Universities UK

Policy Briefing

Publishing research results: the challenges of open access

Policy Briefings

This new series of policy briefings published by Universities UK (UUK) will provide authoritative and accessible analyses of current and emerging higher education policy issues.

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Publishing research results: the challenges of open access

Executive summary

· Governments, public funders of research and universities worldwide are increasingly recognising that improving the dissemination of research raises their research profile and contributes to national competitiveness.

· The traditional system of research publishing is inefficient, uncompetitive and restrictive. It limits access by researchers and students as well as the wider public. Many people think that the results of research that has been funded with public money should be freely available.

· There are two routes to developing a less restricted approach to the publication of research results (known as open access). One way is to publish the paper in an open access publication. The other approach is to publish the paper in any journal that allows the researcher to deposit the final article in a digital archive (or repository); that is the main focus of this briefing.

· Depositing articles on an open access server – based on authors retaining their copyright – could provide efficient access to research results without requiring a wholesale shift to open access journals.

· Peer review is still widely accepted as the most effective guarantee of quality and as such must remain a critical element of any publication process.

· In the UK the Wellcome Trust and five of the research councils now require any research paper resulting from their funded projects and published in a peer-reviewed journal to be deposited in an electronic archive. The Wellcome Trust provides additional funding to cover the costs of open access publishing. Such developments are also happening at a European and international level.

· A Universities UK position statement on open access, published in 2005, provided broad support for the development of a more open system. It made a commitment to facilitating further discussion and this policy briefing outlines the challenges that an open access environment still presents and suggests how they might be overcome.

· The cost of installing and maintaining a repository is comparatively low and provides several benefits to higher education institutions, to the research community and to society at large.

1. The research context

1.1 The UK's international research performance remains strong despite challenges from European neighbours and growing research economies in the Asia-Pacific region. The UK produces about 9 per cent of the world's papers and receives about 10 per cent of the world's citations. The UK's research productivity exceeds that of the United States[1]. UK researchers produce 16 research papers per $1 million of research funding, compared to 9.9 in the United States and 3.6 in Japan, and they are much more effective in getting more citations per paper produced.

1.2 Ensuring the effective and efficient dissemination of research outputs is increasingly important if the UK is to maintain its competitiveness. An OECD report on National Innovation Systems[2] published in 1997 found that prosperity in a knowledge economy depends as much on how well knowledge is distributed as it does on how it is produced.

2. Introduction

2.1 Although not a new issue, in 2004 a House of Commons Science and Technology Select Committee report on scientific publications[3] highlighted several concerns about the way in which scientific publications were accessed and disseminated. The Committee felt that the current system was unnecessarily restrictive and recommended that all publicly funded research should be made freely available. An independent report funded by the European Commission[4] made similar recommendations, including calling for published articles arising from its funded research to be freely available to all.

2.2 In the UK key stakeholders within the research community, including the Wellcome Trust and Research Councils UK (RCUK), have added their voices to the debate, speaking out in favour of a more open approach. In its position statement published in 2005, the Wellcome Trust supported the 'unrestricted access to the published output of research as a fundamental part of its charitable mission'[5]. RCUK recently committed itself to the principle that 'knowledge derived from publicly funded research must be made available and accessible for public use…. as widely, rapidly, and effectively as practicable'[6]. The Wellcome Trust and several of the research councils[7] have adjusted their funding policies to support open access and many other research funders and scientific organisations have developed similar policies or are planning to follow suit[8].

2.3 These significant developments mean that traditional approaches are gradually being modified and there is a lively debate in the research, library and publishing communities – not only about the current problems surrounding the existing publishing model but also about the remedies provided by new and emerging methods of disseminating research information and outputs. A Universities UK position statement on open access was published in 2005[9]. This statement provided broad support for the development of a more open system, but recognised that this was work in progress. It made a commitment to facilitating further discussion and this policy briefing outlines the remaining challenges of an open access environment and suggests how they might be overcome. It also provides an overview of current developments in the open access area, where activity is progressing at a remarkable rate[10].

2.4 While there are many ways of disseminating the results of research, the debate around widening access has so far focused largely on the publication of research articles, which provides the main focus of this briefing.

3. Background: the pressure for reform

3.1 The market for scientific, technical and medical publications[11] is very complex and forms part of a global publishing market, amounting to about £22 billion a year in the UK alone[12]. People in every part of the research community have expressed wide-ranging criticisms of the traditional system. Many studies[13] have shown that the dominance of large commercial publishers does not always work in the best interests of the research community.

3.2 For universities one of the prime considerations is the pressure on library budgets arising from a steady increase in journal prices combined with the long-term reduction in the public unit of funding per student (although this has been stabilised since the turn of the century). The dominance of a small number of large publishers has been blamed for above-inflation increases in prices and has led to criticisms that the current system is uncompetitive and economically inefficient.

3.3 The other important factor within the debate is technological change. Developments in electronic publishing provide speed and access and can potentially remove barriers to entry on the supply side. While this has made it possible to envisage a fundamental change to the way in which scientific articles are published, electronic publishing is not currently challenging the dominance of big players in a significant way. Indeed, quite the opposite occurs in practice. Electronic journals are generally leased to libraries on a time-limited basis with significant restrictions on access.

4. Alternative models: open access

4.1 Open access is an umbrella movement which supports the principle that the output of primary scholarly research should be free at the point of use. Most scientific and library bodies support moving towards some form of open access.

4.2 The open access movement has two main approaches – the 'open access repository' and 'open access journals', which are outlined below. It is important to note that these two approaches are not mutually exclusive and any future scenario could include a mixture of each, together with some elements of the current system. Change is likely to be incremental and would require interventions by a number of stakeholders including funders, government, universities and the academic community. This policy briefing focuses primarily on open access repositories, with some reference to open access journals where appropriate. The latter are now increasing in popularity and usage, particularly in relation to the hybrid model that is highlighted in paragraph 4.12.

Open access repository

4.3 The open access repository suggests that online archives should be established and managed by universities and research institutions to house the articles of the authors at the institution involved. Such an approach would help to put the brake on excessive prices and widen access to research outputs.

4.4 An alternative model is to establish discipline, or subject-based, repositories. A prototype for such a repository can be seen in arXiv, the high-energy physics archive. Based in the United States, it was established 15 years ago.

4.5 There is already a strong current in this direction in the UK, with nearly a third of higher education institutions now having established their own institutional repositories. University libraries are playing a lead role through the Securing a Hybrid Environment for Research Preservation and Access (SHERPA) project and other mechanisms[14].

4.6 A key problem for open access repositories (whether institutionally or subject-based) is that most academics wish to publish their articles in a recognised peer-reviewed journal. At present, open access repositories cannot compete with the incentives provided by such journals. However, simultaneous publication in a journal and an open access repository in principle offers the advantages of conventional publishing as well as those of open access. Many publishers, including Reed Elsevier, have supported this approach, though often with a number of restrictions on the version of the article that is held in the repository.

4.7 In order to extend this arrangement across the entire research community would require a change in culture and the prospect of incentives. Action would be required by government and research funders, but universities would also have a key role to play in advocating the use of repositories.

4.8 For its part, the government has recognised the potential benefits of open access repositories as being worthy of encouragement and has supported the work of SHERPA as a 'valuable experiment' which should be available to all universities[15]. However, the government has so far stopped short of a commitment to providing greater funding and coordination that could facilitate this activity at a national level.

Open-access journals

4.9 In open-access journals, articles are disseminated free of charge on the internet. The publisher sends the articles out for peer review in the usual way, and those articles that are deemed to be of sufficiently high standard are edited and published. A number of business models exist to support the costs of peer review and online publishing, including the levying of a publication charge, normally paid from the author's research grant. The Public Library of Science in the United States and the Wellcome Trust in the UK are prominent supporters of this approach. The biggest open-access publisher is BioMed Central, which currently charges between £370 and £900 per accepted article depending on the journal.

4.10 A key benefit of this approach is that research papers instantly become more widely available. Despite some concerns raised by the publishers, there is a general consensus within the academic community that the integrity of peer review would be maintained under this approach. However, at this stage very little is known about the true costs of open-access journals and much activity so far has been largely experimental.

4.11 The government has so far declined to support a comprehensive independent study into the costs and benefits associated with open-access journals[16]. However, RCUK plans to initiate a project to investigate the impact of author-pays publication, as well as self-archiving, working in partnership with leading publishers and other stakeholder organisations. This project intends to report in late 2008[17].

Hybrid open access

4.12 Under the hybrid approach, publishers producing normal subscription-based journal titles allow articles from their journals to be made available on an open-access basis on receipt of an 'open access fee' from the author. Many of the publishers concerned also permit copies of those open-access articles to be placed in repositories. Such a model has the potential to provide a transition from closed-access subscription based publications to open-access journals.

4.13 The Wellcome Trust has now stipulated that researchers must choose an open-access publishing option where this is made available by publishers in order to meet its conditions of grant. Oxford University Press, Blackwell, the British Medical Journal and the Royal Society of Chemistry have already allowed researchers to choose to pay to make their articles freely available online and many more publishers are now expected to follow suit.

5. Maintaining quality and standards

How do we maintain quality in an open-access environment?

5.1 Universities UK considers it to be vitally important that any new publishing developments should not undermine the quality control of scientific literature. The peer-review process is still viewed as the best method of ensuring quality control in the publication process and this should not be compromised.

5.2 Any publishing process, whether in traditional print format or through an electronic journal, would have to ensure that a robust system of quality control (most likely through peer review) was an inherent part of its processes. The vast majority of new open-access publishers, including BioMed Central, maintain strict quality control procedures and effective peer review is still seen as a key part of the publishing process.

How can we distinguish between pre- and post-print articles in institutional repositories? ie whether they have been peer-reviewed or not.

5.3 The open-access model has the flexibility to allow institutional archives and researchers' self-archiving to include material, such as 'work in progress' and technical reports, that have not yet been peer-reviewed and published (pre-prints). The publication of pre-printed articles on institutional repositories has the advantages of allowing research results to be rapidly accessed in the public domain and to receive early, critical exposure. However, if a repository includes both formally, peer-reviewed material and less formally reviewed work, such as pre-printed articles, it is important that such distinctions should be made clear to users.

5.4 SHERPA has argued that while journal publishers continue to administer the peer-review process, researchers should submit their papers to high-impact journals, while also depositing articles in their institution's (or in a discipline-based) repository. There is no evidence to suggest that such a practice would undermine the viability of these journals. On the contrary, the empirical evidence from high-energy physics community shows that arXiv has not had a negative effect. Physicists continue to submit their work to peer-reviewed journals as well as contributing to arXiv. Authors still value the quality control function the journals provide but also the rapid and wide dissemination that arXiv provides. It is recognised, however, that there has not been enough research to assess the impact of open-access repositories on traditional journal publishing in other disciplines[18].

5.5 SHERPA considers that the widespread adoption of open-access repositories may change the role of journals. Traditional journal publishing bundles together peer review with the distribution of content. These functions could, however, be unbundled. If open-access repositories increasingly become vehicles for content distribution, publishers (including learned societies) could also become managers of peer review, as well as providers of other appropriate value-added services.

5.6 While maintaining the quality of academic publications is essential, the shift towards electronic publishing may encourage the development of new ways of looking at quality assessment. This may include experimentation with online continuous review by a wider group of peers, as well as 'open' and 'double-blind' peer review[19]. Such processes, which are still under development, would still operate alongside traditional peer review. This is still widely accepted as the most effective guarantee of quality and as such must remain a critical element of the publication process.

Does the use of institutional repositories encourage malpractice?

5.7 Plagiarism remains a great concern to the academic community but the use of institutional repositories should not in fact increase the risk of malpractice. In fact it should be easier to detect plagiarism in publications held on an electronic server through the use of specialist software. Additionally, the Joint Information Systems Committee (JISC) currently offers a plagiarism advice service to help institutions detect plagiarism among students and academic staff. In relation to the risk of unauthorised changes to research articles, higher education institutions would wish to introduce adequate safeguards to protect articles deposited within repositories from being amended once they are accessible, although this practice is not believed to be common in the UK.

5.8 In conclusion, as long as a robust peer-review mechanism continues to be the cornerstone of research publishing, trends in delivery mechanisms should not lead to an increase in fraud or malpractice.

6. Does existing copyright law prevent open-access publishing?

Does the transfer of copyright to publishers allow researchers to publish in open-access repositories? Should researchers be encouraged to retain copyright in the articles they have submitted?

6.1 It is widely recognised that existing copyright practice sits uncomfortably with the needs of science for the rapid and free dissemination of information and is often seen as a major barrier to open access.

6.2 The transfer of copyright in research papers from the authors to the publishers gives control of access to the papers to the publishers. The publishers can then place limits and conditions on access, regulating who can view the papers and how much they must pay. Transfer of copyright also limits the uses that the authors and their funders can make of the research. For example, the authors may not be allowed to place a copy of their paper on their own, or on their funding body's, website.

6.3 However, there is a degree of misunderstanding surrounding this process. Organisations such as SHERPA have maintained that there is no practical need for exclusive rights to be transferred to publishers in order for material to be published in their journal. Although the practice is still common, many journal publishers (now over half) do not require the transfer of exclusive rights. Many publishers in the UK, including Nature and Reed Elsevier, have set up an agreement that allows authors to retain copyright – including the right to self-archive – in return for granting the journal a licence to publish and reproduce[20].

6.4 Many people who work in scholarly communications believe that authors should be discouraged by their institutions from signing over exclusive rights to publishers and should retain (at a minimum) electronic distribution rights for their papers. The retention of copyright by authors and the subsequent depositing of articles on an open-access server have the potential to provide efficient access to research results without requiring a wholesale shift to open-access journals.

Should all publicly funded research be available on open-access servers?

6.5 Proponents of open access in the UK have argued that where research work is publicly funded, it should be made a condition of grant that authors cannot sign over the copyright of their papers. These papers should then be deposited in an open-access server (either discipline based or within an institution) preferably in the form in which it has been accepted for publication. Such a proposal would have obvious benefits as research funded by the public purse could then be made freely available.

6.6 Such a move has been proposed in the United States, where the bi-partisan Federal Research Public Access Bill, introduced in the Senate in May 2006, would require that papers describing scientific research substantially funded by the government should be freely available online within six months of publication. This approach has also gained increasing support from funders in the UK. The Wellcome Trust and five of the research councils[21] now require that electronic copies of published peer-reviewed papers produced as a result of their funding support are deposited at the earliest opportunity in an e-print repository[22].

6.7 Where an open-access publishing model (whether offered by a traditional publisher or by an open-access journal) is available to researchers, a key issue is how researchers can recover the costs of publication payable under open access. The Wellcome Trust provides funds to institutions specifically to meet the cost of publication charges paid by their grant holders, although other funders are not doing this, at least not yet. According to the research councils, any publication charges should be accounted for under full economic costing and higher education institutions may wish to consider setting aside funds that can be claimed by researchers for this purpose.

7. The benefits of setting up an institutional repository

Why set up an institutional repository?

7.1 The establishment of institutional repositories provides benefits at several levels:

(a) Open access to research papers gives a direct benefit to academic authors and researchers. Material is free and fully searchable. It is more easily available for researchers, read more widely and authors' citations increase[23].
(b) Repositories increase the institution's visibility and prestige by bringing together the full range and extent of its research interests.
(c) A repository could be used as an effective way of managing an institution's 'information assets' for the submission of work as part of the research assessment exercise, consultancy work or other outreach activities.
(d) Repositories also make provision for the long-term preservation of digital content, which currently lies outside the publication process as such and has traditionally been left to underfunded libraries.
(e) Institutional repositories can accommodate an increased volume of research output (for example, there are no page limits and large data-sets can be accepted). There is also the potential to use repositories to store and provide access to scientific data and other related digital files. This would mean that a published scientific paper could sit alongside the data upon which it is based, giving other scientists access to the research evidence, as well as its published output.
(f) As larger volumes of open-access text and data are made available, opportunities open up for text and data mining to extract related pieces of information and show relationships that would not appear by using a normal search engine. As it is not possible to search commercially-owned text and data without the permission of the rights-owner, the wider establishment of open-access repositories and journals is essential to this process.
(g) There are also clear benefits to society and to the taxpayers who ultimately fund a large proportion of scholarly research. Open-access repositories provide access to the world's research and increase the democratisation of knowledge.
(h) With the increased use of open-access repositories, researchers would continue to publish in traditional journals as normal. None of this would affect the traditional publication process, but would act as a supplement, in addition to dissemination by journals. Peer review is therefore unaffected.

7.2 Subject-based repositories offer an additional advantage to researchers by providing a central, accessible resource. They have been used for several years in the sciences[24]. Arts and humanities subjects are also finding that the same approach works equally well with their research outputs, as institutional repositories can hold book chapters and conference presentations as well as articles. Peer-reviewed material is clearly labelled, so that subject specialists can use repository content as a simple extension of their normal research practices.

7.3 There is growing support for the idea that all higher education institutions should be encouraged to establish either institutional or discipline repositories, whether individually or in collaboration with other institutions. Some people also think that they should strongly encourage (if not require) their staff to deposit articles within a repository to make sure that its potential is fully realised and that it facilitates research oversight and management. This approach has already been adopted by the University of Southampton. If this approach were taken across the higher education sector, it would open up access to research findings significantly and bring enormous benefits to the research community.

7.4 The practical implications for institutions of establishing a repository, including funding issues, are addressed in Annex B.

8. The impact of open access on learned and professional societies

As we move towards an open-access environment how can we mitigate the effects on the learned and professional societies, many of which depend on publishing activities for their survival?

8.1 The Universities UK position statement raised the issue of the impact that emerging models might have on the future of learned and professional societies. The Royal Society has suggested that some of the smaller learned societies would be unlikely to survive without their publishing income under a fully open-access system and has predicted a negative impact on the work of the larger societies – including funding scientists and engineers and engaging in the promotion of science education. However, a significant number of not-for-profit publishers are adopting new business models that support freer, more open dissemination and access.

8.2 Of the 21,000 current or forthcoming peer-reviewed journals in the world, at least 9,250 are published by learned societies, professional associations or university presses. Learned societies often have an interest in the principle of open access as they seek the widest practicable dissemination of information in their disciplines. Many are also seeking to increase the availability of their journals online.

8.3 Learned and professional societies have generally supported two variants of the open-access model. The first, known as 'optional open access', is where authors have the choice of paying a fee to make their articles available on an open-access basis, or not paying this charge and reserving access to subscribers. Many learned society publishers also operate a system of 'delayed free access' where a journal's content is made freely available after a period (usually around six months). This system is now being used by 55 per cent of non-profit respondents according to a recent survey. For some years both non-profit and commercial publishers have also permitted authors to self-archive pre- or even post-publication versions of their articles on personal or departmental web pages, or in institutional or subject repositories.

8.4 Until now publishers have not seen any negative impact on the viability of their journals from open-access repositories, though evidence is currently limited. A recent study that aimed to shed some light on the issue found that 'there is no evidence to demonstrate any relationship (or lack of relationship) between subscription cancellations and repositories'[25]. However, some publishers (notably the Institute of Physics and the London Mathematical Society) have recently noticed that usage of their journal websites has dropped dramatically when their content is largely replicated in an archive.

8.5 Learned society publishers view open-access publishing as being an alternative business model, which may offer a viable way of recouping publication costs and making an adequate return to support other society activities. It is important however that the impact of a move towards new models of publishing on the societies continues to be monitored closely.

9. International developments

9.1 Scientific publication is an international endeavour and given the global nature of the market, any unilateral steps taken by the UK are unlikely to have a significant impact and may in fact prove to be counter-productive. As most high-impact journals are in fact published overseas, a strong international focus to this debate is needed so as not to disadvantage the UK research base.

9.2 Increasing the dissemination of research is a world-wide problem which requires world-wide solutions. Governments and universities worldwide are increasingly recognising that open access raises their research profile and contributes to national competitiveness.

9.3 The United States has recently witnessed a clear move towards open access which may in turn have a significant impact on the operation of UK journals. Many American funding agencies do not now allow the copyright for the work they have funded to be signed-over to private companies and require researchers to submit the final version of their paper to an electronic archive[26].

9.4 As discussed above, the bi-partisan Federal Research Public Access Bill of 2006 would, if passed by Congress, require US government agencies with annual extramural research expenditures of over US$100 million to make journal articles stemming from their funded research publicly available in digital archives on the internet. This legislation would allow free public access and long-term preservation and would prove critical to the future development of the open-access movement.

9.5 The Netherlands is the first country to establish open-access repositories as a national and government-funded initiative. Organised by SURF (the partnership organisation for information and communications technology in Dutch higher education), the Digital Academic Repositories (DARE) programme is a joint initiative of the Dutch universities to make all of their research results digitally accessible. By providing €2 million for the three-year programme, 2003-06, the Dutch government has given a strong boost to widening the provision of academic information in The Netherlands.

9.6 The open-access movement is now gaining widespread support across Europe. In a Communication adopted on 14 February 2007 on 'Scientific information in the digital age: access, dissemination and preservation', the European Commission agreed, in principle, that research data should be accessible to all. The Commission indicated that within Framework Programme 7, it would take measures to promote better access to the publications resulting from the research it funds. In December 2006, the European Research Advisory Board (EURAB) adopted its final report on *Scientific publication: policy on open access*. EURAB recommended that the European Commission should consider requiring all researchers funded under Framework Programme 7 to lodge their publications in an open-access repository as soon as possible after publication, and make these openly accessible within six months at the latest. It also suggests that the Commission should strongly encourage all member states to promote open-access policies for all their publicly funded research. In a statement on 'Open Access' the European Research Council Scientific Council supported the EURAB recommendations and called on research funding bodies across Europe to join forces in establishing common open access guidelines for the mandatory listing of research results from ERC grants. The UK higher education sector is working closely with the European University Association (EUA), which will advise the European Commission on the development of policy in this area.

9.7 It is worth noting that key academic bodies have already established organisations operating on an international basis, such as the Scholarly Publishing and Academic Resources Coalition (SPARC) and the Coalition for Networked Information. These organisations provide opportunities for the international academic community to regain control of scholarly publishing and could also be used as a vehicle for international negotiations with the publishing industry.

10. Conclusion

10.1 This briefing aims to provide an outline of some of the key developments in support of a more open approach to the dissemination of research outcomes. It is clear that much has been achieved so far that will bring about significant benefits to universities, their researchers and students. Ultimately this will benefit the economy and society as a whole.

10.2 Inevitably, the sheer pace of change and innovation in this area has presented new challenges, raised concerns and even led to resistance in some quarters. The issues and challenges identified in this briefing are not, however, insurmountable. Indeed, significant action to address them is already underway. Nonetheless, it will be important that further development across all areas of open-access agenda continues to be underpinned and guided by robust evidence. This will help to provide clear guidance of what researchers, universities, publishers, public funders of research and governments can do to consolidate and extend the significant progress that has already been made. It will also indicate how new and innovative practice that supports the free access and dissemination can be encouraged and supported.

The contents of this report are the sole responsibility of Universities UK, though it has been prepared with input from a number of stakeholders including the Joint Information Systems Committee (JISC), SHERPA (Securing a Hybrid Environment for Research Preservation and Access), the Research Information Network (RIN) and the Association of Learned and Professional Society Publishers (ALPSP).

Annex A
Current list of institutional repositories

- University of Aberdeen – Aberdeen University Research Archive (AURA)
- University of Bath – Bath Eprints
- University of Birmingham – EPrints Service
- University of Bristol – Bristol Repository of Scholarly Eprints (ROSE)
- British Library – EPrints
- University of Cambridge – DSpace @ Cambridge
- Cardiff University – Cardiff ePrints Caerdydd
- CCLRC – (Council for the Central Laboratory of the Research Councils) – CCLRC ePublication Archive
- Cranfield University – Cranfield QUEprints
- University of Durham – Durham E-Print Repository
- University of Edinburgh – Edinburgh Research Archive (ERA)
- University of Glasgow – Glasgow ePrints Service
- Lancaster University – Lancaster ePrints
- University of Leicester – Leicester Research Archive
- London LEAP Consortium
  - Birkbeck College – Birkbeck ePrints
  - Goldsmiths College – Goldsmith's ePrints
  - Imperial College – Imperial Eprints
  - Kings College – King's ePrints
  - London School of Economics – LSE Research Online
  - Royal Holloway – Royal Holloway Research Online
  - School of Oriental and African Studies – SOAS Eprints
  - University College London – UCL Eprints
- Loughborough University – Loughborough University Institutional Repository
- University of Manchester – MMS Eprints
- Manchester Metropolitan University – e-space
- Middlesex University – Middlesex University Digital Repository
- University of Newcastle upon Tyne – Newcastle University Library E-Print Pilot
- University of Nottingham – Nottingham ePrints
- Open University – Open University E-prints Service
- University of Oxford – Oxford Eprints
- University of Portsmouth – University of Portsmouth Eprints Archive
- School of Pharmacy, University of London – eprints.pharmacy.ac.uk/
- St Andrews University – St Andrews Eprints
- University of Southampton – e-Prints Soton
- University of Stirling – University of Stirling Digital Repository
- University of Strathclyde – University of Strathclyde Institutional Repository
- University of Surrey – UniS Scholarship Online
- University of Wales, Aberystwyth – University of Wales Aberystwyth Repository
- University of Warwick – CSC Eprints
- White Rose Partnership (Universities of Leeds, Sheffield and York) – White Rose Consortium ePrints Repository
- University of Wolverhampton – Digital Repository of the University of Wolverhampton

Annex B
Practical issues for higher education institutions

How much does it cost to set up a repository?

SHERPA has suggested that the cost of setting up a basic individual repository for each higher education institution (as shown below) is comparatively small. The software is free – there are several packages available, all of which are freely downloadable. The software can be installed on a standard server, costing about £1,500. It takes a computer officer between two and five days to get the system up and running (at a cost of around £600 for the time).

Summary of costs (per institution)

Installation costs:	£
Server	1,500
Software	0
Installation (5 days)	600
Customisation (15 days)	1,800
Total per institution	3,900
Ongoing maintenance costs:	
Technical support	Absorbed by institutional IT services
Supported archiving service	£35,000 per year
Upgrades/migrations	£3,900 every 3 years
Digital preservation	Significant costs (applies to all digital objects)

What resourcing would be required to maintain the repositories?
While the technical maintenance costs of a repository would be minimal, populating the repository would be an ongoing cost. There are three ways of doing it. The first is that authors archive their own material as and when it is produced, they use a specially designed web interface (available as standard in repository software). The second way is that someone is employed (perhaps within the university library) to deposit items on behalf of researchers. Another way might be that departmental administrative support staff could carry out the role for their department. In reality, a mixed economy may develop, with a variety of academic authors, research assistants, departmental officers and library personnel depositing papers.

SHERPA recognises that the major costs here would be promoting the service and persuading academics to deposit articles in the repository. This cost would, of course, be removed if there was a mandate from all funders that publicly-funded research had to be made publicly available in this way, which SHERPA, JISC and CURL (the Consortium of Research Libraries in the British Isles) have recommended. The concept of open access to research material is widely supported by academics. Research shows that most academic authors (over 80 per cent)[27] would be willing to deposit their materials in a repository if this kind of mandate was introduced across the board.

In the longer term (20 to 50 years), the big costs are likely to be the preservation of the digital files. These costs are, of course, not unique to repositories and apply to all electronic resources intended for long-term use. The British Library and University College London Library Services have therefore been funded by JISC to develop costing models for digital preservation. It is hoped that this research, using indicative case studies, will seek to identify the true costs of digital curation[28].

What support is available to institutions?
So far, over 200 institutions worldwide have taken advantage of free, open-source software packages to implement institutional repositories. As the amount of content in the growing number of repositories continues to increase, new services are being developed to make use of this content. A number of academic search engines, such as Google Scholar, are being developed that can search over a number of worldwide repositories simultaneously, thus allowing researchers and other users to be able to source material no matter where it has been deposited.

SHERPA is currently engaged in discussions with JISC on the establishment of a UK-focused search service for open-access material, which would serve as a quality filtered search service, accepting papers and articles only from recognised academic institutional repositories worldwide. This service would have the advantage of acting as a 'one stop shop' for all open access research outputs in the UK.

How practicable would it be to establish a network of UK repositories?
SHERPA has argued that establishing such a network would be very practicable. The investment made by the funding councils through JISC in recent years has already ensured that universities are acquiring the skills to run research repositories on behalf of their institutions and the costs of doing so are comparatively low, as demonstrated previously.

The establishment of repositories has already become widespread. Forty-one higher education institutions (more than a quarter) currently have institutional repositories in place. Annex A gives a list of current institutional repositories.

Higher education institutions are also collaborating in the development of repositories across a range of institutions. For example, the White Rose Consortium e-prints repository combines the research outputs of the Universities of Leeds, Sheffield and York and the London LEAP Consortium brings together the outputs of the major colleges of the University of London, which are shown as individual repositories. The models that are being used by the London LEAP and White Rose Consortiums could serve as a guide for higher education institutions which may wish to follow this approach and SHERPA can advise on how this might be adapted according to individual needs.

SHERPA is currently working with JISC's EDINA Data Centre on the development of a national repository to allow academics working at institutions without repositories to deposit their material in a national open-access repository. As the development of institutional repositories becomes more widespread, these articles would then be transferred into the relevant institutional repository. The purpose would be to provide an open-access service to individual academics and so to create a level playing-field for all UK researchers in taking advantage of open-access dissemination.

Notes

1 Office of Science and Innovation (2003) *The forward look 2003, Government funded science, engineering and technology*. London

2 Organisation for Economic Co-operation and Development (OECD) (1997) *National Innovation Systems*.

3 House of Commons Science and Technology Committee, (2004) *Scientific Publications: Free for all?* Tenth Report of Session 2003-04 Volume 1: Report, The Stationery Office

4 European Commission (2006) *Study on the economic and technical evolution of the scientific publication markets in Europe*, Final report, January

5 The Wellcome Trust position statement, http://www.wellcome.ac.uk/doc_WTD002766.html

6 RCUK position statement, http://www.rcuk.ac.uk/cmsweb/downloads/rcuk/documents/2006statement.pdf

7 This applies to the Biotechnology and Biological Sciences Research Council (BBSRC), the Economic and Social Research Council (ESRC), the Medical Research Council (MRC), the Natural Environment Research Council (NERC) and the Particle Physics and Astronomy Research Council (PPARC). The Council for the Central Laboratory of the Research Councils (CCLRC) also 'strongly encourages' self-archiving. Please see http://www.rcuk.ac.uk/access/index.asp and individual research council websites for further details.

8 For example, the Royal Society has now launched an open access journal, which will make its new scientific papers available to readers free of charge for the first time. The world's largest particle physics laboratory, CERN, has also published a policy statement requiring researchers to deposit a copy of their published articles in an open access repository, and encouraging its researchers to publish their articles in open access journals where possible.

9 See Universities UK position statement on open access at http://www.universitiesuk.ac.uk/openaccess/

10 Developments in this area are fast moving and this briefing can only at best provide a snapshot. This briefing will be updated periodically.

11 The debate focuses primarily on articles reporting scientific, technical and medical research.

12 Department of Trade and Industry (2002) *Publishing in the knowledge economy; competitiveness analysis of the UK publishing media sector*, Crown Copyright

13 Office of Fair Trading (2002) *The market for scientific, technical and medical journals: A statement by the OFT. London, OFT; Science and Technology Committee Report* (2004); European Commission report (2006), *ibid*.

14 Established with funding from the CURL and JISC.

15 See Government Response to the Science and Technology Committee, Scientific Publications: Free for all?, *ibid*.

16 As requested by the Science and Technology Committee Report (2004), *ibid*.

17 A pre-study commissioned by the Research Information Network (RIN), RCUK and the Department of Trade and Industry, *An Evidence-Based Analysis of Data Concerning Scholarly Publishing*, reported in September 2006.

18 *ibid*.

19 Open peer review is where the referee is identified to the author and this method of reviewing is used by American Psychological Association. However, some scholars might refuse to referee openly and indeed, while the *British Medical Journal* uses a system of open peer review, its specialist journals do not, as the British Medical Association has been unable to convince the editors to change their processes. "Double-blind" refereeing is where the author's identity is hidden from the referee and this system is used by the American Psychological Association. It is considered that this might result in greater objectivity on the part of reviewers as the author is, at least in theory, unknown to the reviewer. However, the value of double-blind refereeing is somewhat debateable as the authorship may be obvious to a knowledgeable reviewer.

20 The SHERPA website provides details of publishers' current policies on self-archiving and copyright at http://www.sherpa.ac.uk/romeo.php.

21 The Biotechnology and Biological Sciences Research Council (BBSRC); the Council for the Central Laboratory of the Research Councils (CCLRC); the Economic and Social Research Council (ESRC); the Medical Research Council (MRC) and the Natural Environment Research Council (NERC). Please see http://www.rcuk.ac.uk/access/index.asp and individual Research Council websites for further details.

22 The new SHERPA Juliet service supports RCUK-funded researchers by explaining what each UK research council requires and details the policies of the Wellcome Trust and the US National Institutes of Health.

23 Antelman, Kristin (2004) 'Do Open Access Articles Have a Greater Research Impact?' *College & Research Libraries News* 65(5): pp. 372-382.

24 The physics community has used an archive in the USA for fifteen years (ArXiv) and it is estimated that it now holds as open access one third of global physics research.

25 RIN/RCUK/DTI 'Evidence-Based Analysis of Data Concerning Scholarly Journal Publishing: A Final Report' (September 2006)

26 Since October 2005, the National Institutes for Health (NIH) – the primary Federal agency for conducting and supporting medical research in the US – has implemented a Public Access Policy requiring NIH-funded investigators to submit to PubMed Central (PMC) an electronic copy of the author's final version, peer reviewed manuscript upon acceptance for publication. Within a maximum of 12 months after the article's publication, the manuscript would then be readily accessible to the public through PMC.

27 Swan, A. and Brown. S (2005), *Open Access Self-Archiving: An Author Study*, Key Perspectives Ltd

28 See www.ucl.ac.uk/ls/lifeproject/

About Universities UK

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