Citation analysis of electronic information resources in master’s dissertations in the Department of Geography, Bayero University, Kano, Nigeria

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Abstract
This study is an analysis of citations appended to dissertations submitted by master’s students in the Department of Geography, Bayero University Kano, in order to ascertain the distribution of citation by formats and the use of electronic information resources. Bibliometrics analysis was used to conduct the study which covered one hundred and forty seven (147) master’s dissertation with a total of six thousand and ninety six (6,096) citations; which were identified using a manually compiled... The results obtained from the analysis revealed that the most frequently cited information resources were books, which accounted for over 46% of the total citations while electronic information resources cited only accounted for 279(4.58%). The findings also reveals that of the 279(4.58%) of electronic information resources cited, 101(1.66%) were cited in 2015. The findings of the study further revealed that there is a steady increase in the number of electronic information resources cited with every passing year. The study concluded that the most cited form of information resources is the books and that electronic information resources were not utilized by the postgraduate students in the department of geography. The study recommended that the university library provide current resources including electronic resources, it was also recommended that the departmental library should also provide adequate and relevant electronic information resources in the library, Internet connectivity should be enhanced and access points be provided at strategic locations in the university and the departmental library need to subscribe to relevant databases and make them readily available to the researchers.

Keywords: Bibliometrics, citation analysis, electronic information resources, geography, Bayero University, Kano, Nigeria

Introduction
Citation analysis is a bibliometric technique of counting citations with evaluation of cited resources in a particular work or group of works. Citation analysis is a highly dependable tool in collection development where libraries can gauge the importance of their holdings and it is also a tool which researchers may need to gauge the importance of their publications. They may gain information about that article’s impact on its discipline simply by counting the number of times it has been cited in research publications. Above all, finding the list of articles that have cited an article can help you to find more information about your research topic, a process called “citation chasing”.

Yuan (2012) opined that, “citation analysis can be used in formulating science policies by research institutions, government, and other funding agencies. It can also assist librarians and other information professionals by providing objective measures as they make decisions regarding collection development.” Effective collection development requires an
understanding of the research needs of patrons. Ideally, a librarian serving as a subject bibliographer or collection development liaison would have an academic background or professional expertise in the field in order to have an in-depth understanding of faculty and student research needs. The main idea of citation analysis is that citations reflect the real impact of published scientific results. It also represents the passage of ideas within and among academic disciplines.

According to Reitz (2013), citation analysis may be defined as “a bibliometric technique in which works cited in publications are examined to determine patterns of scholarly communication, for example, the comparative importance of books versus journals, or of current versus retrospective sources, print or electronic, in one or more academic disciplines. The citation in student research papers, theses, and dissertations are also examined by librarians for purposes of collection evaluation and development”.

The growing influx of electronic information resources and emerging network technologies have been revolutionizing society by making information available to all the people in new ways. This has led to radical changes in the operation of scholarly communications. As a consequence of such an electronic reform, electronic information resources such as e-journals, e-magazines and e-newsletters are growing steadily. In addition, there are many self-publications, preprints and conference proceedings being made available on the web.

Omoike (2013) observed that, “electronic information resources hold great potentials in supporting and augmenting existing educational programmes,”. However, to what extent the electronic information resources have been accepted and used as alternatives and/or additions to traditional means in the formal scholarly communications system is still unclear. Hence, this study was intended to investigate the extent to which the electronic information resources have been used in formal scholarly communication in terms of being cited, by conducting a case study in the Department of Geography at Bayero University, Kano, Nigeria, for the years 2010 to 2015.

Statement of the problem
Academic libraries are constantly under pressure to manage funds effectively and in a consistent manner with teaching and research needs. Faculty interests may be identified from lists of faculty publications, faculty handbooks, and faculty requests for material purchase, but research needs of postgraduate students can be more difficult to understand. Citation analysis act as a tool for selecting and weeding materials as it provides insight into the materials that are selected by various user groups. Analysis of dissertations and dissertations reference lists is one approach used to measure information resources’ use by postgraduate students.

With the current development in information and communication technology, university libraries in Nigeria are now providing information resources in both print and electronic information resources, but unfortunately, observations and available literature such as Aina (2014) has indicated low use of electronic information resources by students. Hence, this research aims to carry out a citation analysis to determine the use of electronic information resources by postgraduate students in the field of Geography, with a view to proffering solution to the challenges to the identified problems.

Objectives of the study
The citation analysis was intended to
1. find out the most frequently cited information resources by postgraduate students in the field of Geography

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2. find out the number of electronic information resources used by students in the field of Geography in the years under study
3. ascertain the degree of use of electronic information resources by the postgraduate students for each year under study

**Literature review**

As many libraries are coming under immense pressure to make difficult decisions on budgetary allocation and space management, citation analysis data can be used to create a list of core resources, which can be used to make collection decisions in support of research and teaching. Citation data may be used in developing core title lists of information resources to maintain when flat or shrinking budget allocations require resources cancellations. Citation analysis can also be used to rank, evaluate and categorize information resources based on their frequency of citation. It can help identify areas of weakness within a collection. Citation analysis is a technique that provides the solid basis for cost analysis to study the correlation between the citation frequency and the impact factor with the subscription costs, which is good for the acquisition department to manage budget. Another significance of citation analysis is in the compilation of reference and reading list for individual user. Individual users such as researchers and scientists also face the problem in selecting resources for reading and keeping, as well as compiling reference list for themselves and their students. Thus a compiled data of the citation frequency and the citation impact will generate data which is useful for researchers to produce quality research.

Hoffmann and Doucette, (2012) opined that “by conducting a citation analysis, a researcher can better understand scholarly trends within a discipline, assess the use or accuracy of citation indexes, create bibliographies, analyze citation trends of specific user groups, or determine the extent to which a library’s collection meets researchers’ needs.” According to Hussain (2011) bibliometrics have been applied mainly to scientific fields and are based principally on various metadata elements like author, title, subject, citations, etc. related to scholarly publication within a discipline. This type of analysis provides useful indicators of scientific productivity, trends, the emphasis of research in various facets and researchers’ preferences for publication (Jacobs, 2001).

Isiakpona (2012) opined that it is a study that gives a detailed statistical analysis of texts, especially of published literature in different fields of learning. Meanwhile, Eckel (2009) postulated that Citation analysis “is a bibliometrics technique that uses citation patterns in documents to trace the relationships between those documents and the original sources and authors. Citations and the composition of bibliographies reflect changes in the information-seeking behaviour of academics.

Hoffmann and Doucette (2012) perceived Citation analysis as a branch of bibliometrics that “examines the citations found in publications such as journal articles and books to look for patterns of use. This type of study typically involves recording the details of the reference lists of a number of publications to determine what materials are being consulted and then analyzing those materials by type, frequency, age, local holdings, or other factors. It is an unobtrusive methodology that can often be carried out with readily available data”.

Rosenberg, (2015) Stated that, Citation analysis studies are conducted in academic libraries for various reasons; some of the researchers’ aim to improve and support collection management others work to create core lists of titles and a number of researchers have examined the use of materials in the Web environment while others place the focus on information behavior and research skills of students for the purpose of evaluating library instruction. Yet others aim for quality assessment of bibliographic references.
Nkiko and Adetoro (2007) analyzed “Pioneer bachelor degree: citation of Covenant University students’ research projects” and discovered that the authors of these research reports cited heavily from textbook holdings of the university library (53.3%), journal 25%, even though one would expect more journal citations. Internet and electronic resources (7.7%) were less frequently cited, which could be due to a lack of information literacy skills and an average of 26.3% citations per report was recorded.

In a similar study by Gunasekera (2016) who analyses the sources cited in 32 post graduate (Master and PhD) theses in sociology and economics at University of Peradeniya submitted between 1996 and 2014 found out that Sociology theses contained 1603 citations and average number of citations was 115 with a range from 53 to 233 whereas economics theses contained 1975 citations (Average =110) with a range from 22 to 227 citations. A total of 28 master’s theses and 04 doctoral dissertations which produced thirty-two in all were gathered and 3578 citations were generated and the mean number of citation was 112 with a range from 22 to 233 citations.

In a study by Mahajan and Kumar (2017) titled; "Citation analysis of doctoral theses in the field of sociology submitted to Panjab University, Chandigarh (India) during 2002-2012 in order to determine the different type of information material cited during the period under study. The analysis revealed that out of 3721 citations cited in the Ph.D. theses submitted in the Department of Sociology, books comprised the highest citations (2145, 57.65%) followed by journals’ citations (1359, 36.52%), websites/Internet sources (94, 2.53%), conference proceedings (63, 1.69%) and reports (60, 1.61%). Since books and journals together accounted for 94.17% citations, authorship pattern, half-life, etc. were calculated for such documents only. A similar study carried out by Singh & Bebi in 2013 also found that researchers in the discipline of Sociology cite more books, followed by journals articles.

Herring (2002) conducted citation analysis on the research articles published in electronic journals during 1999-2000. The study focused on the extent to which scholars were using those resources and the types and subject areas of those online resources that were being referred. The results showed a growing trend of using online resources and a high use of interdisciplinary references.

Another similar bibliometrics study of Angammana and Jayatissa (2015) on Master of Library and Information Science (MLS) theses submitted to the Faculty of Graduate studies, University of Colombo and Master of Social Science in Library and Information Science (MSSc) theses submitted to the University of Kelaniya in the field of Library and Information Science within 11-year period from 1999 to 2009. Out of a total of 4,901 citations, books were the heavily used source material accounting for 39.20%. This was followed by journals, accounting for approximately 34%. Web sites were the next most used source material in the field of Library and Information Science. However, web sites account for only 6.33%. Nearly 80% of total citations were covered by the above three types of source materials. Research findings point to the fact that books and journals are the most used reference materials surpassing all other types of source materials.

Electronic information resource refers to all information source that requires the application of electric energy to access its information content, these includes but not exclusively, e-book, databases or e-journal and articles, CD Plates, flash drives of various sizes. The electronic information resources are not single entities; they include various types of resources such as electronic books, electronic journals, electronic databases, digital/knowledge archives and internet resources. Thus, electronic information resources are available in the electronic form and their access is through intranet, Internet, standalone computer, online and offline databases (Kumar & Singh, 2012).
Shukla & Mishra (2011) described electronic collection as the collection of information which can be accessed only by the use of electronic gadgets while IFLA (2012) referred to electronic information resources as those materials that require computer access through personal computer or mobile devices. In order to utilize the ever growing range of electronic resources students generally must acquire and practice the skills necessary to exploit them. Consequently, Nwokedi (2007) contend that student’s lack of searching skills is responsible for their inability to make good use of e-resources. As Brophy (1993) argues, the libraries must “reach a position where the acquisition of information skills is acknowledged as one of the learning objectives for every students entering a university, so that no student leaves without being fully equipped to cope with the information intensive world, the information society as an end-user. Salaam (2003) has identifies infrastructure decadence such as “poor telecommunication system, unreliable electronic supply, and poor funding of university system” as the one of the major hindrance to the success of access and use of electronic resources and facilities in Nigeria.

Citation analysis has also been applied to investigate the rate at which researchers use electronic resources. For example in the study conducted by Bhat and Kumar (2008) to investigate the use of scholarly electronic journals in the field of library and information science published during the years 2000 to 2006 shows that 81.49% of articles published during the period have web references. Out of 25,730 references, 56.54 % of references are print journal references and 43.52% of them are web references. It was also observed that e-journals are more likely to cite e-resources than the print journal articles. The limitation of the study is the scope of the study which only covers electronic journals, hence, citations exclude print resources which constitute a dependable source of information for researchers. Apart from this, the focus of the study is Library and Information Science unlike the present one that is on geography. The study also failed to look at rate of availability of the cited sources as the present study.

In a similar vein, Herring (2002) did a study to investigate the use of electronic resources in scholarly electronic journals through citation analysis. Scholarly electronic journals published in 1999-2000 were used for the study. The analysis focused on the extent to which scholars were using electronic resources that are being referenced. The findings of the study show that more than half of the articles studied included electronic references and that 16% of the total references were to electronic resources. In the study 345 (8%) of the electronic resources were unpublished or ephemeral resources and over one quarter (27%) of the electronic resources cited in the study were categorized as interdisciplinary or outside the discipline, area of the journals or the author’s affiliations. This study took source data from journals unlike the present study which collected data from Dissertation. It did not also go into the details of finding out the availability of these cited materials to the researchers like the present study.

**Methods**
Citation analysis was used to conduct the study, which covered one hundred and forty seven (147) master’s dissertations with a total of six thousand and ninety six (6,096) citations; which were identified using a manually prepared bibliography as an instrument for data collection. The source of the citation data was Master’s Dissertations submitted to the Department of Geography, Bayero University Kano, covering a period of six (6) years from 2010-2015.

**Findings**

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Research question one: What are the most frequently cited form of information resources by postgraduate students in the field of Geography?

Table 2 shows that of the total of 6096 (six thousand and ninety-six) citations recorded, books were the most cited information resources with 2862 (46.94%), followed by journals with 715 (11.73%) and Reports with 676 (11.09%). These were followed by conference proceedings with 625 (10.25%) and electronic information resources, 279 (4.58%). Government publications were cited 229 (3.76%), theses and dissertations 615 (10.09%) and other forms of resources (comprising patents, lecture notes, product literature, hand books, software, manuals) accounted for 95 (1.56%).

From the foregoing, it can be deduced that books and journal articles still remain the bedrock of all researches in the tertiary and other field of academics as has been revealed by researchers like Nkiko and Adetoro (2007) and Tonta and Al (2006) who have noted that books are the most frequently consulted sources of information by researchers.

Research question two: What is the number of electronic information resources used in the years under study?

Table 3.0 above indicated that out of the 1423 total citations in 2015, electronic information resources were cited were cited 101(1.66%) times, which is followed by 74(1.21%) out of a total of 1126 citations in 2014. It was found that less than 1 percent of the total citations in the years 2010 (0.84%), 2011 (0.48%), 2012 (0.21%) and 2013 (0.18%) were electronic information resources. The result of the findings indicated that electronic information resources were statistically not utilized by the researchers in the field of geography. However, the result showed a consistent increase of usage by the postgraduate student with every year.

Research question three: What is the degree of use of electronic information resources by the postgraduate students for each year of the study

Table 4.0 indicated that the highest number of electronic information resources 101(36.20%) cited were in the year 2015, followed by 74(26.52%) which were cited in 2014. The next were 51(18.28%) cited in 2013, 29(10.39%) cited in 2012, 13(4.66%) cited in 2011 and 11(3.94%) cited in 2010. The result indicated that the use of electronic information resources increases with each year where the highest electronic information resources citation came in the year 2015. The result shows an encouraging picture as the usage of e-resources among research scholars is increasing with time.

Discussion

The methodology employed in this study was the citation analysis. The study runs a descriptive statistics analysis to obtain frequency counts and percentages.

Most frequently cited information resources

The descriptive analysis shows that the most frequently cited information resources is books which amounted to 2862, which is 46.94% of the total citations of 6096. Journals amounted to 715(11.73%) of the total while electronic information resources amounted to only 95 which is 1.56% of the whole citations. The findings is in line with that of Rayudu & Babu (2014) who have noted that books are the most frequently consulted sources of information by researchers. Hence, it is evidential that books are the predominant type of information resources cited by researchers in the field of geography in Bayero University Kano. The implication of this finding is that researches in the field of geography are prone to contain outdated materials and less empirical evidence could be seen clearly since books are more cited than journals and electronic information resources.

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Use of electronic information resources
The study found out that there were more electronic information resources cited in 2015 that there was in the previous years. There were 101 out of 1423 citations in 2015, which indicated that there is more usage of electronic information resources in each succeeding year. The result of the findings substantiates the findings of Fasae (2012), Olatokun and Makinde (2009) who ascertain that electronics resources were not frequently utilized by the students understudy from their respective findings.

Degree of use of electronic information resources
The study also found out that there was a steady increase in the number of citation of electronic information resources for each year. The result showed that the first three (3) years recorded a negative value below the mean value of 46.5 where as the subsequent three (3) years under study were positive where even though the fourth (4th) and fifth (5th) years recorded below the mean value, the final year recorded a mean value above the mean value with standard deviation of 54.5. The result shows that there was a constant growth in the use of electronic information resources yearly. The analysis is in agreement with the findings of Olatokun and Makinde (2009) who found out that electronics resources were least utilized resources but usage increase with time.

<table>
<thead>
<tr>
<th>Year of submission</th>
<th>Num. of dissertation</th>
<th>Num. of citations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>12</td>
<td>653</td>
</tr>
<tr>
<td>2011</td>
<td>18</td>
<td>821</td>
</tr>
<tr>
<td>2012</td>
<td>19</td>
<td>984</td>
</tr>
<tr>
<td>2013</td>
<td>22</td>
<td>1089</td>
</tr>
<tr>
<td>2014</td>
<td>29</td>
<td>1126</td>
</tr>
<tr>
<td>2015</td>
<td>46</td>
<td>1423</td>
</tr>
<tr>
<td>Total</td>
<td>146</td>
<td>6096</td>
</tr>
</tbody>
</table>

Table 2: Distribution of citation according to format of information resources

<table>
<thead>
<tr>
<th>Information resources</th>
<th>Num. of citation</th>
<th>Percentage%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Books</td>
<td>2862</td>
<td>46.94</td>
</tr>
<tr>
<td>Journals</td>
<td>715</td>
<td>11.73</td>
</tr>
<tr>
<td>Conference proceedings</td>
<td>625</td>
<td>10.25</td>
</tr>
<tr>
<td>Electronic resources</td>
<td>279</td>
<td>4.58</td>
</tr>
<tr>
<td>Report</td>
<td>676</td>
<td>11.09</td>
</tr>
<tr>
<td>Thesis/dissertation</td>
<td>615</td>
<td>10.09</td>
</tr>
<tr>
<td>Government documents</td>
<td>229</td>
<td>3.76</td>
</tr>
<tr>
<td>Others</td>
<td>95</td>
<td>1.56</td>
</tr>
<tr>
<td>Total</td>
<td>6096</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 3.0: Number of electronic information resources cited

<table>
<thead>
<tr>
<th>Year</th>
<th>Print resources citations</th>
<th>E-resources Citations</th>
<th>Total citations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>642(10.53%)</td>
<td>11(0.18%)</td>
<td>653(10.71%)</td>
</tr>
<tr>
<td>2011</td>
<td>808(13.25%)</td>
<td>13(0.21%)</td>
<td>821(13.47%)</td>
</tr>
<tr>
<td>2012</td>
<td>955(15.67%)</td>
<td>29(0.48%)</td>
<td>984(16.14%)</td>
</tr>
<tr>
<td>2013</td>
<td>1038(17.03%)</td>
<td>51(0.84%)</td>
<td>1089(17.86%)</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Year</th>
<th>E-resources</th>
<th>Citations</th>
<th>Percentage</th>
<th>Mean</th>
<th>Std. deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>11</td>
<td>46.5</td>
<td>3.94%</td>
<td>-35.5</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>13</td>
<td>46.5</td>
<td>4.66%</td>
<td>-33.5</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>29</td>
<td>46.5</td>
<td>10.39%</td>
<td>-17.5</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>51</td>
<td>46.5</td>
<td>18.28%</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>74</td>
<td>46.5</td>
<td>26.52%</td>
<td>27.5</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>101</td>
<td>46.5</td>
<td>36.20%</td>
<td>54.5</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>279</td>
<td>(100%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

This finding concluded that there is lack of availability of electronic information resources in the library that forced researchers to rely on the available books and journals in the library to sort for relevant materials for their research work. This will have a negative effect on the validity of researches conducted because they are based on information contained in books, and are not as recent and necessarily required. Current and research based solutions to scientific problems are only identified empirically through conducting researches and the reports are presented and published in periodicals especially academic journals and are available timely and easily in electronic format.

Electronic information resources according to the findings of this research is cited very low, out of the 6,096 citations studied only 279 citations representing 4.58% were cited from e-resources, which is concluded that the potentialities of these valuable resources are yet to be tapped by researchers in the Department of Geography in Bayero University, Kano from 2010 up till 2015.

**Implication of the study**

The implication of the study is that the postgraduate students in the department of Geography do not utilize electronic information resources as is expected of them in this age of information explosion, however, there is recorded increase in utilization annually by the students, which is a positive implication to the research. Hence the study will avail the department and library management with useful information on the importance of the resources and how users and researchers are shifting to the use of the resources.

**Recommendations**

In relations to the findings and objective of the study, the following recommendations are put forward for consideration:

1. The University Library should provide current resources including electronic resources.
2. The departmental library should also provide adequate and relevant Electronic Information Resources in the Library for the benefits of all their researchers.
3. Internet connectivity should be enhanced and access points be provided at strategic locations in the university.
4. The departmental library need to subscribe to relevant databases and make them readily available to the researchers for them to keep abreast of the new and trending issues pertaining their field of study.

References


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