

Using an electronic journal availability study to measure access to electronic journals by academics and researchers in the Faculty of Agriculture at the University of Zimbabwe

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Abstract

This article examines the use of an electronic journal availability study as a means of measuring access to subscribed journal collections that are needed by faculty members for their teaching and research. As in other disciplines, academics in agriculture are dependent on articles in electronic journals to obtain recent information and to build upon their own research. Empirical evidence is needed to select specific databases, to justify subscriptions, and to meet the research needs of academics. This article presents findings from an electronic journal availability study, which was used to determine the extent to which electronic journal collections met teaching and research needs at the University of Zimbabwe. The study took place between September 2013 and February 2014. A core journal titles list, simulating faculty's research needs, was retrieved from a library's electronic journals databases to establish the electronic journals availability rate: a measurement of the availability of the journals from the library's electronic collections. This study showed an 85.5% availability rate across local collections, with the following results for the donated journal schemes: 63% in Access to Global Research in Africa (AGORA); 47% in Access to Research for Development (ARDI); 51% in Health Internet Access to Research Initiative (HINARI), and 53.5% in Online Access to Research in the Environment (OARE). This electronic journal availability study

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demonstrates that librarians need continuously to evaluate their collections and to assess whether these meet the needs of their users.

1 Introduction

Access to published research underpins scholarly endeavour. For more than 350 years, journals have been the principal means for scholars and researchers to communicate their research findings (Finch, 2012, 4). Yet the last decades have seen substantial increases in journal prices, and this had an impact on collections in most parts of the world, with Africa being one of the regions most affected. (Bosch and Henderson, 2013; Gantz, 2012, 3). The impact of the rising journal prices was not only felt by librarians and library funders, but also by academics. This has sparked some boycotts of commercial journals by the academics (McCook, 2003; Van Orsdel and Born, 2004), which culminated in a movement sometimes referred to as the “academic spring” (Flood, 2012) and a rise in the Open Access movement (Suber, 2012, 29-43). In Africa, access to online journal literature has been additionally worsened by political, financial and infrastructural factors (UNESCO, 2010; Britz et al., (n.d); Harle, 2009 and Adams, King and Hook, 2010). As a result, many libraries in Sub-Saharan Africa (outside South Africa) struggle to maintain up-to-date journal collections in the face of underfunding, rising purchase costs, and expanding student numbers (Economic Commission for Africa, 2007, 3, Gitau et al., 2011, 75).

Open access has the potential to make more scholarly content accessible to academics in Africa. Open Access is a mode of scholarly communication where authors provide free access to their research outputs. Suber (2012, 4) noted that Open Access literature is digital, free of charge, and free of most copyright and licensing restrictions. The current understanding of open access has its foundations shaped by three important declarations:

1. The Budapest Open Access Initiative (BOAI) in 2002;
2. The Bethesda Statement on Open Access Publishing;
3. Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities in 2003;

and their subsequent amendments.

Authors can provide open access in two ways:

1. by self-archiving their articles in an open access repository (Green Open Access);
2. by publishing in an open access journal (Gold Open Access).

There are various models of open access publishing but all aim to provide free and unrestricted access to journal articles and, in some cases, also to data supporting

those publications. In most cases, authors are requested to pay Author Publishing Charges (APC) to publish in Open Access journals. Some institutions and funders pay for their academics; however, the University of Zimbabwe does not yet have such a fund. By December 2014, the Directory of Open Access Journals (DOAJ) had 10,129 listed journals from 136 countries. This study will seek also to establish the faculty's usage and access to these journals.

In order to improve access to commercial journals by researchers in developing countries, developmental partners have created schemes for accessing online scientific knowledge. These schemes were defined as "knowledge-based aid" (King and McGath, 2004, 26) and may be classed into three groups. Firstly, there are donor programmes, such as the *Research4Life* initiative, which encompasses the databases HINARI, AGORA, OARE and ARDI. *Research4Life* was set-up by United Nations agencies (World Health Organisation (WHO), Food and Agriculture Organization (FAO), United Nations Environment Programme (UNEP)) and the World Intellectual Property Organisation (WIPO), together with leading universities and major scientific publishers. Institutions from eligible countries receive access to more than 44,000 peer-reviewed scientific electronic journals, books and databases. Secondly, there are negotiated access schemes, such as Education Information for Libraries (EIFL) and the International Network of the Availability of Scientific Publications (INASP), two organisations that aim to strengthen academic library consortia in developing countries. In this model, these two institutions negotiate with publishers on behalf of the libraries belonging to consortia in developing countries for access to electronic journal collections. Thirdly, individual publisher-led initiatives include directly subsidised electronic journal access for developing countries. Despite these initiatives, African researchers still complain about lack of access to journal literature (Harle, 2012, 12; Oronge, 2012). In response, McCreadie (2013, 8) contended that providing access to journals is only part of the service; librarians need to further influence behaviour and perceptions of the faculty through acquiring resources that resonate with researchers' interests.

This article examines how an electronic journal availability study was used to determine the extent of access to electronic journals and to determine if the collections met the faculty's teaching and research needs. The Faculty of Agriculture at the University of Zimbabwe is responsible for teaching at undergraduate to postgraduate levels and is research oriented. Its information needs are catered for by the University of Zimbabwe library collections acquired through both institutional resources and through donated knowledge programmes. For example, through the *Research4Life initiative*, the University of Zimbabwe participates in AGORA, ARDI, HINARI and OARE. The library also has, through negotiated access schemes such as EIFL and INASP, further access to many thousands of titles. In addition, the university acquired The Essential Electronic Agricultural Library (TEEAL), which is an offline database providing access to key agricultural journals. Towards the end of 2013 the cumulative titles

accessible to University of Zimbabwe researchers and students were estimated to be more than 100,000 electronic journals (Nyagura, 2013).

2 Literature Review

In the literature, availability studies were mainly documented in the print environment. Mansbridge (1986), Nisonger (2009) and Nisonger (2007) carried out extensive reviews of published works in print. In these articles, availability studies were used to evaluate access to both book and journal collections by library patrons. However, there is limited literature on the use of availability studies with regards to electronic environments. In the print environment, Kantor's Branching Analysis Technique was extensively used, which involved collecting citations that simulate users' needs and searching for these in the library's collections. Each search success or failure is recorded. Possible reasons are suggested for non-availability. The results are added up and it becomes possible to calculate the percentage of success representing the availability rate (Kantor, 1984). The overall measurement of availability is the number of records retrieved expressed as a percentage of total number of documents sought (Shaw-Kokot and De La Varre, 2001). Initial attempts to measure electronic journal availability were reported by Kaske (1994, 317) where he proposed an extension of Kantor's Branching Analysis Technique in searches made on electronic catalogues.

Nisonger (2009, 427) enlarged Kaske's study of electronic availability by applying the approach to electronic journals and measuring their access through the university library web page. In essence, the following key works explore the concept of the availability of electronic journals: Squires, Moore and Keese (2007), Brazzeal and Powers (2007), Nisonger (2009) and Harle (2010). In these publications, an underlying pattern of conducting an electronic availability studies emerged, which included compiling an approximate list of the journals needed by researchers, searching for these journals in the library's collections, establishing the percentage of available journals and offering reasons for their availability or non-availability.

In Nisonger (2009), the needs of researchers were assessed from a 500+ item sample of citations. In Squires, Moore and Keese (2007), the sample was compiled from course reserves, reading lists and articles authored by researchers. In Brazzeal and Powers (2007) and also in Harle (2010) the samples were harvested from the Thompson Reuters' *Journal Citation Reports* (JCR). In a related study by Crum (2011), the sample was analysed from log files from electronic journals access software; the gleaned and cleaned files represented actual user demand for electronic articles. In each respective study, these simulated users' needs were searched for in the local collections to establish an overall availability rate and reasons of availability and non-availability. The following availability rates were identified in these studies, Nisonger (2009):

65.4%; Squires, Moore and Keese (2007): 78%; Brazzeal and Powers (2007): 62.7%; Harle (2010): 79% and Crum (2011): 68%.

Harle (2010) focused on four African institutions: the University of Malawi Chancellor College; the University of Nairobi in Kenya; the University of Rwanda; the University of Dar es Salaam in Tanzania. Harle's study compared his results with those from two European universities and established that around 80% of some the top-ranking journals are actually available in the current collections of many African university libraries (Harle, 2010). The African institutions which were considered in this study had similar electronic journal access to equivalent academic institutions in other developing countries (Harle, 2011).

Besides these studies, journal impact factors (JIF) can also be used to measure the quality of journals under review. In academic journals, the Impact Factor (IF) is a "measure reflecting the average number of citations to recent articles published in a journal" (International Society for Research Activity [ISRA], 2013).

The JIF is one of the many metrics used to evaluate journals. Craig (2010, 3) enumerated the following metrics: h-index; immediacy index; audience factor; article influence; cited half-life impact factor; g-index; journal ratings for research assessment exercises, such as "ERA- A*/A/B/C"; 5-year Impact Factor; AR index; SJR Indicator; Rank Normalised Impact Factor; Eigen Factor; Source Normalisation Impact Per Paper (SNIPP); Author Superiority Index.

There has been a lot of debate about the use of research metrics in scholarly communication and also the appropriateness of these metrics in different fields of study, in different regions, in Open Access content and in publisher bias (Vanclay, 2011, 267; McVeigh, 2004; Vanouplines and Beullens, 2008; Giglia, 2010; Wouter, 2011). As far as this present study is concerned, the University of Zimbabwe relies primarily on the JIF for academic promotions and therefore, the JIF was adopted in this study as a measure of assessing journal quality. In spite of the limitations of the JIF, this study tried to establish the quality of access to journals provided by the university library and also to see whether the journals requested by faculty members are of high impact. Librarians also use the metrics as a means of establishing if their collections house renowned e-journal titles.

3 Methodology

In the present study the researchers' needs were simulated by establishing a *core journal titles list* comprising of:

1. consolidated input from journal requests received from the Faculty of Agriculture;
2. journal titles gleaned from citations from the faculty's publication lists (*University Of Zimbabwe List Of Publications* (University of Zimbabwe, 2011));

3. journal titles gleaned from students' core reading lists.

The *University Of Zimbabwe List Of Publications* is a bibliographic listing of citations collected from works published by academics at the University of Zimbabwe from 2000 to 2011 arranged by faculty. Therefore, in the final analysis the *core journal titles list* was a list of 200 journal titles representing the needs of academics in the Faculty of Agriculture, University of Zimbabwe.

The *core journals titles list* consisted of 51 titles obtained from the purchase requests sent in to the library by the faculty (1 above); 130 titles obtained from the common titles from journals cited by faculty staff (2) and 19 titles obtained from course outlines and reading lists (3). The *core journal titles list* was then searched for in the library's collections to determine the electronic availability rate of the journals in the list. The search results for each title was recorded and where possible the collection(s) in which each title was found was recorded; otherwise reasons for non-availability were noted. Additionally, the individual journal titles in this list were searched in the 2011 *Thompson Reuters Journal Citation Reports*, to establish the impact factor of the titles in the *core journal titles list*. The use of *Thompson Reuters Journal Citation Reports* was used to validate the list as was described in similar studies by Harle (2010), Brazzeal and Powers (2007) and Arrivanathan et al., (2010).

All electronic journal availability studies described in this review attempted to simulate users' needs and search for the relevant journals in collections available. This approach could create bias should the researcher not be prudent enough, and if the sample were not carefully selected. In Nisonger (2009), the needs were based on the sample generated randomly; in Brazzeal and Powers (2007) and in Harle (2010), the samples were gathered from the Thompson Reuters Journal Citation Reports (JCR). In social sciences research, the act of investigating the behaviour, choice, opinions and other elements in a chosen group of entities could create room for sample bias (Kothari, 2004). However, the methods used in this study, as in the electronic journal availability studies reviewed above, aimed to simulate the users' actual electronic journal needs. Once bias is addressed in simulating users' needs, electronic journal availability studies are effective in measuring and assessing the relevance of library collections. The method is straightforward and very useful in measuring actual availability, especially in Sub-Saharan Africa where system based logs for various databases may not be easy to obtain.

4 Findings and discussion

4.1 Electronic availability rate for the core journals

The electronic journal collection at the University of Zimbabwe originates from two sources: journals acquired by the university through negotiated access schemes (consortia arrangements) and journals made available through donated access schemes. The former were referred to in this study as University of

Zimbabwe subscriptions (“UZ Subs” in Figure 1), while the donated schemes were accessed from each respective platform. The faculty *core journals list* titles were searched for in each available collection and the average availability rate of the journals across the collections was found to be 85.5%. The *core journal titles list* was searched in each respective collection and the available journals were recorded. The results revealed that the AGORA database had 63% of the journals in the core list, followed by OARE which had 53.5%. Only 1% of the core journals were Open Access. This shows that very few academics publish in, cite or recommend Open Access journals, which presents an opportunity for librarians to further promote Open Access journals. Figure 1 below illustrates the access to the core journals in each collection.

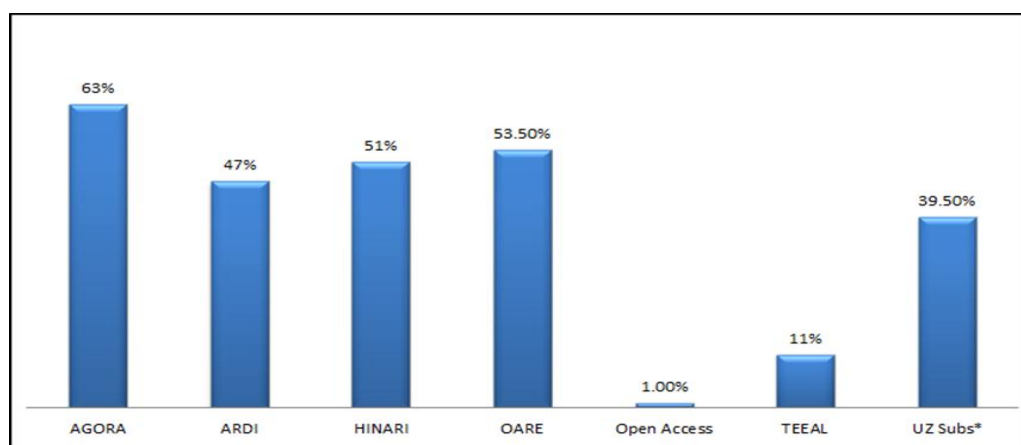


Figure 1: Availability of the core journals in each access platform.

In searching for these journals in the different collections, the results showed the following availability rates, AGORA had 37% of the titles not available, while ARDI, HINARI and OARE had 53%, 49% and 46.5% respectively. The figure indicates that subscriptions by the university could not meet 60.5% of the faculty’s needs, implying that without the support of the donated access schemes, the faculty’s needs could not be adequately met. The findings show that the institutions in developing countries that depend on donated schemes should begin to strategise on sustainability in case of eventual donor pull-out. One possible solution is to promote publication in Open Access journals and for libraries to archive and provide access to published Open Access journals. Efforts should be made by librarians to promote full exploitation of these resources in supporting the research in their own institutions.

Considerable duplication in title access was noted, as some journal titles were available in more than one of the platforms and collections. 46 journals were available on only one platform, 11 titles were on two platforms, and 9 journals were on three platforms. 60 titles were on four platforms, 36 titles were on five platforms and, finally, 2 journals were on all six platforms. Therefore, in real terms, the actual availability (the exact number of journals that could be retrieved

irrespective of the platform) was 170 titles, representing a real electronic availability rate of 85.5%. The negotiated access schemes (or donated journal schemes), which include AGORA, ARDI, HINARI, and OARE, provided 63%, 47%, 51% and 53.5% access respectively.

4.2 Journal Access and Impact Factors

The *2011 Journal Citation Report* was used to establish the impact factors of the individual journals in the faculty core journals list. This was used as a means to establish journals considered to have a higher impact factor; an approach that was used by Wouter (2011), Vanclay (2011) and Harle (2009). The results of this study revealed that 84% (169) of the journals in the list were available in the *2011 Journal Citation Report*. The range of journal impact factors and their numbers are shown in Figure 2 below.

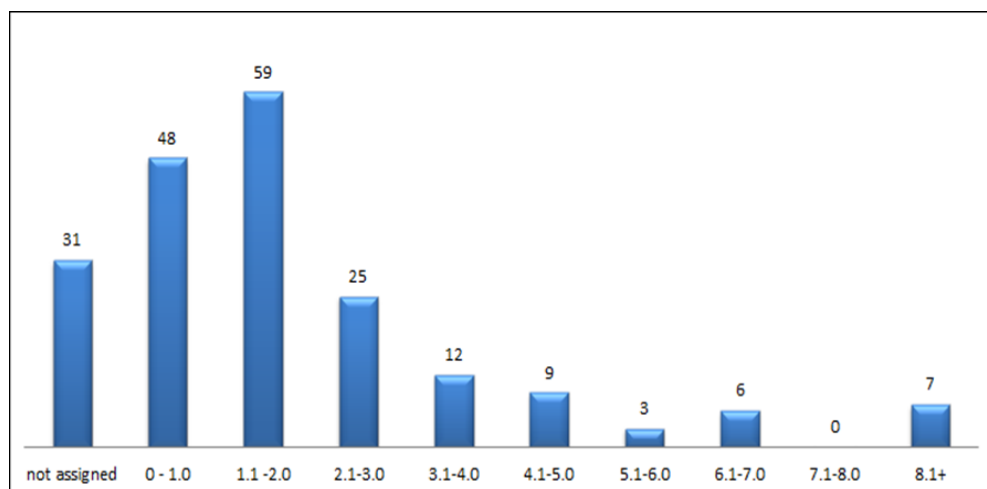


Figure 2: Distribution of core journal titles by impact factor

This graph above indicates that only 31 journals were not listed in the 2011 Journal Citation Report, representing 16% of the journals in the faculty core journals list. 153 of the 169 journals which were listed, rank between 0.1 to 5.0, with a peak of 59 journal titles with an impact factor of between 1.1 and 2.0. There are seven journals that registered an impact factor above 8.0 in the journal citation index. The top high impact journals from the core journals list that are used by the faculty are shown in Table 1 below.

	Journal Title	Publisher	Research4Life				LanTEE AL	UZ Library Subscriptions (PERii & EIFL)	JSC Citation Index	Overall access
			AGORA	ARDI	HINA RI	OARE				
1.	Science	Ame. Ass. Adv.Sci.	✓				X	31,201	Y	
2.	Trends in Ecology and Evolution	Elsevier	✓	✓	✓	✓	X	15,748	Y	
3.	Nature	Nature Publishing Group	✓	✓	✓	✓	✓	36.280	Y	
4.	Annul Rev. Plant Biology	Annual Reviews	✓		✓	✓	✓	25.962	Y	
5.	Animal Review of Entomology	Annual Reviews		✓	✓	✓	✓	11.6	Y	
6.	Biotechnology Advances	Elsevier	✓	✓	✓	✓	X	9.646	Y	
7.	Frontiers of Ecology Environment	Elsevier	✓	✓	✓	✓	X	9.113	Y	
8.	Nuclei Acid Research	Oxford	✓	✓	✓	✓	✓	8.026	Y	
9.	Acta Agriculture Scandinavia	Taylor & Francis	✓	✓	✓	✓	✓	6.9	Y	
10.	Global Environment Change	Elsevier	✓	✓	✓	✓	X	6.868	Y	

Table 1: Top ten high impact journals.

Table 1 indicates that faculty have access to all the top ten high impact journals that they require, including famous journals, such as *Science*, *Nature*, and *Trends in Ecology and Evolution*. These three have the highest impact factors at 31.201, 36.280 and 15,748 respectively. The ten listed titles are all accessible on more than four platforms, with most of them duplicated in the *Research4Life* programme. Since subscriptions to most of these high impact factor journals are very costly, most African scholars cannot afford these journals and they have to rely on institutional library subscriptions (Swan, Willmers and King, 2014).

4.3 Access by database or publisher

The study showed that most of the journals published by scholarly societies which were not included in journal aggregators were also not available through the university collections. The most popular commercial publisher databases such as those provided by Elsevier, Springer, Oxford University Press, Cambridge University Press and Wiley were accessible via the library collections. Scholarly societies (also known as academic associations) are organisations that exist to promote academic disciplines or professions and in most cases they sponsor the publication of academic journals in their respective disciplines (Environmental Studies Association of Canada, 2014). The results indicate that commercial publisher content was most readily available across different journal collections (HINARI, AGORA, OARE, ARDI, EIFL and PERII); followed by titles from university presses and, finally, publications from scholarly societies. The list shows very few African journals databases, except African Journals Online. This suggests that the university prefers to acquire journals through commercial

databases, which may not include journals from scholarly society publishers. It would be beneficial for universities if more journals published by scholarly societies were available in journal bundles, whether in those provided by donor programmes, or in commercial packages.

5 Conclusion

This electronic journals availability study at the University of Zimbabwe revealed that much of the faculty's research needs as expressed in the *core journal titles list* could be met by the library's collections. It showed that the overall average electronic access to agricultural journals required by the Faculty of Agriculture is 85.5%, so that 14.5% of the journals for which researchers have expressed need, are not available on any of the database platforms provided by the library. The negotiated access schemes (or donated journal schemes), which include AGORA, ARDI, HINARI, and OARE provide 63%, 47%, 51% and 53.5% access respectively. Without these donated access schemes, the electronic availability rate for the University of Zimbabwe falls from an average of 85.5% to 39.5%. This clearly shows the contribution of these schemes to improving the availability rate of electronic journals at the University of Zimbabwe.

The electronic availability study revealed that there is considerable duplication of journal titles, especially amongst the *Research4Life* programmes.

Journals available to faculty members were rated by the Journal Citation Reports, and it was found that 84% of the titles from the list had impact factors. There is a low level of faculty participation in Open Access publishing; further research could explore the reasons why faculty members seem to participate less in Open Access publishing and why they do not recommend more Open Access journals to their students. This electronic journal availability study shows how librarians can evaluate their e-journal collections to assess whether these meet the needs of their users. The study also shows how important donor programmes are in providing access to e-journals in a Zimbabwean University library. Further research could examine whether the same pattern is found in other countries in Africa, and could explore how sustainable access to journal collections can be ensured, in order to guarantee the stability of future collections beyond relying on donor programmes.

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