African Higher Education Research Online (AHERO): a disciplinary archive

http://ahero.uwc.ac.za

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Abstract

African Higher Education Research Online (AHERO) is an international disciplinary repository for research texts that focus on the practice and development of higher education in Africa. Distributed researchers upload their documents to AHERO through a semi-automated process. For the most part, this is intended as a supplementary, post-publication exercise to enhance visibility of research articles, although conference papers, research reports, policy documents and theses are also submitted. AHERO editors vet submissions for relevance, scholarly evidence and coherence, but do not otherwise practice editorial peer review. Each item's peer review status is clearly indicated and readers are invited to submit comments. The metadata that is assigned to each submission ensures that the papers are retrievable via Google searches.

Launched in January 2007, AHERO now holds 435 full text research texts relating to African higher education. The paper will outline the project's objectives and present the results of findings emerging from the two year experience of liaison with researchers and publishers as we attempted to recruit papers for the disciplinary archive. AHERO is OAI compliant and uses an open source platform that is available for adaptation by any disciplinary community wishing to consolidate and optimize its scholarship.

Introduction

While most African activity regarding open access to research texts is confined to efforts to establish and populate institutional repositories at universities[3], thus reflecting the multi-disciplinary output of a single institution, our approach has been to set up and build an international repository that is dedicated to a single and highly specific research niche, namely, the practice and development of higher education in Africa.

I work at the Centre for the Study of Higher Education at the University of the Western Cape and it was as a result of our own difficulties in discovering, reaching and learning about Africa-based studies in this field that prompted the project. If trained librarians were unable to locate, uncover and collect African scholarship in our field, how much more difficult would this be for our graduate students? The bulk of published research reflects the output of western higher education researchers and this record, while useful in presenting quality research models, does not speak to the challenges experienced by African practitioners. The project thus grew from our confessed self-interest in developing an aggregated body of localized knowledge that could be used by our students and anyone else working in the field.

Beyond this instrumental purpose, it is plain that the availability of research data and findings may assist in developing solutions to dilemmas and problems experienced within our universities. To appreciate the wide ranging nature of these problems, it should be remembered that many African nations are attempting to revitalize higher

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[3] Deventer & Pienaar, 2008; Olivier, 2008; Fullard, 2007

education following decades of neglect caused by the blight of structural adjustment programmes that continued to deprive universities of resources from the '80s and into the '90s[4].

The background against which AHERO should be viewed is an increasingly unsatisfactory model for dissemination of scholarly research. Africa has a rich natural heritage as well as important bodies of knowledge and information systems that have been passed down from generation to generation.[5] Unfortunately, much of this has not been documented and knowledge resources and infrastructure are very rarely affordable on the Continent[6]. Important information is locked away behind copyright licenses and exorbitant journal subscription fees. Information flows are blocked by the chronic high costs of journals and books as well as the intellectual hegemony and gate-keeping functions of the predominantly Western journals which determine whose articles are to be published[7]. Poor bibliographic control and weak systems of dissemination that lead to poor circulation of research findings further restrict the flow of knowledge[8]. Archives, libraries and primary source materials from and about Africa are few, highly dispersed and difficult to access.[9] The result is an information sharing crisis which hinders progress, especially in Africa's least developed countries.

Objectives

In the course of their work, librarians are attempting at each turn to improve access to knowledge. Collection building, cataloguing, indexing are all aimed at enhancing access to important information. Hence Open Access as a protocol for breaking barriers to the delivery and use of research is automatically highly attractive to us. Right from the start, an important objective of AHERO was to **promote the idea of open access** amongst our disciplinary community. How would authors respond to invitations to self-archive and share their research findings? Would we be able to spread acceptance of open access platforms?

Secondly, we wanted to establish whether an open access approach would in fact **enhance the visibility and usage of existing, though "invisible", Africa-based research**. Would such a disciplinary archive be used and valued by others and would we be able to capture evidence of this? One of the associated challenges was to find ways of overcoming the difficulties associated with copyright. The two freedoms associated with open access, freedom from cost and freedom to re-use and distribute information stand in direct conflict with most publishers' business model.

Methods of Study

This paper reports on the experiences and findings arising from a two year period of recruiting papers to AHERO, and the results of these efforts. From the second year of the project, we were aided by a project partner based at the East Africa Institute for Higher Education Study and Development, which is located at Makerere University in Uganda.

Our first task was to identify experts in the field, to obtain their permission to include their work in the online archive and to either digitize or obtain an electronic file of such content. The Centre for Research on Science and Technology (CREST) at the University of Stellenbosch was commissioned to undertake a search and we were supplied with a database of 1200 individuals who have published books, chapters, journal articles, conference and other occasional papers or research reports about African higher education in the past decade. This served as a constructive instrument for the AHERO project team, providing a starting point from which we began searching for current contact details for the scholars. Thereafter we began contacting the researchers and informing them about the AHERO project.

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[4] Federici, S et al, 2000; Assie-Lumumba, 2006
[5] Masinde, Siro; Rahim, Rajan, 2008, Aluka: Developing digital scholarly collections from and about Africa, pg 3
[6] Teferra (2003)
[7] Ibid
[8] Britz & Lor, 2003;
[9] Smart (2007); Misinde et al, 2008

Besides the subjective qualitative responses that can be offered through our direct daily experience, all correspondence and encounters with prospective authors and publishers was captured in a database. In this way we are able to run queries to discover exact measures with regard to the number of authors contacted, successful deposits in the archive, the types of formats represented, author and publisher responses and the number of embargoed papers. An additional source of information is the responses we have received from presenting the project at a number of conferences and workshops. Following two years' experience of administering AHERO an evaluative survey was initiated. Different questionnaires were sent to two distinct groups, namely, contributing authors, and identified users of the online archive[10]. Using data from these various sources, the results of our project are presented below.

Results

Objective 1: Advocacy for Open Access

An important part of our project involves advocacy within our targeted constituency. In engaging with individual researchers and authors, we attempted to educate and enlighten them about the ideals and objectives of open access. We also produced two posters and an informative brochure and distributed these widely through conference venues. On a more organized, formal basis we deliberately sought out strategic opportunities, such as annual conferences of the associated learned society, and arranged meetings with professional associations such as the Southern African Regional University Association (SARUA) and the Association of African Universities (AAU). Some of these produced helpful results such as the above-mentioned partnership with Makerere University, which enabled us to reach much deeper into the East African region than would have been possible from Cape Town. Further, the AAU has agreed to assist with the promotion of open access and endorses the AHERO project. The deepest success with changing author attitudes probably occurs at the level of the individual since most scholars are predominantly concerned with the benefits that they might personally derive through open access. These concern the increasing exposure of their work and subsequent usage and citations that evolve from such usage, as well as increased opportunities for regional collaboration. Nevertheless, through many recorded instances of unsolicited feedback, it is clear that many recognized the project as a general public good and remarked on the usefulness of the archive.

At a very basic level, it is possible to gauge that we were moderately successful in engaging researchers' receptivity towards open access. Out of 661 overtures to authors, positive responses were achieved from 53% of these (ie, the number of authors in AHERO). However, it is worth mentioning that it may take weeks or even months before consent is secured for authors, publishers or commissioning bodies. They may only reply after the second or even third reminder. Therefore, securing permission and populating the archive is an iterative and time-consuming process.

It is also significant that only 62 out of 350 authors have self-archived their papers. In all other cases, we have deposited them by proxy and with permission. In response to our invitation, authors attach their files to an email, relying on the AHERO team to deposit on their behalf. From the evaluative survey we conducted it transpires that, for many, this is due to lack of confidence with computers. Furthermore, although an open invitation to contribute papers appears on the AHERO homepage, virtually no one will initiate or spontaneously deposit a paper. Soberly, one must reflect that if the site were widely valued as a research resource, scholars should be queuing up to deposit their work. There may exist skepticism and uncertainty about the process of self-archiving which is still a relatively new phenomenon within scholarly communication.

Copyright and open access

It is possible that authors continue to feel uncertain about their right to self-archive, particularly where they have assigned copyright to a publisher[11]. In such cases, it is necessary to consult the publisher's policy with regard to self-

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[10] The questionnaires are available online at http://www.cshe.uwc.ac.za/questionnaire/questions_authors.asp and **http://www.cshe.uwc.ac.za/questionnaire/questions_users.asp**

[11] Pappalardo, Kylie M et al 2007; A guide to developing open access through your digital repository

archiving. The British SHERPA-ROMEO project has created an online searchable directory that provides a comprehensive record of publishers' copyright conditions as they relate to authors archiving their work on-line[12]. It is interesting to note that although major publishers such as Elsevier will permit authors to self-archive in an institutional repository; this freedom is not extended to a disciplinary repository. However, several publishers will allow the author's version of the post peer-reviewed article to appear on a non-profit site.

Besides journal articles, we were also in direct liaison with publishers for permission to digitize chapters of books or papers from a conference proceedings. Our experience has shown that book publishers, in comparison to the journal publisher would more readily concede to the use of a particular chapter in AHERO. A sample of publisher policies may be seen in the table below. The range of responses extends from fairly liberal to extortionist demands for clearance fees.

Table 1: Sample of publisher policy with regard to permission requests

Publisher	Request	Policy
UNISA Press	Journal Article	Article may be used but due acknowledgement must be given to journal and UNISA press as publisher.
Maskew Miller	Book Chapter	Approval granted. No fee, but publisher should be acknowledged.
HSRC Press	Book Chapter	Book may be accessed via a link to HSRC site.
World Bank	Book	Approval subject to Contractual agreement entered between CSHE and World Bank
Open University Press	Book Chapter	Approval subject to a fee.
Greenwood Publishing	Journal Article	Online permission required and fee.
Taylor and Francis	Book Chapter	Fee is charged and full acknowledgement of publisher given
Springer	Journal article	Does not allow open access of their articles, only abstract may be used, unless fee is paid.

Where a publisher will not permit a journal article to be reproduced in the AHERO archive, we would embargo the full text but provide on-site functionality for users to request the full text from the author. The usage of this functionality is reported below. Only 37 papers in AHERO are embargoed where we have been unsuccessful in obtaining the author's postprint.

Notwithstanding the difficulties associated with copyright and permissions, another sign of the growth in author awareness of the potential of open access is that the archive is growing steadily at the rate of approximately 25 papers per month. AHERO also accepts unpublished materials such as conference papers, research papers and institutional research. Since authors are the major copyright holders of these types of documents, they are approached for consent. However, the AHERO administrator checks with conference organisers as to the conditions

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[12] **http://www.sherpa.ac.uk/romeo.php**.

under which conference papers were presented. It may be necessary for permission to be secured from such persons. Alternatively, where papers have been made available via a Creative Commons License, it is not mandatory to obtain permission first before using the research.[13] However, the AHERO administrator courteously informs the author that their paper(s) have been deposited in the archive.

The mix of formats appearing in AHERO is represented diagrammatically below:

Diagram 1: Document Formats in AHERO
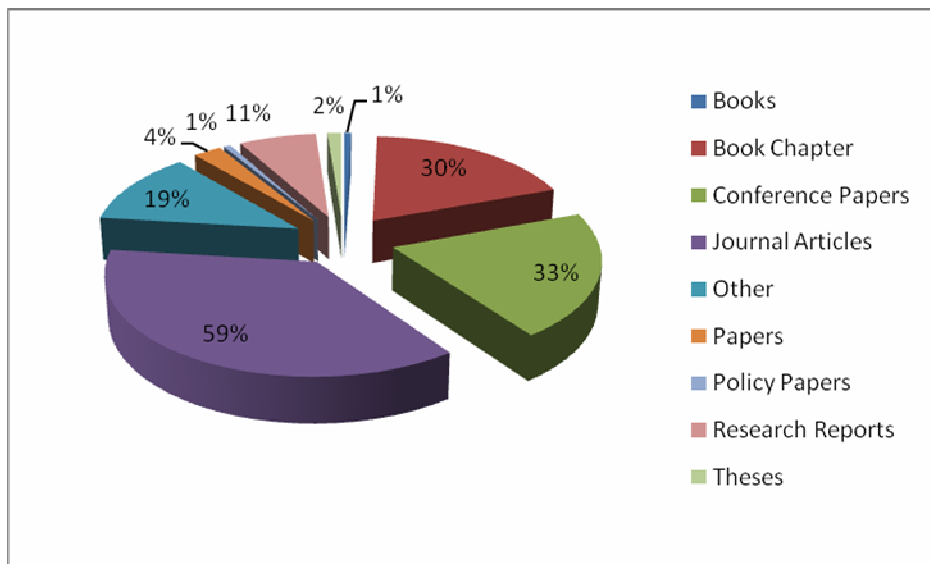
How do authors respond to invitations to self-archive and share their research findings?

Participants to our evaluative online survey were from 26 different countries with Uganda, South Africa and Kenya furnishing most respondents. The study has informed us about possible improvements, authors and users' overall impression of the archive, usage and frequency of visits.

The author survey[14] provides a variety of significant information about their research practices. The majority (72%) of respondents were aware that their papers are housed in the archive. The following conclusions could be drawn:

- Authors are generally satisfied with the database records in AHERO associated with their research. Ninety percent of author respondents have expressed acceptance and approval[15]
- All author respondents (100%) displayed a willingness to contribute their research in the future

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[13] **http://creativecommons.org/**. A range of Creative Commons licenses permit liberal rights to use and redistribute materials

[14] Thirty authors participated in the survey

[15] One of the positive comments includes " I noted that you have some good quality research papers and so you are likely to be a first place for my research literature search"

Overall results show that both authors and users are eager to self-archive their papers:

Diagram 2: Willingness to self-archive in AHERO
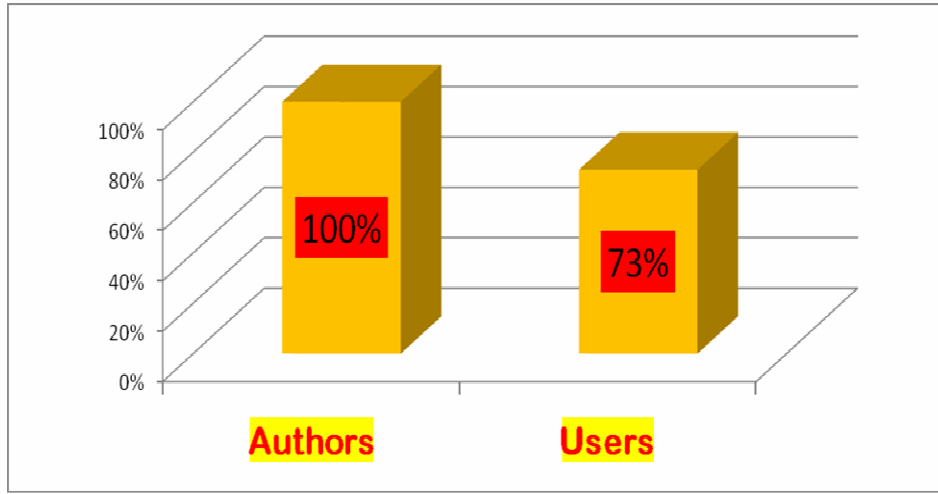
Diagram 3: The quality of AHERO's research texts

It is encouraging to learn that the biggest percentage of authors rates the quality of the archive's papers as "good"[16]. The fact that approximately 60% of these respondents have referred others to AHERO as a research tool reinforces the general standpoint that AHERO texts are indeed beneficial.[17] Only 7% of our respondents have not read the material housed in the archive.

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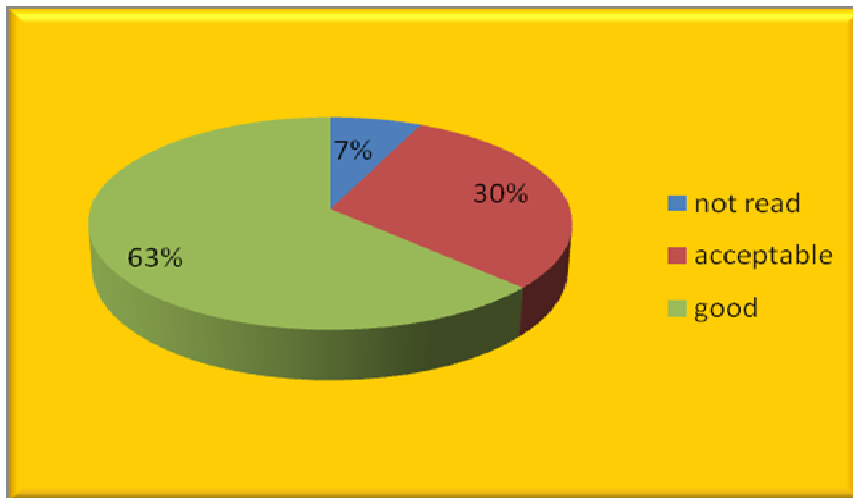
[16] 63% rated AHERO papers as "good"

[17] One of the comments include: *This is bound to become one of the most helpful resources on matters of higher education in Africa.*

Objective 2: Enhance the visibility and usage of existing, though "invisible", Africa-based research

Journal articles, conference papers, unpublished reports, policy documents and theses have been produced by scholars in Africa, but have not been effectively disseminated, either due to weaknesses with the publication system or as a result of the unfavourable attitude toward scientific activities and innovations on the [African] continent which has posed a serious challenge to the development of [its] scientific communication[18]. AHERO aims to promote the communication of scholarship as the developing world remains at a disadvantage in terms of both the production and distribution of knowledge. African researchers produce only 1.8% of the world's total scholarly publications, according to an article in the journal of *Scientometrics* on the state of science and technology across the continent.[19]

The key to both of these is the functionality and performance of the AHERO platform. Because it is built according to the Open Archives Initiative (OAI) standards, AHERO is registered with OAIster, and OpenDOAR and EIFL services. This means that the records in our archive are automatically harvested by other service providers and also crawled and indexed by search engines, including Google and Yahoo. In this way papers deposited in AHERO are more readily discovered and used by a global readership. Respondents to our user survey[20] were specifically asked how they had first discovered the archive and 50% (15) answered that this transpired by using a search engine such as Google. The remaining users were either guided by a friend or colleague or were introduced to AHERO while visiting the CSHE.

The metadata that we assign to each record also contributes to the overall "findability" of the individual papers in the archive. For example, we enhance the browsability of the archive by assigning both broad subject themes as well as indexing each item in the archive with a set of descriptive keywords. Users may thus navigate amongst papers in the archive by country, by author, by theme or by keyword descriptors. The "Browse keywords" functionality is illustrated in Diagram 4.

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[18] Teferra, Damtew, 2003, Scientific communication in African universities: challenges and opportunities, In Phillip Altbach (ed) *Scientific Communication in African Universities: External Assistance and National Needs,* p86

[19] Pouris, Anastassios & Pouris, Anthipi, 2007, The state of science and technology in Africa(2000-2004): A scientometric assessment p5

Diagram 4: A-Z keyword browse functionality

Through the posting of documents online and the creation of additional access points, the individual papers become more visible. With this increased visibility comes a responsibility to ensure that the papers in the archive are of a high standard. Items which have already been peer-reviewed as part of a publication process are clearly kitemarked with this status. Although the AHERO team does not conduct any form of expert peer review, each paper is vetted and reviewed to ensure a scholarly method has been employed and that it is an original or useful contribution to AHERO.

Another indicator of the **quality and usage** of each paper is the **download statistics** that are associated with it. These are automatically registered each time a particular abstract is read or each time the full text is loaded. By displaying these statistics alongside an abstract, a user may already begin to assess the popularity or otherwise of the paper. Likewise, a visitor may separately view the **references** used by a given paper before accessing the full text in order to assess the usefulness of the item. Lastly, the abstract view page allows visitors to submit **comments** on a specific paper directly via the website. These comments are moderated by the AHERO administrator.

The above-mentioned survey also enabled us to begin to evaluate the **usefulness and value** of the archive. All the users who had sent us e-print requests as well as a core set of users of our Resource Centre were invited to participate. Only 30 of 225 users (13%) responded to our online survey. A different set of questions (though with some overlapping questions) was emailed to 206 AHERO contributors requesting them to participate in an online survey.

To gather information on the effectiveness of the archive, the online questionnaire requires users to have utilized its functionalities. Ninety per cent of users agreed that the search and browse options enabled them to locate information with ease. We had been curious to learn why the "comment" functionality has not been used. Replies ranged from "lack of time"[21] to "inefficient computer literacy skills"[22]. 23% of users were uncertain.

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[21] 37% of respondents said that it may be because researchers have no time to comment on the resources that they visit.

Diagram 5: Usage of AHERO's "comment functionality"
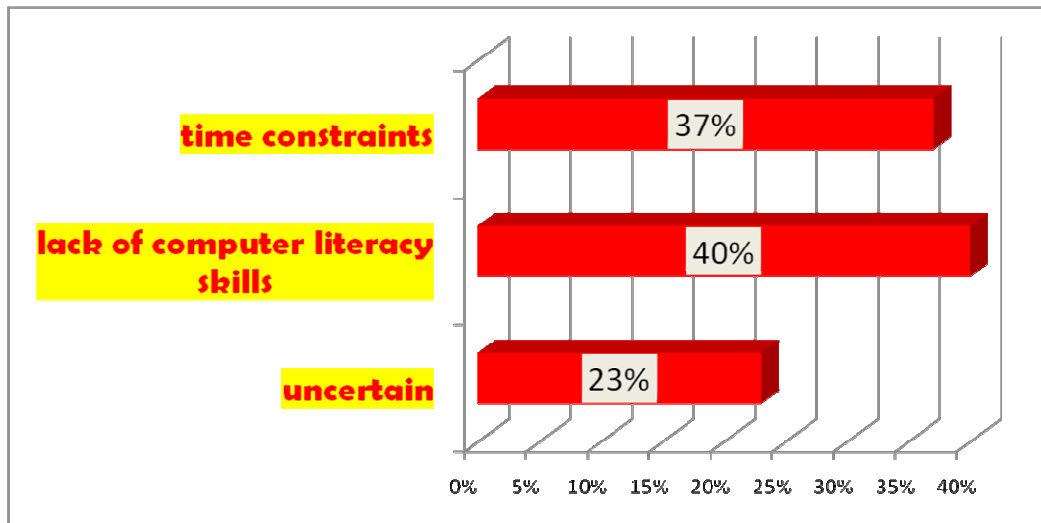
AHERO provides additional services that we believe serve to facilitate visibility and usage of the papers in the archive. These include the possibility of registering to receive email alerts of newly-deposited papers that coincide with specific research interests and the ability to email the full-text of a paper to a 3rd party.

Forty three percent of all users said that they had cited materials found in AHERO within their own work. It is interesting to learn that the majority of these respondents ie. 90% are based at an academic institution[23], while the remainder is affiliated with NGOs and research institutes.

To what extent has AHERO content been broadcast and liberated?

Currently, statistics indicate that there have been approximately 25,000 visits to our site and 28% of these visits result in the downloading of files. File downloads are now experienced at a rate of between 50 to 100 each week. More particularly, we are encouraged that visits are recorded from several regions across Africa. To date, AHERO has been visited by 27 African countries. It has to be acknowledged that, owing to inadequate infrastructure in Africa, most African Internet traffic is routed through America, making it difficult to track accurately exactly the destination of downloads from AHERO. Notwithstanding the opacity of some data, where AHERO indicates direct visits from named African countries, we are able to determine a 71% download rate[24]. This is a significant finding, showing that AHERO resources are indeed needed.

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[22] 40% of respondents believe that there is a general lack of computer literacy skills which contributes to the user's reluctance to use the comment functionality

[24] There have been 6261 visits from Africa, 4438 of which have resulted in the downloading of files.
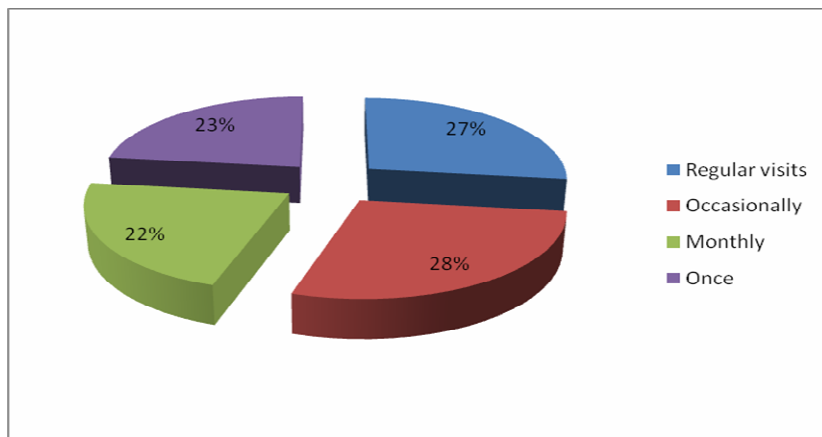
Diagram 6: Visits from Africa


● Represents visits from the African continent to AHERO

Diagram 7: Rate of visitation

Our survey results indicate that 27% of all users and authors replied that they would visit AHERO on a regular basis. 28% visits occasionally; 22% accesses the site monthly and 23% have only visited once.

Who is using the site? Because of the way that Internet traffic is routed, with most African visits routed through aol.com (USA), it is difficult to pinpoint accurately where the files are being downloaded, although visits have been registered from 153 countries worldwide. Judging from the e-print requests received, most of the visits are from South Africa and Africa. Approximately 3 e-print requests are processed each week. By end November 2008 we had received and processed 269 e-print requests as follows:

Diagram 8: E-Print Requests
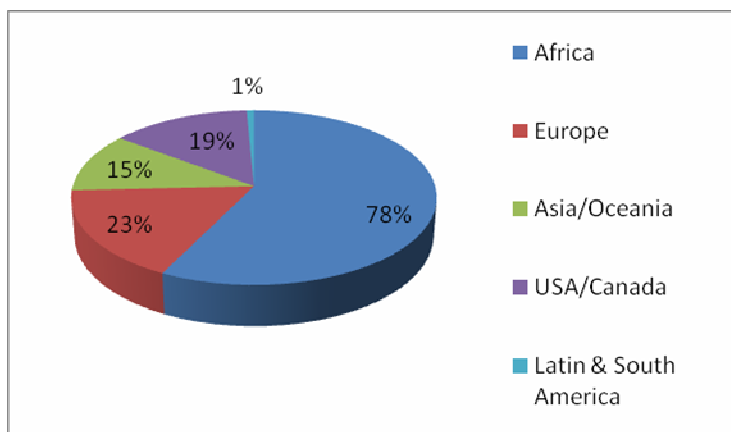
We believe that through satisfying these e-print requests, AHERO is genuinely able to liberate embargoed texts.

Insofar as suggestions for improving the archive are concerned, users request additional features such as links to other websites dedicated to Higher Education research and references to sources of statistical data (eg, World Bank and UNESCO resources). Despite the reported lack of confidence with internet technology we received a request for the incorporation of a chat feature, suggesting a need for increased networking amongst higher education researchers.

Conclusions and recommendations

Our statistical data show that AHERO is successfully delivering relevant content to African scholars.

Furthermore, the analysis of the online survey is based on a relatively small sample of Africans who, by their very participation in the questionnaire, show an active interest in open access. This is also underscored by the many positive and unsolicited emails we receive which convey much enthusiasm for the project.

In can be deduced that our survey sample is a privileged one, yet it is clear that authors who have contributed material to the archive are satisfied with its display and usage.

These conclusions should be tempered by the indication from respondents that lack of computer literacy prohibits many from being able to offer a meaningful comment on AHERO papers. It is apparent that ICT is still in its infancy across the Continent. The challenge that remains is to evolve AHERO into a self-sustainable digital library. Authors should spontaneously self-archive their research, rather than rely on mediated deposit and repeated invitations. Feedback from the questionnaire as well as our statistics informs us that more advocacy is needed to alleviate these problems. Our intention to exhibit AHERO at the 12th General Conference of the AAU, 2009 in Nigeria, will provide an opportunity to showcase the project. Increased contribution from authors and stakeholder support for open access is essential for dynamic growth of the archive. The experience of AHERO may provide a useful starting point for other disciplinary communities which may wish to consolidate and optimize its scholarship through an open access approach. The source code for the archive is available for adaptation[25]

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[25]The URL for obtaining the source code may be accessed from the AHERO site (See *About AHERO*)

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