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TAKING THE eSCHOLARSHIP INITIATIVE

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ABSTRACT

Around the world there is growing interest in promoting 'eScholarship' and in achieving open access to scholarly publishing in the sciences, social sciences and humanities. The open access movement challenges the traditional scholarly publishing model that has been in place for hundreds of years. What are the factors that will make eScholarship succeed or fail at the international, national and institutional level? This paper provides an overview of major national and international eScholarship initiatives and identifies and examines critical success factors in the context of a 'total systems' or 'ecological' approach to information management. These factors are then explored from a practical perspective, using the Macquarie University Library's experience with introducing ideas and projects at the local, institutional level – how we are "taking the eScholarship initiative".

1. What is eScholarship?

The California Digital Library (2004) defines eScholarship as “the use of innovative technology to improve, in a financially sustainable way, all areas of scholarly communication, including its creation, peer review, management, dissemination and preservation”. Around the world eScholarship includes a broad range of activities such as electronic publication of monographs and journals, redefinition of scholars’ intellectual property, creation and exposure of open access repositories of scholarly output, digitising of materials created in other formats, preservation of electronic publications, and the archiving and management of large research data sets.

In this paper I cite many websites and papers that describe in detail the evolution and current activities of the eScholarship movement, both nationally and internationally. With assistance from this and other papers at the conference it is relatively easy to find out ***what*** is going on in eScholarship. It is a little more difficult to translate this activity to a local institutional context in terms of two other fundamental questions surrounding eScholarship – ***why*** it is important and ***how*** one goes about implementing it. The purpose of this paper is to explore the “what”, the “why” and the “how” of eScholarship in the context of a medium-sized Australian research university.

2. Why eScholarship?

At its heart, eScholarship is concerned with improving access to the processes and outcomes of scholarly research. At the broad political and social level, the World Summit on the Information Society (2003) has included open access to information in all its forms as fundamental to the creation of an effective information society. It is easy to see why the electronic information domain is so important to this agenda. In 2004 it was estimated that there were already 750 million Internet users worldwide – this is expected to grow to over 1 billion by 2006, with more than 7 million new web pages created every day (Internet Coverage Report, 2004). However, the world population is currently estimated at 6.4 billion, so we are a very long way from universal access.

In the scientific research arena, the OECD Committee for Scientific and Technological Policy at Ministerial Level released a final communiqué in January 2004, which encouraged national and international coordination of provision of increased access to data from publicly funded research (OECD, 2004). In Australia, the Minister for Education, Science and Training appointed an Australian Research Information Infrastructure Committee (ARIIC) in August 2003 to advise the government on research information issues. The goals of this Committee are to improve the access of Australian researchers to the information they need to carry out their research and to make the results of Australian research widely available and easily accessible (Department of Education, Science and Training, 2003). This work is part of a larger government focus on improving the quality and impact of Australian, publicly-funded research (DEST, 2004).

Why aren’t the results of national and international research widely available? Don’t researchers publish their findings in journals and academic monographs? The OECD (2004) communiqué highlights two tensions inherent in promoting open access to publications – commercialisation of research outcomes and the protection of copyright. Equally, there are problems with providing open access to research data. This data has not typically been accessible outside the research team, there are often no requirements to archive it for future use, and there can be similar tensions with its value in the commercialisation process.

Why is access becoming such an important issue in research? One view is that the traditional scholarly publishing mode, used for hundreds of years to communicate research findings, is in crisis, is breaking down, and should be reformed. In this “old” model the scholar writes an article or monograph, submits it to a publisher who organises a peer review or editorial process and publishes the content in exchange for the author assigning copyright. The published content is then purchased back by libraries from publishers in the form of subscriptions, purchases or licenses for use. In the print version of this model, a member of the public is able to walk into a library and access the published material, with little restriction. In the electronic model, this freedom of access is becoming less common because of licensing restrictions. Halbert (1998) lists the other main manifestations of this ‘crisis’ in scholarly publishing as:

- Problems with access to the journal literature because of rapid cost escalation, exponential proliferation of titles (the ‘publish or perish’ syndrome) and the declining budgets of university libraries
- Increasing barriers to publishing research monographs, including shrinking library budgets and publishing decisions dictated by marketability rather than academic value
- Forfeiting of intellectual property rights by scholars to publishers, which then prevents the open sharing of this material.

In the proposed, new “Open Access” publishing model the reader is freed from both the price barriers to access (subscription cost, licensing fee, pay-per-view) and the permission barriers (most restrictions on copyright and licensing) (Suber, 2004, Overview). The basic premise is that, since the author usually gives this material to the world *without expectation of payment*, then users should not have to pay to read it. In almost all cases, however, the author does at least have an *expectation of recognition and reward* associated with the act of publishing. In universities around the world published output “counts” for both promotion and for research funding. Scholars are reluctant to make their content available for free if this output will not be “counted” officially unless it is published formally in the “old way”. Where the author does have an expectation of royalty payments, for example, from the publication of a scholarly monograph, the access problem can become “getting published”, because the monograph may have very limited market demand.

A different set of access problems emerges from an examination of changing research practices. Houghton (2003, p2) identifies the emergence of a new mode of knowledge production (Mode 2) which is characterised by “increasing diversity in the location of research activities; an increasing focus on interdisciplinary, multidisciplinary and transdisciplinary research; an increasing focus on problems rather than techniques; greater emphasis on collaborative work and communication; and greater emphasis on more diverse and informal modes of communication”. In contrast, traditional Mode 1 research is discipline-based, homogeneous, hierarchical and reliant on formal scholarly communication. Collaborations in Mode 2 research often involve universities, industry and government bodies and are reflected in the published literature by the rising number of co-authored papers. Mode 2 researchers demand access to and need to share data and published materials as both inputs and outputs of the research process. Interpretation of data and results is socially accountable and reflexive. Access to data and information needs to be worldwide, real time. This is particularly important for research in Australia because most of the large-scale scientific instruments are located on other continents.

In a world of increased open access, the focus for libraries and data archives shifts from managing scarcity of physical resources to managing overload of electronic resources – from managing static, predominantly textual information to managing dynamic, linked content in all formats – and from managing only single researcher’s needs to managing the needs of collaborative, cross-sectoral, virtual teams.

3. What is happening in eScholarship?

Clearly we need strategies at the international, national, collaborative and local levels to improve access to scholarship and research. Some international and national commitments in principle have been described above, but what are the practical strategies that are being used to progress the access agenda for each of the activities that form part of eScholarship?

Electronic publication of monographs and journals

Around the world there is growing interest in the establishment of electronic university presses. For examples, see the Berkeley Electronic Press in the US http://www.bepress.com/index.html and the Linköping University Electronic Press in Sweden http://www.ida.liu.se/~erisa/publication/luep.html. There are already Australian implementations of an "ePress" producing both monographs and journals – examples can be found at Monash, Australian National University (ANU), University of Sydney, University of Technology, Sydney and the University of Melbourne. Macquarie University has editorial links with a number of electronic journals and has recently registered its first multimedia Open Access Journal – *SCAN: Journal of Media Arts Culture* http://scan.net.au/ with the *Directory of Open Access Journals* http://www.doaj.org/.

Redefinition of scholars' intellectual property

The major international initiative in this area is the creation of the Creative Commons licence. Australia, through the efforts of Queensland University of Technology (QUT), is one of 21 countries around the world so far to explore the application of the Creative Commons to the flexible management of scholar's copyright http://creativecommons.org/worldwide/au/. The use of such licences may become even more important with the introduction of the US/Australia Free Trade Agreement in early 2005. At Macquarie we are beginning work with our Copyright Committee to draft a new copyright policy which will provide advice on *both creation and use* of copyright materials.

Creation and exposure of open access repositories of scholarly output

The case for the creation of institutional repositories has been made by many authors, for example Crow (2002) and Lynch (2003). There are many significant international initiatives that have been using open source software such as EPrints, DSpace and Fedora to create institutional repositories. In the UK these can be found as part of the Joint Information Systems Committee (JISC) Focus on Access to Institutional Resources (FAIR) Programme as documented at http://www.jisc.ac.uk/index.cfm?name=programme_fair and in Day (2003) and in the Netherlands in the Digital Academic Repositories Project (DARE) http://www.surf.nl/en/themas/index2.php?oid=7. In the US there are also many initiatives, including the University of California Libraries http://libraries.universityofcalifornia.edu/scholarly/sco/SCOprog_and_priorities.pdf
In Australia there are two DEST- funded collaborative repository projects: Australian Research Repositories Online to the World (ARROW) http://arrow.edu.au and Australian Partnership for Sustainable Repositories (APSR) http://www.apsr.edu.au – both of which feature in the program for this conference. There are also existing ePrints repositories at the Universities of Queensland, Melbourne and Tasmania, QUT, Curtin and ANU. An overview of some of these activities can be found in Steele (2004).

To improve exposure of Australian repository content, the National Library of Australia is working with the ARROW project to develop and test national resource discovery services using metadata harvested from the institutional repositories, and the exposing of metadata to provide services via protocols and toolkits. Repositories able to expose the metadata for their content using the Open Archives Initiative-Protocol for Metadata Harvesting (OAI-PMH) can then be searched using OAIster, the search engine developed by the University of Michigan (http://oaister.umdl.umich.edu/o/oaister/dataproviders.html).

OAIster has signed an agreement with Yahoo! for use of this metadata and has tried to influence Google to consider including it in their search engine. It will be interesting to watch the development of the Google Scholar service (http://scholar.google.com/) in this context. At Macquarie we have begun work on the business case for an institutional repository.

Digitising of materials created in other formats

Large numbers of libraries and archives worldwide are actively creating digitised resources. There are many useful international website links, such as http://www.diglib.org, http://www.jisc.ac.uk/index.cfm?name=programme_digitisation. In Australia there are some notable collaborative digitisation projects, such as the Australian Digital Theses Project (also ARIIC funded) and PictureAustralia, co-ordinated by the National Library of Australia. There are local digitisation projects at the National and State Libraries and at individual universities such as Griffith, ANU and Sydney. At Macquarie we have recently been granted funds to begin the digitisation of rare resources in the Brunner Collection of Egyptological resources, to assist in both teaching and research.

Preservation of electronic publications

Miller (2004) highlights the need for long-term preservation of electronic publications to provide future access. National libraries around the world are active in all aspects of the preservation of electronic publications (see, for example, the National Library of the Netherlands, http://www.kb.nl/dnp/e-depot/e-depot-en.html, Library of Congress, http://www.loc.gov/preserv/digital/dp-research.html and Library and Archives Canada http://www.collectionscanada.ca/preservation/1301_e.html). In the Netherlands, the National Library is also involved in the DARE project (see above) and in the UK there are collaborative projects between the universities and the British Library to preserve the content of repositories (http://www.jisc.ac.uk/index.cfm?name=programme_preservation). In Australia, the National Library of Australia has taken a lead role in the development of the PANDORA system http://pandora.nla.gov.au/about.html for archiving online publications and is a member of the International Internet Preservation Consortium http://netpreserve.org/about/index.php. In the APSR repository project, the National Library will have a leading role in scoping and providing advisory services relating to digital continuity through long-term preservation and collection management strategies. At Macquarie we believe that a collaborative national and international approach to preservation of electronic publications is the only sustainable way forward.

Archiving and management of large research data sets

In their detailed overview of UK e-Science programs Hey and Trefethen (2002) identify the sharing of research data and the long term curation and preservation of these datasets with their metadata annotations as critical to the success of collaborative, large scale research. Discovery and use of these datasets is still a difficult and fragmented task in most countries. In Australia there are some well known collections such as Geosciences Australia www.agso.gov.au and the Australian Genome Research Facility www.agrf.org.au, but there is no systematic, coordinated approach to the collection and curation of research data sets. At Macquarie, as in most universities, the majority of research data sets are stored on the local PC hard drives of individual researchers.

4. How do we take the eScholarship initiative?

Section 3 of this paper shows there is no shortage of activity in support of eScholarship. At their core, these activities are concerned with new ways to create, share, manage and leverage information assets in digital form. What is not yet clear is whether eScholarship activities will be successful and sustainable in the longer term. There are certainly many technological challenges to be overcome on the journey, including the development and use of cost-effective digital object repositories. These challenges are explored in more detail in other papers at this conference and I will not deal with them here. However, much of the current literature on eScholarship suggests that the major barriers to implementation and success of these initiatives are political and cultural, rather than technological - for examples, see Mackie (2004), McLean (2004) and Ware (2004). It is clearly *not* a case of “build it, and they will come”.

These problems reminded me of the issues raised in Davenport and Prusak’s (1997) book that introduced the notion of an “ecological approach” to managing the information environment and explained why “technology is not enough for success in the information age”. Davenport and Prusak depict an “information ecology” as comprised of strategy, politics, behaviour and culture, staff, processes, and the technical architecture, all in an organisational and wider environmental context. Would taking this “information ecology” view help to identify critical issues and provide practical assistance for the formulation of local implementation strategies to support eScholarship?

Wider environmental context

Section 2 of this paper highlights some of the tensions evident in the wider environment. Halbert (1998) suggests that a crisis point can arise “when expectations of stakeholders are disrupted and ordinarily balanced tensions are thrown out of equilibrium.” How strong are these tensions? Firstly, there is growing international and national interest in promoting and exposing results of publicly funded research for free. Equally, however, there is interest in commercialising the results of research and innovation to grow national economies. There is a companion shift in emphasis in many disciplines from individual, Mode 1 research to collaborative, problem-based Mode 2 research, supported and reinforced by government research funding criteria. There is often lively competition between discipline areas for funding and perceptions of a bias in funding for science and technology-based disciplines.

Scholarly information is both an input and an output in the research process.
Halbert (1998) indicates that the key tension here arises from academics regarding published output as “cultural capital”, as opposed to commercial publishers who regard it as “economic capital”. Proponents of the Open Access publishing model believe that this model allows both views to co-exist. The technical and financial sustainability of variants of this new model are yet to be proven – payment needs to be made at some stage of the publishing cycle.

Halbert describes the role of libraries as facilitating the development and maintenance of the infrastructures that support access to “communal collections of knowledge”. Can these “communal collections” be reinvented to support new forms of scholarly communication and community? In a world of electronic communication, what does “publishing” mean?

Organisational context

“A university is a group of buildings that have agreed to share a letterhead.”
This statement recognises the high level of autonomy of individual scholars. The core context for scholarly activity is the discipline community or the research team. The university or institutional context provides support infrastructure and facilitates recognition and reward for these activities. In a decentralised, user-centred culture, who is responsible for publishing, for sharing and managing resources, and for managing workflow? Who owns the intellectual property? Are highly centralised support infrastructures to support eScholarship likely to be successful? Or will “peer to peer” repositories be the answer? Why would a scholar want to archive their publications in an institutional context?

The move to Mode 2 research also challenges the notion of the institution as the sole “organisation.” Terms such as “virtual organisation”, “enterprise” and “federation” are now being used to describe some of these more fluid groupings that may come together at different times to support research in different ways.

Politics
"Information is not innocent." Davenport and Prusak (1997, p67) use this quote from James March to reinforce the importance of understanding power and politics as essential parts of an "information ecology". They explore different governance models for organisations along a continuum of control, ranging from monarchy to anarchy. The point on this continuum that best describes most universities is "federalism", where there is a high level of local autonomy and relatively weak centralised control. This tension between centralised allocation of funds and scholarly autonomy suggests that participative approaches to change are generally more likely to succeed than imposed ones. The exception to this is external influence on recognition and reward systems, such as the methods used to "count" publications. Academic "power" can also be affected by whether the scholar is an "emerging" or "established" researcher. The tension here is a generational one – recognition and legitimation of new forms of research output and "publication" may be resisted by those who have been used to more traditional systems. What is the incentive for scholars to publish electronically, except as a by-product of the traditional process?

Strategy
In their discussion of information strategy, Davenport and Prusak are unequivocal on four things:

- the true value of a strategy lies in the communication, debate and consensus that produces it
- an information strategy starts with an information map
- an ecological approach requires that you do many things at once
- enduring changes are changes in behaviour.

Behaviour and culture
"We are far from fully rational and exhaustive in our acquisition and use of information" (Davenport and Prusak, p100) If this is the case, what do we really know about how our scholars and researchers approach and handle information? Davenport and Prusak suggest there are some critical types of behaviour that encourage better use of information:

- sharing - voluntarily and horizontally across functions
- handling overload - providing tools to assist in personal information management and to facilitate the workflow of groups
- reducing ambiguity - dealing with multiple meanings of the same word in the organisation.

Informal sharing works well in discipline-based communities. However, broader sharing is impacted by politics and the tensions in the wider environment. Much work is still needed to develop improved tools for personal and group information management. Agreeing meaning is an issue within and across disciplines as well as within and across organisations.

Staff and processes
"Systems personnel and researchers have been looking at something *they* call information, rather than something that *users* call information". Davenport and Prusak (1997, p108) quote Brenda Dervin to highlight where they believe traditional libraries have failed in supporting a company's "information ecology":

- libraries are passive repositories of knowledge – information does not go out until a user asks for it
- libraries focus more on preservation than access

- libraries don't create or improve information – they store and organise it
- the library model typically assumes a physical repository.

While many librarians would take issue with these statements in 2005 it is useful to look at the emphasis they place on the role of "information staff" being primarily to "make information meaningful", or to add value to it. Davenport and Prusak propose that the value of information is determined by its:

- accuracy (version control)
- timeliness (time to publication)
- accessibility (reduction in time and difficulty to obtain; cognitively understandable in structure and format)
- engagement (getting it noticed)
- applicability (in a form that can be directly used; rich in contextual cues);
- rarity (how unique? This may place a premium on internally created information)

and that the key tasks to be performed by information staff to add this value are information pruning; adding context to information; enhancing the style of information; and choosing the right medium for the information. Information pruning also assists with the management of information overload.

Are the key roles for an academic library to support eScholarship also contained in some of these values and tasks?

5. Critical success factors and strategies for eScholarship

In summary, what does the "information ecology" approach suggest will be some critical success factors and strategies for implementing eScholarship initiatives?

Congruence with wider environment

- understand the changes, tensions and "discontinuities" in the research process and in commercial publishing
- work with the "key players" in the environment, not against them
- collaborate and leverage emerging best practice
- change focus from managing scarcity to managing information overload for individuals and groups

Congruence with organisational context

- use a participative approach focused on outcomes
- focus on scholars and researchers and understand how they gather, use and share information now
- look at differences in behaviours of different "generations" of researchers
- build in appropriate recognition and reward systems to reinforce change
- recognise that the most traditional forms of scholarly output might be the last to change

Agreed information strategy

- create opportunities for ongoing discussion of the issues
- develop a guide or map to the present information environment
- include diverse types of information in all formats
- understand what makes existing information sources valuable
- understand the skills and competencies needed by information staff to deliver this value
- define the "return on investment" or business case for your organisation

Agreed implementation strategy

- work on a number of fronts at once
- find a champion in senior management
- find some "early adopters"

- take a facilitative approach, not an “empire-building” approach
- take an evolutionary approach - avoid excessive structures or methodologies

6. The Macquarie eScholarship Initiative

How are we using these critical success factors and suggested strategies at Macquarie University?

Congruence with wider environment

At Macquarie, we are actively monitoring and participating in the process for the writing of research grants and the DEST-sponsored discussion on the Research Quality Framework. We are interested in working with commercial publishers to see what synergies there may be in the wider exposure of Macquarie’s research. For example, a Google Scholar search of the Macquarie Internet domain yields some 700 items, of which 500 appear to be published research articles. However, a search for Macquarie-affiliated researchers listed in *Web of Science* in the last 12 years alone yields 3,400 hits. By working together with publishers, at the metadata level at least, is there a way in which we could rewrite one of Google Scholar’s FAQ’s to eliminate the question – “why can’t I find all my papers in a Google Scholar search”?

We are monitoring best practice in eScholarship initiatives as these emerge nationally and internationally and are actively pursuing collaborative opportunities. The paper by Jenny Bremner and Nishen Naidoo at this conference explores some of the ways we are attempting to target and “chunk” our online information delivery to help staff and students to overcome “information overload”.

Congruence with organisational context

At a formal level we are working with the Higher Degree Research Committee and the Research Office to develop and fine-tune procedures for the deposit of theses in electronic form for submission to ADT, the Australian Digital Theses Project. This process has uncovered the tension between greater exposure of research output versus potential commercial opportunities.

We will use the process of drafting a new copyright policy (mentioned above) to observe how different generations and communities of scholars and researchers gather, use and share information now. We suspect that a compelling business case for institutional repositories will only be made if there are some real incentives for scholars to use them at the local and national level.

Agreed information strategy

We are creating formal and informal venues for discussion of eScholarship issues using our links with the Library Committee, the Copyright Committee, the Academic Senate, the Vice-Chancellor’s Management Committee and meetings within each academic Division. In 2005-06 I will be responsible for producing an Information Management Plan as part of the University’s ICT Strategic Plan (the Macquarie Information Management Initiative). My first deliverable will need to be a map of the current information management environment!

We have incorporated eScholarship issues in the Library’s 2005-2006 Strategic Plan. We are renewing our organisational structure over the next two years to help develop the required skills for “information staff” (see the paper by Jennifer Peasley and Janet Fletcher at this conference). We are beginning to explore the issue of “return on investment” by writing a business case for an institutional repository, exploring some of the attributes that make information valuable. One example of this is our successful bid for internal funds to digitise some of the rare and valuable materials contained in the Brunner Collection of Egyptological Resources.

Agreed implementation strategy
While we should "work on all fronts at once" we also need to begin in areas where we will get early runs on the board and involve interested researchers. At Macquarie we already have interest and some "early adopters" from a number of areas, e.g. media (electronic publishing); music (Creative Commons licences); education (images); and Equal Opportunity (grey literature management). We may have more than one member of our Executive interested in these issues if we can deliver some improvements in the processes that support academic promotion and research reporting and dissemination.

We will try to heed Davenport and Prusak's advice to take a facilitative, participative and evolutionary approach focused on outcomes – one which avoids the perennial library trap of "perfectionism" – as Robert Schuller said, it is "better to do something imperfectly than to do nothing flawlessly". We will use the experience we gain in applying these strategies to help us understand and support the changing nature of scholarly communication and publishing in a national and international context.

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(All URLs quoted in this paper correct as of January 2005)

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