# Usage of E-resources in Postgraduate Research at Muhimbili University of Health and Allied Sciences: A Citation Analysis

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**Abstract:** *A citation analysis was conducted to examine the use of e-resources in postgraduate research at Muhimbili University of Health and Allied Sciences (MUHAS) in Tanzania. A total of 549 masters dissertations produced between 2002 and 2011 were examined. Collected data were analysed in Microsoft Excel. The findings indicate that a total of 30,405 references were extracted giving an average of 55.4 references per dissertation. References to print journal articles accounted for 70% of the total references. E-resources made up only 5.2% of the total references and citations to e-journals were even fewer (0.3%). The highest citation to e-resources was recorded in 2008 and there were no e-journal citations for the years 2002 and 2004. In general, the number of e-journal citations has remained very low during the ten years period. The findings therefore paint a picture that e-resources were underutilized by postgraduates at MUHAS. However, there is possibility that some of the journal articles cited were retrieved from CD-ROMs databases or retrieved from the web but they were cited as print sources due to lack of skills in using correct citation styles. It could also be that students incorrectly cite secondary references. It is recommended that universities should intensify provision of information literacy programmes (including the use of various citation styles) for students and staff as well as promoting the use of e-resources. Future research may combine citation analysis and other methods to establish reasons for the low usage of e-resources.*

**Keywords:** *citation analysis, bibliometrics, dissertations, e-resources, Tanzania*

## INTRODUCTION

Dramatic developments in information and communication technologies (ICTs) have greatly enhanced access to scholarly information. Many types of scientific publications such as journals, books, theses, research reports and conference papers are now available online either as electronic equivalents of their print counterparts or published in electronic form only. These electronic information resources (e-resources) provide excellent opportunities including concurrent access by multiple users; much easier full-text searching; providing hypertext links that give direction

to other resources; presenting multimedia facilities that attract users; and that e-resources can be accessed any time and without geographical barriers (Vasishta and Navijyot, 2011). As a result, e-resources have become essential components of library collections and users increasingly get access to free and fee-based information. On the other hand, access to print material in libraries continues to be essential.

In academic writing, many citation conventions and guidelines now require inclusion of Uniform Resource Locators (URL[1]) as part of bibliographic details in the lists of references. This is an academic requirement which stems from the assumption that a particular information resource will continue to be located at the cited URL. Like other academic writers, postgraduate students are often bound to use scholarly information and adhere to the conventional scholarly writing procedures in their works such as theses and dissertations. Furthermore, postgraduates are generally regarded as heavy users of library resources to the extent that their theses and dissertations can be examined for the types of resources used (Brazzeal and Fowler, 2005). Examination of resources cited in other documents is normally conducted through usage statistics supplied by journal vendors, library statistics generated locally, user surveys, and citation analysis techniques.

Vendor and library statistics often provide trends on items downloaded or borrowed whereas user surveys measure what scholars report to have been used in their works. On the other hand, citation analysis measures what scholars actually use in their publications. Citation analysis is a systematic quantitative study of cited works. It is part of the broader field of bibliometrics, which is the application of mathematical and statistical methods in the use of publications (Osareh, 1996). Citation analysis involves recording the details of the reference lists of publications to determine what materials were consulted and then analysing those materials (Olatokun and Makinde, 2009). The technique can therefore be applied in the evaluation of different types of library material, including e-resources, for deciding whether to start, continue or discontinue subscriptions. The main benefit of citation analysis procedure is that it is unobtrusive and that data are often conveniently localised in one area of the document (Okrent, 2001). However, citation analysis does not provide possible reasons as to why particular information resources are used more frequently than others. While this limitation cannot be ignored, it can be regarded as an exception because the citations normally give indication of the resources used.

The availability of e-resources in Tanzanian academic and research institutions dates back to early 1990s when some libraries started acquiring CD-ROMs[2]. The popular use of web-based resources began in the late 1990s. The initiative of the

[1]A URL is an address of the location of an electronic document on the Web consisting of four parts - protocol, domain, directory and file.
[2]CD-ROM stands for Compact Disc-Read Only Memory

International Network for the Availability of Scientific Publications (INASP) through its Programme for the Enhancement of Research Information (PERI) in 2001 was the first significant attempt to introduce the use of e-resources mainly e-journals in Tanzania (Manda, 2005). PERI resources were mainly supported through Sida/SAREC grant to the University of Dar es Salaam Library though countrywide licenses were purchased for all non-profit-making institutions including the then Muhimbili University College of Health Sciences (MUCHS) which became a full-fledged university - Muhimbili University of Health and Allied Sciences (MUHAS) - in 2007. Currently, joint subscription to e-resources is carried out by the Consortium for Tanzania University and Research Libraries (COTUL).

In Tanzania, a number of studies (Manda, 2005; Manda and Mkangara, 2007; Manda and Nawe, 2008; Angelo and Wema, 2010) have assessed e-resources usage through survey methods. None of these studies had employed bibliometric techniques to examine what users actually use in their scholarly publications. This study therefore, employed citation analysis to assess the use of e-resources in postgraduate research at MUHAS using dissertations submitted between 2002 and 2011. The need to undertake this study arose from the results by previous studies (Manda, 2005; Manda and Mkangara, 2007; Manda and Nawe, 2008; Angelo and Wema, 2010), vendor-supplied statistics, and anecdotal evidence that e-resources were underutilized in the country. The results of this study would be useful in acquisitions, management and promotion of e-resources in academic and other institutions.

**LITERATURE REVIEW**

There is a growing literature on citations analysis of various types Web-based publications such as journals as well as theses and dissertations. Tonta (1996) examined the use of networked information sources in scholarly print journals published in 1993 and 1994. The findings showed that only 2% of the articles contained references to networked information sources. Harter and Kim (1996) analyzed 4317 references in 279 scholarly peer-reviewed articles and found that only 1.9% of the references were online sources and 0.2% were e-journals. Zhang (1998) examined the frequency of citing e-sources in library and information science journal articles for the period between 1994 and 1996.

The study found that the proportion of e-references was only 1.1%. A similar study was carried out by Casserly and Bird (2003) who examined 1425 articles published in 34 library and information science journals during 1999 to 2000. Of the 35,682 citations examined, only 10% were web citations. The average number of web citations per article was found to be 2.5%. Sellito (2004) examined the bibliographic references of online academic articles in the AusWeb conference archive from 1995 to 2003. A total of 123 articles were examined that contained 2162 references in total, of which 48.1% were web references. The number of web references per article ranged from 3.5 in 1997 to 12.3 in 2001 and the average number of web references per article was 8.5 across all articles. The literature shows that citations to web references have been generally low despite the dramatic growth of e-resources. Citation analysis of postgraduate theses and dissertations has

also indicated low citations to web references. In examining 141 theses in economics at the Iowa State University and Virginia Polytechnic Institute during 1997 ï 2003, Kushkowski (2005) found that only 3.5% of the total citations were web resources. Most of the web citations were to freely available non-library-held documents. Olatokun and Makinde (2009) conducted a similar study on citation analysis of doctoral works accepted at the Department of Animal Science, University of Ibadan, Nigeria. They found that web resources had the lowest citations compared to other publications. Citation analysis of theses and dissertations submitted from 2004 to 2006 in the Faculty of Agriculture of Tshwane University of Technology also found that masters and doctoral students hardly make any use of electronic resources (Swanepoel, 2008). Similarly, Fasae (2012) found that web resources to be the least cited sources in dissertations and theses submitted to the Department of Agricultural Economics and Extension, Federal University of Technology, Nigeria, during 2004 - 2009.

Some citation studies have been carried out in Tanzania. Manda (1989) determined the usage of grey literature by economic researchers at the University of Dar es Salaam using the citation analysis technique. This study established a high frequency (88%) of citing grey literature. Dulle *et al.* (2004) conducted a citation analysis of 295 masters dissertations and 21 doctoral theses submitted at Sokoine University of Agriculture between 1989 and 1999, and 309 conference proceeding articles published during the same period. This study indicated that agricultural scientists in the country had limited access to current journals. Ndumbaroôs (2007) study on the research trends in Dar es Salaam region from 1980 to 2003 established that a large proportion (62%) of research findings were unpublished. Samzugi (2012) analysed the citation patterns of grey literature by postgraduates, academicians and researchers at the University of Dar es Salaam and the Open Univerity of Tanzania. This study confirmed, among other things, that the usage of grey literature remains insignificant despite its value. However, there are no studies in the country that employed citation analysis to assess usage patterns of e-resources. As such, this citation analysis study examined masters dissertations submitted to the MUHAS Library during the 2002 - 2011 period in order to gain insights about the usage of e-resources by postgraduate students.

**Muhimbili University of Health and Allied Sciences: Overview**

The Muhimbili University of Health and Allied Sciences (MUHAS) is a successor to the Muhimbili University College of Health Sciences (MUCHS), which was a constituent College of the University of Dar es Salaam. MUCHS was established by an Act of Parliament, Act No 9 of 1991, when the then Faculty of Medicine was upgraded to a College. The Faculty of Medicine originated from the Dar es Salaam School of Medicine, which was established in 1963. In 1968, the Dar es Salaam School of Medicine was upgraded to a Faculty of Medicine of the Dar es Salaam University College of the University of East Africa. In 1976 the Faculty of Medicine was incorporated into Muhimbili Hospital to form the Muhimbili Medical Centre (MMC). In 2000, MMC was disestablished and two closely linked institutions namely MUCHS and the Muhimbili National Hospital (MNH) were created. The Parliament Act No 9 of 1991 that established MUCHS was repealed in 2005 and subsequently, MUHAS was established in the year 2007. MUHAS has a

range of programmes in basic, clinical and allied health sciences. During this study, MUHAS had a total of 2,741 students of which 1,414 were undergraduates, 904 were diploma students, and 423 were postgraduates (MUHAS, 2012).

**METHODS**

Data for the present citation analysis were collected from dissertations submitted and available at MUHAS library. The study was conducted in February 2013 involving a total of 549 dissertations that were produced within a span of ten years from 2002 - 2011. However, there were no dissertations in the library that were produced in 2006. This may happen because sometimes postgraduate students take longer periods to graduate. All dissertations that were available in the library (covering the 10 years period) during this study were analysed (Table 1). The target period was selected because, as pointed out earlier, MUHAS started subscribing to e-resources in 2001 and hence a ten years period was considered adequate to assess their usage through citation analysis. Each dissertation was manually examined to extract citations from reference lists. The extracted data include the year of publication, total number of references, total number of web references, total number of print journal references and total number of e-journal references. Data were tabulated and analysed in Microsoft Excel and then presented in tables. The limitation of this study is that citation analysis focuses on cited documents only, meaning that the technique does not consider documents that were retrieved and consulted by users but were not cited.

**RESULTS AND DISCUSSIONS**

The analysis of data obtained from 549 dissertations yielded a total of 30,405 references in with an average of 55.4 references per dissertation. References to print journals articles accounted for 70% of the total references (Table 1). This is in line with Olatokun and Makinde (2009) and Fasae (2012) who found that researchers make more reference to journal articles than other information sources. This is mainly because professional journals are the major sources of scholarly information since they contain firsthand research information. The findings also confirm the fact that postgraduates tend to use scholarly materials such as journals because dissertations are often based on original research.

The findings also reveal that web-based references made up a very small (5.2%) proportion of the total citations. Citations to e-journals were even fewer (0.3%) during the ten years period. The highest citation to e-resources was recorded in 2008 (219; 8.2%) and no e-journal citations were recorded for the years 2002 and 2004. Generally, citations analysis indicates that there was very low use of e-resources in dissertations despite the availability of these valuable scholarly resources subscribed by the University. In particular, the number of e-journal citations has remained very low during the ten years period. These findings collaborate well with Swanepoel (2008), Olatokun and Makinde (2009) and Fasae (2012) who found that the proportion of cited e-resources was very low when compared to other information sources. The findings also support previous surveys (Manda, 2005; Manda and Mkangara, 2007; Manda and Nawe, 2008; Angelo and

Wema, 2010) which established a low usage of e-resources in many institutions in Tanzania.

**Table 1: Distribution of References in Masters Dissertations**

| Year | Number of dissertations | Total number of references | Print references | Web References | Print journal articles | e-journal articles |
|---|---|---|---|---|---|---|
| 2002 | 33 | 2,091 | 2,077 | 14 (0.7) | 1,504 (71.9) | 0 (0.0) |
| 2003 | 30 | 1,691 | 1,627 | 64 (3.8) | 1,144 (67.6) | 8 (0.47) |
| 2004 | 31 | 1,465 | 1,391 | 74 (5.1) | 864 (58.9) | 0 (0.0) |
| 2005 | 32 | 1,549 | 1,424 | 125 (8.1) | 884 (57.1) | 3 (0.2) |
| 2007 | 74 | 3,966 | 3,776 | 190 (4.8) | 2,760 (69.6) | 5 (0.1) |
| 2006 | 0 | - | - | - | - | - |
| 2008 | 47 | 2,679 | 2,460 | 219 (8.2) | 1,798 (67.1) | 34 (0.1) |
| 2009 | 73 | 3,876 | 3,647 | 229 (5.9) | 2,543 (65.6) | 21 (0.5) |
| 2010 | 73 | 4,286 | 4,011 | 275 (6.4) | 2,880 (67.1) | 18 (0.4) |
| 2011 | 156 | 8,802 | 8,407 | 395 (4.5) | 6,288 (71.4) | 16 (0.2) |
| **Total** | **549** | **30,405** | **28,820** | **1,585 (5.2)** | **20,665 (70)** | **105 (0.3)** |
| **Average** | **54.9** | **55.4** | **52.5** | **2.9** | **37.6** | **0.2** |

Note: Number in parentheses is the scholars rank on that measure.

The findings in this study imply that most postgraduate students at MUHAS rely heavily on print information sources despite the growing availability of e-resources. The findings therefore suggest that there is underutilization of e-resources and e-journals in particular. This situation may be attributed to the lack of awareness among students on the available e-resources, inadequate skills on access and retrieval of web-based resources, and the fact that e-journals were still very new to many users in during the period covered in this study. This is in line with previous surveys (Manda, 2005; Manda and Mkangara, 2007; Manda and Nawe, 2008; Angelo and Wema, 2010) that had attributed the low usage of e-resources factors such as lack of awareness on the available e-resources, negative attitudes towards web-based information, slow Internet connectivity, inadequate computers, insufficient information search skills, and limited access to computers. The fact that e-resources received very low usage among postgraduates raises a lot of questions especially when considering the value for money. Considering that most e-journals at MUHAS and Tanzania at large have been jointly paid by individual institutions and the donors, these findings suggest that it might reach a point where administrators and funders may not be willing to finance for the acquisition of underutilized resources.

Surprisingly, this study found out that citations to print journals alone accounted for 70% of the total references despite the fact that MUHAS library has not made any serious subscriptions to print journals for many years due to budgetary constraints. On one hand, these findings suggest that some of these sources were journal articles retrieved from CD-ROMs databases available in the library but were cited as the print equivalent since CD-ROM contents do not contain URLs. It is also possible

that students cited references available in other library material as primary references instead of treating them as secondary references. That is to say, students cite the cited sources from other documents as if they had read the original articles. Citation conventions require that for sources that one has not actually seen but which are referred in another work, both the original and the secondary sources must be cited. On the other hand, it is possible that many cited journal articles were retrieved from online databases but they were cited as print sources because of inadequate skills in using correct citation styles. Either the students do not have the required citation skills or there are no mechanisms to countercheck whether users of online resources adhere to the correct citation styles. It is not known as to whether the supervisors possess the right skills to support the students and countercheck their citation practices. This problem might be due to lack of training in information literacy skills which has been pointed out in earlier studies (Manda, 2005; Malekani, 2007; Lwehabura, 2008).

**CONCLUSIONS AND RECOMMENDATIONS**

The study findings indicate that there was very low usage of e-resources by postgraduates at MUHAS. Web-based references made up a small (5.2%) proportion of the total citations. Even though journals were considerably used by postgraduates, e-journals made up even smaller proportion. Citations to e-journals have remained almost constant for all 10 years. The findings therefore paint a picture that postgraduate students at MUHAS rely heavily on print sources and hence e-resources are being underutilized. Consequently, administrators may find it difficult to justify for the continued funding of the resources that are underutilized. There is a possibility that some of the journal articles cited were retrieved from CD-ROMs or retrieved from the web but they were cited as print sources due to problems in using citation styles. The findings also imply that students tend to cite secondary references without indicating that this properly. Based on the study findings, it is recommended that universities should intensify provision of information literacy programmes to students and staff, and promote the available e-resources to increase their usage. Emphasis should also be placed on training students on the use of various citation styles in scholarly works including dissertations. Furthermore, instructors should be equipped with the right skills on various citation styles. Future research may combine citation analysis and other methods to establish reasons for the low usage of e-resources.

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