option. Those who were to "some extent" familiar with keyword and subject search options constituted 154 (28%) and 150 (27%) respondents, respectively. Furthermore, in accordance with the results in figure 3, Boolean search, truncation marks, and advanced search functionalities appeared to be OPAC functionalities with which respondents were to "no extent at all" familiar. The results revealed that 201 (36%) respondents were to "no extent at all" familiar with the Boolean operator feature, while 204 (36%) respondents were to "no extent at all" familiar with truncation marks; and 183 (33%) respondents were to "no extent at all" familiar with advanced search. Therefore, Boolean operators, truncation marks and advanced search are more complex search functionalities, which most novice and inexperienced library users in this study were not familiar with.
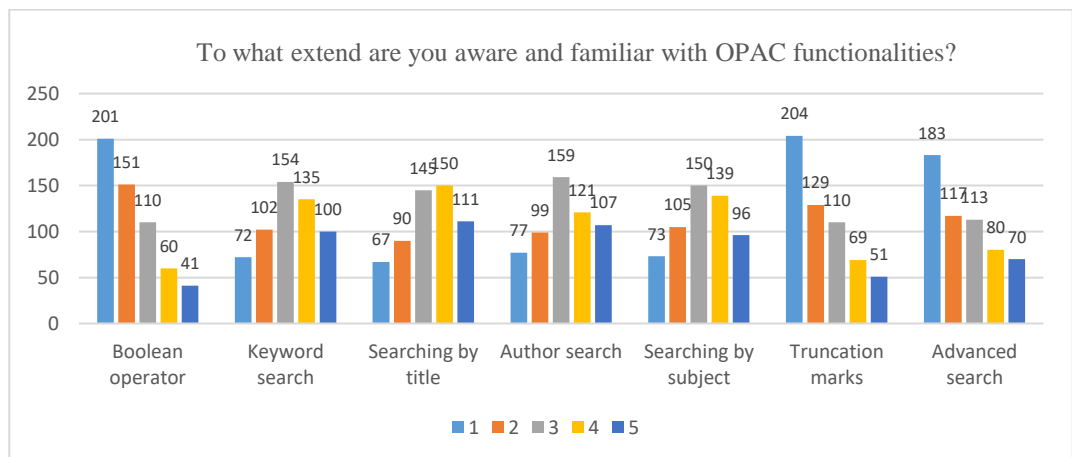


**Figure 3:** Extent of familiarity with OPAC functionalities (N=563)

These results are similar to a study conducted in Odisha, India, by Rout and Panigrahi (2018), which showed that most respondents' familiar search approach to OPAC was by title and the author. Costello (2016) also found that metadata elements that best facilitated the discoverability of digital collections searched by undergraduate students in the southwestern United States of America were title, keywords, and subject search. These are well-known search entries to retrieve information (Costello 2016). Furthermore, Boolean operators appear to be the most complicated and difficult to manipulate for obtaining needed information among undergraduate students or novice users (Warwick et al. 2009). A study conducted by Fresnido and Barsaga (2019, 29) on the information-searching behaviour log analysis of OPAC searches in an academic library, found that users were oblivious of search limiters such as Boolean operators and truncation marks. Boolean operators and truncation marks are best known by professional information librarians when searching for information on behalf of library users. Information professionals have a long history of using Boolean logic and operators in information search services, and are likely to confuse less experienced users (Haider et al. 2022).

**How Respondents Became Aware of OPAC**

As a follow-up to the previous question, the participants were asked to choose how they became aware of OPAC. Among some of the options for the respondents to choose from were lecturers, librarians, friends, library training, and when they were borrowing library materials. Figure 3 shows that 277 (49%) respondents became aware of OPAC during library training, while the other half of respondents became aware of OPAC through friends (80, 14%), lecturers (26, 58%) and when browsing through the internet (58, 10%). The results revealed that undergraduate students who attended library training were more likely to be aware of OPAC than those who did not attend.
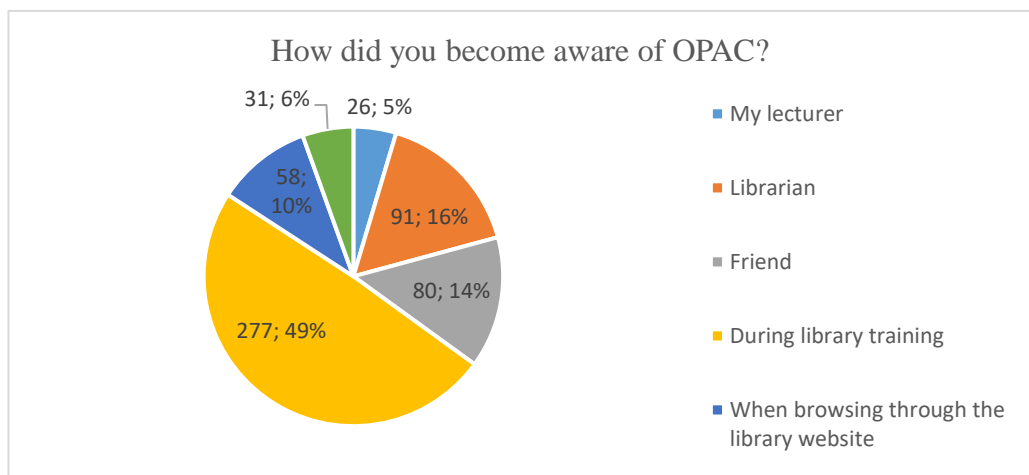


**Figure 3:** Sources of awareness

Narayanaswamy (2019) and Naik and Nikam (2014) also found the same outcome with undergraduate students at Bangalore University Library and at Karnataka, in India, respectively, who became aware of OPAC through library orientation, library tours, library brochures, library manuals and handbooks. A study conducted by Shorunke, Eluwole, and Gbenu (2014) at the Landmark University also found that library users learned about OPAC during the library study skills and information technology course offered by the library. These findings reveal that library user education training by librarians is crucial, not only for enhancing students' basic research and information skills, but also for making them aware of library resources (Chinyere 2014; Saliba 2021). However, Civilcharran, Maharaj, and Hughes (2015) found that most respondents in SA higher educational institutions gained their search skills through experience rather than through formal training. This demonstrates that the users' knowledge of information resources is not in a fixed position, but is constantly shifting from unfamiliarity to familiarity with experience (Blummer and Kenton 2014).

**Search Entries Used**

The respondents were further asked to choose the search entries that they used for searching information on OPAC. Figure 4 indicates that 379 (67%) respondents searched using title, 339 (60%); subject, 302 (54%); keywords, 299 (53%); author, 120 (21%); and accession number, while 92 (16%) respondents said they never used OPAC.
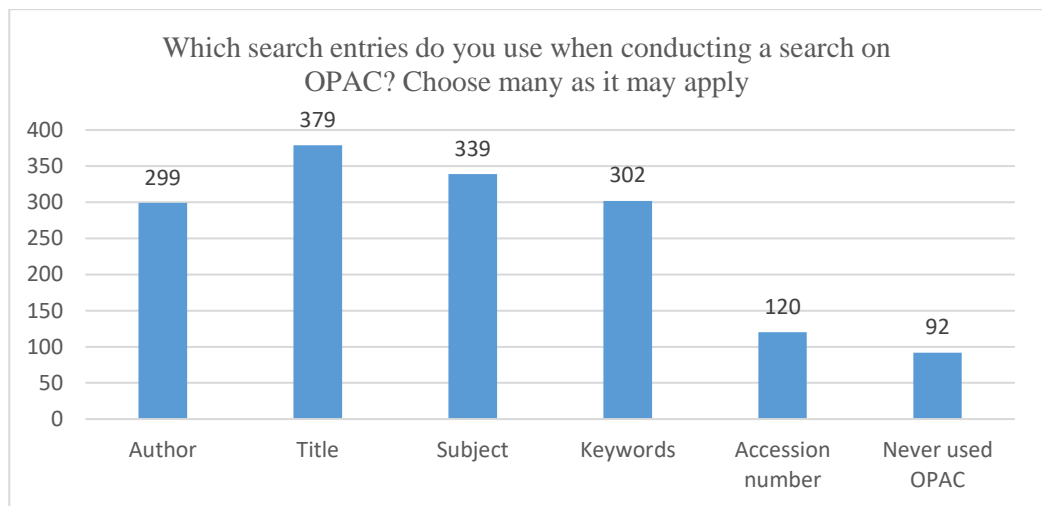


**Figure 4:** Entries used when conducting a search on OPAC (N=563)

These results in figure 4 confirm previous results that students are only familiar with title, author, and subject search entries. Keyword search entry also appears to be used as search entry by respondents, because they are default search fields for OPAC (Wu, Liang, and Bi 2018). Gohain and Saikia (2013) also emphasise that the purpose of OPAC is to know what a library has on a particular author, title, and subject. Therefore,

most novice users of OPAC may not be aware of search entries on OPAC beyond finding library materials by author, title, and subject. Ndumbaro (2018) also found that most OPAC users at the University of Dar es Salaam library preferred access points such as author, title, and subject and, by default, keyword search. Searching information by author, title, and subject search appears to be the easiest way of finding needed materials when searching for unknown items. The accession number is also used as one of the bibliographic search entries for library materials, which users may use to find information from the OPAC circulation system (Onah et al. 2020).

**Search Options Used**

The respondents were further asked to indicate which search options they used when searching information on OPAC. Search options included either simple or advanced search options, or a combination of both. Figure 5 shows that the search options used when searching on OPAC were simple search with 249 (44%) respondents, followed by 142 (25%) respondents who used both simple and advanced search, and then 93 (17%) who never used OPAC, and 79 (14%) respondents who used advanced search.
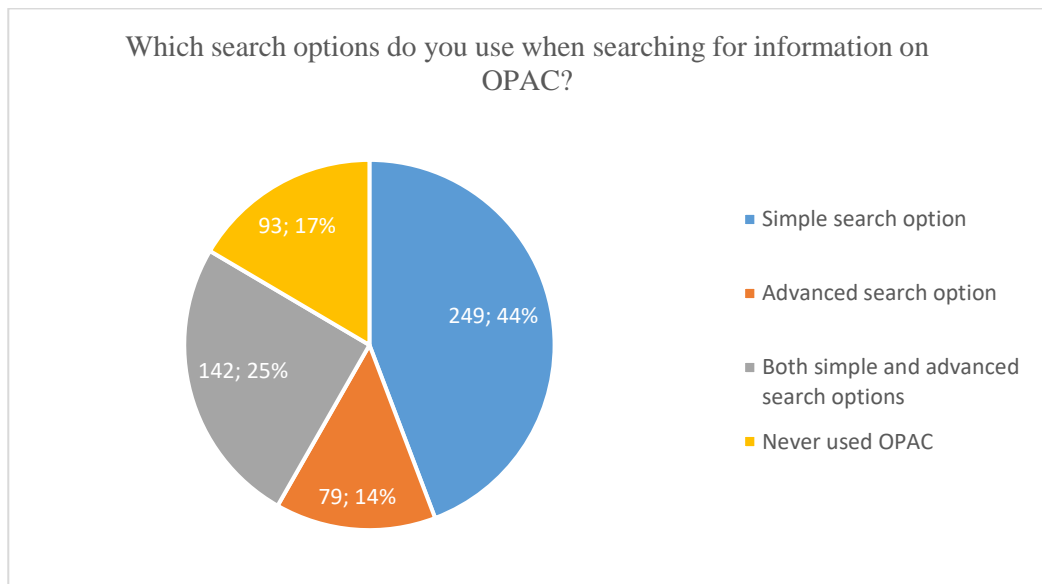


**Figure 5:** Option used when searching for information on OPAC (N=563)

From an information-seeking behaviour point of view, information seekers prefer easy-to-use information search options rather than options that are more difficult and complicated (Abera 2019). This, then, results in the most convenient search method for the least exacting mode available, and information-seeking behaviour stops immediately when minimal accepted results are found (Fisher, Erdelez, and McKechnie 2005, 290).

**Factors Affecting OPAC Information Searching**

The respondents were also asked about the challenges they usually encountered in searching OPAC. From figure 6, it is revealed that the major challenge encountered was slow internet connectivity by 250 (44.4%) respondents. Lack of knowledge and skills to search OPAC were also mentioned by 224 (40%) and 222 (39%) respondents, respectively.
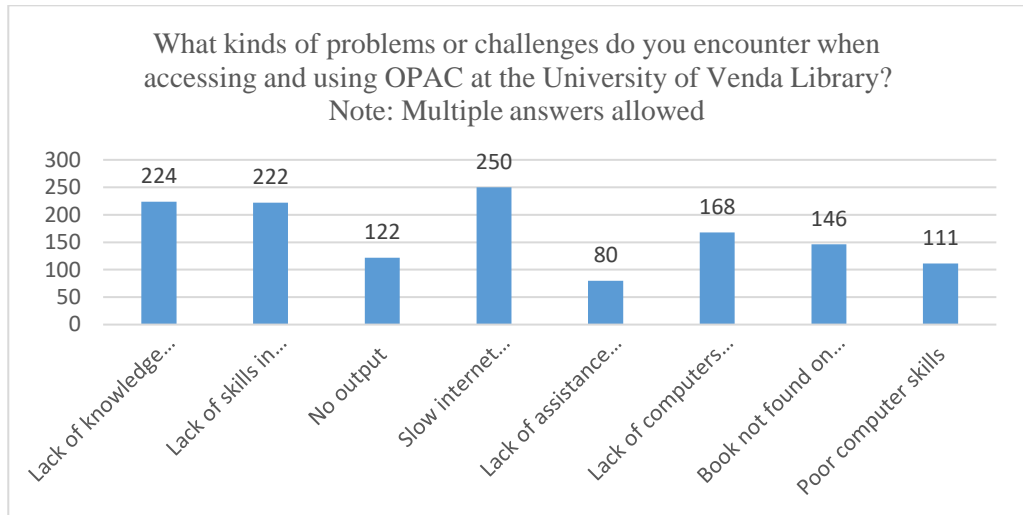


**Figure 6:** Factors affecting students' use of OPAC (N=563)

Slow internet connectivity appears to be the common variable that affects most of the students' use of OPAC (Williams 2020). This challenge was also reported by Howlader and Islam (2019) in most developing countries. Larson (2018), on the use of OPAC among undergraduate students at Osagyefo Library, University of Education, Winneba, Ghana, also found that among some of the challenges experienced was slow internet connectivity. The next challenge towards optimal usage of OPAC in this study was a lack of search skills and knowledge of OPAC. Lack of information retrieval skills was found to be the most prominent reason for not utilising the OPAC functionalities in most countries in Africa (Arshad and Shafique 2014; Eserada and Okolo 2019; Ferdows and Ahmed 2015; Gohain and Saikia 2013; Lwehabura 2018). Larson (2018) also shows the lack of basic skills for searching OPAC as one of the factors that undergraduate students face. The reason for the lack of skills regarding OPAC appears to be the lack of library orientation by library staff (Obim, Ezeani, and Nwadike 2017). This finding relates to the information search process by Taylor (1962) on the state of readiness on the part of the inquirer. Molepo and Bopape (2019) also note that the information user's experience with searching for information from any IRS has an influence on his/her confidence in finding the desired information. Furthermore, the complexity of the IRS affects the

information user's readiness to manipulate the system for the purpose of retrieving the needed information.

## Conclusion and Recommendations

In conclusion, the study found that most students rated their awareness of OPAC as average, followed by those who rated their awareness as low. It was also found that in as much as there were undergraduate students who were aware of and familiar with OPAC functionalities, such as author, title and subject search, there were those who were not familiar with some of the functionalities, such as Boolean operators, truncation, and proximity search. Furthermore, the results showed that most of the undergraduate students became aware of this tool during library training. The conclusion drawn from the findings on awareness is that even if undergraduate students at UNIVEN were aware of OPAC, they did not use it optimally to obtain information from the library OPAC. The major obstacle towards optimal utilisation of OPAC was their poor knowledge of advanced features and OPAC search options, as well as their poor information search skills and internet connectivity challenges. Looking back at the information-seeking behaviour model (Taylor 1962) on which this study was based, the interaction between OPAC users and the OPAC system was affected by internal system organisation, state of readiness of the inquirer, and the complexity of the OPAC system. It appears that because of the state of readiness of undergraduate students to search information from OPAC, they tend to depend on simple information search options such as title and author. The OPAC search options that are complex and advanced are, therefore, avoided by undergraduate students as information enquirers. When they try to use more advanced search options, the questions that they put into the system are not recognised by OPAC and result in irrelevant information. This is because they do not have skills in utilising information search techniques or strategies such as Boolean logic, truncation and proximity and field search. It is also concluded that among the challenges that undergraduates encountered in the interaction with OPAC was slow internet connectivity. Challenges of this nature are found to be general variables in the information-seeking behaviour model on which this study was based. This includes the physical and geographical environment in which the system operates, including the infrastructural requirements needed for the information system to operate. This study recommends that librarians ought to promote the importance of using all OPAC advanced search options to improve their awareness and, ultimately, optimal usage of OPAC.

## Acknowledgement

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