Citation Analysis of Serials in Graduate-Students' Thesis: A Functional Tool for Effective Serials Management in University Libraries

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ABSTRACT: *Serials being important to students and researchers as they contain the most current and relevant information that can be used for academic and research purposes needs to be assessed periodically to determine if they are still relevant to the users. This study therefore examines the analysis of serials citations in graduate-students' theses as a functional tool for effective management of serials in university libraries using theses submitted from 2013 to 2021 in Library and information Science of four government owned universities in eastern region of Nigeria as case in point. The study was meant to provide answers to three research questions which formed the guide while a descriptive survey design was applied with a population of 203 which stood as the total number of masters' degree theses produced by the four universities within the period under study. The main instruments used in collecting data for this study were the researcher-designed checklists with which 8445 serials citations were collected and analyzed using descriptive statistics of mode, mean and range and data presented in tables, charts and graphs using frequencies and percentile. The outcome of the study revealed that journals with 76% citations were the most cited against conference proceedings/reports with 20% and the least cited being government publications with only .5% citations. It was further established that multi authorship is the most cited authorship pattern in the graduates' theses whereas the average age of serials cited were within the age bracket of 0 - 18. The conclusion drawn is that with the most cited type(s) of serials, serials titles, ages of serials and preferred authorship pattern known through citations analysis of serials in research reports, the university librarian is better placed as to knowing which serials to select, acquire and how to have them organized for easy accessibility and retrieval by users as well as the amount of money to be earmarked for their acquisitions which invariably will bring about prudent management of the library budget in this period of shrinking budget for academic libraries.The study therefore recommended among other things that for effective application of serials citations analysis as a functional tool for effective serial management, staff of serials unit most partner documentation unit as to ensuring proper citations analysis of serials submitted to the library by every department as this can be used as a guide for the unit to identify the core serials for selections, acquisitions and also as a guide for total serials collections maintenance.*

KEYWORDS: serials, citation analysis, theses, graduate-students, library and information science, university library, serials management, academic library

INTRODUCTION

Serials which can be classified as periodicals and non-periodicals (Idhalama and Obi, 2019) and could include: newspapers, magazines, newsletters, accessions, journals, indexes, abstracts, reports, memos, proceedings and transactions of societies (Komolafe, Gbotosho and Odewole, 2020) are publications in any medium issued in successive parts at regular or irregular intervals, usually having numerical or chronological designation and intended to continue indefinitely (Onwubiko, 2016). Basically a periodical is a serial that has a specific title and frequency of issue, while a non-periodical does not have a regular frequency, that is, it is published at irregular interval. In other words, serials are publications with distinctive titles that are published periodically at regular intervals with distinctive information pattern and content when compared to monographs (books). It can be in any format that is print or electronic and are expected to continue indefinitely.

Serials management on the other hand, involves harnessing serials into the library through selection of new publications that will be relevant to users. Serials management therefore include all activities concerned with the availability, accessibility, acquisition and organization of serials in the library (Aghadiuno, Agbo & Onyekweodiri, 2015) Serials addendum in any library is done through selection and acquisitions which would be organized by cataloguing, classification and indexing among others. In this regard, serials needs to be assessed periodically to determine if they are still relevant to the users through evaluation and the serials that are obsolete are removed through the process of weeding. Serial management also involves the preservation of serials to prolong their lifespan. Therefore, the overall goal of serials management is to ensure balanced serials collections that are organized and can be easily accessed and retrieved when needed by users.

The importance of serials to researchers cannot be underestimated as researchers depend on them on current researches and outcome as they consult especially conference proceedings and journal articles where recent and current researches and their result can be found. It is against this backdrop that Idhalama and Obi (2019) posit that serials are important publications in academic and special libraries due to the currency of information they contain as well as Komolafe, Gbotosho and Odewole (2020) who opined that serials are important to students and researchers because they contain the most current and relevant information that can be used for academic and research purposes. Serials management is important in libraries and information centers because users need current information and this can only be retrieved and used by them when the serials are managed effectively for users to have access to the information contained in them. Management of serials becomes imperative with the escalating costs of serials and the dwindling available library budgets which necessitates the judicious use of available financial resources and invariably manage the acquired information resources including serials. This is affirmed by Ogunnuga (2013) who reported that there is an increase in the relevance of serials management by libraries due to

reduction in library budget and the need to provide current library information materials such as serials and this has made serials management to be among the most challenging routines in the library.

If one has to go by the above assertion, librarians need not to look in the negative direction when the issue of citation analysis is discussed. It should be grabbed as a functional tool for harnessing the needed information materials by researchers like graduate-students. This is built on the axiom that through citation analysis of serials in theses or any other research report, the librarians will come to terms with the actual serials that are being utilized by researchers. As explained citation analysis is a non-intrusive method of finding patterns in specific populations' use of research materials when one author cites another author, a relationship is established. Citation analysis therefore, uses citations in scholarly works to establish links. Many different links can be determined, such as links between authors, scholarly works, journals, fields, or even between two or more nations. Citations both from and to a certain document may be studied. The implication is that citation analysis is very useful to finding out the influence of a single author on a given field by counting the number of times the author has been cited by others and also permits researchers to see how frequently a work has been cited in articles and are an invaluable tool for any literature review (Library Information Science Education Network, 2022), The obvious placement of citation analysis is that it is used to determine collections' used by students in academic libraries. Suffice it to say, that citation analysis serves as invaluable tool in the assessment of library collection which the serials are part (Anunobi, C.V., Nwakwuo, O.P and Ezejiofor, V.O. 2010; Haycock, 2004).

The underlying premise is that the more frequently cited publications are the more valuable, will continue to be used heavily and consequently, are more important to have in the library collections (Johnson, 2007). Collection-focused activities that make use of citation data include examining print versus electronic usage to determine the impact of electronic journals, compiling lists of most and least cited journals and local holdings to make acquisitions or cancellation decisions, and examining age of cited references to help develop storage and retention policies (Smith, 2003).

Available evidence did show that citation analyses have been in use as a collection development tool within the disciplines of engineering, linguistics, education, sciences and psychology (Williams & Fletcher, 2006; Georgas & Cullars, 2005; Haycock, 2004; LaBonte, 2005; Sylvia, 1998). Multi-disciplinary studies by Kushkowski, Parsons and Wiese (2003) and Smith (2003),
On the other hand, researchers have discovered that Journals are one of the most commonly used research tools (Pancheshnikov, 2007; Rethlefsen, 2007; Williams & Fletcher, 2006). The implication is that citation analysis can be used to rank, evaluate and categorize journals based on their frequency of article citation. It can help identify areas of weakness within a collection (Rethlefsen, 2007) inasmuch as it has its limitations it is an effective tool for ranking journals. Consequently, this approach helps clarify both the information needs of researchers and what

should be contained in a research library collection. Major use of citation analysis pertinent to collection evaluation include identifying the core collection, using citation as a check list, ranking journals and analyzing a disciplines structure to assist collection development decision making (Waugh,2004) **.**

As information experts, librarians have usually been challenged in the ability to generate, organize, make accessible, analyze and evaluate information resources in a way the researchers would find useful. Consequently, librarians have recognized citation analysis as a very useful technique for proper analysis and evaluation of research outputs, leading to its growing acceptance for research evaluation. As expressed by University of Illinois Library (2021), citation analysis has been found to be useful in investigating the coverage of library acquisitions and for research evaluation.

It is disheartening therefore to state that despite the accrued gains of citations analysis in collections development and serials management and prominent role serials play in meeting up the information needs of graduate researchers and other scholars, there are evidences that there is inadequate and some cases, lack of analysis of serials citations of graduate-students theses not only in libraries and information science but in other fields of study in the past years in most public universities especially those of developing countries like Nigeria. The worst scenario is that there is no data showing that these universities are providing citations analysis of references in theses generally and to best of the knowledge of the research no research has been carried out in this aspect of body of knowledge therefore there a gap in knowledge that needs to be filled.

It is in view of this ugly scenario, there came this awakening call that there is a great need for a study on citation analysis of serials in graduate-students theses in particular (since their program involves a lot of researches and serials are primarily used as major sources of information) as a functional tool for effective serials management in university libraries with a view to creating the desired awareness for serials librarians in universities to embrace citations analysis as veritable tool for evaluating serials collections and by so doing enhancing effective serials management. To this end, the title: 'Citation analysis of serials in graduate-students' theses: A functional tool for effective serials management in university libraries is deemed fit in the realization of the objectives of this study using theses submitted from 2013 to 2021 to four government owned universities in Eastern region of Nigeria offering Library and Information Science to postgraduate level.
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Research Objectives
The primary objective of this study was to establish citations analysis serials in graduate-students theses as a functional tool for effective serials management in university libraries. Other objectives include:
1)	To determine the most cited serials in these theses
2)	To ascertain the recency of cited serials in the theses (age of serials cited)

3)   To identify most cited authorship patterns

Research Questions
The study was guided by the following questions
1)   Which serials types were mostly cited in the masters' theses?
2)   How recent (age of serials) are the serials cited in these theses?
3)   Which authorship patterns were mostly cited in the theses?

METHODOLOGY

The study applied descriptive survey design with a population of 203 which form the total number of masters' theses submitted from 2013 to 2021 in the four government owned universities in the Eastern region of Nigeria offering Library and Information Science to higher levels that covered the area of study. They are; Nnamdi Azikiwe University, Awka (UNIZIK), University of Nigeria, Nsukka (UNN), Abia State University, Uturu (ABSU) and Imo State University, Owerri, The researcher self-designed checklists were the major instrument used in obtaining data needed for the study. To gather the data, researcher personally visited the libraries in the universities selected during which, photocopies of title and reference pages of the theses were made. The checklists were used to record the citations made in the theses as regards to the research questions that guided the study. The citations as contained in the theses were manually counted for the analysis as it is the only way by which the researcher can discover the types of serials cited, most frequently authorship patterns cited, most frequently cited serials as well as their ranges putting into consideration recency and period (ages of serials).With the checklists, 8445 serials citations were analyzed using descriptive statistics of mode, mean and range and data presented in tables, charts and graphs using frequencies and percentile

RESULTS AND DISCUSSION

Table1; Distribution of theses from each university from 2013 to 2021

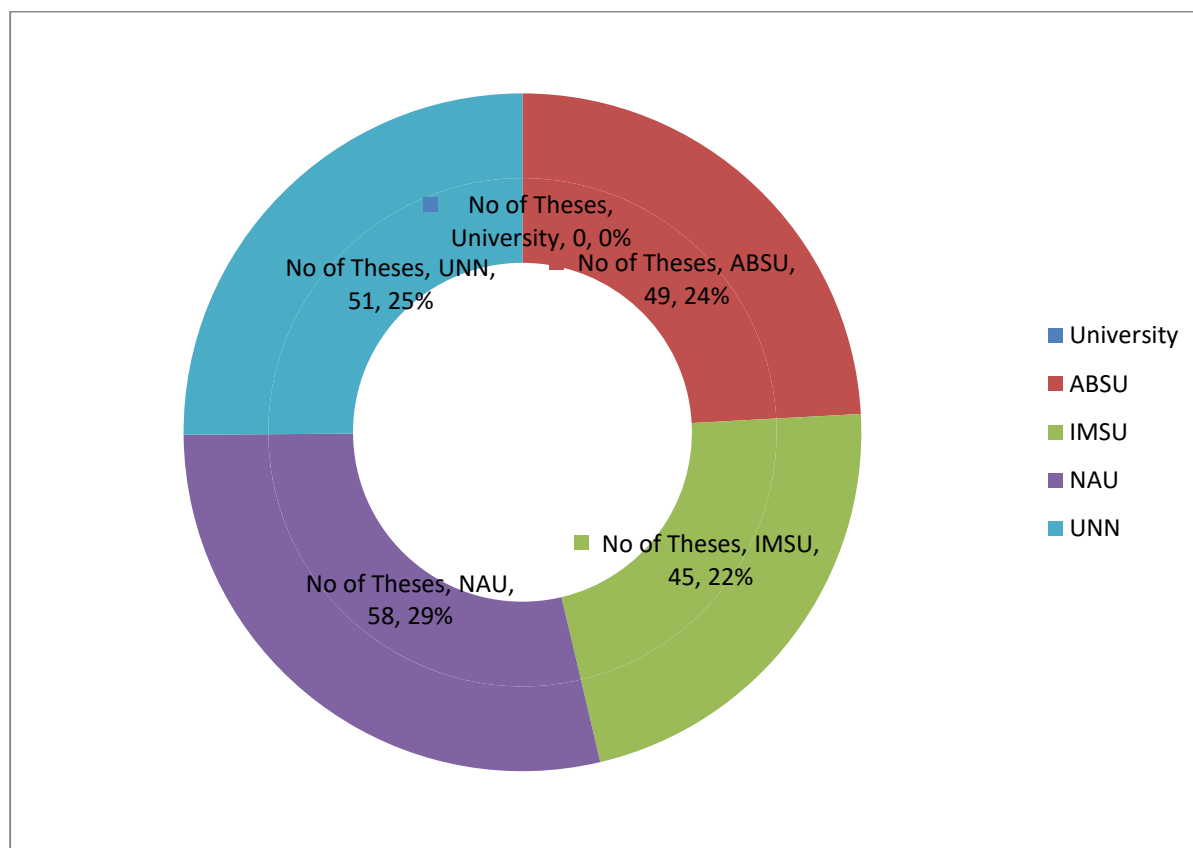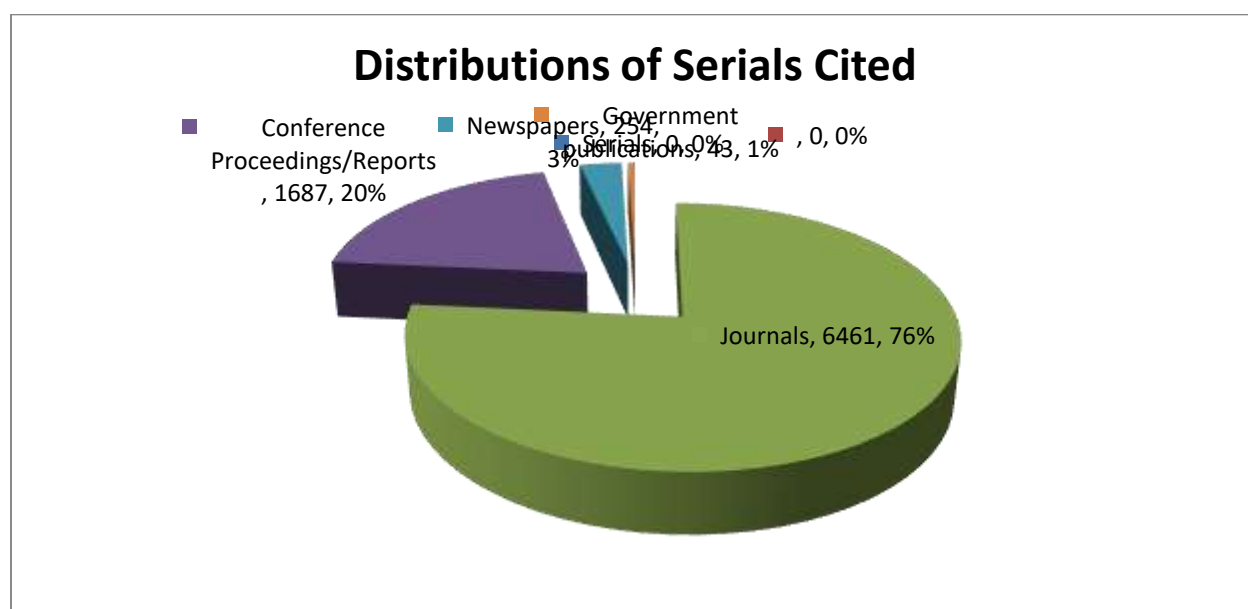| University	No of Theses	
	F	%
ABSU	49	24.14
IMSU	45	22.17
NAU	58	28.57
UNN	51	25.12
TOTAL	203	100

Figure 1: Distribution of Theses by Universities from 2013 - 2021

The distributions of theses as submitted by the four universities are as displayed in table 1 and figure 1 above.   The data revealed that 203 theses were submitted by the four university within the nine year period under study with Nnamdi Azikiwe University, Awka making the highest submission of 58 theses or 28.57% against University of Nigeria, Nsukka (UNN) 51 (25%); Abia State University, Uturu (ABSU) 49 (24%) and Imo State university (IMSU) 45 (22.17%). The theses were submitted in partial fulfilment of the requirement for the award of the degree of Master in Library and Information Science of the studied universities.

Research question 1: Which serials types were mostly cited in graduate-students' theses?

Table 2: Most cited serials in graduate-students' theses - 2013 -2021

Serials	No of citations		
	Frequency	**Percentage**	**Ranking**
Journals	6461	76.5	1st
Conference Proceedings/Reports	1687	20	2nd
Newspapers	254	3	3rd
Government publications	43	.5	4th
Total	8445	100	

Figure 2: Distributions of Serials Cited in Graduate-students' Theses

The data in table 2 and figure 2 above are those of types and most cited serials in graduate-students theses within the period under review. The data did show that among many types of serials, graduate-students cited in their theses the following; journals, newspapers, conference proceedings/report and government publications. By order of ranking, Journals with 6461 citations representing 76% of the 8445 totally cited were the most cited with 1687 (20%) of conference proceedings/reports ranking second while government publications took the rear with approximately 1%

The outcome of this study affirms the assertion that Journals are essential for research, but due to the ever increasing demands for the journals librarians are struggling to select most relevant titles by studying the quality, usefulness and suitability to particular group of users. The ranking list of journals is a practical tool that helps librarians to select journals of maximum utility in relation to their coverage of new and important literature in a particular subject area (Chamani, 2013).

Furthermore high level utilization and preference for journals may be attributed to Adeoya (2004) assertion that journals are meant to fill a specific gap in communication. This also buttresses the fact that journals are regarded as primary sources of information on research undertaken in any given field. The result of this study is a confirmation of the previous studies carried out which found that journals were the most commonly cited type, with other type varying widely. (Kim 2002; Kushkowski et al. 2003; Crawley-Low, 2006 & Olatokun and Makinde, 2019). The argument is that through citations analysis of serials, librarians will be well informed in journal rankings which will hitherto be a practical help in selecting serials of maximum utility leading to effective management of serials and reduces wasteful expenses on irrelevant serials.

Research question 2: How recent are the serials cited in the graduate-students' theses?

Table 3: Age of cited Serials

No of Years	No of Citations	Percentage (%)	Cumulative Percentage
Same year	34	.4	0,4
1 year	144	1.7	2.1
2-5 years	1300	15.4	17.5
6-10 years	1858	22	39.5
11-20 years	2694	31.9	71.4
21-30 years	1208	14.3	85.7
31-40 years	566	6.7	92.4
41-50 years	279	3.3	95.7
51- 100 years	244	2.9	97.9
More than 100 years	34	.4	99
Unknown	84	1.0	100
Total	**8445**	**100**	

Table 4: Timeliness of cited Serials

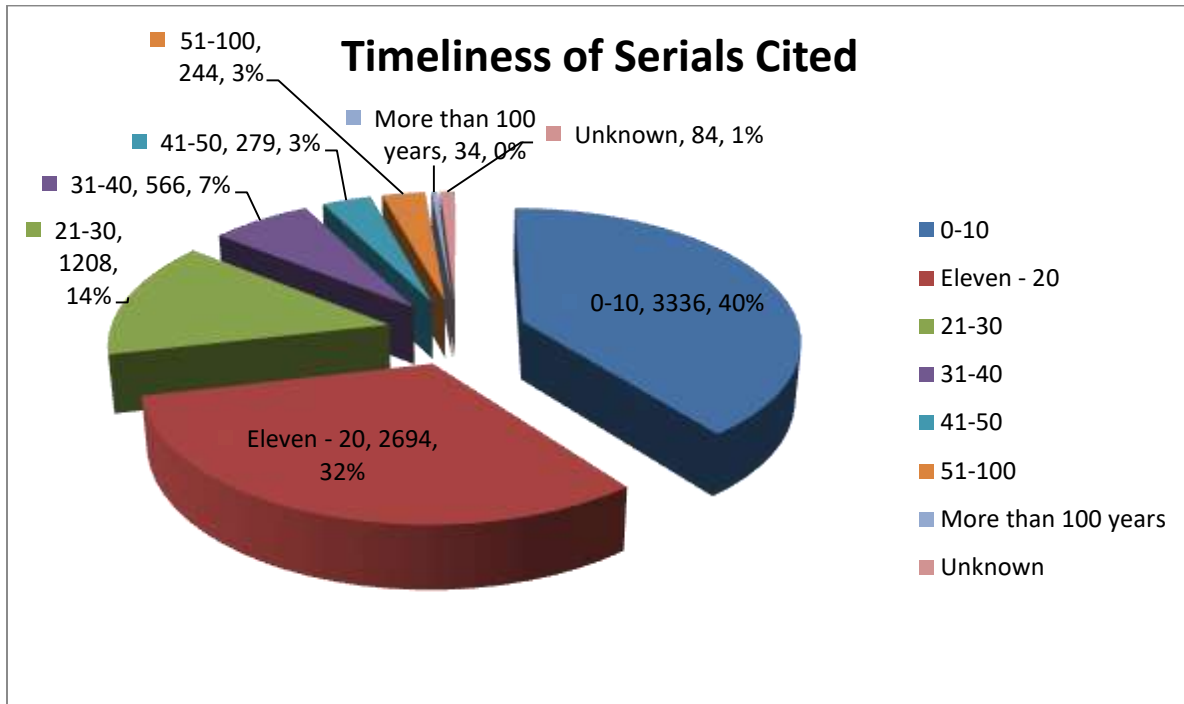| Years	No of Citations	Percentage (%)	Ranking
0-10	3336	39.5	1st
Eleven - 20	2694	31.9	2nd
21-30	1208	14.3	3rd
31-40	566	6.7	4th
41-50	279	3.3	5th
51-100	244	2.9	6th
More than 100 years	34	0.4	8th
Unknown	84	1.0	7th
TOTAL	8445	100	

Figure 3: Distributions of Ages of Cited Serials

Data collected and displayed in Tables 3 and 4 are for ages of serials also known as timeliness or recency of serials cited.   As revealed in the table 4 and figure 3 39.5% or 3336 of serials cited were published within 0-10 years while 2694 (31.9%) serials cited were within 11- 20 years. It further revealed that 14.3% or 1208 of serials were within 21- 30 years and 6.7 % or 566 of serials were within the last 40 years among others.

The analysis of citations by age of cited documents reveal useful life of documents. This period of citation of the serials are popularly referred as "half life of periodicals" or often quoted as "obsolescence of use of literature" (Shafi, 2001) For calculating the citation age, the difference between the date of the citation and the date of the publication in which it was cited is considered rather than simply analyzing publication date.

The essence of this area of this study is built on the premise that understanding the extent to which library users rely on older materials can be useful in determining which materials can be moved to remote storage (Ackerson 2001). This outcome is therefore in tandem with that of Musser and Conkling (1996) and Kushkowski et al. (2003) who in their separate studies found that the majority of materials cited in research works were less than eight years old. This implies that with the ages of the materials used by researcher known it will be easier for the serials librarian to determine

which materials should leave the shelve or stay and in selection, it will also guide as to knowing serials that are not in their collections but need to be acquired regardless of the age.

Research question 3: Which authorship patterns were mostly cited in the graduate-students' theses?

Table 5: Most cited Authorship Pattern

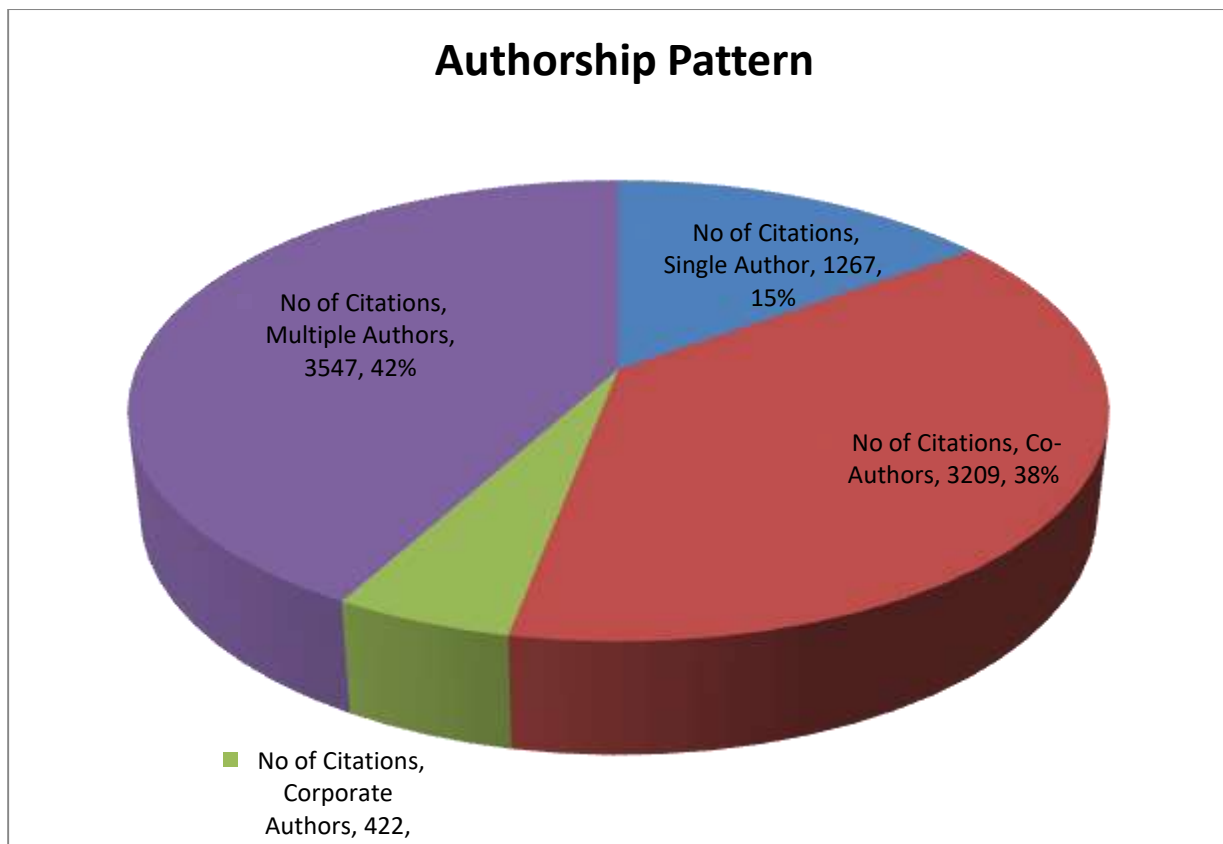| AUTHORS	No of Citations	Percentage	Ranking
Single Author	1267	15	3rd
Co- Authors	3209	38	2nd
Corporate Authors	422	5	4th
Multiple Authors	3547	42	1st
Total	**8445**	**100**	

Figure 4: Most Cited Authorship Pattern

Data in table 5 and figure 4 above indicate that 15% representing 1267 serials citations in graduate-students theses were that of single authors while articles written by two authors were cited 3209.times or 38%, corporate authors had 422.citations representing 5% of the total serials citations in theses within the period under study, whereas multiple authors had a total of 3547serials citations which stands for 42% of all the serials citations in master's theses and doctorate dissertations within the period. The data therefore showed that the most cited authorship pattern by ranking were multiple authors as they were cited 3547 times or 42%. This was followed by co-authors with 38% of the citations while single authors with 1267 or 15% took the third position. Corporate authors took the rear with 623.citations representing 5% of the total serials citations of 8445. The outcome of this study corroborate the findings of Tiew, Abdullah and Kaur (2002); Park (2010) and Pradhan; Panda and Chandrakar (2011). It is also in line with the historical construction theory of citation to interacting networks of authors and has a position for multi-dimensional space (Leydesdorff, 2006).

In serials management, apart from knowing the author patterns most cited, further steps should be taken by serials librarian while analyzing serials cited by researchers to know most cited authors in a particular field of study with a view to selecting materials where he or she has contributed. In other words, knowing most cited authors saves the librarian the pain of which author's work has greater impact on researchers.

Implications of this finding
This citation analysis of serials study on graduate-students theses has many implications to serials management. In the first instance maintaining yearly analysis of serials cited in graduate-students' research report, will no doubt put at a glance the rate of serials in use making it possible for serials librarian to know the desirable type, age and authorship pattern. This will definitely keep the librarian informed of areas that need more attention in respect to which serials should be subscribed for, retained and at what age should a particular type of serials be moved to the archive or outright weeding. This act will bring proper control of both serials budget and organization which will eventually lead to the right serials being used by students. The holistic implication is that the application of serials citations analysis in the university library will guarantee effective management of such materials in the library.

Through the application of citation analysis of serials as a tool for managing serials, it will enable serials personnel know what serials to choose from the enormous series published based on the information needs of users, how to acquire or subscribe to serials and how to organize serials. These different activities if not properly done will negatively affect the serials collection in terms of wrong choice of serials selection and invariably, poor service delivery to users

This study should be important in recommending for selection and deselecting of serials. Findings should be relevant to librarians in developing collection development policies and in their budget

planning. Examining age of cited references to help develop storage and retention policies. If the need arises to make cuts to serials budgets and if the collection managers are forced to cancel titles, this data can be used to find the least cited serials. This method may also be used if the library needs money to purchase back issues of more heavily used journals. Understanding the extent to which library users rely on older materials can be useful in determining which materials can be moved to remote storage (Ackerson 2001)
.
The outcome of this study will also help in analyzing serials in the university library as to determining actual uses of these serials and through which, the libraries and information system designers will be helped into providing ideas for acquisitions of important serials to plan their products, services and analysis using bibliographic references which help to identify serials which are related to a particular topic and are worth reading (a veritable tool for SDI).

 Furthermore, the result will help to determine serials being used by graduate-students in academic libraries as it will serve as invaluable tool in the assessment of the library collections in this area as well as helps in understanding of subject relationship, author effectiveness, publication trends and user behaviour.   Just as observed by Gooden (2016) citation analysis will be used by librarian in different fields to eliminate costly low use/unused journals, identify core journals needed for use and to purchase the needed materials.

CONCLUSION AND RECOMMENDATIONS

The data as collected, analyzed and discussed in this study did reveal that graduate students' citations of serials favour current research as the average age of citations in the theses for most topics were within 0 – 10 years; which is an indication that the current researches are being used when writing theses. The study further discovered that most of the cited serials were journals, as over 75% of the total citations for graduate works were journals which affirms previous findings that journal are the most commonly cited type of serials. Since more than 60% of resources cited were 0-18 years old, it meant that graduate students prefer to use current materials than old resources. By examining the age of the cited references, data can be used to develop storage and retention policies of the library.

From the outcome of this study therefore, one can deduce that citations analysis of serials is a veritable instrument if applied will enhance effective serials management in any university library. The obvious being that by identifying the serials types that are most cited and further identify the most cited titles of such serials especially, journal, ages of materials and preferred authorship patterns, (see tables 2 – 5 and figure 2-4) the librarians is placed in a better position as to knowing areas to be considered while selecting serials for acquisitions and how to organize them based on researchers preference for easy accessibility and utilization. Hence this buttress the assertion that the obvious placement of citation analysis is that it is used to determine collections' used by

students in academic libraries. Suffice it to say, that citation analysis serves as invaluable tool in the assessment of library collection which the serials are part (Anunobi, C.V., Nwakwuo, O.P and Ezejiofor, V.O. 2010; Haycock, 2004).

This result further places the librarian in a better pedestrian as to knowing what should be budgeted for each serials type, proper organization and placement in either the ranks or shelves as well as knowing when it is due to withdraw particular serials from display and when to finally weed or return them to the archives. It then based on this discovery and drawn conclusion that the following recommendations are made:

a)   In the first instance, for effective application of serials citations analysis as a functional tool for effective serial management, staff of serials unit most partner documentation unit as to ensuring proper citations analysis of serials submitted to the library by every department as this can be used as a guide for the unit to identify the core serials for selections, acquisitions and also as a guide for total serials collections maintenance.
b)   The librarian should expose staff of the serials units to series of in-house training on how to apply citations analysis in evaluating serials and proper classifications serials based on their bibliographic entries.
c)   Since one of the primary roles of university libraries and librarians is information creation and documentations, it behooves the university librarian to ensure that all submitted theses are documented and analyzed in line with the lay down collections development policy of the library. In fact, the ideal practice is to ensure the existence of a functional documentation unit headed by a professional in the field of documentations whose duty should be tracking down research reports, ensuring proper documentations of their citations for upward delivery to both the serials librarians as the case may be and the acquisitions and collections development librarian.
d)   The university management should formulate policy that will promote bibliographic control of theses and dissertations. This is based the on the experience of the researcher that none of the university libraries could at a glance state the number of postgraduate reports available. The art of bibliographic does not only help in organizing knowledge, but will also help postgraduate students know areas covered so far in their fields and areas that need to be researched upon

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