

**CHALLENGES IN DEVELOPING AND IMPLEMENTING
INSTITUTIONAL REPOSITORIES IN HIGHER
EDUCATIONAL INSTITUTIONS**

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ABSTRACT

Institutional repositories have become popular amongst higher educational institutions around the world. Many higher educational institutions, especially universities, have developed institutional repositories as the alternative medium for their scholars to deposit copies of their works. Establishing an institutional repository enables a university to publicise its research and teaching programmes by enabling access to the work of its staff and students. The academic work of an institution can be presented in one place rather than just spread amongst hundreds of journals, thus increasing visibility and prestige. However, there are several obstacles which can become a challenge in developing Irs and has to be overcome.

Keywords: Institutional repository; Open access; Higher educational institution; Scholarly publications

INTRODUCTION

In recent years, institutional repositories (IRs) have become popular amongst higher educational institutions around the world. Many higher educational institutions, especially universities, have developed IRs as the alternative medium for their scholars to deposit copies of their works such as journal articles submitted for publication (pre-prints), journal articles accepted for publication (post prints), conference papers, working papers, doctoral theses and dissertations and datasets resulting from research projects, into electronic repositories or open archives.

According to Crow (2002), by depositing academic works into an IR or open access repository, it will increase the profile of an author on a worldwide basis, increasing both the dissemination and the impact of the research they undertake. Regular submission of an author's work to a repository provides an author with a central archive of their works and a record of publications to add to their resume.

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Establishing an IR enables a university to publicise its research and teaching programmes by enabling access to the works of its staff and students. The academic work of an institution can be presented in one place rather than spread amongst hundreds of journals, so increasing visibility and prestige (Crow, 2002). The quality of a university's academic output forms an effective advertisement for the institution, attracting external revenue streams, new faculty, and students. Depositing into a university repository can also ease, both for the institution and the academic author, the administrative burden of reporting publications for research assessment and review exercises.

By depositing into the IR, it can be accessed by everyone and is freely available via the Internet. This can help to increase the visibility of the university to the world. This method has become increasingly popular among university scholars whereby they share research that has been conducted rather than distribute them through personal websites. However, not all succeed as planned because most academics are aware of the existence of a similar medium established by the university. Although they know the existence of IR, many do not want to use it. They would rather send their research results to external publishers. Indeed this is one of the many challenges faced by numerous local and international universities. This situation will result in losses to the university itself, especially after all the financial assistance given to researchers to conduct their research and the results cannot be shared.

DEFINITION OF INSTITUTIONAL REPOSITORY

An IR can be defined as a service that is offered by a university to its community or members involving information management and dissemination of scholarly materials in digital format. IR is an organizational commitment which provides a new style of managing and preservation of digital materials contributed by university members (Lynch, 2003).

The Loughborough University Library (2009) defines IR as “digital collections of an institution's research” where the material can be in various forms of collection such as “published articles; pre-prints; book chapters; theses or even audiovisual material”. All these materials are deposited in a university repository in digital form and the repository is a 'shop-window' for the university's intellectual output.

Crow (2002) defines IRs as a “digital collection that capture and preserve the intellectual output of a single or multi-university community”. It focuses on storing and makes accessible the educational, research and associated assets of the institution. It provides an open access to the research output in the institution such as

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research papers, learning materials, image collections, articles, conference papers and many other different types of contents.

IMPLEMENTATION OF OPEN ACCESS INITIATIVES IN HIGHER EDUCATION

Open access means ‘free’ and in the context of IR, it is free online access to research articles by everyone anywhere via the web. In essence, the main aim of the open access movement is to provide free and open access to anyone for materials such as articles published in peer reviewed journals. The Budapest Open Access Initiative (2002) has determined that open access is considered achieved when one or both of the criteria below have been complied with:

- a. All users have free, permanent access to research and licence to use, copy or distribute that research or that
- b. Research is deposited in electronic form, into an established repository

In the United Kingdom, the movement and development of open access and IR initiatives has changed and become more important to all higher educational institutions via a statement made by the Research Councils UK (RCUK) in 2005 which states that:

“Where research is funded by the Research Councils and undertaken by researchers with access to an open access e-print repository (institutional or subject-based), Councils will make it a condition for all grants awarded from 1 October 2005 that a copy of all resultant published journal articles or conference proceedings (but not necessarily the underlying data) should be deposited in and/or accessible through that repository, subject to copyright or licensing arrangements.”

The statement issued by RCUK clearly states that all research funded by RCUK should be kept in the IR. However, this does not mean that other studies not funded by RCUK are exempted from this. Basically the majority still has to be kept. Besides the RCUK, the Joint Information Systems Committee (JISC) has also played an important role in ensuring the success of the IR development in United Kingdom by providing guidance, advice and opportunities in using ICT for the development of IR (Hockx-Yu, 2006).

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The Focus on Access to Institutional Repository (FAIR) Programme has been set up to look into the creation of a repository and enlarging storage capacity software to contain the database. Creating the IR and encouraging academics to self-archive is seen as an ideal solution to part of the library's journal crisis. These projects were funded by JISC and additional funding was given by the Consortium of University Research Libraries (CURL).

Universities are currently burdened with high journal subscription costs and there is a need to look at new mechanisms that can overcome this problem. The creation of an IR will hopefully provide a solution. The FAIR projects were conducted to look into the creation of a repository which will enable self-archiving by academic authors. When harvested, these electronic resources will facilitate dissemination and accessibility to the scholarly community (Freeney, 1999).

Between 2002 and 2005, JISC has funded 14 projects as part of the FAIR programme which included:

- a. pilot repositories of e-prints and different types of content, such as securing a hybrid environment for research, preservation and access, and electronic theses
- b. projects with investigated cultural, legal and interoperability issues, such as metadata for open archiving (ROMEIO).

JISC's vision for digital repositories is not restricted to hosting institutional research outputs, but it extends to the need for a network of distributed repositories for primary data, research papers, learning objects and other types of both formal and informal information. Their goals help to underpin a variety of use and begin to build the infrastructure required for the future to cater for the knowledge economy and to deal with the digital data deluge (Hockx-Yu, 2006).

According to Friend and Swan (2008), the number of open access repositories is growing and they expect by the summer of 2008, more universities and research institutes will launch their own open access repositories. Users can find a list of open access repositories which is maintained by the Directory of Open Access Repositories (OpenDOAR) and also by the Eprints.org site at Southampton University.

BENEFITS OF INSTITUTIONAL REPOSITORIES

Nowadays, universities develop IR to accommodate the multidisciplinary and organizational needs of a large institution. This mechanism is increasingly deployed

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in academic institutions to cater and manage a variety of digital content especially papers published by scholars including educational, research, and archival materials. Implementing IR has benefitted many parties and it has been discussed by many authors and it has also led to increased knowledge sharing (Rieh et. al., 2007). By providing such a facility, it would provide the following benefits:

a) Increase visibility - By depositing in an IR, all the articles or research works by the academics will be freely available via the web and more accessible to a wider audience and this will increase the citation impact (Loughborough University Library, 2009). According to Madhan, Roa and Awasthi (2006), by publishing research works in IR, it will enhance the visibility of the research outputs which are locally produced. They also mention that researchers and also the institutions can benefit from the “enhanced visibility and research impact in terms of enhanced research funding and prestige”. IR is also one of the channels which can be used to showcase to the world what the university or institution has (Strakman, 2008).

Indeed, it is very useful to deposit the work of researchers into the IR. According to Johnson (2002), the writers and researchers will benefit from the online open access where it can enhance professional visibility. This visibility and awareness are driven by both broader dissemination and increased use. Besides that, the OAI Metadata Harvesting Protocol also creates the potential for a global network of cross-searchable research information. Another related benefit derived is from the increased article impact that open access articles experience compare to their offline counterparts. According to Johnson, the accuracy and appropriateness of use of an index to the documents and using the correct search method will increase the use of online documents. This will indirectly increase the citation to the article compared to the traditionally printed article. This form of visibility and awareness works well for both the individual author and the author's host institution.

b) Accessibility - By depositing in IRs, all the articles or research works are available and accessible faster compared to traditional scholarly communication methods. The quality of the materials is ensured and maintained by the traditional peer-review process. The advantage is that the articles can be accessed much faster compared to common publishing.

Because the collection in open access or repository are in digital format, this exposes the metadata of each article such as the titles, authors and other bibliographic details which are compliant with an international standard/protocol. This will make the contents of the repository easily searchable. All the content can be searched via the

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Internet using the various search engines. Open access also allows for data and content harvesting from the existing repository to be performed worldwide and globally (Friend and Swan, 2008).

IR is a very good initiative for the sharing of information amongst researchers around the world because all the materials can be accessed online. According to Starkman (2008), with IR, users throughout the world have access to a university output which can be found in a number of ways. In support of this argument, Hayes (2005) in his article also stated that the IR is an initiative that is meant to enable researchers to share information for free. He also mentioned that scholars in the world can have access to the scholarly works of other studies and this means that the IR can promote cooperation and communication between education institutions involving their research activities.

c) Easy to manage - IR has the ability to manage contents for various communities with different needs. Most IR's software have been designed to make participation easy. Communities such as faculty, department, institute and others can adopt the system to meet their individual needs and manage the submission process themselves. Most of the IR systems allow depositors to create as many collections as they wish in the system (Smith et al., 2003).

With the development of IR, it indirectly helps in the storage of documents and provides better access to the material in different formats. Storage will become easier, faster and more economical. For the university, to facilitate access by researchers and users, the documents are kept in one place only, and offers a simple way to organize and maintain documents of an academic institution that is accessible to the university and global community (Starkman, 2008).

IRs have the same advantages as other types of author self-archiving tools namely, global accessibility, increased speed of dissemination and potentially reduced subscription charges for institutions. The benefits are therefore not just for the reader, who gets better and cheaper access, or the institutions, who save on journal subscriptions, but also for the authors; better access leads to more citations, better impact and ultimately better career prospects (Allen, 2007).

CONTRIBUTION TO INSTITUTIONAL REPOSITORIES: ACADEMICS' ATTITUDE

Academics' participation and contribution to IRs is the main factor contributing to the success of IR implementation in higher educational institutions. This is a popular

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topic discussed in many higher educational institutions around the world. Previous research shows that one of the reasons why faculty members are reluctant to participate and deposit their works into an IR is because they are too busy and burdened by heavy loads in research and teaching. The other reason is that they are very concerned with copyright and intellectual property issues of their work when it is freely available via the Internet.

According to Starkman (2008), getting the faculty to participate is one of the main challenges in developing IRs since without the willingness of the faculty to contribute their work to the repositories, the IRs will be useless and the collection will never grow. The other reason why they may be reluctant to contribute in IRs is that they are afraid of the backlash from the publishers. Chan, Kwok and Yip (2005) noted that generally, most faculty members have a low awareness of open access and IR concepts. The low contribution is also because the faculty fears that submission of their research papers to IRs will attract plagiarists.

When looking at the academics' contribution in different disciplines, Jingfeng (2007) categorized the social science and humanities as a 'divergent discipline' where the research work is low in this field and the scholars may be less desirable in sharing their pre-published or post-published materials with others when compared to scholars in science and technology. Lynch (2003) noted that the reason why there is a small number of contributions from other disciplines especially those in the social sciences and the humanities when compared to the scholars in science and technology, is because they were not exposed to online information acquisition and dissemination. Many scholars in these fields are relatively unfamiliar with the self-archiving practice and are hesitant to take part in what they consider as experimental works.

Allen (2007) found that most of the current contents of United Kingdom's IRs are mostly from the science and technology. From the 25 IRs surveyed, only 19% of the documents are from the arts, humanities or social science departments. He found that only a few repositories are dominated by documents from the arts, humanities or social sciences. The larger repositories with over 200 documents, are dominated by science and technology. The research also found that there are differences in attitudes and behaviour of the academics in both disciplines in depositing their works into the repositories. However, the current trend still indicates that works deposited by the arts, humanities and social science academics are still low when compared to the academics from the science and technology discipline.

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Van Bentum et al. (2001), in a Dutch study of the attitudes towards IRs of 26 research managers and 45 authors in the sciences, social sciences, humanities, and law, emphasized the difference in attitudes between the various disciplines. As for both the social sciences and humanities, the scholars still prefer the traditional print or electronic format due to more stringent quality control mechanisms compared to scholars in science and technology. However, they acknowledged that for certain types of publication such as congress papers, it would be more appropriate to self-archive.

In his study conducted at the University of Brescia in Italy among social scientists, Pelizzari (2004) noted that although 56% claimed never to have heard about open access publishing, the same number had published documents, especially teaching materials, on the web, for example on a departmental website. From his study, he found that 19.4% participants would self-archive their documents, 46.8% wished for adequate support before doing so and 17.7% stated that they would require more information before making a decision. Most of the 16.1% who were unwilling to self-archive did not say so because they did not like the idea of self-archiving, but rather thought that somebody else, such as their department's or faculty's technical or administrative support personnel, should perform this task for them.

OTHER RELATED ISSUES IN INSTITUTIONAL REPOSITORIES

Digital preservation is on the list of issues facing most of IR developers and administrators. Jones and Beagrie (2002) defined digital preservation as a series of managed activities necessary to ensure continued access to digital materials for as long as necessary. The challenge for digital preservation is not just the volume of data but it is also related to the hardware and software used to store and access digital information that are constantly upgraded and obsolete. Technology obsolescence is the challenge that needs to be given more attention by developers to ensure continued access to digital materials.

According to Hockx-Yu (2006), a few IRs have encountered problems with long-term access or experienced an unmanageably large volume of content. In addition, there is little consensus on the extent to which IRs should be responsible for preservation. Hockx-Yu mentioned that the arguments with regards to the purpose of these open access IRs are chiefly access, usage and impact, while preservation of institutions' published journal articles should be undertaken by legal deposit libraries and publishers.

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The current experience with IRs is that a significant cultural change is required for researchers to deposit materials. In a survey conducted by the JISC Rights and Rewards in Blended Institutional Repositories, they found that the ability of the IRs to preserve digital content is the main reason why participants contribute teaching materials to the IRs (Joint Information Systems Committee, 2004). Hirtle (2000) reported that trust becomes one of the issues related to IRs since depositing intellectual assets into IRs requires that everyone are able to trust the ability of the IRs to keep the information on a long term basis. This has become a significant barrier for IRs and has increased the complexity of digital preservation.

Another challenge faced by the IRs is to maintain the balance between ease of deposit and the need for preservation. James et al (2003) stated that a study commissioned by the JISC found that the costs and risks associated with digital preservation will grow when a digital collection includes a large number of diverse file formats. However, this will not become a barrier that will prevent researchers from depositing their works in the repository. To facilitate the contributors, most repositories will accept formats other than those preferred to perform format migration for archival and preservation purpose (Joint Information Systems Committee, 2004).

RECOMMENDATIONS

In ensuring that the IRs will continue to grow and used by academics, the following steps should be taken:

- a) Promotional activities – The university should consider conducting intensive promotion to ensure the success of the IR. In most of the higher educational institutions, the IR is developed and maintained by the library. Hence, the library should work hand-in-hand with the university administrators and get their full support. The library should publicise and employ a variety of methods to promote the IR to the faculty's head of department, centre directors, academics, researchers and students. The library should maintain a promotional website and also publish articles on the latest development on IR through the university's newsletters, pamphlets, and faculty bulletin boards.
- b). Liaison librarian - Another strategy that should be implemented is a liaison system where a librarian or a student assistant or an academic staff is assigned to work with the faculty to collect and deposit articles on behalf of the faculty. This will enable the academics to focus on research and teaching rather than depositing articles in the IR. According to Ashworth (2004), the library at the University of

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Glasgow is doing a service for their faculty members by managing the submission process from metadata entry and file conversion to uploading documents.

c) Depositing services - Self-filing does not require much time once authors are familiar with the process. However, a significant barrier to self-perceived filing is the time required and technical difficulties encountered. To overcome this problem, it is proposed that the IR management or library generally introduce services such as “Mediated Deposit Service” to help the depositors. This service allows depositors to send their content via email to the libraries and the next step will be done by library staffs who have been dedicated to deposit content into the IR. This will encourage academics to contribute their research materials into the IR as it saves their time. Library staff may also undertake file formatting and conversion as many academics do not have the software to convert a word-processed file to a PDF which is one of the preferred depositing formats.

d) Content harvesting - To ensure the development of content in the IR, the administrator cannot expect the depositors to send their content. The library and IR administrator should take a more proactive approach to discover and harvest materials for IR research. They should:

- i. Visit faculty members’ personal and departmental website as well as the websites of the research centers and institutes on campus to harvest full-text research papers and publications posted on the web
- ii. Survey academic departments to harvest collections of working papers, conference papers, technical reports and other publications
- iii. Search electronic databases and open access sources to identify papers published by the academics and researchers
- iv. Contact individual faculty members to ask for their complete publications lists and their full-text documents
- v. If the electronic version is unavailable, the paper document should be digitized

e) Intellectual property issues - Most depositors are tied with the publishers policies which does not allow them to deposit their work into other mediums such as open access. To overcome this problem, the library staff can encourage authors to negotiate with publishers to retain the right to publish their materials in open access repositories as well as in scholarly journals.

g) Implementation of the mandate policy - This will require all faculty members to deposit their publications with which they are affiliated to. Numerous surveys found

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that most faculty members are willing to cooperate with the mandate policy if it is implemented in the institution (Jingfeng, 2007). However, in implementing this policy, it must obtain approval from the university's senior management. If approved, it will indirectly require academics and researchers in universities to contribute to the IR. This will indirectly increase the use of IR and increase visibility of the university at the international level.

h) Conspicuous link - Apart from the recommendations that are discussed above, less attention is given to establish links to the IR. Although the library is responsible in developing and managing the IR, the links to the IR should not be placed on the library's website only. Links to the IR should also be placed on major websites which are frequently visited by researchers and users. Indirectly, the IR will be one of the ways to promote and facilitate users to find it.

CONCLUSION

In conclusion, it can be said that an IR is very useful to higher educational institutions as a means to promote and share the results of research and writings of academics and researchers. However, not all that one designs can achieve success. There are various obstacles and challenges as discussed above that require action and attention so as to produce a product that is beneficial to all parties.

REFERENCES

- Allen, J. 2007. *Interdisciplinary differences in attitudes towards deposit in institutional repositories*. Accessed on 20 April 2009 from: <http://eprints.rclis.org/5180/1/FULLTEXT.pdf>
- Chan, D.L.H., C.S.Y. Kwok and S.K.F. Yip. 2005. *Changing roles of reference librarians: the case of the HKUST institutional repository*. Vol. 33, no. 3, 268-282. Accessed on 20 April 2009 from: <http://www.emeraldinsight.com/0090-7324.htm>
- Crow, R. 2002. The case for institutional repositories: a SPARC position paper. *ARL*, 223. August 2002. Accessed on 15 April 2009 from: <http://old.arl.org/newsltr/223/instrepo.html>
- Feeney, M. 1999. Towards a national strategy for archiving digital materials. *Alexandria*. Vol.11, no. 2.

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- Friend, F. and A. Swan. 2008. *Publishing research papers: which policy will deliver best value for your university?* Accessed on 20 April 2009 from: http://www.jisc.ac.uk/publications/briefingpapers/2010/publishingresearchpaper_sbpv1.aspx#download
- Gadd, E.; C. Oppenheim and S. Proberts. 2003. The impact of copyright ownership on academic author self-archiving. *Journal of Documentation*. Vol. 59, no. 3 : 243-277. Accessed on 20 April 2009 from: <http://www.lboro.ac.uk/departments/ls/disresearch/romeo/RoMEO%20Studies%201.pdf>
- Hayes, H. 2005. Digital Repositories: Helping universities and colleges. *JISC*. Accessed on 22 April 2009 from: http://www.jisc.ac.uk/uploaded_documents/HE_repositories_briefing_paper_2005.pdf
- Hirtle, P. 2000. Archival authenticity in a digital age. Accessed on 23 April 2009 from: <http://www.clir.org/pubs/reports/pub92/pub92.pdf>
- Hockx-Yu, H. 2006. *Digital preservation in the context of institutional repositories*. Vol. 40, no. 3, 232-243. Accessed on 20 April 2009 from: <http://www.emereldinsight.com/0033-0337.htm>
- Jingfeng, X. 2007. Assessment of self-archiving in institutional repositories: across disciplines. *Journal of Academic Librarianship*. Vol. 33, no. 6, 647-654. Accessed on 20 April 2009 from: <http://www.sciencedirect.com>
- James, H. 2003. *Feasibility and requirements study on preservation of e-prints*. Accessed on 24 April 2009 from: http://www.jisc.ac.uk/index.cfm?name=project_eprints_pres
- Johnson, R.K. 2002. Institutional repositories: partnering with faculty to enhance scholarly communication . *D-Lib Magazine*, Vol. 8, no. 11. Retrieved on 20 April 2009 from: <http://www.dlib.org/dlib/november02/johnson/11johnson.html>
- Jones, M. and N. Beagrie. 2002. *Preservation management of digital materials: a handbook digital preservation coalition*. Accessed on 20 April 2009 from: <http://www.dpconline.org/advice/digital-preservation-handbook.html>

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in Higher Educational Institutions***

- Joint Information Systems Committee. 2004. *JISC circular 4/04: call for projects in supporting institutional digital preservation and assets management*. Accessed on 18 April 2009 from:
http://www.jisc.ac.uk/index.cfm?name=funding_circular4_04
- Joint Information Systems Committee. 2005. *Digital repositories: helping universities and colleges*. Accessed on 20 April 2009 from:
http://www.jisc.ac.uk/uploaded_documents/HE_repositories_briefing_paper_2005.pdf
- Loughborough University Library. 2009. *Institutional repository at Loughborough University*. Accessed on 20 April 2009 from:
<http://www.lboro.ac.uk/library/resources/InstitutionalRepository.html>
- Lynch, C.A. 2003. Institutional repositories: essential infrastructure for scholarship in the digital age. *ARL*, Vol. 6, 1-7. Accessed on 20 April 2009 from:
http://scholarship.utm.edu/21/1/Lynch,_IRs.pdf
- Madhan, M.; Y.S. Rao and S. Awasthi. 2006. Institutional Repository Enhances Visibility and Prestige of the Institute: the case of National Institute of Technology, Rourkela. Paper presented in the National Conference on Information Management in Digital Libraries, Indian Institute of Technology, Kharagpur, August 2-4, 2006. Accessed on 20 April 2009 from:
<http://dspace.nitrkl.ac.in:8080/dspace/bitstream/2080/310/1/madhan1.pdf>
- Research Councils UK. 2005. *RCUK position statement on access to research outputs*. Accessed on 20 April 2009 from:
<http://www.rcuk.ac.uk/access/statement.pdf>
- Rieh, S.Y. et al. 2007. Census of Institutional Repositories in the U.S.: A comparison across institutions at different stages of IR development. *D-Lib Magazine*, Vol. 13, no. 11/12. Accessed on 20 April 2009 from:
<http://www.dlib.org/dlib/november07/rieh/11rieh.html>
- Pelizzari, E. 2003. *Academic staff use, perception and expectations about open access archives: a survey of social science sector at Brescia University*. Accessed on 20 April 2009 from: <http://eprints.rclis.org/archive/00000737>

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Smith, M. et al. 2003. DSpace An Open Source Dynamic Digital Repository. *D-Lib Magazine*, Vol. 19, no. 1. Accessed on 20 April 2009 from:
<http://www.dlib.org/dlib/january03/smith/01smith.html>

Starkman, A. 2008. Institutional repositories: benefits and challenges for libraries. *Open and Libraries Class Journal*. Vol. 1, no. 1, 1-10. Accessed on 20 April 2009 from:
<http://infosherpas.com/ojs/index.php/openandlibraries/article/viewFile/5/10>

Van Bentum, M. et. al. 2001. Reclaiming academic output through university archive servers. *New Review of Information Networking*. Vol. 7. 251-264. Accessed on 20 April 2009 from:
http://drcwww.kub.nl/~roes/articles/arno_art.htm