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Overview of Open Access and Innovation

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Presentation at the SALALM Panel (April 30, 2007) on “Opening Doors to Research Information: Institutional Repositories and the Open Access Movement”

Open access repositories are springing up globally at academic institutions, allowing staff and students to share research findings effectively. There are many flavors of Institutional Repositories (IRs) and many options for building support and recruiting content. Existing content in IRs are sometimes available through an internet search facility or from secondary service providers through harvesting and subject portals. A parallel movement is based on mandating open access to funded research that will stipulate when and how such research needs to be made freely available.

Latin America provides excellent examples that illustrate the challenges and great opportunities ahead. Pioneering work continues to be done by the *Instituto Brasileiro de Informação em Ciência e Tecnologia* (Brazilian Institute of Science & Technology Information; IBICT). They lead a process in Brazil that resulted in a *Brazilian Manifest in Support of Open Access to Scientific Information* that was launched in September 2005. In the introduction it states: “The intention of this document is to inform and mobilize the scientific community and Brazilian society as a whole to the need for global and democratic access to science and technology information as an essential condition for the economic and social development of the country.” An English translation was done at the University of New Mexico and will soon be available in our Institutional Repository. In 2006 IBICT organized two international symposia; one focused completely on “Research, Publication and Open Access to Scientific Production, Archiving, and Dissemination of Knowledge” (22-25 August, 2006 in Brasília , Brazil). A detailed report on this can be found at <http://hdl.handle.net/1928/1891> . Other examples from Latin America include the hundreds of universities with open access repositories of theses.

Is open access making a difference in the evolution of publishing?

I will postulate a theory of open access together with pervasive connectedness as an example of a complex adaptive system created by Internet-based scholarly publishing. I see this underlying concept as one the drivers for change in the current publishing conundrum. I will be drawing heavily from a recently published article in the Brazilian information science journal, *Ciência da Informação* (van Reenen, 2006) available online at: <http://www.ibict.br/cienciadainformacao/viewarticle.php?id=924>

First let us explore the nature of trends. Can we even distinguish between trends and fads? If so, we certainly want to take trends seriously when planning strategic initiatives. To understand how open access has progressed we need to answer some legitimate questions raised by researchers and librarians:

What is the rationale for open access? Is there a viable financial model(s) for open access publishing? Is the Open Access Movement global and credible?

Fads tend to come and go, and may resurface years later but in the same guise without any improvement, Bungee Jumping and Lava Lamps are good examples of fads. To illustrate the evolution of a trend, let's look at how "Bobbed Hair" changed the work place and employment opportunities for women. Briefly, Connie Willis (1996) in a novel described how for 4000 years women were expected to wear their hair long, social pressure, especially in the west, was strong to maintain this habit. Sermons were even preached in England against short hair. Then the 1st World War required female workers, which in turn required them to cut their hair shorter for convenience and safety. After WW I however society expected them to return to long hair, thus short hair did not take in 1918 but re-emerged in 1921 once women understood that they have a choice a person working for themselves. By 1925 all graduation pictures and advertisements showed bobbed hair; hairpin companies started going out of business overnight, and hat-makers and hairdressers boomed.

The lesson from this is that when habits and expectations change due to an external force the results can be suppressed for a while but the experience of convenience, ease-of-use, and affordability will resurface commercial and societal change based on this. Thus we should not be surprised at the fits and starts of getting the open access movement to affect drastic change in scholarly communication.

Open access is a strong trend but even these processes are not "free". Nothing is actually free only more accessible and affordable. JISC, the *Joint Information Systems Committee* (www.jisc.ac.uk/) has developed a support system for starting open access initiatives and Willinsky (2006) provides "The 10 flavors of open access and their economic models" (Appendix A in his book).

There is much more to do

There is much more to do before we can answer the question: When lots of academic information is affordably accessible – how would it change the world? How would it change the way scholars work?

However, we can begin to see firm trends and can speculate based on the diffusion of past innovations.

The next important steps in ensuring the role of IRs include:

- **Monitor research developments in Repositories**
 - **Especially the cross-repository interoperability layer**
- **Develop more services that add value. This will in turn impact:**
 - **Innovation**
 - **Ways of working**
 - **Citation and evaluation systems**
- **Quality Assessment, esp. of metadata and productivity**

- **More local and national policies** (especially the current *Federal Research Public Access Act* before the US Congress - see FAQ at <http://www.arl.org/sparc/advocacy/frpaa/index.html>)
- **Implementation and compliance systems for the above**
- **Sustainability and Preservation**

At the University of New Mexico we have merely scratched the surface of what could be done, even so, the UNM Institutional Repository already houses:

- Meetings and proceeding. For instance we host the minutes of the University's Board of Regents which they are required to make public
- Whitepapers, opinion pieces, grant preparation work. The latter is important as these ideas have merit and can stimulate other work even if a grant is not funded. It may also lead to new partners for resubmission of such a grant
- Local journal or other publication series. For instance, a professor in the Department of Economics at UNM, with the help of his graduate students, started a portal for the Nepal Studies Center (see: <http://nepalstudycenter.unm.edu/index.htm>) for which they created a very easy and affordable journal publishing system based on our *Dspace*TM implementation. They created the website interfaces for the journals from the above website and then created the *Dspace* community and collections (see: <https://repository.unm.edu/handle/1928/343>) for the NSC. They currently have two start-up journals:
 - [Himalayan Journal of Development and Democracy](http://nepalstudycenter.unm.edu/journals/hjdd.htm) (see: <http://nepalstudycenter.unm.edu/journals/hjdd.htm>)
 - [Liberal Democracy Nepal Bulletin](http://nepalstudycenter.unm.edu/journals/LDNB/ldnb.htm) (see: <http://nepalstudycenter.unm.edu/journals/LDNB/ldnb.htm>)
- Association documents. We are in negotiations to become the official institutional repository for the *American Indian Planning Association* who has unique planning documents relating to developments in Tribal areas.
- Technical Reports
- Research data. For instance we have a large collection of Scanning Electron Microscope (SEM) images of cave microbiology (more about this below) collected from Karst systems (<http://en.wikipedia.org/wiki/Karst>)

Another panel presenter from UNM, Christy Crowley will address current work to expand the functionality and impact of the UNM IR, such as:

- Social software applications (commenting and community tagging)
- Promoting IRs and Harvesting for a Latin American Portal – LAKH
- Experimenting with EDT plug-ins (Electronic Theses and Dissertations at UNM will be in Dspace)
- Separate system for our Manuscript and Archival collections (ContentDM)
- Monitoring work elsewhere and looking for partners to work with to improve Dspace. We currently have a

partnership with the Universidad do Minho in Portugal to co-develop community software.

However, to realize the true value of an Institutional Open Archive at UNM our most practical and urgent current challenges are:

- A Project to digitize and post past UNM scholarly and creative works. These are reported and published annually
- A campus-wide process to develop policies and incentives
- A drive to educate authors and create a constant flow of newly published works into the IR. This will require one-on-one visits.

Connectedness and Open Access as disruptive agents

“Shouldn’t the way we share research be as advanced as the Internet?”

<http://www.createchange.org>

Open access could be the cause of a cascade of increasing complexity and opportunities that will reshape this system. I speculated in the previously mentioned article (van Reenen 2006) the pervasive and global “Connectedness” created by the internet and the content spaces it provides for open access collections is a “simple disruptive agent”. Briefly my premise is thus:

- ❖ Open Access is part of a Complex Adaptive System created by Internet-based scholarly publishing
- ❖ Open Access could be the cause of a cascade of increasing complexity and opportunities that will reshape this system – if we keep the system open-ended. Meaning that fewer controls will provide more options and thus more innovation
- ❖ The pervasive and global “*Connectedness*” created by the internet and the content spaces it provides for *open access collections* could be acting as “simple disruptive agents” e.g. as we have seen blogs impacting newspaper publishing
- ❖ This pervasive connectedness creates infinite variety, creativity, new ways of working, unexpected change, and new ways of creating knowledge
- ❖ This leads to *Emergence* of new systems. This is where we need to be able to distinguish trends from fads

On page 22 of van Reenen (2006) this is explained in more detail:

“Emergent complexity is driven by a few simple patterns that combine to generate infinite variety. Kao (9) shows how one simple creative breakthrough can “evoke a cascade of increasing complexity. ‘Simple’ inventions such as the wheel, printing press, or transistor lead to ‘complex’ offshoots such as automobiles, cellular phones, electronic publishing, and computing.”

My premise is that just so Open Access can be the cause of a cascade of increasing complexity and opportunities for scholarly communications. As alluded to in the introduction, open access can be equated with a “Living System”, that is, it cannot be

directed only disturbed by the unexpected emergence of new agents working on the system. An example is the rise of social tagging systems that supports self-selected communities of interest. One relatively small and isolated variation can produce huge effects while large changes may have little effect (3). This phenomenon is common in the information industry as will be seen later.

Although the technology and the history of the development of the internet is not simple, the subsequent pervasive and global “Connectedness” that arose spontaneously was a “simple creative breakthrough” arriving with unexpected impact and speed. No large management team, complex strategic plan, and huge financial project “created” the many levels of connectedness that exploded on the Internet in recent years. It happened through many small and unpredictable connections made by individuals, organizations, and small businesses who wanted to share their ideas and products. Connectedness as a *creative breakthrough* provides content spaces for open access systems such as institutional repositories. These in turn are beginning to act as *simple disruptive agents* in the traditional scholarly communication system. As Wilson and Hayward (1999), not verbatim, says:

The increase in the degree of [electronic] connectedness constitutes the greatest change in life today. For it is not just that there is more change than ever before, but the inter-connectedness has changed the nature of change itself, making it more unplannable and unpredictable, more abrupt and dynamic than it has ever been or than our traditional organizational systems can handle.

We distinguish between *Connectivity* which is a physical link between systems, and “*Connectedness*” which is the personal, academic, partnership, and community connections people make based on seamless connectivity provided by today’s electronic systems. It has changed everything we used to know about such partnerships, joint ventures and group work.”

What would happen if three disruptive agents converge on the Internet: a community agent (social software), a pervasiveness agent (connectedness), a supply agent (open access content)? Connectedness is the driver behind open access – without this “agent” open collections would still only serve local users. Open access in turn drives a great variety of possible implementations. As mentioned above, the Nepal Study Center’s use of our local *Dspace*TM instance is a creative solution for a widely distributed community of political scientists who have very few means to get together in person but who has a demonstrated need for real-time and freely shared information. The website and *Dspace*-based journals cost less than 5000 US\$ to create. Crowley’s talk gives more examples of innovative uses of the IR at UNM.

Conclusion:

Connectedness plus *Open Content* overlaid by the use of *Social Software* – e.g. **Drupal** (<http://drupal.org/>) as a community portal for blogging, image sharing; social tagging to categorize a subject area collectively, et cetera – and the ability to *track usage* and *make connections* between researchers and ideas could conceivably all work together to form rich e-research communities spontaneously or in planned ways. This collective

intelligence may in turn spawn new systems of cross-fertilization and collaboration. Thus it is not only about the open content but also the emergence it supports that may result in future disruptive agents with unpredictable consequences for the march of science!

Already collaborating research groups are exploring how to harness this growing international multidisciplinary collective intelligence in a scientific manner. The [Web Science Research Initiative](#) provides a very broad and high level of exploration of future collaboration and the reengineering potential of the Web. Their goal is to facilitate and produce the fundamental scientific advances necessary to inform the future design and use of the World Wide Web (see: <http://www.webscience.org/>).

The bottom line is, those of us involved in open access initiatives are working toward a larger purpose!

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