

EXTENT OF USE OF PARENTHESIS SEARCH STRATEGY FOR LIBRARY DATABASE ACCESS AMONG POSTGRADUATE STUDENTS IN UNIVERSITIES OF TECHNOLOGY, IN SOUTH EAST, NIGERIA

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Abstract

This study evaluates the extent of use of parenthesis search strategies for library database access among postgraduate students in Universities of Technology in South -East, Nigeria. Despite the proliferation of digital resources, evidence suggests students lack the necessary retrieval skills, resulting in the underutilization of subscribed content. The research adopted a survey design, sampling 230 respondents from a population of 540 postgraduate students at FUTO and ESUT using stratified random sampling techniques. Data were gathered using structured questionnaires to assess usage frequency. Findings revealed a statistically significant difference between institutions; while ESUT students applied the strategy "very often" for OPAC, the general usage across most databases, such as HINARI and AGORA, was merely "sometimes". The study concludes that students possess only moderate proficiency in advanced search strategies, which hinders effective information retrieval. Consequently, it recommends that university management increase funding for database subscriptions, while libraries must organize intensive information literacy training and ensure reliable network connectivity to enhance research output.

Key words: Library Databases, Parenthesis Search, Information Retrieval.

Introduction

The increasing reliance on electronic information resources in higher education has made effective search strategies a critical component of academic success, particularly among postgraduate students. In library and information science, advanced search techniques such as the parenthesis search strategy are used to group search terms and

control the order of operations in database queries. It plays a vital role in improving the precision and relevance of retrieved information. The library landscape is undergoing a significant shift driven by new developments in information technology and a massive proliferation of information resources. Integrating technology into libraries is no longer merely an option but a necessity in this digital era (Dar, Jeelani, Mir, & Ganaie, 2017). It is the responsibility of university libraries to procure printed materials, such as books and journals, alongside electronic resources. They must also facilitate inter-library loans, update and renew digital collections including library databases and assist users in preparing course materials (Liat and Snunith, 2019). Nigerian universities are expected to evolve their operations to sustain their status as central hubs for research and learning (Anunobi, & Emezie, 2020). To fulfill this mandate, university libraries stockpile thousands of information resources in both print and digital formats, ensuring accessibility (Akpan and Akpan, 2018). Consequently, the establishment of these libraries guarantees that the varied information requirements of the academic community, including students, faculty, and staff, are met (Olorunfemi & Ipadeola, 2021). The most efficient method for locating and accessing relevant, and up-to-date research materials within universities is through scholarly databases.

Databases act as gateways to a vast array of research materials, including academic journals, newspapers, and magazines, while some offers access to e-books, web resources, and multimedia content. These databases are generally classified into two categories: offline and online databases (Deptula, 2019). Offline databases give access to information

without an internet connection. These databases provide entry to a wealth of valuable research materials from academic journals, periodicals, and magazines. According to (Usman, Binta, & Abdullahi, 2018), offline information content is recognized as a prominent electronic resource for searching the latest literature conveniently without the internet. This content is conceived as a resource searchable without a connection, the information is stored on a computer workstation, CD, or flash drive, allowing for the sharing of information locally or through a library portal. While online databases entail those information resources that can only be accessed with the availability of internet. This is the types of databases that requires a login details. Due to overwhelm information over the internet, it requires an information retrieval skill for easy accessibility and exact retrieval.

Information retrieval encompasses the methods and processes employed to search for, locate, and extract recorded data from a file or database (Encyclopaedia Britannica, 2020). Automated information retrieval systems are utilized to mitigate what is known as information overload (Zahid & Huma, 2021). Retrieval can be executed using specific parameters such as the author's name, title, subject headings, International Standard Book Number (ISBN), International Standard Serial Number (ISSN), or publication year, alongside advanced search options. To ensure precise access and retrieval from library databases, it is critical to employ appropriate information search strategies.

Information search strategies involve the use of specific search terms to find required information via tools such as search engines (e.g., Google), library catalogues, and

online databases. A search strategy combines the key concepts of a research question to yield accurate results. The process begins with selecting keywords and proceeds to judging the relevance of the retrieved results. Information can be retrieved using basic and advanced techniques such as Boolean logic, parenthesis, phrase searching, truncation, wildcards, and field searching (University of Johannesburg library 2020). Therefore, this study seeks to examine the extent of use of the parenthesis search strategy among postgraduate students in this region, with a view to identifying gaps in search skills and recommending interventions for improved database access and utilization.

Statement of the Problems

Library databases are established sources of credible and pertinent online information for students and researchers. To support scholarly activities, Universities of Technology in South East Nigeria maintain subscriptions to these valuable resources. Despite this, there is a noticeable deficiency in the skills required to retrieve information effectively. Observations suggest that postgraduate students often bypass these databases in favor of general Google searches, pointing to a significant gap in resource utilization. This underutilization is further corroborated by librarian reports and digital library usage statistics. Such neglect of subscribed content may adversely affect the quality of research output, particularly at the postgraduate level. Accordingly, this study aims to catalogue the library databases available in these institutions and evaluate how postgraduate engineering students leverage their ICT skills to access them. It is, therefore, critical to

analyze the use of parentheses search strategies for research by postgraduate students in engineering department South-East, Nigeria.

Research Question

The following research questions guided the study

1. what is the frequency of utilization of parenthesis search strategy by postgraduate students in accessing library databases for research in universities of technology in South-East, Nigeria?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance

H₀₁: There is no significance difference between the mean ratings of post graduate students of federal university (FUTO) and state university (ESUT) on the extent of utilization of parenthesis search strategy in accessing library databases for research

Literature Review

Library databases represent a collection of digital books, journals, and other study materials accessible via the internet. According to (Chukwu & Njoku, 2018), a library database is an organized body of information designed for easy access, management, and updates. The content found within these databases is either originally generated or

aggregated from various credible sources (St Luke School Library 2020). These databases offer entry to a vast array of valuable research materials, including academic books, journals, newspapers, and magazines (Usman, et al, 2018). Examples of these databases include the Directory of Open Access Journals (DOAJ), Directory of Open Access Books (DOAB), African Journals Online (AJOL), BioMed Central, PubMed Central, Research4life, ProQuest, ERIC etc. This database can be a fee base or free base, online or offline as well as books or journals (Chukwu & Njoku, 2018). However, some database requires a login detail and can be accessed both within and outside the institutional environment, while some do not. Each database houses thousands of articles that can be searched simultaneously, allowing for the retrieval of materials with higher relevance than searching through individual journals. Due to overwhelmed information over the database, information retrieval skills are need for easy retrieval of current and exact information.

Information Retrieval (IR) is the process by which a collection of data is represented, stored, and searched to discover knowledge in response to a user request or query (Swati, Neha, Mioule, & Manjusha, 2020). Retrieval techniques are engineered to assist users in locating required information with ease. Information retrieval is the process of extracting relevant documents from large datasets (Binbin, 2019). Information retrieval refers to the task of finding relevant documents from a set of documents by applying a user query. It involves obtaining information system resources relevant to an information need from a collection of those resources (Su and Sun, 2020). The objective of the search is to retrieve all publications potentially relevant to the study object in order to minimize bias in

forming conclusions (José, Gonzalo & Rosario, 2019). Applications for IR require characteristics such as accuracy, speed, consistency, and ease of use in recovering relevant documents that satisfy user queries (Nagpal, 2018). Consequently, information retrieval deals with the production, representation, organization, storage, retrieval, use, or evaluation of information, alongside the tools and techniques associated with these processes.

A search strategy is an organized structure of key terms used to query a database. The search strategy combines the key concepts of a search question to retrieve accurate results (Adile, & Bülent, 2018). Search strategies integrate the key concepts of a research inquiry to retrieve accurate results using possible search terms, keywords, phrases, truncated terms, wildcard variations and parenthesis search (Tony and Jon, 2017). Parentheses are upright curved marks enclosing matter of secondary importance (Jaymz, 2018). Therefore, parenthesis is used to separate information that is not essential to the core meaning of the rest of the sentence.

Utilization of Parenthesis Search Strategy in Accessing Library

Parentheses can be used to combine other operators for a more complex search. The keyword(s) within the parentheses are given priority (Empire State College, 2021). The most common use of parentheses is to enclose two possible keywords separated by an OR operator, and then link those enclosed keywords with another keyword using AND (Bramer, Gardien, Melissa, Frans, & Kleijnen, 2018). When a search requires multiple

Boolean operators (AND, OR, NOT, or their symbols), one must use parentheses to group the appropriate terms and quotation marks with each Boolean operator. The resulting statements connect terms, remove terms, and organize search terms in ways that result in precise and complex searching. A parenthesis is a word, phrase, or clause inserted into a sentence as an explanation or afterthought (University of Johannesburg Library, 2020). When the parenthesis is removed, the surrounding text remains grammatically sound. Parentheses are symbols () or "" placed around words to show that what is inside should be kept together.

Example: “conceptual digital” will retrieve different results from conceptual digital. Using inverted commas to indicate a phrase will reduce and precise results.

Example of parentheses using brackets;

The search below does not make sense—it will find either articles about library and user or articles just about researchers: library AND user OR researchers

To make it logical, it would need to include brackets:

Library AND (users OR researchers)

Therefore, to make even better use of Boolean operators, one can enclose search terms and their operators in parentheses to specify the order in which they are interpreted.

Information within parentheses will be read first, before information outside the parentheses. Parenthesis works alongside Boolean operations.

Research Method

The study utilized a quantitative survey research design. The research was conducted in the South East geopolitical zone of Nigeria. It focused specifically on the only two Universities of Technology in the area: Federal University of Technology, Owerri (FUTO) and Enugu State University of Science and Technology (ESUT). The total population for the study comprised 540 postgraduate students obtained from the Postgraduate Studies offices of both institutions. The breakdown was ESUT (280) students and FUTO (260) students. The instrument used was a structured questionnaire on how often do postgraduate students of the universities utilize parenthesis search strategy in accessing library databases for research in these universities. To manage the population size effectively, the researcher calculated a sample size of 230 students using the Taro Yamane formula for finite populations. The study employed two specific sampling techniques to ensure the data was representative and relevant: Stratified Random Sampling was used to select participants proportionately from both universities (130 from ESUT and 100 from FUTO) and Purposive Sampling was also applied to narrow the focus specifically to postgraduate students within the Faculty of Engineering, aligning the participants with the study's specific objectives

Research Question

what is the frequency of utilization of parenthesis search strategy by postgraduate students in accessing library databases for research in universities of technology in South-East, Nigeria?

Table 1:
Mean responses on the frequency of utilization of Parenthesis search strategy in accessing the library databases for research in the university library

S/N	ITEMS- DATATBASES	FEDERAL UNIVERSITY (FUTO) N=101			STATE UNIVERSITY (ESUT) N=115		
		X	SD	DECISION	X	SD	DECISION
1	HINARI	2.32	.80	Sometimes (SM)	2.23	1.2	Sometimes
2	OARE	2.16	.94	SM	1.99	1.11	SM
3	ARDI	2.02	.94	SM	2.16	1.12	SM
4	GOALI	1.95	.79	SM	2.06	.90	SM
5	AGORA	1.93	.91	SM	2.49	1.19	SM
6	Taylor and Francis	1.86	.94	SM	2.18	1.28	SM
7	EBSCOHOST	1.99	.87	SM	2.18	.95	SM
8	ProQuest	2.08	1.09	SM	2.20	1.01	SM
9	TETEAL	2.00	.86	SM	1.94	1.00	SM
10	Z-Library	2.29	.90	SM	3.13	1.03	Often
11	JSTOR	2.35	.90	SM	2.58	1.17	Often
12	DOAJ	2.01	.85	SM	2.28	1.09	SM
13	DOAB	2.09	.94	SM	2.03	1.06	SM
14	LEXISNEXIS	2.14	1.01	SM	2.09	1.17	SM
15	PUBSMD	2.24	.96	SM	1.87	1.02	SM
16	University OPAC	2.78	1.05	Often	3.57	.91	Very Often
17	Institutional Repository	2.34	.94	SM	2.80	1.11	Often
18	SCI-HUB	2.09	.91	SM	2.59	1.22	Often
19	AJOL	2.09	.87	SM	2.18	1.24	SM
20	Science Direct	2.41	1.08	SM	2.63	1.24	Often
GRAND MEAN & SD		2.16	0.93	SM	2.36	1.10	SM

Table 1 shows the results of the responses of the postgraduate students on how often they use parenthesis search strategy in accessing the library databases. Results here indicated that in FUTO, the postgraduate students do use parenthesis search sometimes in

accessing all of the library databases except for university OPAC which was rated 2.78; hence the mean ratings for the rest ranged between 1.86 for Taylor & Francis as the lowest to 2.41 for Science Direct. In ESUT, postgraduate students indicated accessing OPAC very often using parenthesis search. Few more databases were accessed often using parenthesis search. These databases include Z-Library with a mean rating of 3.13, JSTOR - 2.58 amongst few others. However, most of the databases are accessed sometimes by the Postgraduate students using parenthesis search strategy. These include AGORA with a mean rating of 2.49, HINARI with a mean rating of 2.23; OARE, ARDI. Taylor& Francis amongst others all with mean ratings ranging between 1.94 to 2.49 with TEEAL rating lowest (1.94).

Ho₁

There is no significance difference between the mean ratings of postgraduate students in federal (FUTO) and State (ESUT) universities on the extent to which they use parenthesis search strategy in accessing library databases

Table 2:

T-test of significance difference between the mean ratings of postgraduate students in federal (FUTO) and State (ESUT) universities on the extent to which they use parenthesis search strategy in accessing library databases

PG Students	N	X	SD	Df	Std. Error Mean	Sig.(2-tailed)	DECISION
Federal Univ. (FUTO)	101	2.16	0.93	214	04253	.000	Significant (Rejected)
State Univ. (ESUT)	115	2.36	1.10		.01139		

Table 2 shows the results of the t-test analysis of significance difference between the mean ratings of the postgraduate students of the federal (FUTO) and state (ESUT) universities on the extent to which they utilize parenthesis search strategy in accessing

library databases for research tested at 0.05 level of significance and 214 degrees of freedom. The results showed that at $df = 214$ p value = 0.000 which is less than < 0.05 ; therefore, it is significant hence the null hypothesis is rejected indicating that there is statistically significance difference between the mean ratings of postgraduate students in federal (FUTO) and State (ESUT) universities on the extent to which they use parenthesis search strategy in accessing library databases.

Result and Discussion

The major findings of the study include the following:-

Findings shows that easy accessibility of the databases, the postgraduate students in both federal and state universities of technology do use parenthesis search strategy sometimes. There is also a significance difference between the mean ratings of the postgraduates in federal (FUTO) and State (ESUT) universities on the utilization of parenthesis search in accessing the library databases. The findings indicate that students employ this strategy only "sometimes" for the majority of databases. This intermittent usage suggests that the students may lack proficiency in this advanced search technique. This observation aligns with Bramer, Gardien, Melissa, Frans, and Kleijnen (2018), who emphasize the complexity inherent in parenthesis searching. They note that when a search involves multiple Boolean operators (AND, OR, NOT), users must skillfully use parentheses to group appropriate terms and quotation marks to structure the query effectively.

Recommendations

Drawing from the results of this study, the following recommendations are proposed:

1. University authorities should allocate sufficient financial resources to library services to support sustained subscriptions to electronic databases. Continuous availability of these databases is essential for enabling postgraduate students to engage effectively in high-quality academic research.
2. Library administrators should strengthen awareness campaigns and expand user education initiatives for postgraduate students. This can be achieved through regular workshops, seminars, and training sessions aimed at enhancing students' competencies in information searching and retrieval.
3. Library management, in partnership with university authorities, should ensure the provision of stable and efficient internet infrastructure. Reliable network connectivity is crucial for facilitating uninterrupted access to electronic databases and improving the application of diverse search strategies.
4. Postgraduate students should take personal responsibility for developing their information literacy skills by actively learning and applying various search techniques. This proactive approach will enhance their ability to efficiently access and utilize online academic databases for research purposes.

Conclusion

It is a well-established fact that online library databases are indispensable for satisfying the information requirements of university researchers at every level. This is particularly true for postgraduate students and researchers within Universities of Technology, as these databases house the most current and updated information essential for science and technology-based inquiries. It has been observed that university libraries provide a significant number of these online databases comprising both subscription-based and open-access resources which require the use of standard information search and retrieval strategies for effective access.

Key databases available include HINARI, AGORA, OARE, DOAB, DOAJ, Taylor & Francis, the University OPAC, and Institutional Repositories, among others. However, the study reveals that postgraduate students utilize these search strategies only to a moderate degree. Specifically, the "parenthesis search" technique is applied merely "sometimes" when accessing the majority of these databases. The extensive use of search strategies is limited to only a few specific platforms, such as Z-Library, Institutional Repositories, the University OPAC, and Science Direct. Ultimately, if the application of these search strategies is improved, there will be a corresponding improvement in the accessibility and retrieval of information from these databases.

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