DESIDOC Journal of Library and Information Technology, Vol. 28, No. 1, January 2008, pp. 15-24

Open Access for Indian Scholarship

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ABSTRACT

India's scholarship has ancient roots and a glorious heritage. Over the last few decades in particular, due to the way the scholarly communication system overall has developed in that time, India's academic output has suffered from low visibility and poor dissemination. At the moment, global visibility is good for Indian articles that are published in the *best* 'western' journals and in Indian journals indexed by the major abstracting/indexing services, such as ISI's *Web of Science*. Moreover, for Indian articles deposited in open access collections in India or those that are co-authored with scientists in other parts of the world who have deposited them in Open Access repositories outside the continent, visibility is maximal. This still leaves a lot of Indian output—most of it in fact— virtually invisible to the rest of the world. India's investment—intellectual, effort and cash—can never hope to gain a good return this way. The article focuses on how open access can help resolve the problems of maximising the visibility, and thus the uptake and use, of Indian research outputs. The mechanisms to provide open access to scholarly communications, impediments to Open Access in India, and how self archiving can provide a boost to open access movement has been highlighted in this document. The author argues that it is important to emphasise that *only mandatory policies work well*. Policies that just encourage or even request authors to make their work Open Access do not result in a sizeable level of compliance.

Keywords: Open access, Indian scholarship, JIF, OA repository

1. INDIA'S SCHOLARLY COMMUNICATION PROBLEMS

India's scholarship has ancient roots and a glorious heritage. India's top scientific institutions have worldwide reputations for excellence and the country's historic contribution to cultural and scientific advances are recognised by all. Yet over the last few decades in particular, due to the way the scholarly communication system overall has developed in that time, India's academic output has suffered from low visibility and poor dissemination.

Much resource and investment goes into education and research in India but, as I shall demonstrate, the impact of this is minimised by the failure to grasp new opportunities offered by the Web for disseminating research results. The failure lies largely in the hands of the research community, from top to bottom, and it is thus condemning itself to relative

obscurity when it could remove all barriers to visibility for its outputs simply and rapidly.

At the moment, global visibility is good for Indian articles that are published in the *best* 'western' journals and in Indian journals indexed by the major abstracting/indexing services, such as ISI's *Web of Science*. Moreover, for Indian articles deposited in open access collections in India or those that are co-authored with scientists in other parts of the world who have deposited them in Open Access repositories outside the continent, visibility is maximal. This still leaves a lot of Indian output–most of it in fact–virtually invisible to the rest of the world. India's investment—intellectual, effort and cash—can never hope to gain a good return this way.

2. HOW OPEN ACCESS CAN HELP RESOLVE THESE PROBLEMS

This can be turned around. Open Access provides the means to maximise the visibility, and thus the uptake and use, of Indian research outputs. Open Access is the immediate (upon or before publication), online, free availability of research outputs without any of the restrictions on use commonly imposed by publisher copyright agreements. It is definitely *not* vanity publishing or self-publishing, nor about the literature that scholars might normally expect to be paid for, such as books for which they hope to earn royalty payments. It concerns the outputs that scholars normally give away free to be published–journal articles, conference papers and datasets of various kinds.

Not only scholars benefit from Open Access. They are the most obvious beneficiaries, perhaps, because their work gains instant worldwide visibility, and they also gain as readers if much more world research is available on an Open Access basis for them to access freely and read. But there are many other beneficiaries, too. Indian research institutions benefit from having a management information tool that enables them to assess and monitor their research programmes, and they have a marketing tool that enables them to provide a shop window for their research efforts. The same advantages apply to external research funders—the Indian Government being the biggest example—who need to be able to access and keep track of outputs from their funding, and measure and assess how effectively their money has been spent. They also can ensure that the results of their spending have had the widest possible dissemination.

It is because Open Access is so much in the interest of research funders and employers that an increasing number of them around the world are introducing Open Access policies that require their funded researchers to provide Open Access to their work. I shall return to this issue later in this article. First, though, I want to turn attention to the researchers and their attitudes to Open Access, because even without any encouragement or coercion from their funders they have good reason to provide such access to their work. Do they, though? Well, not too well, not as yet. But there are signs of change even amongst established scientists, and this plus a generational difference—the 'Netgen' (The 'Netgen' is a term used to denote the younger generation —people who have grown up with the World Wide Web and its norms) has vastly different attitudes to information use and sharing—will ensure Open Access prevails soon.

The advantages of Open Access for science and scholarship have been laid out in a recent essay written specifically for the research community, including administrators and funders[1]. In brief, Open Access brings greater visibility and impact, moves science along faster, enables better management and assessment of research, and provides the material on which the new semantic web tools for data-mining and text-mining can work, generating new knowledge from existing findings: four very important reasons for striving to achieve a complete Open Access corpus across the world as soon as possible. Something for everyone directly, then, and certainly a very big advantage for science, scholarship and society as the investments in research pay off faster and more effectively.

India spends perhaps 170 billion rupees of public money annually on science and technology research. The return on this investment must be maximised: it is the

duty of research administrators to ensure that is so. Open Access has been demonstrated to increase citations to published research on average by over 50 per cent (see later in this article) and since only 15 per cent of research is available on this basis, this means that the remaining 85 per cent stays hidden away in subscription-based journals that only a minority of libraries purchase, largely unread and unused. That 85 per cent could be getting much better visibility and use if it were all Open Access. Evidence suggests that the average increase in citations for Open Access research is 50 per cent (see later in this article for further explanation). In other words, India would have to spend a further 70 billion rupees on research to get the same impact on the world stage as it could currently get for no more money by making all of the country's research output Open Access.

3. PROVIDING OPEN ACCESS IN INDIA

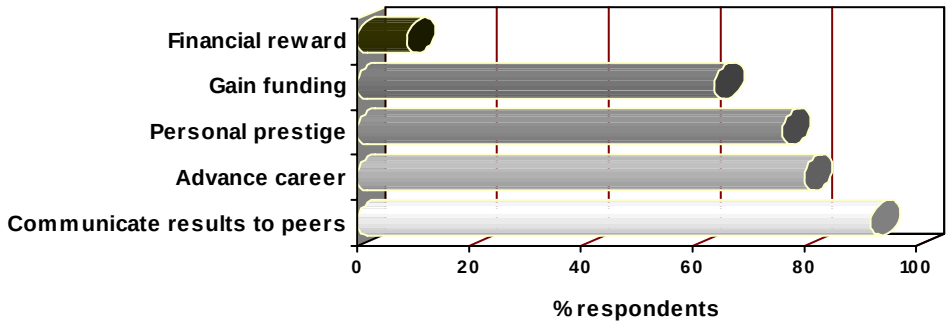
What, then, is India's research community doing about Open Access? Not much so far, is the answer, and this is a shame because it flies in the face of the primary aim of researchers when publishing their work, which is to communicate their results to their peers (Fig. 1).

Open Access can be provided in two ways. Either a researcher can publish in an Open Access journal, a special kind of journal that does not charge for a subscription yet makes its content freely available online for all to read and use, or a researcher can publish in any journal of choice as usual but deposit a copy of the article in an Open Access repository. This process is now known as 'self-archiving'.

3.1 Open Access Journals

A Directory of Open Access Journals is maintained at Lund University Library in Sweden (www.doaj.org). There are currently more than 2500 journals listed. Some of them charge a 'front-end' publication fee which the author's institution or grant normally pays. Others do not charge a fee but have some other business model that enables them to run the journal without charging a subscription. The Web of Science lists some 200+ Open Access journals in its service and some of them have very high impact factors indeed. They operate peer review in exactly the same way as other traditional journals and the big Open Access publishers, the Public Library of Science (www.plos.org), BioMed Central (www.biomed central.com) and Hindawi (www.hindwai.com) all offer waivers if authors cannot pay the publication fee but wish to publish in their journals for the increased visibility that brings to their work.

In India, MedKnow Publications, the country's largest publishing house for scientific and medical journals, leads the field in innovative business and the provision of Open Access (http://www.medknow.com/journals.asp). All MedKnow journals are Open Access and are enjoying high visibility and increased impact as a result of opting for this approach. Their impact, audience, submissions and subscribers have all risen because of the Open Access policy[3]. Moreover, MedKnow journals do not



Source: Swan and Brown[2]

Figure 1. Reasons researchers consider 'very important' when publishing their work.

charge any publication fees at all. Indian scientists in the fields covered by MedKnow journals can make their work Open Access, benefit from the worldwide visibility these journal bring for their work *and* support an Indian publisher by choosing these journals in which to publish. *Current Science* India's premier scientific journal, now 75 years old, is also an Open Access publication. So much does it value this status that in its recent negotiations with *Nature* on a publishing partnership that would have the journal bear the Nature Publishing Group's logo for the first time, remaining Open Access was a critical issue. *Nature* does not have Open Access content on its journals site, but has made an exception in this case (http://www.hindu.com/2007/03/stories/20070351832200.htm).

3.2 Open Access Repositories

Now to the alternative way of making work Open Access–by self-archiving. Open Access repositories are either centralised subject-based depots or are broad-based institutional depots for electronic articles. They comply with a set of standards (OAI–Open Archives Initiative) and are interoperable, forming in effect a worldwide database of research. Google and Google Scholar index Open Access repositories so any articles in them are assured of the best visibility. In India at the time of writing there are 24 Open Access repositories: twelve of them are institutional and the one with the most articles in it is the repository at the Indian Institute of Science in Bangalore, which contains over 7500 documents. The others have much, much smaller numbers of documents: far fewer than there would be if all the outputs of those institutions were being self-archived. Three of the repositories collect theses only and three others are repositories forming the basis for the publication of Open Access journals. The repositories can be seen and sorted by using the facility at the eprints.org site (http://roar.eprints.org).

The number of repositories in India is guaranteed to grow. Worldwide, they have been increasing at the rate of about one per day over the last year or so and it is anticipated that every research-based (and probably teaching-based, for they are useful for that too) institution will have one within a few years. These institutional collections will be useful for management and marketing purposes as well as for making research output Open Access and institutions see the usefulness of having this tool. In India, this means that there will eventually be hundreds of Open Access repositories, each making freely available the output of their institutions for everyone to see and use. Beaming India's scholarship to the world, in other words.

4. IMPEDIMENTS TO OPEN ACCESS IN INDIA

But first, there are a few hurdles to leap. Although Open Access is clearly in the interests of the research community—from India's top research administrators through the universities and research institutions to the individual scholar—there is a diffidence towards Open Access that needs to be swept aside. It has been a disappointment to those of us trying to support the adoption of Open Access in India that the country's research community has not more readily grasped the opportunities it brings. India has suffered considerably from the scourge of journal impact factors and the difficulties for Indian scholars in trying to make their work *visible* to the world, which has usually meant publishing in 'western' journals, journals that have always enjoyed much higher visibility than more Indian counterparts. The other side of the coin, getting *access* to research journals, has also been a long term problem for India. Open Access abolishes both of these problems by giving worldwide visibility and providing access to the world's literature for Indian scholars as more and more of their colleagues around the globe begin to make their own work Open Access too.

Partly, the diffidence is based upon a lack of awareness of the issues and advantages of Open Access. There must be more effort put into explaining the concept and how to achieve it for scholars, administrators and funders. The latter two categories, indeed, have a major role to play themselves in raising awareness of Open Access. A recent

study by my company (in press) showed that in the UK many scholars who are aware and informed about Open Access learned about it through their research funder's policy. Five of the seven UK Research Councils have a policy now which aims to ensure that the work they fund is made Open Access by the scholars to whom they give grants. This has had the effect not only of increasing the amount of Open Access material but of helping to inform scholars about it. India's research funders can play a similar, critical role.

And policy-making by research funders—and research-based institutions—is not only critical in informing scholars: it is critical in another sense, for without such policies the level of provision of Open Access is very poor. Scholars—most of them—do not voluntarily and spontaneously provide Open Access for their work. As I have said, partly this is a matter of awareness, but there are other reasons why authors do not provide Open Access. Let's examine these and then return to the issue of policy.

4.1 Author concerns about Open Access

First, authors worry about copyright restrictions imposed by their publishers. It is important to point out that Open Access publishers do not have any copyright restrictions at all: they allow the copyright to remain with the author of an article and they permit the author to do anything he or she wants with the article, including making unlimited numbers of copies for distribution, using them for teaching and so forth. This is quite unlike the restrictions imposed by many traditional publishers who require the author to relinquish copyright to the publisher and lay down strict rules about how the article may be used by the author and others—and this is the author's article, let us remember. So with respect to self-archiving in repositories, authors worry that the publisher, who in most cases holds the copyright, will not permit this activity. In fact, over 60 per cent of journals *do* allow self-archiving of the final, peer-reviewed version of an article (the 'post-print') and a further 28 per cent allow the author to self-archive the 'preprint', the article before it has been peer reviewed (Fig. 2).

Authors can check these permission policies by going to the resources maintained by SHERPA (sherpa.ac.uk/romeo.php) or by EPrints (http://romeo.eprints.org/publishers.html).

Second, researchers worry about how easy it might be to deposit an article in their repository. The process is very simple, consisting of a series of steps for filling in a form that the repository software provides. Details required include the article metadata (authors' names, affiliations, title of the article and so on) and some other information about the type of article it is and whether it has been peer reviewed; there is an uploading step where

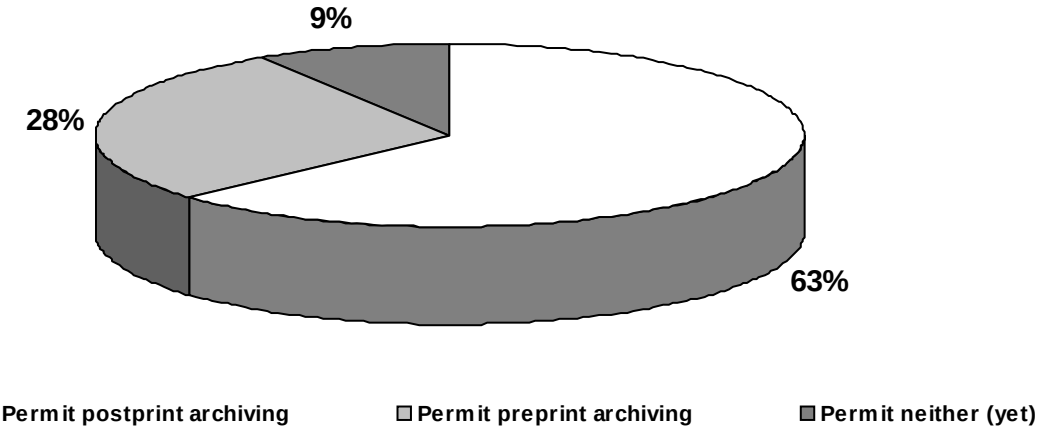


Figure 2. Journal permissions for self-archiving (http://romeo.eprints.org/publishers.html).

the article file is sent to the repository; and there are a few final pieces of information to fill in. Readers can practice depositing a paper by going to the EPrints demonstration site (http://demoprints3.eprints.org/).

Researchers who were surveyed about this[2] told us that they found the process generally easy (Fig. 3). We also know from an examination of log files at one large repository that it takes just a few minutes to do[4].

5. ENCOURAGING OPEN ACCESS

So much for the worries that authors have about Open Access. Since they are unfounded, authors must be reassured about them. There is also much that can be done to actively encourage authors to embrace Open Access.

Making authors aware of the increased visibility, usage and impact their work will receive via Open Access is crucial. Repositories can provide usage data to show the number of times articles have been downloaded. The levels of this type of usage can be surprising. For example, the University of Otago's Business School set up an Open Access repository in November 2005: by February 2006, with just 220 articles in it at the time, it had received almost 20,000 'hits' (downloads)[5]. No doubt many of these will translate in time to citations. The authors at Otago are delighted and so they should be. Until they made their work Open Access in this way its visibility was constrained to those institutions whose libraries subscribed to the journals they were published in and having 20,000 article-reads in three months was almost certainly just a dream.

Several studies have been done on the increased citation impact that Open Access can bring[6,7,8]. Stevan Harnad's groups in Southampton and Montreal continue to work on this and their early results are shown in Fig. 4, which depicts the increase in citations of Open Access articles over those for Closed Access articles in the same issue of the same journal [7,9]. This study is ongoing and new disciplines will be added to the list, but the striking finding is that across *all* disciplines there is an Open Access advantage for citations.

The data above emphasise how far and how fast we are moving towards a new world where impact is measured at author level. Up until now, authors have remained rather obsessed by the metric known as Journal Impact Factor (JIF). Readers will no doubt be familiar with this as the metric developed by ISI in order to comparatively rate journals on the basis of the 'citedness' of their articles: essentially, the more articles re cited by other articles, the higher a journal's impact factor. This is a fine measure for the impact of *journals* but is only a proxy measure for the impact of an individual author. Nonetheless, being all we had until recently, it has rather ruled the roost and employers and funders have used the JIF *ad absur*dum, judging

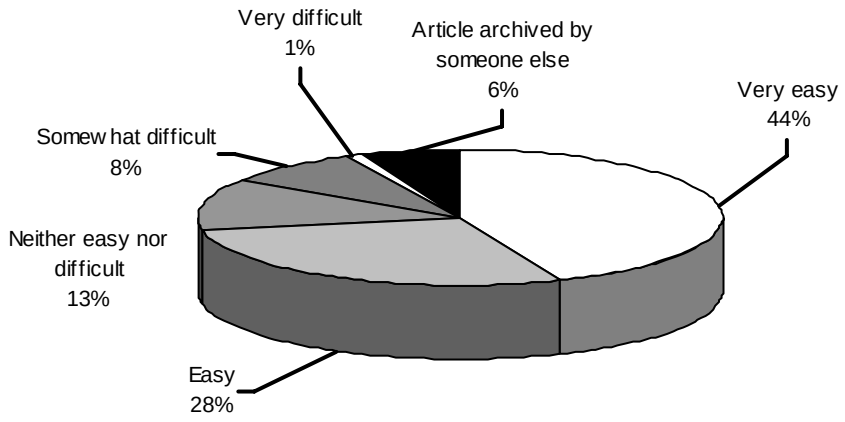


Figure 3. Ease of depositing an article in an Open Access repository.

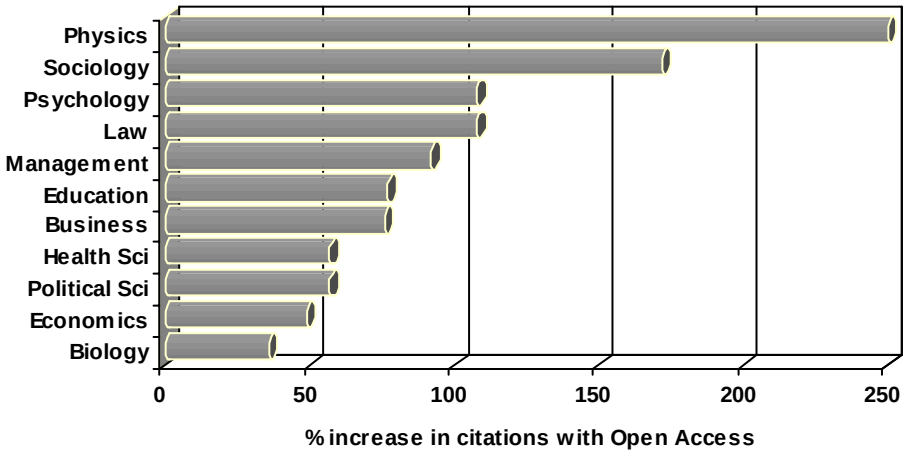


Figure 4. Increase in citations as a result of Open Access.

candidates for positions or for tenure on the JIF of the journals the individual publishes in. Careers have risen or fallen on the basis of journal impact factors and the primary publishing aim of authors–encouraged by their employers' and funders' obsession with this metric–has been to publish in journals with as high an impact factor as possible. Mercifully, this reign of terror is fast coming to an end. In the Age of the Web, measuring individual impact, at least in terms equivalent to measuring a journal's impact—the amount an individual's articles are cited—is now possible. Google Scholar's citation counts are fast gaining ground as one of the new measures by which authors can be assessed. It follows, of course, that Open Access maximises an author's chance of having a paper read and used and cited, boosting his or her own 'impact factor' as far as possible.

Finally, in respect of what can be done to encourage Open Access, I want to return to the issue of Open Access policies, because these are critical in spreading the word about Open Access and in securing author involvement. Policies from funders and employers are increasing rapidly now. The Wellcome Trust was the first big funder to formulate an Open Access policy to ensure that the work it funds is made Open Access (Wellcome Trust position statement in support of open and unrestricted access to published research. http://www.wellcome.ac.uk/ doc_WTD002766. HTML), but a lot more funders have followed suit. In the UK now over 90 per cent of all funded biomedical research is covered by an Open Access policy as the Medical Research Council and all the other big medical research funders, such as Cancer Research UK and the British Heart Foundation fell into line behind the Wellcome Trust. Almost all of the UK Research Councils have a policy and the remaining two are expected to produce one shortly. In the US, the NIH has one, as do many other federal research funders and a bill is before Senate that would make Open Access mandatory for all research funded by federal agencies spending over 100 million dollars a year. This of course covers agencies like NASA and the EPA and will ensure that a huge proportion of US publicly-funded research is freely available to all. Universities are also jumping on the bandwagon because they, too, see the advantages in promoting their research and having it gain the best impact it can through Open Access. A list of institutions and funders with policies is maintained by EPrints (www.eprints.org/openacess/policysignup).

It is important to emphasise that *only mandatory policies work well*. Policies that just encourage or even request authors to make their work Open Access do not result in a sizeable level of compliance. Some people have questioned the use of mandatory policies in an academic setting, arguing that they sit uncomfortably alongside the tradition of 'academic freedom', but this is stretching the point too far. Academic freedom has always been about the right and duty of

academic 'neutral minds' to investigate and report without shackles and without political or religious constraints. Open Access is not about this; it is about the process of carrying out those academic activities in the best way and about ensuring that in the interests of optimal research progress public money is spent as well as possible. This means *not* just hiding results away in journals that work on the basis of *restricting* access rather than maximising it. Academics already have mandatory policies guiding their behaviour with respect to carrying out their jobs–they are normally required to teach and profess their subject, to do research and to report it, plus if they are funded by an external funder then they are required to write up reports of their funded work at the end of a project and to publish the findings. Open Access mandatory policies are merely another piece of this particular job-process jigsaw.

But anyway, the vast majority of academics happily comply with mandatory Open Access policies. They do not consider them an imposition at all. We have asked authors on a number of occasions how they would behave if their employer or under required them to make their work Open Access. The results are shown in Fig. 5. Over 80 per cent said they would willingly comply and a further 14 per cent said they would comply reluctantly.

Why am I belabouring this point about mandatory policies? Wouldn't voluntary policies be just as good? The answer is no. When the efficacy of Open Access policies is measured it is clear that non-mandatory policies just do not achieve the desired results. The National Institutes of Health in the US has a non-mandatory policy and the level of compliance is very low, resulting in just 4 per cent of articles that should be deposited in the Open Access repository used by the NIH being collected. As a result of this failure the NIH is rethinking its policy and likely to change it to a mandatory one.

Other institutions around the world also bear witness to this. Those that have introduced a mandatory policy for Open Access see their repositories filling with articles while those that have no Open Access mandate have repositories whose content represents only a fraction of their total output. Figure 6 shows the results from a study by Arthur Sale on the contents of a number of Australian university repositories and clearly demonstrates the effect of the recent mandatory policy on Open Access introduced at Queensland University of Technology (QUT). The graph shows the percentage of government (Department of Education, Science and Training) funded research articles collected into university repositories in the years 2004 and 2005. The mandatory policy resulted in a vastly greater percentage of articles being collected at QUT than at the other universities, none of which have mandatory Open Access policies[10].

The adoption of Open Access is considerably dependent, then, upon the actions of research administrators and funders. Around the world they are beginning to act. It is in India's

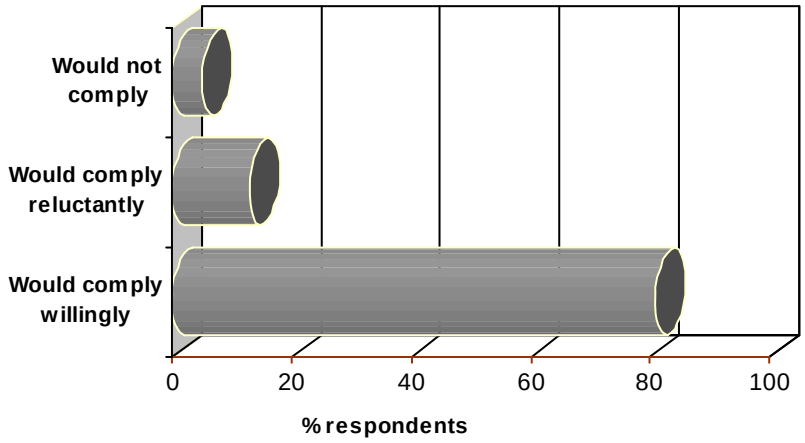


Figure 5. Author willingness to comply with a self-archiving mandate from their employer or funder.

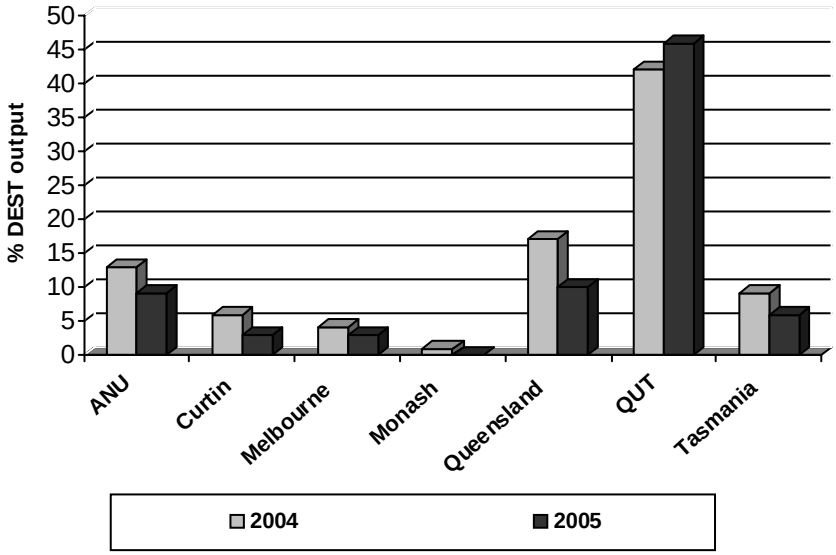


Figure 6. Effect of an institutional self-archiving mandate at Queensland University of Technology[10].

interests that her research output is available for all the world to see. India needs firm, well-designed Open Access policies now, from its research institutions and research funders. In November 2006 a conference took place at the Indian Institute of Science in Bangalore on the future of science publishing in developing countries. It brought together Open Access experts and advocates, publishers, funders, administrators and scientists from India, China and Brazil to discuss the best ways forward.

The outcome was the drawing up of an optimally-worded Open Access policy for institutions and funders to use (http://www.ncsi.iisc.ernet.in/OAworkshop2006/ pdfs/NationalOAPolicyDCs.pdf). The implementation of this Commitment is exactly what India needs now, before she loses out still further in the race for visibility and impact. Brazil is putting the matter before parliament and China has taken further steps along the road. Time is being lost.

6. CONCLUSION

Let me finish by reminding readers that open Access does make a difference for the better. The increased visibility of Open Access articles and the beneficial outcomes of this for authors is nicely summed up in this comment provided by one author during one of our periodic surveys:

> *"Self-archiving …. has given instant world-wide visibility to my work. As a result, I was invited to submit papers to refereed international conferences/journals and got them accepted."*

We hear of new connections and new collaborations between authors around the world as a result of self-archiving their work to make it more visible. Scholars working on the same or related topics, who previously never knew of each other's existence, start conversations and end up working together. This is how scholarship *should* be, but it has not been possible to have this unimpeded worldwide communication and discovery until the World Wide Web arrived. Now that we have the tools to make global communication a reality, the research community really should embrace them.

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Alma Swan obtained a first class honours degree in zoology in 1974 and a PhD in cell biology in 1978 from Southampton University. After research fellowships funded by the Cancer Research Campaign at Southampton General Hospital and St. George's Hospital Medical School (London), she took a position as Lecturer in Zoology at the University of Leicester. Her research was in medical cell biology and she taught a range of courses from vertebrate biology to the biology of cancer. She also has an MBA from Warwick Buisness School. In 1985, she moved into science publishing as managing editor of a Pergamon Press (later Elsevier Science) biomedical research indexing service, published both in print and online. In 1996 she jointly founded Key Perspectives. For four years Alma Swan was tutor and consultant for the Open University Business School's MBA programme and since 1991 has been tutor for two business strategy courses on Warwick Business School's MBA programme. She holds honorary roles as business mentor and teacher for the Institute for Entrepreneurship (part of the School of Management) at the University of Southampton, is a Visiting Researcher in the School of Electronics & Computer Science at the University of Southampton, and Associate Fellow in the Marketing and Strategic Management Group at Warwick Business School. Alma is a Member of the Institute of Biology and is an elected member of the Governing Board of Euroscience (the European Association for the Promotion of Science and Technology).