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Opportunities and Challenges

A Handbook

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The only changes made to the original German edition are updates on the information concerning the authors' affiliations. The present publication thus reflects the debate in early 2007. In the meantime, amendments to German copyright law, the so-called 'second basket' ('zweiter Korb') of the implementation of the EU directives mentioned in several articles, have been adopted (5 July 2007).

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Foreword by the European Commissioner for Science and Research

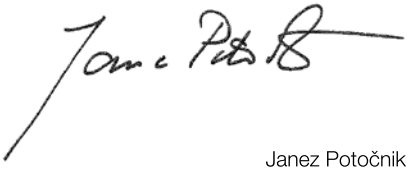
We live in a digital age that has opened up unprecedented opportunities for the dissemination of scientific knowledge. Sharing this knowledge efficiently is crucial for the future of European research.

One much debated way of sharing scientific information, and in particular peer-reviewed academic publications, is open access.

In 2006, the European Commission's Directorate General for Research commissioned a study investigating the scientific publishing market in Europe[a]. In 2007, the European Commission adopted a Communication which acknowledges the need for new initiatives leading to wider access to and dissemination of scientific information[b]. I am pleased that EU Member States entered the debate in 2007 by adopting Council Conclusions calling for the reinforcement of national strategies and enhanced co-ordination between Member States regarding access, preservation and dissemination policies and practices[c].

The debate on open access is controversial and complex, with stakeholders displaying widely contrasting opinions. I strongly believe that we must work towards solutions that offer the research community rapid and wide dissemination of results. At the same time, I am convinced that there must be fair remuneration for scientific publishers who invest in tools and mechanisms to organise the flow of information and the peer review system.

I welcome this handbook which presents the various views of major stakeholders and covers a wide range of issues relevant to open access. I view it as a very useful and timely contribution to the debate on open access.



Janez Potočnik

[a] http://ec.europa.eu/research/science-society/pdf/scientific-publication-study_en.pdf.
[b] http://ec.europa.eu/research/science-society/document_library/pdf_06/communication-022007_en.pdf.
[c] http://ec.europa.eu/research/science-society/document_library/pdf_06/council-conclusions97236_en.pdf.

Preface by the President of the German Commission for UNESCO

Knowledge is increasingly important for the development of the individual and society in an ever more globalised world. One of the primary goals of UNESCO is therefore to build up modern knowledge societies in which all people can participate in information and knowledge. At the same time the protection of intellectual property is a major concern, with the aim of ensuring creativity as a core sphere of culture.

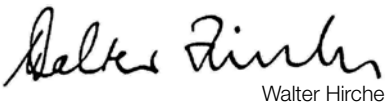
Today, the Internet allows access to information worldwide and at any time. Simultaneously, university libraries' warnings that they can no longer fully meet their responsibility of providing information because of considerable price increases in subscriptions to academic journals are increasingly urgent. In other words, the development of new models of information provision is not only possible, but necessary if access to knowledge and culture is to be secured as one of our most important resources.

In this connection, Open Access is one of the models under discussion. Can and should access to publicly funded academic knowledge be free of charge to the user?

This question is being hotly debated. It has implications for educational, research, legal and economic policy. Without a doubt, individual educational opportunities will be enhanced and innovation promoted if access to knowledge is facilitated in this way. At the same time, there may well be a justified interest in the commercial exploitation of academic results, for example when research is partly financed by private funds.

These few aspects suffice to show that the debate on Open Access must be held on as broad a social basis as possible. The present handbook is designed to contribute to this debate. It provides an interested public with information on Open Access, a subject which, despite its great social importance, has hitherto been mainly discussed by experts.

This handbook is the result of a workshop bringing together 25 experts. These workshop participants — coming from German Federal Ministries, the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany, the European Commission, the academic community, major academic organisations, the publishing sector, and the Open Access community — discussed the structure and contents of the present publication. I would like to express my thanks to them, and to the numerous authors of this handbook. I should also like to thank the German Federal Foreign Office for its support of both the workshop and the publication.



Walter Hirche

Message from the Commissioner for Culture and Education at the German Federal Foreign Office

The issue of Open Access is no longer a matter just for specialists, it is now firmly on the European political agenda. In February 2007 – during the German EU Presidency – the European Commission published a Communication on scientific information in the digital age. The Open Access issue has considerable implications also for cultural relations and educational policy, as became clear at a conference held at the Federal Foreign Office in October 2006 under the motto "Investing in People – the role of culture and education in German foreign policy". The purpose of the conference was to bring together representatives of the political, business, academic and cultural communities to discuss, in the cultural relations and education context, the difficult balance to be struck in a modern information society between, on the one hand, copyright and the protection of intellectual property, and on the other, the principle of unhindered access to science and education.

Given the variety and number of participants in the Open Access debate – academics in a host of different disciplines, scientific organisations, libraries and publishers and so on – as well as the sheer complexity of the issues involved, a wide-ranging and intensive discussion is clearly indispensable.

I therefore greatly welcome the initiative of the German Commission for UNESCO – a Federal Foreign Office partner organisation – to publish a handbook designed to draw the attention of a wider public to the opportunities and challenges of Open Access. The idea for such a handbook was elaborated at a workshop for stakeholders in the Open Access debate organised by the German Commission for UNESCO on 26 January 2007 at the Federal Foreign Office during the German EU Presidency.

I am most grateful to the German Commission for UNESCO as well as the handbook's authors and the experts who took part in the workshop for their commitment and hard work. The Federal Foreign Office is pleased to have supported both the workshop and the handbook.

Rolf-Dieter Schnelle

Introduction: *Quo vadis,* Knowledge Society?

By Richard Sietmann, Science Journalist

Science and scholarship, in other words, the creators of knowledge, consist in large measure in the processing of information. New knowledge arises through the study of existing works, exchange of ideas, the linking of ideas and networking with other disciplines. Any restriction of access to academic information hinders the process of obtaining new insights and making new discoveries whose usefulness cannot be determined in advance. The publication of results and the accessibility of publications are therefore a precondition for the efficiency of the research process.

However, the following developments have created difficulties for traditional publishing: worldwide, more than one million peer-reviewed published articles appear in some 23 000 academic journals, about 90% of which are available online[1]. The industrialised world is suffering an information overload. The number of published articles has truly exploded following a 'publish or perish' logic. In view of drastic increases in costs, libraries can no longer guarantee a comprehensive supply of literature, and researchers are finding it more and more difficult to get an overview of the relevant publications in their field.

Until now, the publication of research information on the Internet has largely followed the subscription model of printed journals. Academic institutes pay for online access so that faculties and students can consult the articles without financial constraints. For their research, however, the scientists, scholars and students must also turn to individual search engines of rival academic publishers such as Reed Elsevier, Thomson Scientific, Springer, or Wiley, in order to rustle up the relevant articles for their particular field of interest, a process that lags behind the potential of information technology. Though academic meta-search engines such as Google Scholar or Vascoda allow searches beyond the confines of individual publishers, the retrieval will only be successful if the links resulting from specific searches lead to the full text versions of articles, or access to them is covered by a subscription paid by the researcher's library or institute.

As no research institution or library can afford to purchase all electronic journals, faculties and students often find themselves in the same situation as ordinary citizens. Browsing in the research landscape ends at a publisher's portal where it may cost 25 or 30 euros to download a complete article. For this pay-per-view procedure, payment is as a rule by credit card, and the reader will not know until after paying whether the article was worth the price charged.

[1] Ware, Mark, 'Scientific Publishing in Transition: An Overview of Current Developments', 2006. http://www.zen34802.zen.co.uk/Scientific_journal_publishing_-_STM_ALPSP_White_Paper_140906.pdf.

Researchers, interested lay people, inventors, patients, teachers and journalists are all confronted with a tollbooth at the entrance to the gardens of knowledge when seeking the latest state of knowledge for private or professional reasons. For many users, this is a paradoxical situation: never before has scholarship had at its disposal such a platform for knowledge-networking as is offered by the Internet, but at the same time the transfer of the traditional publication system to cyberspace goes hand-in-hand with exclusive rights of access. Reputable scholars and scientists see these barriers to access as ultimately endangering precisely what constitutes the generation of new knowledge in that they hinder the free exchange of thoughts and ideas which is a *sine qua non* condition of research[2]. By contrast, a declaration submitted by publishers of scientific, technical and medical journals states that 'copyright protects the investment of both authors and publishers', and that 'respect for copyright encourages the flow of information and rewards creators and entrepreneurs'[3].

E-Science

In the light of this situation, some progress has been made. Since it is relatively easy to operate a website as an electronic journal, many scholars and scientists have become active in this field. With the help of software tools and editorial systems that organise the processing of manuscripts from submission to the review process and all the way to final approval, they have established independent communication platforms for their communities. The Directory of Open Access Journals now lists more than 2 500 freely accessible journals, amounting to about 10% of all scientific journals[4]. Responding to this development, a number of publishers are now also offering authors the option of making their articles freely accessible electronically on payment of a fee through an 'author pays' rather than a 'user pays' model.

While many Open Access journals are using the 'author pays' model to transfer traditional journals to the Internet, totally different forms of publication are beginning to appear. In many cases, electronically written dissertations are already accessible online, for example, via Dissertation Online[5] at the German National Library (Deutsche Nationalbibliothek) in the case of Germany. Increasingly, scholars and scientists are uploading presentations, survey articles, position papers or lecture scripts onto their own homepages, institute server or onto external electronic archives as so-called 'grey literature'. On a broad variety of conditions, some publishers already allow authors

2 Open letter by 25 Nobel prize-winners to the US Congress: http://www.fas.org/sgp/news/2004/08/nobel082604.pdf.
3 Brussels Declarations on STM Publishing. http://www.stm-assoc.org/brussels-declaration/.
4 http://www.doaj.org (as of March 2007, 2597).
5 http://www.dissonline.de.

to publish their manuscripts in so-called repositories before peer review (preprints) or after publication in a journal (postprints). This procedure is not uncontroversial. In the above-mentioned declaration, publishers complain that 'self-archiving' of manuscripts accepted for publication in freely accessible repositories risks destabilising subscription income and undermines peer review.

The Directory of Open Access Repositories already lists 852 repositories, about half of which are operated by research institutes and libraries in Europe, and one-third in North America[6]. Such repositories additionally open up the possibility of making original research data accessible, and of preserving them in the long term. For it is precisely with the masses of data obtained at great expense from satellite missions, global sensor networks or large-scale basic-research experiments, as well as clinical studies and statistical surveys, that traceability, plausibility and re-use by colleagues in the field is increasingly important. As actors such as advocates of Science Commons emphasise[7], repositories that are 'open archives' transcend the role of publication servers for journal articles by far; indeed, they can become the nodes of a novel kind of network, a kind of Web 2.0 for research, which is often known as 'E-Science' (Enhanced Science). This notion refers to a service infrastructure for access to primary scientific data and for net-based forms of collaboration. According to this vision, scientists and scholars will be able to form project-related virtual organisations based on tools and services for cooperative work, media-integrating procedures of 'information mining', and access to widely-distributed heterogeneous collections of data, as is already practised by high-energy physicists for their experiments.

The migration of academic publishing to the Internet is thus more than just a change of medium for specialist communication in which e-mails replace postal services, publishers' portals assume the function of libraries, and PDF downloads replace the photocopying of articles from journals. It exposes hitherto concealed structural conflicts, primarily in regard to the question of who in the system pays precisely how much for what. Should scientific and technical information obtained with taxpayers' money in public institutions or on the basis of publicly funded projects be a free commodity? Or is it 'a commodity, which, as an information product or service, is traded and sold, and in other words has a market'[8]? Toll Access or Open Access — the two concepts seem to be irreconcilably opposed. In addition, electronic publishing poses a severe test for the actors' traditional understanding of their roles.

6 http://www.opendoar.org (as of March 2007: Europe 419, North America 279).
7 http://sciencecommons.org/projects/data.
8 Programme of the German Federal Government, '1996–2000 Information als Rohstoff für Innovation', BMBF, 1996, p. 19.

If access is to be free of charge for the end-user, who will ensure the adequate quality of the product? Who will provide and pay for the infrastructure necessary for its presentation, access and storage?

Role distribution

Traditionally, publishers perform these services. They organise the peer-review process and develop new journals as a communication platform for the specialist community, in view of the increasing fragmentation of academic disciplines. In these activities, major publishing companies whose prime obligation is to maximise the shareholder value compete with small publishers and 'non-profit' publishers set up by learned societies that plough their profits straight back into the academic activities of the societies. In the opinion of STM (science, technology, and medicine) publishers, the market for scientific publications needs no state intervention. 'Authors should be free to choose where they publish in a healthy, undistorted free market'[9].

In contrast, advocates of Open Access argue that academic publishing is very different from the rest of the media sector. They point out that in this sub-market, the public sector is present both as a supplier and a customer. It pays for the research and the documentation of the results, finances peer review by paying the salaries of the referees, and enables libraries to purchase journal subscriptions. Moreover, unlike copyright-holders in the media sector, scholars and scientists are usually not paid for the articles in which they document the results of their research, but make their work freely available. Their remuneration comes in the form of their reputation and their recognition by the academic community, which cannot be directly measured in financial terms. They are at the same time 'content providers' and researching readers, and in this double role it is in their natural interest that both their own results, as well as those of their fellow researchers, be disseminated as widely as possible.

The crisis and financial pressure in the information-provision sector are, however, not a direct incentive for most scientists and scholars to exert any active influence on developments, because they do not have to bear the cost of the publication system themselves. Researchers need publications for their career advancement, but they do not pay for subscriptions themselves. Their interest is confined to being published in reputable journals. As readers, in turn, they are mainly interested not in the journal, but in the contributions of their fellow researchers, regardless

9 c.f. footnote 3.

of where these are published. (In this context a small number of journals, for example *Science* or *Nature* for the STM field, constitute an exception in that they link refereed articles with editorial content and provide their readers with additional information on research policy and academic controversies.)

Libraries are the most affected by the changes described. Their classic mediating function becomes a dilemma in the context of the virtualisation of information supply, which now takes place in a paperless form via the web and is no longer tied to buildings and opening-times. In the Toll Access scenario, in which access is possible exclusively via the web portals of commercial publishers, as far as journals are concerned, libraries would have no more than the role of museums of the Gutenberg cultural legacy. They would administer the material from pre-Internet days, or maybe act as brokers negotiating digital-rights management conditions with publishers on behalf of affiliated institutions. In the other scenario, they would be the actor which, as operators of institutional repositories, would be responsible for the administration, conservation and long-term storage of research results in digital archives, thus ensuring the preservation of this cultural asset for future generations.

In both cases, it is the taxpayer who bears the costs. For example, in the context of an 'author pays' model, the author or his or her institution pays the publisher for services rendered in the form of publishing the article and disseminating the results. Therefore, the costs would simply be shifted from one branch of the public sector to another, namely from the library budget to the research budget. In the transitional period, in which the two systems co-exist side-by-side, this would require extra funds, or, if subscriptions to electronic journals were cancelled, it would lead to gaps in the availability of scientific and scholarly information.

In the present phase of upheaval, therefore, we clearly need to ask not only about return on investment, but also about the optimum structures for the supplying of information in the knowledge society. The transformation of academic publishing from the Gutenberg Galaxy to cyberspace demands of all those involved that they redefine their role within the system. The forthcoming changes will make it necessary to take into account a large number of technical, legal and economic factors. In the definition of their new role, all actors depend upon each other. In the following chapters, light will be cast on the opportunities and risks of the possible paths of development from the differing

points of view of these concerned actors. This handbook thus seeks to make a contribution to meeting this challenge.

It is subdivided into five chapters: following an explanation of the terms and the origin of Open Access in Chapter 1, three innovative publication models are introduced in Chapter 2. Chapter 3 deals with the questions raised by the implementation of Open Access: what are the challenges of archiving on the Internet? How will quality be assured if the traditional peer review process becomes less important? Who will pay for the publication process if access to information is free of charge to the user? How is copyright affected by Open Access? How will Open Access change the structure of academic communication? Chapter 4 presents position statements by institutions judging Open Access from their own perspective, while Chapter 5 presents an overview of the international scene.

CHAPTER 1:

Definition and Origin of Open Access

The Concept of Open Access

By Norbert Lossau, Göttingen State and University Library

The principle of free access to academic knowledge

A first approximate definition of the term 'Open Access' is free access to knowledge at no charge to the user. In the current debate, 'knowledge' refers primarily to publicly funded academic knowledge. This handbook also concentrates on the academic sector. The question of an extension of the term to other spheres, for example to the media or to development policy, is dealt with briefly in a few position statements in Chapter 4.

In Germany and elsewhere, the Open Access debate is largely determined by the 'Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities'[10]. It was issued in Berlin in 2003 by the major German academic organisations, and has since found many signatories.

What is meant by 'knowledge'? The Berlin Declaration defines this term very broadly. According to its definition, knowledge is not just the actual research publication, but includes a whole variety of other digital media and objects, as well as research data. A publication should be available as 'a complete version with all supplementary materials'. This definition goes beyond authors', publishers' and libraries' traditional understanding of a publication.

What is meant by 'access'? Here too, the Berlin Declaration adopts a broad definition: authors and rights owners should allow all users the 'free, irrevocable, worldwide, right of access' and give them the 'permission to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship [...], as well as the right to make a limited number of printed copies for their personal use'.

Open Access in practice

In the wake of the Berlin Declaration, two basic forms of implementation have established themselves, with a focus on academic journals:

1. the 'green road': deposit of copies of already published, peer-reviewed research articles in university or research institute repositories;
2. the 'golden road':
   a. publication by Open Access publishers or in Open Access journals, financed either upfront through publishing fees (e.g. BioMed Central) or through public funds (e.g. Digital Peer Publishing Initiative DPPI);

[10] http://www.mpg.de/pdf/openaccess/BerlinDeclaration.html.

b. the parallel publication of books in printed form (for a fee) and in an electronic version (free access) in Open Access publishing houses, in particular university presses.

What is meant by Open Access

The first signatories to the Berlin Declaration were well aware of the far-reaching significance of their demands – and probably no less aware of the problems of implementing them. This explains the visible discrepancy between the uncompromising proclamation of the principles and the cautious choice of words actually used for the section entitled 'Supporting the Transition to the Electronic Open Access Paradigm'. The subsequent lively and often polemical debate about Open Access and the appropriate way to implement it continues to this day, and, as expected, has made very clear a number of problems.

The further coining of the term is strongly influenced by the respective understanding of Open Access on the part of the three main groups of actors, namely authors, publishers and libraries, and this understanding in turn is influenced by their specific experiences, expectations and fears with respect to knowledge dissemination.

The attitudes of academic authors are characterised by the different cultures of their disciplines and offer a heterogeneous picture, as the following examples will show.

Natural and Life Sciences

In the natural and life sciences, the academic journal is the relevant medium. As users, however, natural and life scientists increasingly come up against its limitations. Free access for the individual researcher via library subscriptions is no longer guaranteed as subscriptions are being cut back severely due to cost increases on the one hand and reduced library budgets on the other. As subscriptions decline, so does the number of readers and thus the visibility of research results within the scientific community.

A novel area addressed by the Berlin Declaration is that of access to raw and primary data, which to date scientists have generally closely guarded and kept under lock and key. Advocates argue that Open Access could contribute to good scientific practice through the dissemination of these data, which could be of increasing relevance in the natural and life sciences in view of a number of spectacular cases of scientific fraud in recent years.

Humanities and Social Sciences

For historians, philosophers, philologians and linguists, archaeologists, musicologists, as well as jurists and economists, the printed book continues to be the primary medium for disseminating research results. In these disciplines online media are used primarily as research instruments. Access is in principle guaranteed, if not in the local library, then with some delay via inter-library-lending schemes or document delivery from other libraries. Instead of concrete access, the emphasis in the humanities and social sciences is on the potential of electronic publishing[11], for example greater publication speeds, the uniting of different media (text, pictures, speech, film etc.) and the development of new 'types of text' (hypertext). Academics in these disciplines are thinking not so much of replacing the print medium as of usefully supplementing it. While Open Access is welcomed as a basic principle of academic information infrastructure, it is not a primary goal in itself.

Publishers

At first sight, the publishers' understanding of Open Access seems unambiguous: commercially damaging and, at worst, life-threatening since income is traditionally generated precisely via access[12]. In particular, it is alleged that Open Access means lack of quality assurance. Publishers' actual practice vis-à-vis Open Access, however, is far more differentiated. In the natural and life sciences, numerous publishers already allow parallel storage of the author's final corrected version[13]. Alongside declared Open Access publishers such as BioMed Central, other publishers offer authors an Open Access option for accepted articles. The starting point for the implementation of Open Access varies widely. While large STM publishers already offer their journals online, considerations of cost have so far stopped many publishers in the humanities and social sciences from going down this road. Readiness to cooperate with partners from the business world and in particular the public sector (especially academic libraries) is growing in an effort to take the plunge into Internet publishing.

Libraries

Securing comprehensive access to knowledge is one of the specific tasks of libraries, both in the public and the academic sphere. The German Library Association was among the first signatories to the Berlin Declaration. The appearance of Open Access has taught libraries a great deal about the working methods of scientists and scholars and has at times put them on a collision course with publishers, who traditionally have been their good partners. Today, public institutions are the ones primarily building up an infrastructure in the spirit of the

11 As referred to at the symposium staged by the Europäische Akademie Bad Neuenahr "Elektronisches Publizieren in den Geisteswissenschaften" (30-31 March 2007). http://www.ea-aw.de/susanis/index.php?lang=EN.

12 http://www.stm-assoc.org/brussels-declaration.

13 cf. the SHERPA/ROMEO database at http://www.sherpa.ac.uk/romeo.php; for German publishers: http://www.dini.de/oap and www.open-access.net.

Berlin Declaration to secure reliable and sustainable access to knowledge in the sciences and humanities. They are doing so as operators of institutional repositories and their national and international networks, as sponsors of university presses, or as partners of scientists and scholars in the organisation and operation of Open Access journals. However, libraries are also increasingly approaching publishers with a view to trying out alternative business and payment models[14], or else are proposing their partnership and support in 'going online', in particular to small and medium-sized publishing houses.

Libraries deal with one aspect in the context of Open Access only marginally: access to the cultural heritage, which is also created by libraries alongside museums and archives. Libraries notice that they themselves still have major deficits in the networking of their services: while in principle scientists and scholars have Open Access, this access can in practice be laborious in view of the numerous isolated digitalised collections. Libraries share with publishers the insight that digitalisation and permanent online provision will require a major financial contribution, which could certainly come from the public purse, but could also be recouped via 'customers'[15].

Summary

The Open Access principle has found numerous supporters. The implementation of a vision of a worldwide networked knowledge society, however, is still in its infancy. A translation of the concept of Open Access in a way that allows all involved actors to find their roles in the new system and does not threaten their very existence is decisive for its success or failure.

[14] A consortium of research organisations and libraries, SCOAP3 (Sponsoring Consortium for Open Access Publishing in Particle Physics), is currently negotiating with various publishers in order to recast the financing of journals in this field completely from a subscription model to pre-payment for the publication process.

[15] For example, the association of 14 libraries, '*DigiZeitschriften*', offers digital access to more than 100 journals digitalised by publishers, and is financed via institutional subscribers. http://www.digizeitschriften.de.

Open Access – A Historical Survey

By Peter Schirmbacher, Department of Library and Information Science, Humboldt-Universität zu Berlin

'Our mission of disseminating knowledge is only half complete if the information is not made widely and readily available to society. New possibilities of knowledge dissemination not only through the classical form, but also and increasingly through the Open Access paradigm via the Internet have to be supported.' This is a statement in the 'Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities' of October 2003[16], signed by all the leading German academic organisations and funding bodies, and in the meantime also by 227 academic institutions worldwide.

This declaration is well-known to many people, because it launched the notion of Open Access not only in Germany but worldwide. More than three years have elapsed since this conference in Berlin, and these years have made it clear that the path from public perception to constructive implementation can be a long one. On the other hand, three years is a relatively short time in light of the fact that unhindered access to the results of academic research has always occupied mankind. For a long time, the question was one of technical barriers to duplication. These were to some extent broken down only in 1452 by Gutenberg's invention of 'movable types'. Of no small importance was the quality of local libraries, which was decisive in determining whether one had a chance of getting hold of the latest insights of the academic community or not. Of course it has always been and still is a question of publishing economics, which even in the academic world was and is determined by supply and demand. These aspects make it clear that, in the past, preconditions and chances of realisation precluded raising the question of free access to academic information.

The decisive difference today lies in the possibility to digitise research results and thus the real option of placing them at users' disposal worldwide via the Internet. Thus the technical barriers to free access have come down. The greatest upheaval in the history of academic communication is currently under way, and it has forced a debate about a new culture of academic publishing. One component of the discussion is the confrontation with the question of whether and how we organise access to information. Technically, digitisation and the Internet create the preconditions to allow free worldwide and unrestricted access to knowledge as it appears. However, this presupposes that we can answer the question of who will bear the costs involved, as in any other form of publishing. There is a whole variety of publishing business models, which will be examined in greater detail later in this book.

[16] http://www.zim.mpg.de/openaccess-berlin/BerlinDeclaration_dt.pdf.

It should be noted, however, that the upheaval in academic communication demands more than just the solution to an economic problem. The rules governing concerned actors as well as their behaviour have developed over hundreds of years. An upheaval on this scale is not easy to cope with, for almost any change carries its own dangers and can bring not just benefits for all those involved, but also effects that cannot be immediately foreseen. Criticism of Open Access comes not only from established academic publishers, but also from authors who fear for their income from authors' contracts. Above all, the system of assessing scientific and scholarly performance, which has hitherto been organised by the publishers, could go off the rails if anyone could simply upload results on to the Internet, and if there were no longer any kudos in having articles published in reputable academic journals.

The development of the Open Access initiative makes clear the stages in the upheaval of the academic communication system. Peter Suber, one of the main voices of the Open Access initiative, has worked out a 'Timeline of the Open Access Movement'[17], in which many details and basic data of the evolution to date are listed. The conference mentioned at the beginning of this section culminating in the Berlin Declaration was the third to be held on this subject. The first conference to deal with the matter was organised by the OSI (Open Society Institute) in Budapest in December 2001. The scientists and scholars who took part in it had set themselves the goal of finding a way to bring together existing Open Access activities and, as a first step, to determine the kinds of academic literature for which free access should be made possible. On 14 February 2002 a corresponding call to an initiative appeared, which in the meantime (as of March 2007) has been signed by 4 391 individuals and 391 academic organisations: 'An old tradition and a new technology have converged to make possible an unprecedented public good. The old tradition is the willingness of scientists and scholars to publish the fruits of their research in scholarly journals without payment, for the sake of inquiry and knowledge. The new technology is the Internet. The public good they make possible is the world-wide electronic distribution of the peer-reviewed journal literature and completely free and unrestricted access to it by all scientists, scholars, teachers, students, and other curious minds.'

This call has generally been described as the 'birth' of the Open Access initiative, although this does not do justice to all the activists who, years earlier, had strongly supported free access to academic information. It is often forgotten

[17] http://www.earlham.edu/~peters/fos/timeline.htm.

or overlooked that this first call was only concerned with guaranteeing free access to journal articles which had already undergone the peer review process and which, in parallel with publication in the journal, should be made freely available on the Internet. As a rule, this concerns only those authors who cannot expect any royalties or fees for the articles they publish. The authors of other works, for example textbooks or monographs, were therefore not to be deprived of potential income. In addition, those authors who are not remunerated directly for their academic works are called upon to place their full texts on the Internet, as is the case for dissertations and research reports.

A full year later, on 11 April 2003 in Bethesda, Maryland, USA, a discussion was held on the possibilities of better integrating actors of the publication process. It resulted in the statements of the 'Libraries and Publishers Group' and the 'Scientists and Scientific Societies Group'[18]. The third conference, in Berlin, marked both an end point and a new start. It represented an end point in that academic policy goals had been formulated, and, as Peter Suber puts it, because a 'BBB-definition (Budapest-Bethesda-Berlin) of Open Access' had been established. At the same time, it represented a starting point with regard to technical and organisational questions. Thus the follow-up conferences in Geneva, Southampton, Potsdam and Geneva again dealt with matters of technical implementation, such as the use of the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) or the building and visibility of institutional and disciplinary repositories. A series of contributions in this handbook take a detailed look at these topics. The focus of the Southampton meeting was to call for all scientific and scholarly institutions to adopt an Open Access policy of their own in order to be able to better address researchers locally. Since then, there has been growing interest in Open Access, but it has not yet established itself as an alternative form of publication in the academic world.

[18] http://www.earlham.edu/~peters/fos/bethesda.htm.

CHAPTER 2:

An Introduction to Three Publication Models

The Edoc-Server at the Humboldt-Universität zu Berlin: An Example of an Open Access Repository

By Susanne Dobratz, University Library, Humboldt-Universität zu Berlin

The edoc-server

The document and publications server of the Humboldt-Universität zu Berlin, known as the edoc-server, celebrated its tenth birthday in 2007. The server operators, the university library and the university's computer and media service, regard it as the Open Access repository of the Humboldt University. These two institutions maintain the edoc-server through the joint working group 'Electronic Publishing'. All the articles, journals, reports, dissertations, etc. published on edoc are available worldwide, free of charge and without any access restrictions.

When we started in 1997, like many of the 109 German document servers in existence today[19], we had a different goal in mind. This was to provide doctoral students at the Humboldt University with a platform allowing them to publish their dissertations digitally. The so-called 'Dissertations Online' initiative[20] enabled the use of a more up-to-date, quicker and cheaper medium to comply with the German obligation to publish dissertations.

In the meantime, the spectrum of publications made available via the edoc-server has completely changed. It is now a genuine Open Access repository. Three-quarters of its publications are articles, conference papers, research reports or monographs forming part of a series. All in all, there are some 7 020 documents[21] of different types on the server. Compared with international Open Access servers, such as the arXiv[22], the most widely recognised physics preprint server containing 415 000 documents, this is not very much. However, if we consider the fact that these are all primary publications, and that the authors received individual assistance, this is a noteworthy achievement.

The edoc-server is incorporated into the university's information infrastructure. Together with a media server, a course-management system, and the digital library, it forms just one source of information available to members of the university for teaching and research purposes.

Open Access at the Humboldt-Universität zu Berlin

Every university pursues its own path when it comes to dealing with the topic of Open Access. The Humboldt University's path has been as follows. As early as August 2005, an Open Access working group was set up under the Vice-President for Research. Following a decision by this working group, a first activity was

19 See list on the server of the Deutsche Initiative für Netzwerkinformation: http://www.dini.de/wiss-publizieren/repository/.
20 http://www.dissonline.de.
21 as of May 2007.
22 http://www.arxiv.org.

the attempt to provide the technological basis for publishing already published articles ('the green road') and to involve selected professors in order to publish a critical mass of articles in the form of so-called postprints. Only later was the Open Access Declaration[23] of the Humboldt University passed by the Academic Senate and officially made public on 16 May 2006 at a public colloquium[24]. In this declaration, the scientists and scholars of the university support the world-wide Open Access initiative and join the 'Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities'. Since then, it has been the task of the working group on 'Electronic Publishing' to assist members of the university in matters of electronic publishing. This applies both to the 'golden road' and to the 'green road' to Open Access. In this sense, the edoc-server is one of a number of instruments promoting Open Access at the university.

Through the edoc-server as a university Open Access repository, the Humboldt University pursues the following goals:

- making available university content, in particular types of content that have been difficult to access till now, for example dissertations, etc.;
- making a university's scientific and scholarly work visible;
- supporting staff and professors with electronic publishing and in the use of modern publication technologies;
- maintaining a university bibliography.

At some universities, for example the Technische Universität Berlin, the document and publications server is coupled with the operation of a university press[25].

What makes a good document server?

In order to standardise the quality of the service provided by a document server within Germany, the Deutsche Initiative für Netzwerkinformation (German Initiative for Network Information, DINI) has created the DINI-certificate for document and publication services[26]. This certificate defines the organisational and technological conditions and characteristics that a server should fulfil if it is to be interoperable with other services and integrated into a nationwide network. These conditions relate to: the visibility of the service as a whole, the existence of guidelines, assistance for authors, legal aspects, security, authenticity and integrity of server and documents, the bibliographical registering of the documents and classification by content, the existence of technical interfaces, the export of

23 The full text is available at http://www.edoc.hu-berlin.de/e_info/oa-erklaerung.php/.
24 http://www.cms.hu-berlin.de/ueberblick/veranstaltungen/kolloquium/jahreskolloquium.
25 The Arbeitsgemeinschaft Deutscher Universitätsverlage (Consortium of German University Publishers) lists others: http://www.ubka.uni-karlsruhe.de/portale/ag_univerlage/verlage/.html.
26 http://nbn-resolving.de/urn:nbn:de:kobv:11-10075687 (english version).

metadata, the maintenance of access statistics, and to measures to ensure the long-term availability of the documents. The edoc-server of the Humboldt University fulfils these conditions.

The edoc-server as the platform for publishing the university's e-journals

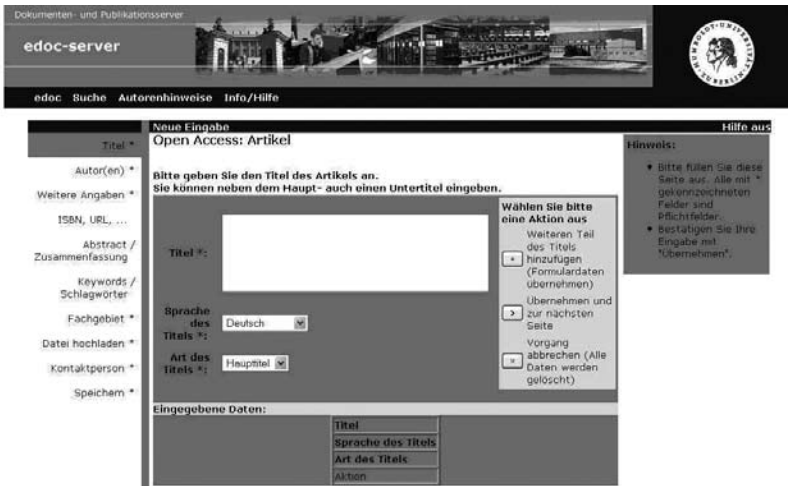
For years and in some cases decades, some scientists and scholars at the Humboldt University have been editing their own journals or publication series. With the increasing importance of the Internet as an instrument for disseminating knowledge and in particular over the past two years, we as operators of the edoc-server have increasingly been receiving requests from academics to assist them in the conversion of their publications to this medium. In doing so, we concentrate primarily on providing the technological base, while confining ourselves to providing only useful tips in other areas, e.g. organisational and legal matters. The organisation of quality control stays with the editors.

The technological basis includes the provision of a database with a WWW-based input facility, so that the descriptive metadata for the e-journal and each individual article in the e-journal can be registered. In addition, for every projected publication, a user-view is worked out and implemented jointly with the editors. Furthermore, templates are made available to authors along with conversion tools to allow editors to produce their own archive and Internet versions.

In order to increase the effectiveness of the publications, the edoc-server additionally offers editors a series of previously unavailable services, such as automatic registration with the German National Library, the journal database, and other index instruments as well as a print-on-demand component for the articles, and integration into international search engines, in particular Google.

The edoc-server as an institutional repository supporting the 'green road' to Open Access

The edoc-server supports the inclusion of academic articles already published elsewhere by making available a special input format for these articles, which, based on the concept of the EPrints server at the University of Southampton, registers all the potentially necessary information



Input possibilities for preprints and postprints

and takes into account the conditions imposed by individual publishers, who sometimes require an indication of the original place of publication or other details. The scientists and scholars deliver their documents in PDF-format and are given support in researching the legal framework conditions. This begins with consulting the German interface of the SHERPA/RoMEO database[27], which lists the conditions of individual publishers regarding Open Access, and goes all the way to addressing enquiries to the publishers and providing help with the technical preparation of articles.

Challenges

Among the great challenges in the preparation and operation of Open Access repositories are the procurement of scientific and scholarly papers and the need to convince authors of the value of this approach. According to a study conducted by the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG) in 2005[28], many academics do not know what Open Access means and have not yet integrated this form of publishing into their normal publication activities. Many of the authors also

27 http://www.dini.de/oap/.
28 http://www.dfg.de/dfg_im_profil/zahlen_und_fakten/statistisches_berichtswesen/open_access/index.html.

demand that an Open Access publication in an institutional repository be accorded the same recognition as a publication in learned journals. The latter provide what are known as 'impact factors', which measure an article's scientific or scholarly importance according to the number of times an article is cited. This is of great significance for the reputation of young academics, in particular when negotiating a professional academic position. An overall assessment system of this sort has not yet established itself for Open Access publications appearing in institutional repositories. We shall continue to work on this particular problem while establishing further services for authors and editors.

The New Journal of Physics as an Example of Open Access Journals

By Eberhard Bodenschatz, Max Planck Institute for Dynamics and Self-Organisation

Introduction

In order to get a better understanding of the origin of the *New Journal of Physics* (NJP), it is useful to look more closely at the publishing system before the introduction of Open Access journals. In traditional academic publishing in the field of physics, the following parties played a role in the publication process: authors, editors, referees, the publisher, the library, and the reader. Upon a closer look, one sees that all the parties, with the exception of the publisher and the library, are active in physics research. In other words, in the field of physics, the producer, the examiner and the consumer are members of the same circle. For decades, physicists submitted their knowledge free of charge, refereed it, often paid publishers to publish and disseminate their articles, and then commissioned their libraries to buy back these articles from the publishers.

This traditional system was cast into question by the rapid development of the World Wide Web and the global information network with its quasi cost-free access. Preprint servers such as arXiv.org have shown for more than 15 years that it can be relatively cheap (at just a few dollars per manuscript) to build up a stable academic archive with voluntary submissions. At the same time, in the case of paperless publishing, publishers would only allow libraries to access journals if they actively maintained their subscriptions. This new system is in contrast to traditional publishing, where libraries kept the right of the printed book or article. In this present system, if a library cancels its subscription, it loses access to volumes that it has already paid for. In addition, in traditional publishing, the costs of the subscriptions are normally borne by the library, and are thus unknown to the producer (author), referee and consumer (reader).

The *New Journal of Physics* as an Open Access journal

Publishing with quality assurance through peer review, editing and archiving, cannot of course be cost-free. In the age of electronic publishing, however, there are new possibilities. Thus the development of publishing in the World Wide Web, along with the rising costs, motivated the German Society of Physics (Deutsche Physikalische Gesellschaft, DPG) and the British Institute of Physics (IOP) to jointly found the *New Journal of Physics* as an Open Access journal in 1998.

The NJP makes top-quality articles from all branches of physics available to readers online and free of charge. The distinguishing features of the NJP are as follows:

1. Manuscripts can be read entirely free of charge.
2. Manuscripts must satisfy the highest quality standards, the progress they report must be substantial, and they must be comprehensible to a broad readership.
3. The highest-possible quality is assured by a traditional peer-review system with an Editorial Board and at least two anonymous referees. Currently, 70% of the articles submitted are rejected.
4. The Editorial Board consists of leading academics representing the physics community worldwide. It meets annually, alternately in England and Germany and, in addition, there is an annual electronic board meeting.
5. At three months on average, publication periods are short.
6. There is no restriction on manuscript length.
7. Colour and multimedia contents are welcomed and free of extra charge.
8. In addition to traditional manuscripts, *Focus Issues* are published, i.e. original publications of the highest quality which present a snapshot of a particularly active area of research. These articles, typically numbering about 30, are supervised by visiting editors and are subject to the same criteria as normal manuscripts.
9. Archiving is performed by the publishers, the German National Library, the British Library and via LOCKSS (Lots Of Copies Keep Stuff Safe). LOCKSS is an initiative of Stanford University which allows member-libraries to collect the NJP in its entirety, store it, archive it, and grant access to its own local copy.
10. The NJP is financed by the authors (current article charge: EUR 870); current publication costs were covered by current income in 2006 for the first time. Since 1998, publishers' subsidies for the NJP have decreased on an annual basis; the NJP currently has support contracts with the Max Planck Society, Cornell University, Northwestern University, the University of Göttingen and the Utah University Library Advisory Council.

Currently, the NJP receives more than 100 submissions a month, and that number is growing. More than 50 000 downloads of complete texts are registered every month, with readers in more than 180 countries. The illustration shows the development of the ISI impact factor, which reflects the increasing importance of the journal. For a general physics journal, the impact factor is already very high. In the last six months, the NJP has been constantly identified by the ISI as the physics journal with the highest proportional rise in citations.

Advantages of the NJP

The development of the NJP shows that Open Access is very well received by international readers. One clear advantage is that the NJP can be freely read wherever there is access to the World Wide Web. In this way, an author achieves the broadest-possible dissemination of his or her research results. An additional advantage of the 'author pays' model is that it is market-oriented. Authors will be prepared to submit a manuscript to the NJP and to pay the author charge only as long as the NJP meets the highest quality demands. This market-

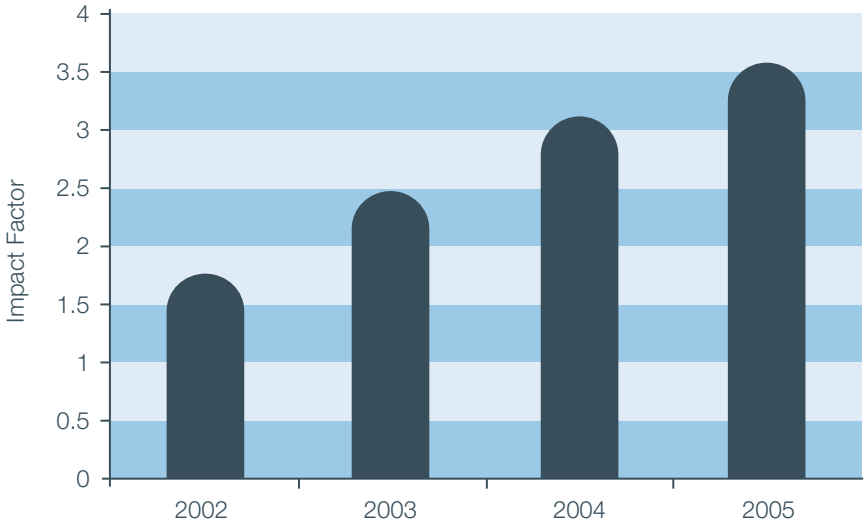


Illustration: Development of the ISI impact factor. This is calculated over a period of three years and corresponds to the average number of citations of articles over a period of two years following their publication. For example, the 2007 impact factor of a journal is calculated as follows: Z = the number of citations of articles in that journal in all journals listed by ISI and published in 2005 and 2006. P = the number of articles published in the journal in 2007. The ISI impact factor is then the quotient of Z/P.

oriented model has the additional advantage that the publication costs are transparent and known to authors and referees. This makes cost-control automatic. Increasingly, author charges are being taken over by libraries, as the NJP will always be freely available to them. The stability of NJP is guaranteed by the Deutsche Physikalische Gesellschaft and the British Institute of Physics.

Challenges

The greatest challenge involved in the setting up of a new journal is always to get it established. For both traditional and Open Access publications, start-up finance is essential. For the NJP, this was provided by the Deutsche Physikalische Gesellschaft and the Institute of Physics. Step by step, the subsidies for the author charge have been dismantled. In 2006, break-even point was reached for the first time. By then, in particular the ideas of the financial backers had changed. For example, the German Research Foundation (Deutsche Forschungsgemeinschaft) now allows researchers to apply for publication costs, the Max Planck Society finances publications in the NJP from its central funds, and the Joint Information Systems Committee (JISC) financed publications by British authors over a period of three years. In addition, author charges are increasingly being shouldered by university libraries. The other challenges facing the NJP were the same as for any other new journal. Successful establishment is only possible with a very active Editorial Board with excellent support from the publisher.

The Example of a Hybrid Model: Springer Open Choice

By Jan Velterop, Springer Science+Business Media

Publishing costs money

The broad availability of academic research results is doubtless welcomed by everyone. However, research results are reliable and certified only after they have undergone official peer review and appeared in a scientific journal. This formal publishing process requires qualified work, organisation, technology and infrastructure: in other words, it costs money.

Traditionally, publishers have covered their costs through subscriptions to their journals. With the development of digital formats and online platforms for journals, subscriptions have turned into licences. The underlying principle has remained the same: the reader, or the library in the name of the reader, pays for access to content.

Then along came Open Access...

In the context of Open Access, access licences are fundamentally unsuited to generating the income needed to cover the costs of publication. Subscriptions to the printed version of a journal could, of course, still be offered, but then users would not be paying for the content of Open Access articles (these would be available online free of charge, after all), but merely for the additional comfort and service of decently printed and bound volumes. The market for such a service is in all probability significantly smaller than the market for the content itself. Thus the potential income from the journal would also be smaller, in most cases too small to support the publication.

In the case of a few very small journals, publication costs can be taken on by universities or institutes and the necessary work can be done on an honorary basis. In such cases, online access can be granted free of charge. Where professional publishing skills are needed, however, a feasible source of finance is necessary. For this reason, an Open Access model has been developed for new journals: the author, or often the institution or academic society to which he or she belongs, pays what is known as an 'article processing fee' for the publication of his or her article.

For new journals, this is a feasible course of action. For existing journals with a loyal body of authors, on the other hand, it is not: if an established journal were suddenly to demand a processing fee from all its authors, it would risk losing them. Indeed, taking this risk can hardly be expected. On the other hand, some authors would probably be prepared to pay such a processing fee for Open Access.

Open Choice leaves the choice to the author

Thomas J. Walker, the editor-in-chief of the *Florida Entomologist*, was the first to recognise this problem and therefore gave his authors a free choice[29]. The model was known as 'sale of electronic reprints' to authors — the term Open Access had not yet been invented. The decisive element, however, was that authors could make their articles available free of charge to any reader via the Internet.

Today, the 'Walker model' is often known as 'hybrid model', and forms the basic idea behind Springer Open Choice[30]. As soon as articles have undergone peer review and been accepted for publication, authors have a free choice: if they decide on Open Choice, they or their institute pay a processing fee of (the equivalent of) USD 3 000, and the article is accessible online free of charge to anyone. For this type of publication, Open Access licences are used which are basically identical with a 'Creative Commons Attribution Licence'[31]: the official published version of the article can be freely disseminated anywhere by anyone, in printed form or online, provided that the author and original source are correctly acknowledged. This also applies to uploading to the Web and making photocopies.

Springer Science+Business Media was the first major publishing house to implement this concept to its entire journal portfolio. Open Choice applies to all Springer journals and to most of the journals which Springer publishes in cooperative ventures. Some critics doubt that Open Access can guarantee the scientific quality of articles. At least for the hybrid model, these fears are unfounded, since authors may choose Springer Open Choice only after their articles have successfully undergone the peer review process and after they have been accepted for publication. Just as in the traditional subscription model, scientific quality is the only criterion for this decision.

Springer Open Choice articles are not only published online, but are also included in the printed edition of the journal. This is of great importance since the archiving of printed formats is still considered an important form of storage for scientific and scholarly information.

Challenges for Open Access and hybrid models

Every publication model has its advantages and drawbacks. Just like purely Open Access journals, the hybrid model also faces certain practical difficulties. It is sometimes accused

29 *BioScience*, 45 (1996): 171. http://www.fcla.edu/FlaEnt/bioscivp.htm.
30 http://www.springer.com/openchoice.
31 http://creativecommons.org/licenses/by-nc/2.5.

of making the scientific community pay twice, once for subscription and once for processing. This is not the case since the costs which accrue to the publisher for the publication of an Open Access article are covered by the processing fee and are not taken into account when the coming year's subscription rates are fixed. The annual setting of subscription rates involves a certain delay, but no one pays twice for the same contents. Criticism is due largely to the fact that this relationship cannot always be made clear and transparent. In particular, the relationship is difficult to recognise when the number of traditional articles in a journal increases at a greater rate than the number of Open Access articles. If the subscription rate of a journal increases, this is due exclusively to the higher proportion of traditional articles which it contains; Open Access articles are not part of the calculation.

The decisive challenge both for hybrid and for purely Open Access models is that the intensity of the research pursued by an institution does not correlate with the level of its expenses for academic literature. The literature requirements and publication output of a research institute are not the same as for a university whose focus is on teaching, and are different again when one compares highly specialised institutes and multidisciplinary institutes: the latter usually require a much broader portfolio of journals. In principle, research-intensive institutes publish far more articles on the literature to which they subscribe than do teaching-intensive universities. If it is not the reader who bears the publication costs (as in the subscription model), but rather the author wholly or in part (as in hybrid and Open Access models), then this necessarily entails higher costs for research-intensive institutes that publish a great deal. At the same time, universities with many readers, which, until now, have borne a major proportion of the costs, will have fewer expenses. While costs for science and scholarship are not higher overall in an Open Access model, individual research institutions are understandably worried that this redistribution will mean that they pay more than they have in the past.

This major obstacle to the success of Open Access and hybrid models has now been recognised by some research sponsors who have subsequently taken action: they define the publication of research results as an integral and necessary part of the research process and therefore bear the cost of publication as a necessary part of funding the research. On this basis, the institution with the highest research budget also pays the most in the way of publication costs. As these are in any case ultimately borne by those funding the research, albeit

often indirectly, be it in the form of subscriptions or processing fees, this model represents one solution to the problem.

At the same time, this meets the fundamental challenge that both libraries and publishers have to face, regardless of whether the model in question is Open Access, hybrid or traditional subscription: the constantly growing number of high-quality research articles submitted for publication that clear the peer review hurdle. This growth in research literature alone increases the financial strain on libraries and publishers. The strategy of those funding research to accept publishing costs as a fixed item of research expenditure mitigates this problem.

The number of authors that choose Open Choice is currently still relatively small. In the next few years, however, we expect a marked increase.

CHAPTER 3:

Implementing Open Access Models

Financing Open Access Models

By Stefan Gradmann, Department of Library and Information Science, Humboldt-Universität zu Berlin

From the outset, one of the most controversial issues surrounding Open Access has been the financing of Open Access models, or indeed the question of whether they can be financed at all. This question was also one of the original motivations for Open Access as a possible answer to the general problem of the affordability of academic publication routes. In the beginning, this complex subject was discussed in a very one-dimensional fashion, focusing on the paradigm of what is frequently referred to as the 'serials crisis'. In the meantime, however, the multifarious aspects of the problem have become apparent, and it has become clear that their treatment must not stop at the front-line question of how the publication of journals should be financed. In this context, it is also important to consider what services Open Access stands for within the academic value-creation chain, and who is ultimately to pay for them. Finally, with regard to the question of finance, the fact that the publication economics of the various academic cultures are just as fundamentally different as their forms of publication must be taken into account.

The traditional 'Closed Access' finance model

For a long time, the dominant model of publishing scientific and scholarly articles in academic journals was based on a chain of production and exploitation in which, as a rule, academics drawing their salaries from public funds transferred the exclusive exploitation rights of their articles to publishers. The publisher would ensure the quality of the content of these contributions prior to publication by means of a peer review process, in which the referees were in most cases academics who drew their salaries from the public purse. At the end of the chain, publicly funded libraries acquired the rights to use these publications by subscribing to academic journals whose prices have shot up in recent years and are increasingly regarded as being disproportionate to procedural costs.

Many argue that ultimately, this is an extremely expensive outsourcing model, in which public funds flow in three places at the same time. During the 1990s, it became more and more apparent that this could no longer be afforded. In addition, with the appearance of electronic forms of dissemination, libraries have found that they are now increasingly acquiring only limited and time-restricted rights to publications, in other words a very limited return on the considerable outlay. A final point of criticism has been that commercial dissemination routes no longer or inadequately serve maximum dissemination of academic publications among the specialist readership for which they are intended.

'Green' and 'golden' publication economics

Open Access was in essence a reaction to these developments. However, the two roads to Open Access focus on quite different aspects. The 'green road', in which journal articles already published elsewhere are made publicly available via private or institutional repositories, seeks above all to ensure the maximum distribution of academic publications and thus to compensate a secondary effect of traditional publication economics[32]. It does not, however, change the way in which publication economics functions, although it does possibly undermine it in that the sale of rights to use the articles, an important source of income, may be lost without another replacing it. The financing system represented by the traditional model would thus at least partly be put at risk. For this reason, many doubt that the 'green road' can be a sustainable dissemination model in the long term.

The 'golden road' is a different case: in implementing electronic journals in the Open Access model, a method must be found to finance the procedural costs. This necessitates alternative approaches in publication economics to replace the traditional method of finance through the sale of rights of use. One frequently chosen method is to recover the costs from the author or institution responsible for the article instead of from the end-user. In this 'author pays' model, 'per page' or 'per article' charges are supposed to cover the procedural costs including the peer review process. Thus, for example, the Public Library of Science (PLoS) currently charges article fees ranging between USD 1 250 (PLoS ONE) and USD 2 500 (PLoS Biology). BioMed Central charges USD 1 700 per article. Atmospheric Chemistry and Physics (ACP) charges between USD 23 and USD 68 per page depending on the work required by individual manuscripts.

It is often unclear, however, to what extent the income generated in this way would really cover the cost of publication, or, to put it differently, to what extent publication would depend on grants or other subsidies, as are for example given by BioMed through endowments[33]. It may be possible to justify such a public subsidy in the long term with the argument that the publication of results is one of the core functions of academic institutions[34].

The 'author pays' financing approach is also becoming increasingly appealing for commercial academic publishers. Thus, for example, Springer is pursuing a declared Open Access policy through its 'Open Choice' concept, albeit with the high fee of USD 3 000 per article.

[32] Numerous publications by Stevan Harnad focus predominantly on this aspect, e.g. Harnad, Stevan & Brody, Tim, 'Comparing the Impact of Open Access (OA) vs. Non-OA Articles in the Same Journals', in: D-*Lib Magazine* 10. 6 (2004). http://www.dlib.org/dlib/june04/harnad/06harnad.html.

[33] This question is not definitively answered, even by the 2005 study 'The Facts about Open Access' (http://www.alpsp.org/ForceDownload.asp?id=70) sponsored by the ALPSP, perhaps the most detailed comparative investigation to date of the publication market. The two tables on approaches to finance on pages 43 and 44 of this study in fact convey a rather inconsistent picture.

[34] A convincing argument along these lines is put forward in Willinsky, John 'Scholarly Associations and the Economic Viability of Open Access Publishing', in: *Journal of Digital information 4.* 2 (2004). http://journals.tdl.org/jodi/article/view/jodi-117/103.

Academic publication: commodity or service?

Financial considerations in Open Access should not be limited to the funding models described above, if only in relation to the publication culture in the humanities. The latter is characterised to a large extent by the monograph, which is a different publication format. It is obvious that funding models here have to start from hitherto largely unknown and little-discussed parameters. From the outset, the determining factors will be not so much the relatively modest procedural and production costs as the possible added value for scholarship as a result of free availability on the Internet.

Even in areas currently dominated by the journal format, however, the genuine potential of electronic publication methods will increasingly be exploited. Therefore, results cannot be offered as statically tailored publication products anymore, because they contain dynamic, interactive or multimedia components, for example. If such publication methods are to be implemented on a sustainable basis, new business models are needed.

Those designing such models may find the following consideration helpful. Because of its pronounced concentration on the exploitation model, the traditional publishing industry was dependent on defining academic publications as a commodity that could be exploited. So far, Open Access has taken over this logic basically unaltered, providing only for a redesign of the funding methods and cash flows. However, this ‘commodity character‘ of academic publications will not be dominant for much longer. Even the strategies of major commercial providers show signs of a rethink away from the commodity-geared model based on exploitation of rights. They seem to be moving towards a service model, where users no longer pay for the finished publication as a commodity, but rather for services provided along the publication process, such as novel aggregation or localisation services.

According to these models, access to the content itself will in principle be free, and the present boundaries between Open Access and commercial models could thus become increasingly blurred. The business models underlying such future open electronic publishing will presumably be designed by the present-day protagonists of Open Access in cooperation with commercial publishers who are currently regarded as antagonists.

Academic publication and the academic added-value cycle

Service-based Open Access models will not be feasible on a truly sustainable basis until the publication of scientific and scholarly matter is clearly seen as just one stage in a holistically conceived academic value-added process[35]. This can be understood as a cycle starting with the author and leading back to the start of the cycle via the referees of the publication, the publication stage itself, the administration of the publications in libraries, and finally the academic reception and discussion of the contents by readers (who in turn are once again potential authors!). If we look at this cycle from the point of view of funding as a whole, the costs of the publication in a narrower sense become comparatively marginal and can be recovered from the provision of services rendered prior to, subsequent to and in the context of publication.

[35] On the foreseeable changes in this value-added chain, see the interesting, albeit speculative contribution of Roosendaal, Hans E., Geurts, Peter A.T.M. & van der Vet, Paul, 'Eine neue Wertschöpfungskette für den Markt der wissenschaftlichen Information?', in: Bibliothek – Forschung und Praxis 26. 2 (2002): 149–153. http://www.bibliothek-saur.de/2002_2/149-153.pdf.

Open Access and (German) Copyright

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Introduction

The Berlin Declaration demands Open Access to 'scientific knowledge'. To the extent that knowledge is in the public domain, in other words not protected by copyright, this demand can be fulfilled. 'Creative Commons', in the sense of a work being in the public domain, is however only possible at the earliest when it goes out of copyright, as a rule 70 years after the death of the author (as laid down by section 64 of the German Copyright Act - Urheberrechtsgesetz, UrhG). Open Access models for works still in copyright must therefore be implemented within the scope of licensing agreements. The terms 'green road' (archiving on institutional servers) and 'golden road' (self-publishing, university presses), which are used in the context of Open Access, have no direct relevance as far as copyright is concerned. The question of the format in which access is granted and on what servers (institutional servers or private homepage, technical specifications), can however be added as a term of the licensing agreement concluded between the copyright owner and the user or exploiter of the work.

What is protected?

Anyone who sets out thoughts in an individual verbal, graphic or pictorial form, i.e. a form characterised by his or her personal style, normally creates a work protected by copyright, whether it is in the form of text, a visual art work, a graphic design, a scientific representation in the form of a model, a drawing or a complex diagram. Copyright protection arises solely through the act of creation, whether the creator desires it or not. While copyright is territorially restricted, there is an extensive network of international obligations which afford protection to the works and creations of foreign scientists and scholars in Germany as well as those of German scholars and scientists abroad.

In principle, the (unformed) content (idea) itself is free, and only the concrete form (expression) of the statement enjoys protection. Laws and court judgements, abstract ideas, theories, methods, discoveries, styles and everyday utterances, such as letters and ordinary communications, are not such personally intellectual creations and may in principle be freely exploited by anyone. This also applies to raw materials and metadata. Source material is as a rule in the public domain. Indeed, in many cases, any copyright that source material

may have enjoyed will have expired. The freedom to exploit material ends when the ideas are embedded in an organised collection of information (database) and access can be controlled *de facto* (e.g. by electronic access mechanisms). The same applies when sources are 're-monopolised', for example when an archive or museum photographer photographs the items. These photographs then enjoy copyright protection of their own. In the electronic world, freedom to carry out exploitative actions is the exception.

The specific permission of the author or copyright holder is not required for actions which fall within certain conditions (in Germany, these are set out in sections 44a to 63a of the UrhG). These include academic quotation, duplication for personal (including academic) or archive use, the sending of copies by public libraries (to be regulated in future by section 53a of the UrhG), the displaying of contents in reading areas in libraries, museums and archives (in future to be regulated by section 52b of the UrhG), public reproduction of contents in the lecture room, and making contents publicly available in internal research networks (section 52a UrhG). All such uses, with the exception of quotations, are however subject to royalties, which are as a rule collected by authors' rights societies and are a burden upon the university budget.

Licensing models

1. Open Access means that whoever has the authority to license can make such access possible. In copyright terms, this means that those with the right to prohibit also have the right to grant permission. Opening up access comes about when either everyone is granted access, or particular groups of people (e.g. academics, students, clients). The important thing is that the formulated material is licensed not only to the first taker, but that it remains freely accessible, even if it is further licensed by the first licensee. This happens when a licence is granted on condition that it is passed on freely down the chain of users and exploiters. Open Access thus reverses the logic of copyright: from prohibition, or permission on payment of a fee, to permission without payment of a licence fee.
2. Open Access begins with a licence declaration by the author or copyright holder. Licence declarations need not be issued in the context of contracts; they can also be issued unilaterally (as is done, for example, by the Creative Commons model licence, http://de.creativecommons.org). The copyright holder has a certain creative scope in this respect. He or she can restrict

the permission to a single person, and/or individual types of use, e.g. passing on protected material only in electronic, not printed form. Any user who performs an unlicensed action is in breach of copyright. The Creative Commons model licence provides for two types: the licensing of copying, dissemination and public reproduction, and, additionally, the possibility of editing the text, both on condition that the original author is named.

3. More common, and more important for the future of Open Access, is the granting of permission on condition that a licensing agreement is concluded with the user or exploiter (e.g. the Digital Peer Publishing Licence (DPPL), www.dipp.nrw.de). Such an agreement may impose duties on both the copyright holder and the user/exploiter that go beyond the scope of copyright, for example, in the case of publicly funded projects, the duty of copyright holders and of their licensees (users and exploiters) to publish material on institutional servers ('green road'), or the duty to provide metadata. The licence declaration is seen here as a unilateral offer which the user accepts by virtue of performing the relevant act of use. The declaration must be displayed to the user in a clear form, otherwise later enforcement of the duties accepted by the user is put at risk.

Rights of third parties (publishers, universities, sponsors) to issue licences

1. Problems arise with licence declarations issued by scientists and scholars in respect of works already licensed to publishers or editors of journals. In so far as the scholar has not limited himself/herself to issuing a simple right of use, but, as normally happens, has conceded exclusive rights, only the licensee can issue licence declarations. Academics must therefore ensure, in contracts with publishers, that they retain the authority to license their works for publication in electronic archives. Whether they succeed, however, will depend on the negotiating power of the scholar and on the generosity of the publisher. In order to guarantee broad Open Access, it would be necessary at the legal level to ensure that 'repository rights', which cannot be licensed, remain with the copyright holder, or to seek the cooperation of the publisher.

2. Open Access could in principle also be guaranteed if universities obtained the authority to issue licences from their academic staff. However, this presupposes the readiness of scholars not to publish their work in the journals run by publishing houses, but to grant their employers the rights to their work on the basis of individual contracts. Universities could then set up repositories and issue licence declarations of the type discussed. According to legal opinions to date, an 'automatic' granting of rights to universities would have no legal foundation, as academic freedom includes the freedom to leave results or insights unpublished and to decide how results are to be published. In the context of sponsored projects, however, an obligation to allow Open Access could be the subject of an individual contractual agreement. This is something to be considered for research grants by bodies such as the German Research Foundation (Deutsche Forschungsgemeinschaft).

Unknown forms of use

To a limited extent, there is a loophole in publishing-contract law for old cases in which forms of use were unknown (in the sense of being not commercially viable or technically possible) at the time the rights were granted, for example rights to electronic use on the Internet. Under current German law (section 31 sub-section 4 of the UrhG), such unknown forms of use can still (as of April 2007) not be granted with any legal effect; in other words, they remain with the author. If the latter, in a contract prior to 1995, granted an exploiter exclusive rights to copy, disseminate or reproduce his/her work, the use of the work on the Internet is not covered. If the publisher wishes to exploit the work in this way, he or she must acquire the rights specifically. This incidentally also applies to authors' rights societies which have concluded corresponding safeguarding contracts with the author involved. In the pending reform of copyright law (the so-called 'second basket'), this provision has been removed. For old contracts, the draft bill means that an exploiter who has been granted comprehensive exclusive rights can also exercise these rights in the future with respect to unknown forms of use, provided that the author does not file an opposition within a year. This new provision will result in exploiters being able to exclusively exploit many fully depreciated repertoires lying in their archives. The vision of making archives freely accessible to the public could only be implemented if old rights could generally only be exercised on moderate terms by intermediaries such as authors' rights societies or academic organisations.

Open Access and Quality Assurance

By Eberhard Bodenschatz, Max Planck Institute for Dynamics and Self-Organisation, & Ulrich Pöschl, Max Planck Institute for Chemistry

Introduction

Publications are the central product and lasting legacy of scientific and scholarly research. They document and explain discoveries and results in a precise fashion. While specialists are largely in a position to judge the quality and informative value of publications, this is often difficult or impossible for less experienced academics and those from outside the field. The quality of a publication lies in its factual correctness, its reproducibility and in how it relates to the specialist literature.

In traditional academic publishing, quality assurance usually results from anonymous refereeing by others working in the field (peer review). The editor or the editorial board of the journal or other medium is responsible for choosing one or more referees and for the final decision on whether to accept a manuscript for publication. In the course of the review process, manuscripts are usually edited and improved, and only the revised manuscript is finally published.

Particularly in the natural sciences peer review is performed mostly electronically, using email and the Web, including in classical journals. This traditional process can be transferred to Open Access publications without change. The additional advantage of Open Access is that referees have unlimited access to other relevant Open Access publications, including those from other academic fields, and that it offers scope for new interactive approaches to quality assurance involving the whole academic community[36].

Overview of various quality-assurance models

The Internet revolutionised scientific and scholarly publishing. For the first time in the history of mankind, it is now possible for a person, at relatively little expense, to place information at the disposal of a broad public worldwide, in other words, to publish it. These publications can then be retrieved at no cost with the aid of a search engine. This process involves no quality assurance of any kind, and the decision as to the correctness of the information is left to the reader alone. In academics, however, often only specialists are in a position to judge the quality of a publication. The following list provides a basic overview of different quality-assurance approaches which are conceivable or already in use for Open Access publications. It makes no claim to completeness, especially since electronic publishing allows a whole range of variations.

[36] See for example: Baldwin, I., Brammer, M., Newmark, P., Pöschl, U., Schutz, B. & von der Lieth, C., 'Quality Assessment Working Group Statement', Open Access Conference, Berlin, 2003; David, P.A. & Uhlir, P. F., *Creating the Information Commons for e-Science*, Paris, 2005; Pöschl, U., 'Gemeinschaftliche Begutachtung', in: *Wissenschaftsmanagement Special 1/2006* – Open Access, 6 (2006).

1. *Peer review*
   In this well-established model based on editors and anonymous specialist referees, articles are only published after a non-public specialist review and revision process. Sometimes, however, original manuscripts are published electronically as so-called 'preprints' before the completion of the peer review process. This classical model is used by most Open Access journals.
2. *Collaborative peer review*
   The publication and review process takes place publicly in two or more stages, starting with the preprint or discussion stage. While original manuscripts are being reviewed by editors and anonymous or known referees, readers can offer additional comments. With the editors' approval, the authors have the chance to publish improved versions on the basis of these reviews and comments.
3. *Moderation*
   Submitted manuscripts receive only a perfunctory review by a moderator. The original manuscript is published if it appears not to contain any gross defects. Further revision is in the hands of the authors, who can submit improved versions if they wish.
4. *Automatic assessment*
   Publication of the manuscript goes ahead without any kind of quality assurance. An automatic assessment on the basis of quality criteria comes later, e.g. number of citations, number of links to the page, number of downloads, historical assessment of the authors, etc.
5. *Assessment by readers*
   Publication of the manuscript goes ahead without any kind of quality assurance; it is followed by an assessment by readers, who can also make comments. These are published with the manuscript.

In practice, a whole variety of combinations of the above models is used. For example, traditional peer review is used in the Open Access *New Journal of Physics* (NJP, www.njp.org), while the Open Access journal *Atmospheric Chemistry and Physics* (ACP, www.atmos-chem-phys.org) combines collaborative peer review with public discussion. This approach is presented in greater detail below.

Interactive Open Access publishing combined with collaborative peer review

The Open Access journal ACP and a growing number of sister journals of the European Geosciences Union (EGU, www.egu.eu)

practise a two-stage publication process comprising public peer review and interactive discussion. In the first stage, manuscripts which have passed a rapid pre-selection procedure by the editors known as 'access review' are published as discussion papers in the journal's online discussion forum (ACP Discussions, ACPD). The comments of referees commissioned by the editors and additional comments by interested readers are published here together with the authors' responses. The specialist referees have the option of remaining anonymous. In the second stage, the revision and refereeing of the manuscripts are completed as in the traditional peer-review process, if need be with further revision and review. An article is not published in the journal as a final paper until the editors have accepted a revised version of the manuscript. For the purposes of lasting documentation of academic discourse, the discussion forum is also ISSN-registered, and all discussion papers and comments are permanently archived and individually quotable, regardless of whether or not they result in final papers published in the journal[37].

The interactive two-stage process allows a combination of rapid communication and thorough quality control, in addition to promoting academic discussion:

1. Discussion papers allow authors to disseminate new results quickly. Readers can obtain up-to-date information and opinions almost directly from the source.
2. Comments, suggestions and criticisms made by specialist referees are available to the whole academic community and not just to authors and editors.
3. The transparency of the review process deters the submission of poor-quality original manuscripts. The resulting reduction in the number of rejected manuscripts and in the need for correction helps relieve the pressure on available referee resources.
4. For interested readers, the setting out and documentation of controversial issues and supplementary comments in the interactive discussion is often just as informative as the original article.
5. The combination of traditional peer review with interactive public discussion leads to high quality assurance and information density in the final papers.

The practical feasibility of the interactive Open Access publishing concept is confirmed by the rapidly growing number of articles and by citation statistics. Within five years, ACP achieved the highest impact factor of any journal in the field of atmospheric research, as well

[37] Koop, T. & Pöschl, U., 'An open, two-stage peer review journal', Nature Web Debate on Peer Review, 2006; Pöschl, U., 'Interactive journal concept for improved scientific publishing and quality assurance', in: *Learned Publishing* 17 (2004), pp 105–113; Pöschl, U., 'Open Access & Collaborative Peer Review: Öffentliche Begutachtung und interaktive Diskussion zur Verbesserung von Kommunikation und Qualitätssicherung in Wissenschaft und Gesellschaft', in: *iFQ Working Paper No.1*. 2006, pp 43–46.

as one of the highest in the fields of earth and environmental sciences (ISI Journal Citation Report 2005).

Initial doubts about the technical feasibility and academic value of the two-stage Open Access publication process have been dispelled by its results. Many scientists working in the aforementioned fields in Germany and worldwide are prepared to implement Open Access and collaborative peer review, and in some cases are already actively involved. As with other innovative Open Access publications, financial barriers were the major obstacle to establishing the ACP and its sister journals. Because of the lack of availability of Open Access grants, the publication costs for the first few years had to be borne from the EGU's own funds. Most of the authors were not accustomed to the payment of publication fees, which continue to constitute a competitive disadvantage *vis-à-vis* subscription-financed journals.

Even so, the interactive Open Access publishing concept has since moved into other academic fields. It can be applied to existing academic journals and to large-scale Open Access publishing systems. The ACP approach has been adopted largely unchanged by, for example, the journal *Economics* (www.economics-ejournal.org). Publishing forums that apply modified approaches to public peer review and interactive discussion include PLoS One (www.plosone.org) and Biology Direct (www.biology-direct.com) in the life sciences.

Conclusions

Open Access allows both the retention of traditional quality assurance by peer review and the development and deployment of a whole variety of supplementary or alternative quality assurance procedures. New approaches, such as the combination of collaborative peer review and public discussion, can enhance the efficiency of quality assurance. These approaches would in principle also be possible for articles published in traditional printed form, albeit at considerable financial and technical outlay. Their practical implementation and dissemination is really only made practical by electronic publishing and Open Access. Sometimes, the opinion is expressed that peer review is no longer necessary in the age of the Internet and electronic publishing. However, experience shows that, without peer review, the quality of publications varies considerably. Traditional or modified forms of peer review therefore still seem to be necessary for the efficient quality assurance of Open Access publications.

Open Access and Long-term Archiving

By Ute Schwens & Reinhard Altenhöner, German National Library

In the context of the discussion on Open Access, the entire publication chain, from the writing of the text to making available the published article, is increasingly taken into account. This chain also includes guaranteeing the article's long-term accessibility and 'citability'. Ensuring this long-term availability, in other words the long-term archiving of digital objects, includes all those measures that serve to permanently preserve these objects for posterity. These include the preservation of the substance of the material content on the one hand, and the guaranteed usability of digital resources on the other[38].

Measures to preserve the substance of the contents of data are successful when data deriving from a whole variety of sources and stored on a whole variety of storage media (including existing networks) are successfully transferred to a homogeneous storage system and preserved there in a stable fashion. Important components of this system are therefore automated control mechanisms which monitor the continuous system-internal data-transfer. However, the fact that technical platforms have short half-lives affects this system too, and forces a constant change of data-storage medium generations and the migration of data collections that this may involve.

Preserving the usability of digital resources is far more complex. The user of the future may well not be in a position to interpret the originally archived material (the data flow), since the necessary technical environment (operating systems, applications) will have long since ceased to be available. For this reason, experiments are being conducted with processes that aim to emulate obsolete systems.

These two briefly described approaches only apply when the digital object with its specific characteristics has already been generated. In addition, however, a number of important initiatives worldwide are working towards promoting the use of data formats that are stable in the long term, and of open standards already at the publishing stage of the digital resources. Taken together, all the selected measures also contribute to the preservation of older states of the art in order to be able to integrate them into current and future academic processes. That is the primary goal of the long-term archiving of digital resources.

The question of the context and business model in which digital publications are generated is irrelevant for (technical) long-term archiving processes, as Open Access journals in principle undergo the same technical processes as commercial e-journals of specialist academic

[38] Liegmann, Hans & Schwens, Ute, 'Langzeitarchivierung digitaler Ressourcen', in: Kuhlen, R., Seeger, T. & Strauch, D. (eds), *Grundlagen der praktischen Information und Dokumentation,. Vol.1: Handbuch zur Einführung in die Informationswissenschaft und – praxis,* 5th ed., Munich, 2004.

publishers. The German National Library Law (Gesetz über die Deutsche Nationalbibliothek) provides for this equal treatment where long-term archiving is concerned[39]. Since 29 June 2006, this law has obliged the German National Library to collect all works published after 1913 in Germany, in German or about Germany. This legal obligation to collect materials is linked to the obligation to permanently preserve and make archived materials available.

In 2004, in response to the challenge which this duty involves, the German National Library started the project 'Co-operative Development of a Long-Term Digital Information Archive', known by the German acronym *kopal*[40], with funds from the German Federal Ministry of Education and Research. This project, carried out by the German National Library and the Göttingen State and University Library, the Society for Academic Data-processing (Gesellschaft für wissenschaftliche Datenverarbeitung, GWDG) and IBM Germany, pursues the goal of implementing and testing a cooperatively created and operated long-term archiving system for digital documents and data as a sustainable solution both for long-term preservation and guaranteed long-term availability of digital resources.

The starting point of the archive system is the Digital Information Archiving System (DIAS) developed by IBM in collaboration with the Dutch National Library (Koninklijke Bibliotheek). In its architecture and implementation, DIAS is consistently geared to the Standard Open Archive Information System (OAIS), which has also been established via ISO since 2003, and has provided a kind of conceptual framework and orientation point for corresponding systems.

For the development of the *kopal* project, a number of important components were added to DIAS, and its architecture was adjusted. The system was thus made client- or multi-user compatible, and, in particular, the grouping of storage and administration of objects was replaced by a technical approach geared to individual objects. The object-related comprehensive metadata information necessary for this purpose was formulated as Universal Object Format (UOF) and anchored in the system. Finally, tools were created to homogenise the metadata to posted objects that address and operate the open, standardised interfaces in the system. The corresponding modular software library koLibRI is available for other institutions to use under an Open Source licence. This architecture and orientation means that *kopal* is in a position to store publications permanently and securely, to migrate them if necessary on the grounds of extended meta-information using automated processes, or to

39 http://www.d-nb.de/wir/pdf/dnbg.pdf.
40 http://kopal.langzeitarchivierung.de.

make them available in appropriately generated emulation environments. From a technical point of view, the *kopal* solution does not involve any demands on or tying-down of publications, nor, in particular, of the production processes behind them.

What, then, are the differences between long-term archiving of Open Access publications and the publications of commercial publishers? Differences and open questions can be found primarily in two areas:

- A standardisation of publication processes across different media would seem simpler in the case of Open Access models, since editors as a rule belong to a more homogeneous community (university, research institutes, learned societies, etc.). Competition plays less of a role here than in the commercial world; the use of the same standards and interfaces is preferred to the unique position of a single producer as is required by the market. On the other hand, experience suggests that a commercial publisher can impose on its authors much more rigid demands relating to the semantic and syntactic-technical quality of submitted articles, and thus require that authors actively cooperate in the specific publishing chain at an early stage.
- Access to Open Access publications in the archive of the German National Library with its long-term availability features of the archived items can be granted on the same basis as access to the documents of the server of origin. Of course, the rights owner must give his or her consent according to copyright regulations, but most licences involved in the context of Open Access recommend the receipt of this consent so as not to fall back into access restrictions or discussions about cost.

Both points could also be negotiated with those commercial publishers who operate appropriate corresponding business models for electronic publications.

For the publishing author, what we have said so far means that when submitting the article to whoever will publish it, he or she should insist that the question of long-term availability of the publication be explicitly clarified. In this context, it is ultimately irrelevant whether this responsibility is exercised directly by the institution to which the article is submitted, or by some other institution, for example acting under a legal obligation, as in the case of the German National Library. As a rule, the latter form of long-term archiving will be the most

appropriate for the majority of Open Access repositories. The German National Library is currently setting up submission interfaces for this very purpose. Appropriate agreements should be implemented, including a catalogue of rules for the long-term handling of the digital object.

For the Open Access movement, the theme of guaranteeing the long-term availability of digital objects certainly has potential: the use of existing technical and operational options and the design of corresponding workflows guaranteeing the availability of publications at a high technical level could play an increasingly important role in the competition for the optimal form of publication, especially in an institutional context. An important sub-component here is the system of 'persistent identifiers' whose use ensures that sources and articles are quotable, and which guarantees that citations will permanently be understood in an open world, and that they will not just exist in a closed and often only partially accessible service.

Open Access and the Structure of Academic Communication

By Hans Pfeiffenberger, Alfred Wegener Institute for Polar and Marine Research, Bremerhaven

The criterion for any assessment of the system and means of academic communication must be their maximum contribution to the benefit and progress of science and scholarship. In particular, individual means are no more than a necessary service for science and scholarship, a service whose effectiveness and efficiency needs occasional examination.

State of the art

Beginning in 1665 with the Philosophical Transactions of the Royal Society, the peer-reviewed article in an academic journal has become the gold standard of academic communication. It did partly replace communication by letter between colleagues and rivals. For the pure communication of results, the journal was and is more efficient, and professional editing probably also makes it more effective. The 'date stamp' of a trustworthy publisher established priority, which previously was difficult or impossible to determine in disputed cases. Finally, refereeing by peers provided a quality assurance that allowed the reader, to a degree, to accept the facts and conclusions contained in the paper as correct.

To a certain extent, the journal article still has these advantages, even if these are no longer undisputed. Above all, the efficiency of communication is fundamentally questioned when the Blue Ribbon/Atkins Report[41] notes that: 'The primary access to the latest findings in a growing number of fields is through the Web, then through classic preprints and conferences, and lastly through refereed archival papers.'

Furthermore, the value of quality assurance is in decline as growing quantities of underlying primary data, as well as other materials, no longer form part of the publication as printed, and are assessed neither during the review process nor otherwise. Recent major scientific scandals are largely connected with invented or falsified data, or with erroneous evaluation and summarisation.

Modern demands and possibilities

From a relaxed point of view, one could say that the age of Internet-based communication is only just beginning — and this certainly goes for academe, too. However, access to academic journals is currently almost exclusively via the Internet. The reason for this rapid development must be the greater efficiency of net-based access, which in turn has many reasons.

[41] Atkins et al., *Report of the National Science Foundation Blue-Ribbon Advisory Panel on Cyberinfrastructure,* 2003, http://www.nsf.gov/od/oci/reports/toc.jsp.

The increase in efficiency is also absolutely necessary, since the proportion of the population engaged in research or using research results is increasing. If the efficiency of reception were not rising, the proportion of what any one individual could take in would constantly be on the decline, as would the use of any individual research result.

A further reason why there is a need for a clear increase in efficiency lies in the shape of certain areas of research. There are those which are particularly costly, and thus require as complete an exploitation of the results as possible. Others are of highest relevance to society and at the same time of great interdisciplinary complexity. They require the correlation and utilisation of many results from many different disciplines. We might cite as examples such 'modern' research topics as *Risk Habitat Megacity*[42] and of course *Global Change*. Relevant disciplines range from the further development of climate models, via examinations of traffic flow from an engineering point of view, to sociological insights into the change in the lives of Arctic peoples.

The 50 000 participants in (and doubtless also the recipients of the insights obtained from) the International Polar Year 2007–2008 (www.ipy.org) — a programme that represents only part of research into global change — come from 60 nations. Its persistent results — including a 'data snapshot' of the Polar Regions, which is perhaps more important than journal articles — will form a basis on which global change will be tracked in the coming decades. For this reason, the programme has adopted a policy which includes an obligation to make resulting data available rapidly and freely. Both the implementation of this one coordinated research programme of 170 formally independent project clusters and the utilisation of results demand an extremely rapid, effective and efficient communication system. This does not yet exist in institutionalised form, but it is planned in order to exchange data sets in real time that are needed for the implementation of the project.

Approaches to a solution

In the global knowledge society, the extensive knowledge present in people's heads, the information that has been written down, and the data obtained at huge expense can only be really comprehensively and effectively accessed and utilized if they can be linked in every possible way, including ways as yet unknown. To the degree necessary, this is clearly beyond human capability. Therefore,

[42] Strategies for Sustainable Development in Megacities and Urban Agglomerations, http://www.risk-habitat-megacity.ufz.de/.

machine processes — from the (full text) search engine to techniques of text and data mining — need to be employed. Today, however, only a financial giant like Google would be in any position to purchase access to the entire material of major publishers if it wanted to. Accordingly, in today's STM (science, technology, medicine) fields, for example, only one (commercial) entity is in a position to make available a relevant part of all electronically available scientific texts of a certain quality standard and to network these via their citation structures: http://scientific.thomson.com/products/wos.

By contrast, what can already be done for openly accessible material at evidently little effort is made clear by limited, simple services such as Citeseer (http://citeseer.ist.psu.edu) or Scientific Commons (http://www.scientificcommons.org). Alongside obvious search functionality, both services also contain text-mining approaches in order to identify networks of persons (authors and co-authors), schools or communities. Such navigation aid for the sea of information would be highly useful only in complex contexts such as global change.

An example of the evaluation of texts on biochemical compounds[43] shows that only their machine analysis allows researchers to recognise far-reaching correlations and to draw conclusions when the underlying foundations of these conclusions are spread over hundreds of publications.

That even the refereeing of individual articles will not be able to manage without such techniques was pointed out by the journal *Nature* in a Special Report: 'As information technology becomes more sophisticated, I think you are going to see more journals adding new tools to their screening processes.'[44] The report also explains why access to underlying data, presumed to be stored on CDs in cardboard boxes, is not a possible procedure in the refereeing context.

The need for access to full text and to underlying data becomes particularly clear if one considers that even the most valuable data-sets are not adequately retrievable and usable if the texts which describe them or are otherwise associated with them are not available for automatic analysis services. Pure data-set catalogues, not connected with publications and the other contexts in which the authors of the data work, cannot in the long term do justice to the data[45] any more than just the abstracts of articles in journals can.

43 Hofmann-Apitius, M., 'Paradigm Changes Affecting the Practice of Scientific Communication in the Life Sciences', in: *Scientific Publishing in the European Research Area*, Brussels, 15 February 2007. http://ec.europa.eu/research/science-society/document_library/pdf_06/hofmann-022007_en.pdf.

44 Marris, E., 'Should journals police scientific fraud?, in: *Nature*. 439 (2006), 520–521, doi:10.1038/439520a.

45 Pfeiffenberger, H., & Macario, A., 'Text, Data and People – How to Represent Earth System Science', CERN workshop on Innovations in Scholarly Communication (OAI4), Geneva, 20 October 2005. http://epic.awi.de/Publications/Pfe2005c.pdf.

Conclusions

These considerations lead to the expectation that the future of academic communication will be marked by a wide variety of Internet-based services, which will efficiently make available and effectively present freely accessible articles, data and other materials in a variety of ways.

Data-processing, Data-transfer and Search: Further Technical Challenges for Open Access

By Wolfram Horstmann, Bielefeld University Library

Open Access is a child of the Internet. Theoretically, the World Wide Web (WWW) has made it possible for everyone to have immediate access to news, media and communication everywhere. Scientists created the Web almost 20 years ago in order to exchange academic information more efficiently, and thus made direct access to information possible. Since then, for many people, the Web has developed into the ultimate global information platform.

Today scientists and scholars are once again aiming at the goal of Open Access to academic information on the Internet. This is not because access to academic information on the Internet has meanwhile been closed off. Rather, information in the form we are concerned with today did not exist in the infancy of the WWW. In those days, academic publications existed largely in printed form. It is only in the past decade that they have become available electronically on a large scale. In addition, today we are not merely concerned with publications: many other data can be found in academic offices and laboratories on computers, storage media or servers that are not compatible with the standards of the WWW. For example, we are talking about the digitalisation of cultural heritage, experimental measurement data, computer programs for evaluation, modelling or simulation, and learning materials.

Manual processing of all these data is impossible, which is why the machine-readability of data plays an important role. Firstly, machine-readability means that data must be recognisable from external servers or digital services. This recognition mostly takes place via metadata, a kind of digital label for data, which contains information about the form and content of the underlying object. In addition, machine-readability requires a transfer protocol which allows the data to be transferred from one place to another. In the traditional WWW this is primarily 'http' (hyper-text transfer protocol). However, for the multitude of data types and uses to be found in science and scholarship today, this is not adequate since far more multifarious information on the type and purpose of the data has to be exchanged before any transfer can take place.

For academic data, but also for other forms of data, labelling with the 'Simple Dublin Core Metadata Element Set' (http://dublincore.org) has become standard practice. As a transfer protocol for open, machine-readable data stores, the 'Open Archives Initiative Protocol for Metadata Harvesting' (http://www.openarchives.org) is often used. The combination of the two allows a new form of technical networking based on the principles of Open Access: digital knowledge stores, known

as repositories, are coming into existence worldwide. Alongside the repositories that are created directly for academic disciplines, many academic libraries function as systematic digital age providers of information by operating repositories. These repositories expose their data without restricting access for digital 'harvesters', which collect metadata and structure them in intermediate storage facilities for systematic access. After that, search engines enable researchers, teachers and learners to access information, which is distributed worldwide in an unrestricted and targeted fashion.

But even if the data are present in repositories, labelled with metadata and accessible from other servers and services, there is still no guarantee that the results are actually usable by academics. Due to major Internet protagonists like Google, scientists and scholars are accustomed to relatively comprehensive and rapid access to the results. Google and others invest a great deal in the registration and computer-based structuring of data, which relate not just to metadata but to every conceivable form of information which subsists in the digital object itself. The approach of structuring academic information exclusively via metadata is conceptually superior. However, in practice this approach still needs to be turned from an individual testing application into a comprehensive everyday tool. A 'future-proof' solution could lie in collaboration between libraries, which guarantee the quality of the metadata and data presentation, and experts in information sciences, media studies and informatics.

Especially for the young generation of researchers and students, the WWW has developed into a highly interactive environment. For many, the browser is a central switchboard in their professional and social lives, in which communication, the exchange of data and the structuring and configuration of their daily routines take place. The academic world also works on an increasingly interactive basis. This means that not only access, but also the manipulation of data, collective editing à la Wikipedia (http://www.wikipedia.org) or sharing à la Del-icio-us (http://del.icio.us) are expected.

The reconfiguration of the WWW into an interactive environment suitable for science and scholarship represents a challenge for service providers even with respect to publications with a relatively simple structure. Increasingly, however, we also have to deal with the other materials mentioned above, such as multifarious digital items, computer programs, and learning materials. These days, many academic results are obtained with the help of precisely these new media; traditional publication with text and

graphics forms only a fraction of this academic work. Tracing back, let alone the verifying of scientific results, is becoming increasingly difficult on the basis of publications alone.

At the outset, there seem to be no limits to the possibilities offered by a new, virtualised academic world in the context of such forms of electronic publishing. In such a comprehensive scenario, however, it must not be forgotten that vast quantities of data are generated that are totally inconceivable in the analogue, non-electronic world. Also, much of this information is not intended to be used by the public or even by scientists or scholars in related disciplines. And not every piece of academic information generated in such a scenario can or need be preserved and placed at the permanent disposal of posterity. Science and scholarship have become more fugacious.

In addition, the atomisation of science and scholarship into more and more sub-disciplines has made it more and more difficult to provide interdisciplinary services for the academic community in the way that university libraries have traditionally done. Today, only academics themselves know what information and services they need for their work in their respective areas of research. The challenge for information service providers will consist in offering to structure, process, and make accessible academics' specialist knowledge with functional, generally valid information tools, be they search engines, or tools for the administration of information, documentation, editing or communication.

The Acceptance and Distribution of Freely Accessible Publications

By Johannes Fournier, German Research Foundation

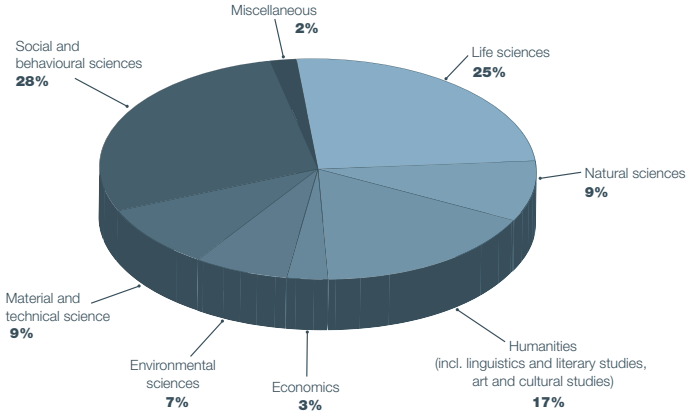
A representative survey among DFG-supported scientists and scholars, published in 2005 by the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG), showed that there was broad agreement on the principle of Open Access by grantees across all academic disciplines: 74% of the materials scientists participating in the survey thought that it was in principle beneficial to specifically promote access to research results free of charge, as did 81% of those working in the humanities and social sciences, 84% of the natural scientists, and 88% of the life scientists[46]. At least in theory, the international academic community also supports Open Access. Interdisciplinary support for this principle was confirmed in February 2007: a petition to the European Commission was submitted on 11 February 2007 by more than 6 000 life scientists, some 2 000 physicists and 2 000 materials scientists, as well as by some 2 100 social scientists and some 1 200 representatives of the humanities. This petition requests free access to research results by making it mandatory to place these in repositories after the expiry of an embargo period. In the meantime, it has been signed by over 24 000 scientists and scholars[47].

In principle, there are various ways in which scientists and scholars could implement this evidently widespread readiness to make their research results openly accessible. Two thousand six hundred and sixteen Open Access journals ranging across all academic disciplines have been registered under http://www.doaj.org/ alone. As was to be expected, the list is headed by publications in the fields of medicine, biology and food sciences. Alongside technology and environmental sciences, the social and behavioural sciences (including psychology, pedagogy, sociology, political science and jurisprudence) are also well represented, as are linguistics, literary studies, art and cultural studies (including history, archaeology and philosophy). The latter two groups have been consolidated in the diagram.

All the large publishers now have schemes whereby articles published in subscription journals are made freely available to users directly after publication provided that authors cover the costs of publication[48]. In certain subjects — e.g. physics with arXiv (http://arxiv.org/) and economics and social sciences with the *Research Papers in Economics* (http://repec.org/) — it is becoming standard practice to make preliminary versions of academic contributions available via subject-based repositories. In addition, more and more publishers are also allowing published journal articles to be placed on document servers and thus be made freely available. Therefore,

[46] Deutsche Forschungsgemeinschaft, *Publication Strategies in Transformation? Results of a study on publishing habits and information acquisition with regard to Open Access*, Bonn. 2005, p.51 et seq., http://www.dfg.de/en/dfg_profile/facts_and_figures/statistical_reporting/open_access/index.html.

[47] The statistics on the petition to the EU as of 11 February 2007 with app. 18 000 signatories can be found under http://www.ec-petition.eu.



Distribution of subject areas of the journals registered in the Directory of Open Access Journals

it should not be difficult to publish on an Open Access basis[49].

Actual publication practice, however, contrasts sharply with the general acceptance of Open Access and the multiple publication possibilities. In 2004, of those grantees questioned by the DFG, IT specialists had made 46% of their journal articles available on an Open Access basis after they had been published, mathematicians 32%, but biologists only 17%, social scientists 9%, and academics working in the humanities a mere 3%. At the same time, only 12% of those questioned had published at least once in an Open Access journal[50]. However, an upward trend can be observed: while an international survey in 2004 found that only about 11% of those questioned had published in an Open Access journal, this figure had risen to 29% by 2005[51].

In another survey of 1 296 academics worldwide, authors responded that they had not published in the context of Open Access because they knew of no or at least of no 'appropriate' Open Access journals in their subject area in which they could have published their work. In addition, three-quarters of those participating in the survey were unaware that they could have made their already published works available via repositories[52].

48 For more detailed information see Suber, Peter, 'Nine questions for hybrid journal programs' in: *SPARC Open Access Newsletter* 101, 2 Sept.2006. http://www.earlham.edu/~peters/fos/newsletter/09-02-06.htm#hybrid.

49 Cf. Scholze, Frank, 'Goldene und grüne Strategie des Open Access – Übersicht und Vergleich', in: Lülfing, Daniela (ed.), *95. Deutscher Bibliothekartag in Dresden 2006, Netzwerk Bibliothek*, 2007, pp. 173–182.

50 Deutsche Forschungsgemeinschaft 2005 op. cit., p. 44 (Open Access journals), pp. 45–47 (Open Access postpublications).

51 Rowlands, Ian & Nicholas, Dave, 'An International Survey of Senior Researchers', in: *New Journal Publishing Models*, 22 Sept. 2005, 5. http://www.ucl.ac.uk/ciber/ciber_2005_survey_final.pdf.

At the same time, these brief considerations represent the general framework conditions for greater acceptance and dissemination of Open Access publications:

1. Open Access publications are seen by many as not carrying sufficient renown. New journals, such as those listed in the *Directory of Open Access Journals*, have not yet managed to create a brand image. As long as existing reputable subscription journals cannot be turned into Open Access publications, the 'green road' promises more success. But it is essential to inform academics that they can first publish in high-ranking journals and then subsequently deposit their articles in repositories, and under what conditions.
2. It is essential to inform about legal, technical, and organisational aspects, and in particular about all the researchers' possibilities of making their own research results available in Open Access without too much investment. In this regard, the information platform http://www.open-access.net sponsored by the DFG should provide an important component for German-speaking researchers.
3. Publishing in Open Access mode should not fail because authors cannot afford to pay for it. It is up to funding and research organisations to take the principle of recognising the cost of publication as a component of the total research costs seriously. The deliberately reticent financing of publication costs — for example the DFG's lump sum of just EUR 750 a year — can be explained by the fact that those providing the publication service do not make their price policy sufficiently transparent for research-grant providers. If in future publishers explain their pricing strategy in a way that others can understand, more courageous decisions on the part of grant-providers when it comes to funding Open Access publications may become possible. In this regard, the setting up of a working group on pricing transparency was recommended at the 'Academic Publishing in Europe 2007' conference.
4. Authors must be given support in legal matters ('What articles may I place in repositories?', 'How do I protect my rights as an author?'), as well as technological and organisational matters ('How do I upload my article on our university server?'). Above all, it must be conveyed that Open Access publications cannot simply be used or edited by others as they see fit, but rather that authors — for example via particular licences — are in a position

[52] Swan, Alma, *Open Access self-archiving: An introduction. Executive Summary,* 2005. http://eprints.ecs.soton.ac.uk/11006/01/jiscsum.pdf.

to determine who can use their research results, how they can use them, and for what purposes. With appropriate advice and support, for example when setting up an Open Access publishing infrastructure, in particular academic libraries will be taking on new tasks, and must reposition themselves in the rapidly changing world of academic communication.

5. Role models are essential. If senior and highly respected scientists and scholars publish their research work in Open Access channels, their example will encourage other authors to make their own publications available free of charge.

Finally, it is worth pointing out that reservations *vis-à-vis* Open Access publishing on the part of some authors are not due to the issues of cost-free access. Rather, what authors seem to fear is electronic publication, whether cost-free to the user or under licence. Many academics believe that the quality of electronic publications is lower than that of printed publications, and that the long-term archiving and accessibility of digital publications is in no way secured[53]. What is revealed here is a profound uncertainty on the part of authors in the face of a phase of fundamental and comprehensive upheaval in academic communication, in which Open Access is just one of many aspects.

The extent to which Open Access is still to be addressed as a transitional phenomenon was shown in a recent survey of 688 researchers in IT, German philology and medicine who have published academic articles. Many of those surveyed state that even though they and their close colleagues are not doing so, they think that leading colleagues of other disciplines are already publishing their articles in Open Access mode: 'This [...] is typical of the "wait and see" position in which many scientists currently find themselves, with regard to Open Access publishing. Many think that others are already doing it, but not they themselves and their close colleagues'[54].

[53] Deutsche Forschungsgemeinschaft 2005 op. cit., pp. 48-51.

[54] Hess,Thomas,Wigand, Rolf T., Mann, Florian & von Walter, Benedikt, *Open Access and Science Publishing. Results of a Study on Researcher's Acceptance and Use of Open Access Publishing*. http://openaccess-study.com/Hess_Wigand_Mann_Walter_2007_Open_Access_ Management_Report.pdf.

CHAPTER 4:

Political Perspectives

Controversial Issues in the Context of Open Access

By Ralf Schimmer, Max Planck Digital Library

Where there is smoke, there is fire. If this cliché contains some truth, the dense smoke (the frequency and tone of the current debate on Open Access) must conceal a fire that is burning quite fiercely. The discussions and arguments on this topic are intense and bitter, not only in Germany. The typical munitions from the arsenal of political lobbying are deployed more and more openly: one expert opinion on the tail of another, one position statement quickly followed by the next. A competition of appeals, resolutions, declarations and petitions can be observed.

In the Open Access debate, there is a collision between the interests of large and powerful collective actors: the academic world, the publishing industry, the public, and the community. An institutional structure that for a long time had seemed to have found a stable balance that satisfied everyone has been put out of kilter for good through the breathtaking speed at which the Internet has developed, progressive digitalisation, and the huge changes in academic communication. As a result, issues which in the past were rarely of public concern and which were usually negotiated only in specialist circles have become the topic of wide-ranging public debate.

When it comes to access to knowledge, scientists and scholars aim at maximum dissemination, and emphasise the new possibilities offered by the Internet with regard to immediacy, affordability and superiority. Nowadays, from the academic point of view, the dissemination of research results looks something like this: most research worldwide is carried out at publicly funded institutions, primarily universities. The results of publicly funded research are mostly passed on free of charge to publishers, where they are prepared for publication. The publishers organise and finance what is known as the peer review process as the central quality-assurance instrument. This depends on the collaboration (which is as a rule unpaid) of publicly funded scientists and scholars. At the end of the publication process, publicly funded libraries have to buy back publicly funded research results, which have been quality assured by publicly funded scientists and scholars acting as reviewers, in the form of constantly increasing rates of subscription to journals. Looking at the process like this, it would appear that the taxpayer is shelling out at a number of stages along the way. This in turn leads to talk about the privatisation of public funds. The cost argument, however, is by no means the only one adduced by academics. According to them, there are not just financial, but also legal and technical barriers that make the publication of academic research results in the Internet age far from being as efficient and sustainable as they would wish or think possible.

If one considers the various academic disciplines, one will see that there is no uniform attitude, indeed not even an unambiguous attitude, towards Open Access. The preconditions and cultures, as well as the possibilities and requirements in different academic fields are too distinct from one another to allow us to speak of a coherent academic standpoint. There are substantial differences between the natural sciences and the humanities, but also between the individual natural sciences or even sub-divisions thereof. Even so, there is generally a growing interest in the theme of Open Access. What unites academia in all this is the feeling of living in what may be a revolutionary period in which more and more paths for further improvement of the effectiveness of research are opening up. This suggests that academics' discomfort with the traditional publishing system and its current allocation of resources will increase.

This situation seems quite different from the point of view of commercial information providers. Publishers argue that it is part of their remit and their culture-historical achievement to contribute to the dissemination of knowledge. Many publishers see themselves explicitly as partners of academia, highlighting their massive investment in academic quality assurance and in electronic distribution platforms, and stressing the fact that never before has so much content been available to scientists and scholars as today. Publishers counter the complaints of academics about qualitative restriction by pointing to vast quantitative growth in the form of constantly increasing contents and user numbers. They underscore their competence and experience in ensuring the quality and integrity of the content of articles, warning against underestimating the costs and organisational demands of electronic publication and distribution processes, and insisting that there is no alternative to the current subscription model. They counter the brave new world promised by the Internet with warnings about the danger of loss of quality in academic communication. In the eyes of publishers, Open Access threatens not just the academic journal as a cultural good, but also substantial investments in information infrastructures, jobs, and ultimately a whole industry. Optimum access to knowledge, according to the publishers, will continue to lie in the goods and services offered by commercial information providers.

The points of view are no less diametrically opposed when it comes to copyright and the question of what and whose interests this is supposed to protect. For artists who live by their creativity, the significance of copyright is not the same as it is for academics whose

livelihoods are guaranteed by their salaried positions and whose main interest as a rule lies in their academic results being accessible to as broad a public as possible. In particular, many scientists and scholars see that they are surrendering extensive rights to the publishers in their publishing contracts. They are of the opinion that copyright, at least where it has an effect on science or scholarship, ultimately serves the interests not of the author, but above all of the publishing industry. Not only many academics, but also other institutions and organisations with a public remit, such as public-service broadcasters, schools, cultural institutions and consumer protection organisations, see the restriction of rights in the digital media more and more as a problem. With increasing vehemence, many are demanding a simple and unambiguous right of use, which for example would allow authors, after a defined embargo period, to make their own work available on their own homepages or on an institutional document server for non-commercial use.

The publishers also invoke the authors in this regard, because they see themselves as the guardians of authors' interests. Copyright is a necessary legal framework that creates legal security and without it, commercial activity would be impossible. It takes the interests of both authors and publishers into account. Without the exploitation rights defined in copyright law, there would be no safeguard for publishers' investment and thus the framework which supports the whole publishing system would simply not exist. For this reason, the publishing side has hitherto vehemently opposed the demands for generous rights of exploitation for the authors, and any legislation initiatives to this effect.

Apart from academia and publishers, the Open Access debate is increasingly extending to other institutions with a public remit, in particular a cultural public remit. For some, Open Access represents the possibility of updating their remit and opening up new fields of activity for themselves. The declared aim is always to make publicly funded knowledge available to the public quickly and free of charge (or at least, affordably). For libraries, the theme of Open Access is thus vital, as they are the ones suffering particularly from having to pay the increasing costs of academic publications while their budgets stagnate, and they therefore see no solution but to cancel subscriptions. This has a negative effect for library users, and of course is not in the publishers' interests either. Admittedly, some libraries also feel that resolutely implemented Open Access would inevitably lead to structural and administrative changes in universities and other

academic institutions, and thus to a change in their importance and responsibilities.

In recent years, university publishing houses of German universities have witnessed a mini-renaissance in that they have been newly founded or restructured with the remit of online publishing under Open Access conditions. In this process, they are developing innovative approaches, both technically and in the field of business models. In the schools sector, in the public-service media, in the Standing Conference of State Ministers of Education and Cultural Affairs, in consumer protection, and in many other sectors with a cultural sphere of activity, there is a hope of better access to information and a minimisation of thresholds and barriers.

Another area of discussion, albeit one that is not a focus of attention, is free access to information held by public authorities and similar publicly funded bodies. The demand for Open Access seems to many to be incomplete while information not subject to data-protection constraints, such as geographical, geological or climatological data held by ministries or planning and environmental authorities, is also not made freely available to the public and therefore to research. In archives, museums and other cultural heritage institutions, the debate on Open Access will doubtlessly intensify.

This article is intended to cast some light on the controversies that exist in connection with Open Access. It has shown that the fracture lines that currently exist, in particular between academia and the publishing houses, are not negligible. But at the same time, it would be wrong to paint a simple black-and-white picture. Neither of the camps is monolithic, and both show pioneering spirit and a readiness to innovate on the one hand and defensive tendencies and obstinacy on the other. ‘When the wind of change blows,’ says a Chinese proverb, ‘some build walls and the others windmills.’ At the moment, both walls and windmills are being built on both sides. But there is certainly room for hope that one day the consensus will be broad enough to build windmills together, or — to be coherent with the current potentials — entire wind-farms.

Open Access in Higher Education, Science and Scholarship

Open Access in the Natural Sciences

By Wolfgang Voges, Max Planck Institute for Extraterrestrial Physics

Owing to the large number of disciplines and the extremely varied ways of handling scientific knowledge, the willingness of scientists to grant Open Access to research results is not uniform. The arguments for and against the Open Access movement are complex and sometimes controversial. Therefore a description and evaluation granting every aspect of the argument the attention it deserves cannot be given in this brief contribution. For example, there are several fields where commercial considerations regarding inventions and patent rights play such a large role that we cannot expect cost-free access to research results and data, either now or in the future.

I will limit myself to a rough description of the situation in the fields of astronomy and astrophysics in which a differentiated but predominantly positive attitude towards Open Access prevails. Research results in publications are generally handled quite liberally. Scientists wish to have their findings disseminated quickly and widely in order to allow global discussion and thus growth in knowledge. Electronic distribution and availability lend themselves to this objective. In many areas of physics it has been possible for years to make new publications awaiting peer review available for free on an electronic pre-print server (http://lanl.arXiv.org). So far, more than 415 000 e-prints have been deposited there, and the much discussed problem of quality control also seems to have been solved satisfactorily on this server.

Particularly in the field of astronomy, every 10-15 years a new generation of instruments provides more detailed data, permitting new approaches and insights. This rapid turnover causes 'old' data to lose some of their value. Their short lifespan requires research results to be published quickly, to be freely accessible, and to be speedily discussed.

In my opinion, it is imperative to apply the Open Access philosophy not just to publications but also to primary data. This includes, for example, the provision of tools for data analysis, data mining and for the presentation of data and results. However, the willingness to make these data available at an early stage varies. While scientists involved in space research have always ensured the early availability and long-term safeguarding of their recorded data, this is not yet the case for earth-bound observations. A frequent line of argument is that financial means are only provided for the science itself and not for services such as archiving data. The solution here is to change the funders' way of thinking, and to accustom scientists with the need to take into account the cost of publishing data when planning grant applications.

A much-discussed issue in this context is the necessity for a certain 'embargo period' during which scientists would have the exclusive right to evaluate 'their' data. Many publishers incorporate this type of embargo period into copyright agreements. In this context, scientists would favour a standardised and uncomplicated form that they can fill out quickly.

There are already some examples of excellent Open Access journals that can boast considerable impact factors (e.g. *New Journal of Physics*, *Journal of Cosmology* and *Astroparticle Physics*, as well as the Open Access journals of the European Geosciences Union). However, their acceptance amongst scientists is still relatively low. At the moment, traditional methods of publication are still preferred, since some fear that otherwise their colleagues would not find and quote their article. There is still much convincing to be done here and incentives have to be created to promote the submission of works to Open Access journals. Thus the Max Planck Society takes responsibility for the fees required to publish work in the *New Journal of Physics*. Traditional publishers should also examine the various opportunities created by the electronic age in order to introduce future products to the market that will appeal to the scientific community and guarantee their survival. Together with the scientists, the challenge should be accepted and new forms of publication should be developed.

Open Access in the Humanities

By Gudrun Gersmann, History Department, University of Cologne

Even though dealing with electronic publication is now a normal part of historians' or literary scholars' teaching and research work, the debate on Open Access in the humanities has not met with much response so far. Unlike in the STM disciplines (science, technology and medicine), only a few representatives of the humanities know in detail what Open Access means, let alone comply with the call to archive texts on university servers or discipline-specific repositories. The current attitude towards electronic forms of publication is still predominantly passive. There are a variety of reasons for this. Often it is simply due to ignorance regarding the creation and stability of digital publications. It seems that there is a widespread, albeit false, notion that electronic publishing requires such a high degree of personal data-processing skills that a layperson is not capable of handling it. Another presumption frequently cited is that electronic publications are *per se* transient and peripheral since their long-term archiving can not be guaranteed. A connected argument often used is that large and important expert contributions can naturally only be presented in books: 'What are we supposed to do? Read Hegel on our computer screens? That's out of the question!' The fact that such statements combine two completely unrelated issues, i.e. the question of the medium's material form and the question of the quality of scholarly texts, is treated as irrelevant. The final worry cited by scholars in the humanities is that if they were to participate in the 'fun culture' of the Internet, they would run the risk of losing respectability amongst their peers in the field.

Notwithstanding all these still existing reservations, electronic publications have been able to gain a foothold in the humanities over the past few years. This is true for example regarding the online review journals created in the past 10 years, which have become a permanent fixture of expert discussions, even though the 'important monographs' continue to be the main form of publication in history and literary studies.

Besides the quality of their book reviews, online review instruments such as *sehepunkte* (www.sehepunkte.de), which publishes approximately 100 reviews from the fields of history and art history, or the review service of the Berlin mailing list *H Soz u Kult* (http://hsozkult.geschichte.hu-berlin.de/) have successfully established themselves in their field, a main reason being that they can react faster to new publications than printed academic journals.

Without the support of large funding organisations such as the DFG (German Research Foundation) or ministries, Open Access services

in the humanities would be inconceivable. Thus, thanks to the North-Rhine Westphalian initiative 'Digital Peer Publishing'[55], 10 online journals in different fields of expertise have been created since 2004, including *zeitenblicke* (www.zeitenblicke.de), a history and art-history online journal with a wide readership addressing a specific research focus in every edition. An important and forward-looking factor for the dissemination of the concept of Open Access is doubtless the commitment of learned societies: unlike those societies that pay relatively non-committal lip-service to Open Access, the German Historians' Association (Verband der Historiker und Historikerinnen Deutschlands, VHD) set up a subcommittee for the area of 'electronic publications and specialist information' at the historians' annual congress in Constance in September 2006. The subcommittee has the mandate to develop strategies to strengthen integration of the new forms of publication into their field of studies.

This is a central concern, particularly with regard to the next generation of academics, who will definitely benefit from the Internet's multiplying effect, since every manuscript reproduced electronically by definition has a greater visibility than an article published in little-read journals that may seem somewhat old-fashioned. In the long term, even the humanities will not be able to escape the triumphal march of the new informal forms of communication or publishing known as 'blogs' or 'wikis', which include experiments with collaborative authorship.

[55] http://www.dipp.nrw.de/journals/.

Open Access in the Social Sciences

By Ulrich Herb, Saarland University and State Library

The social sciences can only be vaguely defined: for example, the Brockhaus encyclopaedia provides a broader definition than the classification adopted by DFG (German Research Foundation). In addition, some subjects can be classified as social sciences, natural sciences and humanities. This conglomerate of subjects explains why there are different attitudes towards Open Access within the social sciences.

However, a DFG study published in 2005[56] provides some insight: compared to other disciplines, German social scientists have scarce knowledge of Open Access, and of relevant initiatives and declarations[57]. They have less knowledge about relevant Open Access journals and they almost never publish in these kinds of journals[58]. These characteristics are not just evident with respect to first publications with Open Access publishers or in Open Access journals; German social scientists also rarely use Open Access servers for second publications of published documents or of preprints. International inquiries confirm these findings[59]: social scientists publish work on Open Access servers less often than is average in other disciplines and are often not familiar with any Open Access journals in which they could publish their work.

This lack of knowledge stands in contrast to the numerous services that are available: in Germany, the institutional Open Access server coverage for authors at the local university is exemplary[60]. However, fewer than 20% of the documents on these servers[61] come from the social sciences. According to a DFG study, social scientists, more than other academics, request discipline-based servers. Already existing examples in the social sciences are the Munich Personal RePEc Archive MPRA of the Ludwig-Maximilians-Universität of Munich for economists (http://mpra.ub.uni-muenchen.de), and PsyDok, the psychology server of the Saarland University and State Library (http://psydok.sulb.uni-saarland.de). Similar servers are being set up with the Social Science Open Access Repository (SSOAR) at the Centre for Digital Systems (CediS) of the Freie Universität Berlin in cooperation with the Social Science Information Centre (IZ Sozialwissenschaften) in Bonn, or Pedagogical Documents (PeDoc) by the German Institute for International Pedagogical Research (DIPF).

Of more than 2 600 journals listed in the Directory of Open Access Journals (DOAJ: http://www.doaj.org), approximately 23% can be attributed to the social sciences, and fewer than 20 are published in Germany. The frontrunner is the

56 Deutsche Forschungsgemeinschaft, *Publikationsstrategien im Wandel? Ergebnisse einer Umfrage zum Publikations- und Rezeptionsverhalten unter besonderer Berücksichtigung von Open Access,* Bonn 2005.

57 By social sciences we mean sociology, social research, political sciences, education, psychology, economics, and law, and in the extended sense media studies, ethnology and anthropology.

58 This may be due to the lack of established publishing houses like the Public Library of Science (PloS) or BioMed Central, which in other faculties take an exemplary approach in regard to Open Access.

59 Swan, Alma & Brown, Sheridan, *Open Access self-archiving: An author study,* Truro (UK) 2005.

60 Van Westrienen, Gerard & Lynch, Clifford, 'Academic Institutional Repositories. Deployment Status in 13 Nations as of Mid 2005', in: *D-Lib Magazine* 11 (2005), http://www.dlib.org/dlib/september05/westrienen/09westrienen.html.

61 This statement is based on the server list of the Deutsche Initiative für Netzwerkinformation DINI e.V. (http://www.dini.de).

trilingual journal *Forum: Qualitative Social Research FQS* (http://www.qualitative-research.net/fqs/), which has already been accessed some 16 million times. It is probably the most important online journal for qualitative social research. Others to be mentioned are *Survey Research Methods* (http://surveymethods.org), the psychology journal *Brains, Minds & Media* (http://www.brains-minds-media.org) and the education journal *Bildungsforschung* (http://www.bildungsforschung.org).

The acceptance of Open Access depends on its recognition within a specific area of expertise. There are some positive signals here: the German Sociological Association (Deutsche Gesellschaft für Soziologie, DGS), the German Educational Research Association (Deutsche Gesellschaft für Erziehungswissenschaft, DGfE) and the German Psychological Society (Deutsche Gesellschaft für Psychologie, DGPs) are represented on the advisory committee of the Information Platform on Open Access. (http://www.open-access.net), which addresses scientists and scholars, universities and learned societies. The DGPs even makes recommendations regarding Open Access. As the DFG study shows, this is the right way to go: the more knowledge of and experience with Open Access there is, the fewer the reservations.

Open Access within the German Research Foundation

By Johannes Fournier, German Research Foundation

Funding organisations such as the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG) have a natural interest in the widest possible dissemination of the research results obtained with their financial assistance so that these results can form the basis for further insights. As a result, the DFG, as one of the first signatories to the 'Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities' supports the principle of Open Access and, after conducting a representative survey of funded scientists and scholars from all disciplines[62], was also the first German research organisation to put free-of-charge access to the results of publicly funded research on a legal footing at the start of 2006. The guidelines for the use of funds, which apply to all funds approved by the DFG, explicitly call on recipients to make their research results available free of charge either by publishing them in peer-reviewed Open Access journals or by placing them in repositories. In addition, the DFG can make a lump-sum available for each project to help defray the cost of publication in an Open Access journal[63]. As legal and material preconditions are not sufficient to usher in a culture of Open Access, however, this article shall outline the activities which the DFG supports in order to make Open Access a reality.

Information and awareness-raising

In order to provide comprehensive information for scientists and scholars on how they can make free access to research results possible, the DFG is supporting the construction of an information platform http://www.open-access.net. On this platform, contents are presented by subject, academic discipline, and role (academics, learned societies, infrastructure service providers, university administrations). Closely intermeshed with this activity is the DFG-funded project 'Open Access Policies – *Was gestatten deutsche Verlage ihren Autoren?*' (What do German publishers allow their authors to do?')[64], which discusses the conditions on which academic publishers allow articles in respected journals to be additionally made available via repositories. This information, which is also included in an international database, makes it clear at the same time that the 'green road' in no way reduces the high quality of the academic work desired by the DFG, as the articles made accessible via repositories have already appeared in traditional journals.

62 Deutsche Forschungsgemeinschaft, *Publication Strategies in Transformation? Results of a study on publishing habits and information acquisition with regard to Open Access*, Bonn, 2005, http://www.dfg.de/en/dfg_profile/facts_and_figures/statistical_reporting/open_access/index.html.

63 see Guidelines for the Use of Funds (DFG-form 2.012e): 5 (publication of research findings); Research Grants. Guidelines and Proposal Preparation Instructions (DFG-form 1.02e): 6s. (publication expenses).

64 For more details see http://www.ub.uni-stuttgart.de/wirueberuns/projekte/oa-policies/.

Organisation of a publication infrastructure

The DFG has supported the organisation of Open Access journals in various academic fields (*German Medical Science, Forum Qualitative Social Research, sehepunkte*) since the mid-1990s. The journal *economics* (http://www.economics-ejournal.org/), recently launched with DFG funds, introduces open peer review as a quality criterion which is closely linked with Open Access, and in addition intends to provide links from the articles to their primary data. For the 'golden road', those projects which aim to transform journals currently subject to licence into Open Access journals would be of particular interest in the future. In this way, the existing reputation of a journal can be transferred to the new form of publication.

In order to ensure the user-friendliness of publications accessible via repositories through full-text searches and subject-based browsing, the DFG supports the organisation of a network of certified repositories: this is intended as a German contribution to a European research infrastructure.

Integration of disciplinary communities

Different academic fields have different practices with regard to publication. These differences should also be respected when it comes to Open Access: for biologists, what is important is the quickest possible access to an article in a journal; for historians, the conveniently accessible electronic edition; for earth scientists, the verifiability of an article through access to the climate data on which it is based. In the debate with different disciplines, a better definition must therefore be reached of where and in what form Open Access is of particular relevance. The DFG thus expects important impetus for the future shaping of this field from the advisory committee of the above mentioned Open Access information platform, which includes representatives of various academic societies.

Open Access and the German Academic System: Common Perspectives of the Alliance of Research Organisations

By the Working Group of the Open Access Commissioners of the Alliance of Research Organisations

An important step in implementing the principle of Open Access in Germany was the 'Berlin Declaration' which was adopted following a conference hosted by the Max Planck Society on 22 October 2003. Amongst the first to sign were the presidents of the seven large German academic organisations: the German Rectors' Conference (Hochschulrektorenkonferenz), the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG), the German Science Council (Wissenschaftsrat), the Max Planck Society (Max-Planck-Gesellschaft), the Fraunhofer Society (Fraunhofer-Gesellschaft), the Helmholtz Association (Helmholtz-Gemeinschaft) and the Leibniz Association (Leibniz-Gemeinschaft).

A joint working group of these seven alliance organisations regularly discusses the prospects of Open Access in the individual organisations and in the German academic world. The degree of implementation of the Open Access principle varies depending on the structure and tasks of the organisations. They all have the common goal of supporting the transition to Open Access and allowing a productive handling of openly accessible research results. A number of measures are supposed to contribute towards achieving a comprehensive and freely accessible representation of knowledge.

Approaching academics

Scientists and scholars, as the producers of high-quality information, are central to the Open Access debate. Only if the best publications are also freely accessible via the Internet, will they be able to achieve their full potential. Therefore, scientists and scholars should not just be offered an Open Access infrastructure which they can use to publish their research results; they should also be informed about their technical, organisational and legal options. Higher education institutions, research organisations and research sponsors should create incentives to make Open Access publishing even more attractive, and ascertain whether and to what extent they can obligate their scientists to use this form of publication.

Involving scholarly associations

Different areas of science and scholarship have different publishing habits as well as different methods of assessing research contributions. By including scholarly societies and associations in the development of an Open Access publication culture, these differences can be accommodated.

Recognising publication costs as research costs

One of the prerequisites for Open Access is the coverage of publication costs. Publication costs are research costs and thus must be firmly anchored in the budget of every research endeavour. These means should preferably be used for the authors' fees of Open Access journals or hybrid publications. By paying a publication fee they make the contributions that would ordinarily require a licence, freely accessible.

Ensuring quality

Since Open Access publications are accessible for every Internet user, they are, in theory, subject to critical assessment of the worldwide academic community. Exploiting new forms of review, such as the open peer review, offers a means of sustained quality assurance. Open Access journals in particular should take advantage of this in order to increase their acceptance in the community.

Network publishing

The Internet offers the possibility of networking the data and sources that underlie a piece of academic research with the actual publication in a multitude of ways. This makes discovery processes easier to understand. At the same time, the integration of primary sources into publications makes a contribution to quality assurance in the spirit of good academic practice.

Identifying models

It has long been routine for many scientists to make their own research results available as Open Access publications. As the Dutch 'Cream of Science' project has shown, an information platform giving free access to publications by leading German scientists such as Nobel Prize and Leibniz Prize winners could be used for targeted advertising of this new form of publication.

The legal base

For publications created within the context of teaching and research activity largely financed with public funds, a simple, non-commercial right of use or exploitation should be granted to academics and their institutions. This will ensure that research results can be viewed, for the most part, without obstacles.

Supporting transformation processes

The mere distribution of research results at minimal cost via the Internet poses a particular challenge for academic publishing. The only possible reaction to this is the creative design of the academic information space: discipline-specific value-added services must be developed on the basis of freely accessible publications in order to support work with digital information in an efficient manner.

Korinna Bauer, Helmholtz Association
Michael Erben-Russ, Fraunhofer Society
Johannes Fournier, German Research Foundation
Ralf Schimmer, Max Planck Society
Elmar Schultz, German Rectors' Conference
Robert Steegers, Leibniz Association

Libraries and Open Access

By Claudia Lux, President of the International Federation of Library Associations and Institutions

Libraries aim to ensure free access to global knowledge for all citizens, and particularly to education, science and scholarship. In order to achieve this they obtain a selection of the academically relevant publications and store them for future use and unrestricted access. This selection reflects the plurality and diversity of science, scholarship and society, and is in accordance with the specific needs of its current and future users.

Traditional free access to printed books: The library purchases the book with a one-off payment, and the reader can then borrow it for free and as many times as desired. The library stores it for further use. This is economical and effective. Other printed materials such as articles in academic journals are used within the library, or copies are made for research work at home. If students and scientists need specific literature it can be ordered from other libraries through electronic catalogues with Internet library tickets. All in all, a simple system.

This has changed. Besides printed publications, libraries now buy content in the form of e-books and electronic journals. In contrast to printed books, these may not be stored in the library permanently and made available to users over and over again. Libraries can only provide access within the library or on a university campus as long as they pay the licence fee regularly. Readers are allowed to 'borrow' e-books by downloading them from the Web. They can then be used for a limited amount of time until they automatically become unusable.

Students want to be able to electronically access academic literature that they cannot obtain on the spot, or they want to receive it via email. The quick and efficient delivery system of libraries for printed works will be severely impaired by the impending copyright for electronic publications. Libraries want to see a change in this area: it has to become possible to make electronic publications available to users in the same way as printed works are.

Licences have suddenly become vastly more expensive. Many university libraries are thus no longer able to obtain them to a sufficient degree in order to supply their scientists and scholars. Some licences are not even offered to them in the first place because the publisher has set up an exclusive, fee-based direct system. A breakthrough for selected academic literature only has been made through national licences, which are free of charge for academic institutions, and are obtained with the support of the German Research Foundation. However, they cover nowhere near all of the relevant areas and publications. Many important electronic

full-text databases for the natural sciences, technology and medicine are extremely expensive and so scientists with a small budget can no longer afford access to current knowledge.

It is beyond comprehension that access to publicly-funded research results is re-purchased with public funds. Libraries no longer want access to the scientific results of their own university through expensive licences: they are demanding Open Access to these works. They also want to store them for permanent availability. For this reason they are setting up their own digital repositories in their universities and institutes. The result is a growing collection of electronic academic publications by university members, which are enriched with further Open Access materials.

From both a German and an international perspective, Open Access is necessary in order to overcome the digital divide in our society. The December 2003 declaration of the International Federation of Library Associations and Institutions (IFLA) on Open Access (IFLA Statement on Open Access to Scholarly Literature and Research Documentation http://www.ifla.org/V/cdoc/open-access04.html) points to the significance of the global network of services provided by libraries to ensure access to scientific literature from the past, present and future. Libraries guarantee this access permanently through electronic long-term archiving and help users find and access these materials.

Open Access allows libraries to make academically relevant publications available in a lasting manner and at any time. Libraries are working towards this development. It is their contribution to education, research and science and their way of ensuring that everyone can participate in global knowledge.

Publishers and Open Access

Subscription-based Journal Publishing

By Robert Campbell & Edward Wates, Wiley-Blackwell[65]

Introduction

Annual global revenue for STM journals is about $6.5 billion although estimates vary. There are about 25 000 peer reviewed journals produced by at least 2 000 publishers, with around 65% of the market held by the top 20 publishers. Around 1.6 million peer reviewed articles were published in 2006 and the number has risen steadily by 3-4% per annum for decades in line with the growth in the research community. It is possible, however, that we shall see this annual increase go up to around 4-5% driven by the rising global spend on R & D.

Unfortunately although governments are spending more on research, scholarly communication is unlikely to be funded so generously. Many European universities, for example, have seen spending on libraries fall from about 4% of total expenditure to around 3% since 1980.

Most of the $6.5 billion of journal income comes from institutional subscribers. Other sources of revenue are advertising, reprints of articles and sponsored supplements (particularly in medicine). There is also revenue from personal subscriptions (including members of societies), although this is in decline largely as a result of the almost universal availability of journals through institutional libraries. Some members only join a society to get their journal at a low rate. Some publishers also operate schemes whereby an author can pay for Open Access, which is another potential source of revenue although as yet insignificant in relation to subscription revenues.

The publishing community has invested heavily over the last decade in the online delivery of journal content and linked with new pricing models (including the so-called 'big deal') has provided more access to more articles at a much lower unit cost. However, while print runs have fallen in recent years, most journals are still issued in both print and electronic format. As a result of this, and because of the high cost of developing electronic systems, there has not been a reduction in overall subscription prices, despite the substantial rise in overall access.

The dramatic development of the research journal and access to its content can be seen in the example below.

The rise, fall and rise in circulation of a research journal

The graph (Figure 1) shows the circulation to libraries of a specialised research journal in

[65] The views expressed are those of the authors and may not under any cirumstances be regarded as stating an official position of Wiley-Blackwell.

whole organism biology launched in 1972. Growth in circulation was steady until a peak in 1986 then like most other journals and despite the efforts of two excellent editors the circulation started to slip.

There was pressure from researchers to publish more pages with the result that to pay for these and compensate for loss of subscribers the subscription price went up by more than inflation. By the early 1990s the future of the print-on-paper research journal looked grim and understandably the library community was being increasingly critical of the ever higher prices and the difficulty in maintaining holdings.

Then the first online delivery systems were launched in the late 1990s and behind these there followed a complete revolution in journal production. Once these systems were in place publishers could rethink their traditional pricing model as an extra user could be supplied at minimal extra cost, rather than for the considerable additional costs of printing, binding, materials and postal distribution.

The journal in Figure 1 is still supplied in hard copy to subscribers that want it in this way but by 2006 35% of the subscribers opted for e-only; this figure will be at least 65% by 2010. And the subscribers are only the core circulation. Through the 'big deal', e.g. licences to consortia for access to the publisher's whole list and arrangements with organisations that provide access at reduced rates in developing countries, the total circulation is lifted to

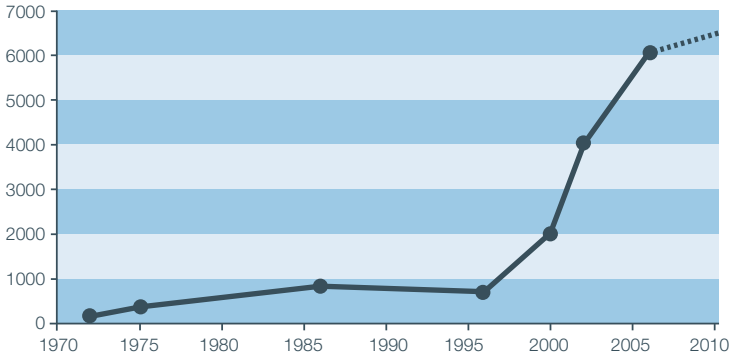


Figure 1: the rise, fall and rise in circulation of a research journal

around 6 000. Almost universal access has been achieved without risking the sustainability of the publication. Speed of publication (helped by an Electronic Editorial Office system for running peer review over the Internet) has improved along with the Impact Factor which was up by 26% in 2005. Submission of articles in 2006 was 35% up on 2005 necessitating a rejection rate of over 70% while submissions continued to climb in 2007 (up 11%).

Sustainability

This remains a major problem for Open Access. Hardly any of the pay-to-publish Open Access journals (the 'golden road' to Open Access) are making a profit or even breaking even. The likelihood is that some will be maintained by enthusiasts (but for how long?), some will cease and some will raise charges as we are seeing already. Are authors taking risks in placing articles with some of these exclusively pay-to-publish journals? Will the standard of some of these titles become compromised as they struggle to survive? There are even examples of companies exploiting the pay-to-publish model by charging authors for Open Access publication but without offering any of the traditional functions of a publisher that contribute to maintaining the 'minutes of science'. On the other hand, the subscription-based journal outlined above can afford to raise its rejection rate because it is financially viable.

The other route to Open Access – the so-called green road – is through self-archiving of articles published in subscription-based journals. It is proposed that this would not lead to librarians cancelling subscriptions even though the content is freely available on Institutional and Subject Repositories (IRs and SRs). Unfortunately this model is unlikely to be sustainable although it may work in some subjects, e.g. astronomy[66]. A recent survey has shown, not surprisingly, that librarians are likely to cancel subscriptions if self-archiving becomes commonplace[67].

The journal is not just about dissemination, however. Another critical function is to establish a permanent record, 'the minutes of science'. In the digital era, this requires the publisher to develop sophisticated techniques for preserving metadata (such as dates of submission, acceptance and publication) as well as secure content delivery platforms. Due to the facility with which publicly available electronic files can be manipulated, both the golden and green roads to Open Access could undermine this – a major flaw which remains ignored by the Open Access lobby.

66 see Henneken, E.A. et al., 'E-prints and journal articles in astronomy: a productive co-existence', in: *Learned Publishing 20* (2007), 16-22.
67 Beckett, Chris & Inger, Simon, 'Self-Archiving and Journal Subscriptions: Co-existence or Competition?', *PRC Summary Papers 2* (2007).

With so many versions of an article potentially available, there exists a problem of version control. With many journals the author can post their version of the accepted article after publication. This may well not include corrections made by the publisher's copy-editor or changes made by the author in proof. A recent paper gives details of the many albeit minor differences[68]. The authors of this article used the final version held on the publication system (what might be called the 'version of record') and compared it with the author's original MS as accepted but before any copy-editing or proof correction. It was shown that most amendments that occurred as a result of the publication process affected the accuracy of references. Without such attention to detail, the ability to link out to the original source of the reference would be substantially impaired.

Clearly publishers need to work with research funders and those running IRs and SRs to establish international standards with appropriate metadata indicating whether the author has archived a 'working paper' or the final published version. With the former a link should be provided to the publisher's site for the final version, 'the minutes of science'.

Conclusions

The journal publishing system is a huge global enterprise handling more articles every year in line with the growth in research funding.

The system is robust and operates at high standards delivering wider access at lower unit cost as a result of huge investment in technology and new pricing models.

'Author pays' Open Access is one pricing model and should be included as a viable part of the system as funders accept the charges required to sustain high standards.

The green road to Open Access (self-archiving) could undermine the system and endanger the 'minutes of science' unless funders accept an embargo on self-archiving to maintain economic viability and work with publishers to establish international standards for archiving.

[68] Wates, Edward & Campbell, Robert, 'Author's version vs publisher's version: an analysis of the copy-editing function', in: Learned Publishing, 20 (2007), 121-129.

Hamburg University Press and Open Access

By Gabriele Beger & Isabella Meinecke, Hamburg University Press

The Open Access publisher Hamburg University Press

On 22 October 2003, the German research and academic organisations signed the 'Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities' with the goal of guaranteeing the global exchange of knowledge which science and scholarship deserve, by strengthening and supporting the Open Access movement. The University of Hamburg had already created the Open Access publisher Hamburg University Press (http://hup.sub.uni-hamburg.de) at the beginning of 2002. After it had been successfully set up, it was handed over to the Hamburg Carl von Ossietzky State and University Library (Staats- und Universitätsbibliothek Carl von Ossietzky, SUB) for regular operation on 1 July 2006. This publisher's goal is to operate online publishing in the spirit of Open Access. In addition to online publications, other forms of publications (print/crossmedia/CD-ROM) are also offered. Currently, publications from the humanities are a focal point. This primarily means the publication of monographs and edited volumes, which have different requirements from journal articles. The emphasis is on quality (selected publications and formal quality control), and there is generally a mandatory layout. The Hamburg University Press publishes with the same care and academic honesty as traditional publishers. It follows the 'golden road' of Open Access publishing.

The rights-model covers contracts with a minimum runtime of three years, and an automatic renewal is possible. Open Access publishing is obligatory, and creative commons licences for the online version are guaranteed if requested by the author. All authors have the right to publish their work elsewhere at the same time. The financing model used is the 'author pays' model, with 'author' referring not just to the author but also to his or her institution or funding body. Payment is required exclusively to cover the cost of services connected to the publication process.

The Hamburg University Press of the SUB Hamburg is a member of the German Academic Publishers e.V. (GAP) association, as well as of the working group of German university publishers, both active supporters of Open Access. Hamburg University Press is present at relevant national and international events. In particular, it publishes work emanating from the University of Hamburg, the Hamburg state archive and the Hamburgische Wissenschaftliche Stiftung (Hamburg Academic Foundation). In addition, it cooperates with other academic publishers, including de Gruyter. The goal of

this cooperation is to share the work involved in order to accommodate the need for a print publication by reputable academic publisher and at the same time for an Open Access publication.

The free availability of academic content is the prerequisite for effective and efficient research. In this spirit, all of the large German academic and research institutions have committed themselves to Open Access in the Berlin Declaration. Established publishers are also becoming increasingly open to the changing needs of science, be it through their own Open Access services (Springer), through relaxing the contracts they have with authors ('green road') or through cooperating with university institutions. While Open Access is recognised at the academic policy-making level, it is still not used much by scientists and scholars, particularly those working in the humanities.

Challenges for the Hamburg University Press and an outlook

Hamburg University Press will provide a practical demonstration of the advantages of Open Access publishing to academics on location. This primarily means the realisation of and the publicity for successful and attractive pilot projects. Finding strong (cooperative) partners such as other publishers, academic institutions and libraries in order to create synergies is also important. Furthermore, a transparent and respectable business model is crucial.

The name of a university publisher is automatically associated with traditional publishing. University publishers have to get the message across that they are facing the challenges of the digital age even though they come from a long, and, when it comes to quality, binding tradition. It is their task to live up to scientific demands with regard to sustainability and visibility. In this context, it is clear that their ideal place is with academic libraries. University publishers act locally, but they have their sights set on global ideas and strategies to make the work of scientists and scholars globally and publicly accessible and visible, primarily through electronic publishing. Through their proximity to academia, they share in innovative projects and forms of publication. In this way they are also an ideal field for experimenting with cooperation and future-oriented academic publishing.

Brussels Declaration on STM Publishing[69]

by the international scientific, technical and medical (STM) publishing community as represented by the individual publishing houses and publishing trade associations, who have indicated their assent below.

Many declarations have been made about the need for particular business models in the STM information community. STM publishers have largely remained silent on these matters as the majority are agnostic about business models: what works, works. However, despite very significant investment and a massive rise in access to scientific information, our community continues to be beset by propositions and manifestos on the practice of scholarly publishing. Unfortunately the measures proposed have largely not been investigated or tested in any evidence-based manner that would pass rigorous peer review. In the light of this, and based on over ten years' experience in the economics of online publishing and our longstanding collaboration with researchers and librarians, we have decided to publish a declaration of principles which we believe to be self-evident.

1. **The mission of publishers is to maximise the dissemination of knowledge through economically self-sustaining business models.** We are committed to change and innovation that will make science more effective. We support academic freedom: authors should be free to choose where they publish in a healthy, undistorted free market
2. **Publishers organise, manage and financially support the peer review processes of STM journals.** The imprimatur that peer-reviewed journals give to accepted articles (registration, certification, dissemination and editorial improvement) is irreplaceable and fundamental to scholarship
3. **Publishers launch, sustain, promote and develop journals for the benefit of the scholarly community**
4. **Current publisher licensing models are delivering massive rises in scholarly access to research outputs.** Publishers have invested heavily to meet the challenges of digitisation and the annual 3% volume growth of the international scholarly literature, yet less than 1% of total R&D is spent on journals
5. **Copyright protects the investment of both authors and publishers.** Respect for copyright encourages the flow of information and rewards creators and entrepreneurs
6. **Publishers support the creation of rights-protected archives that preserve scholarship in perpetuity.**
7. **Raw research data should be made freely available to all researchers.** Publishers encourage the public posting of the raw data outputs of research. Sets

[69] Issued on 13 February 2007. Reprint by courtesy of the International Association of STM Publishers.

or sub-sets of data that are submitted with a paper to a journal should wherever possible be made freely accessible to other scholars

8. **Publishing in all media has associated costs.** Electronic publishing has costs not found in print publishing. The costs to deliver both are higher than print or electronic only. Publishing costs are the same whether funded by supply-side or demand-side models. If readers or their agents (libraries) don't fund publishing, then someone else (e.g. funding bodies, government) must
9. **Open deposit of accepted manuscripts risks destabilising subscription revenues and undermining peer review.** Articles have economic value for a considerable time after publication which embargo periods must reflect. At 12 months, on average, electronic articles still have 40-50% of their lifetime downloads to come. Free availability of significant proportions of a journal's content may result in its cancellation and therefore destroy the peer review system upon which researchers and society depend
10. **"One size fits all" solutions will not work.** Download profiles of individual journals vary significantly across subject areas, and from journal to journal

List of signatories:
http://www.stm-assoc.org/brussels-declaration/.
(ed.)

Open Access and Education

The Legal Protection of Open Access: The Position of the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany

By Thomas Pflüger, Baden-Württemberg State Ministry of Science, Research and the Arts; Working Group on Libraries of the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder

The German Länder (federal states), which are responsible for funding universities, have a fundamental interest in ensuring that new research findings generated on the basis of taxpayers' money is made available to the academic community quickly and as easily as possible. However, the legal framework and developments over the past few years have proved to be increasingly problematic. These circumstances pose a major problem for policymaking in the higher-education and research sectors. The Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany (Kultusministerkonferenz, KMK), the regular forum of the ministers of the federal states responsible for universities, education and culture, therefore already submitted proposals on the legal protection of Open Access to the Federal Ministry of Justice in autumn 2004[70].

Initial position

Access to and use of the knowledge generated at universities and non-profit research institutions are now increasingly under threat: legally by the unlimited possibility of the transfer of exclusive rights to publishers, and factually by digital rights management and disproportionately rising subscription costs coupled with university libraries' stagnating purchasing budgets. Access to scientific and scholarly information has developed into a bottleneck in the supply of information at universities. Technical and legal possibilities currently allow publishers to make the contents of online media accessible on an exclusive basis. If they are in control of information which is absolutely essential for science and research, they can charge whatever they want. Another factor is that it is precisely younger academics from the life sciences, natural sciences and technology who need to publish in renowned and often expensive journals in order to build their reputation. Large international academic publishers have thus been able to increase the prices of this type of journal considerably over the past 10 years. It can hardly be a coincidence that the profit of a large international publisher was around 650 million euros in 2005, which corresponds to the entire annual investment of the German Länder in universities' infrastructures in the areas of mathematics, natural sciences and engineering. In view of this development, universities have had to cancel journal subscriptions, and this in turn has had an impact on the viability of a central part of what makes up research infrastructure.

70 Position paper of the KMK of 11 Nov 2004, www.urheberrechtsbuendnis.de/links.

The KMK's proposed amendment

On 22 March 2006, the German federal government presented the draft of a 'Second Law to Regulate Copyright in the Information Society' (so-called 'second basket', *zweiter Korb*). The opinion paper of 19 May 2006 of the Federal Council of Germany (Bundesrat), prepared by a working group of the KMK universities committee, assesses the draft law as not being in the best interest of education and science[71]. For this reason, the Bundesrat rejected proposals which would have led to the availability of knowledge becoming even more difficult and expensive, and which would, as a consequence, have hampered innovation, the foundation of economic growth. Going beyond the government draft, the Bundesrat proposed the creation of a legal framework to allow results of publicly funded research to be made reliably available for non-commercial purposes in the context of Open Access.

The Länder are responsible for the good functioning of the universities.The KMK thus urged the federal government to exploit the legal room for manoeuvre in favour of universities, science and libraries and to ensure a digital second publication right for scientists and scholars, subject to certain copyright conditions. This move is intended to bring about a paradigm shift in the area of academic publications at universities, creating the appropriate legal framework for the freest possible access to academic information and strengthening the position of scientists and scholars against the *de facto* market power of international publishing houses. The imbalance which has arisen between publishers and academic authors can then be removed on the level of copyright law while maintaining the latter's constitutional rights. This proposed amendment[72] leaves the right of first exploitation of the holder of the rights untouched, since the legal implementation would apply to non-quotable postprints and would be linked to a period of time no longer than six months, after which the work can be made accessible elsewhere (embargo period).

The KMK is striving for the normative implementation of its proposal in the current legislative process relating to the 'second basket' in order to maintain and improve the viability of the infrastructure of universities and research institutions, as well as to further strengthen the transfer of technology and knowledge. The proposed amendment's contents correspond to similarly oriented reform considerations in the Anglo-American world and met with broad agreement amongst experts at a hearing at the committees on Legal Affairs and Education of the German Bundestag on 20 November 2006.

71 Government draft (with counter-statement on BR-Drs. 257/06) BT-Drs. 16/1828 of 15 June 2006; BR-Drs. 257/06 – resolution of 19 May 2006.

72 It is proposed to add the following clauses (3 and 4) to section 38 sub-section 1 of the Copyright Law: 'Even where an exclusive right of exploitation has been granted, in the case of academic contributions which have their origin in teaching and research activity predominantly financed by public funds and are published in periodicals, the author has the right, once six months after the said contribution's first publication have passed, to allow public access elsewhere to the content, provided that such granting of public access is justified by the pursuit of non-commercial interests and that is not in the same format as the first publication. No agreement to waive this right shall be legally binding.'

Open Access and Education Policy: Perspectives of a Politician

By Jörg Tauss, MP (German Bundestag)

The current dominant publication practice in the academic world is out of kilter, in particular from the point of view of science and research policy. The practice, often described as paradoxical, is as follows: a research area, as a rule financed by public funds, generates academic results whose commercialisation is undertaken by a scholarly publisher. The usage rights in the resulting publications are made available to other scientific and scholarly organisations, for example libraries, which are required to pay for them, again using public funds. The specialist publishing sector is dominated, both nationally and internationally, by a small number of large companies whose publication and pricing policies tend to be somewhat opaque, due to their *de facto* monopoly. The financial risk faced by these publishers in the current academic production system is, to say the least, limited thanks to the dual flow of public funds into the publication cycle. In an expert opinion delivered to the Committee on Legal Affairs of the German Bundestag, Professor Hilty of the Max Planck Society rightly describes this situation as a privatisation of public funds.

Therefore, against the background of tight public-sector budgets, it is becoming increasingly difficult for academic institutions to find the money to purchase current publications and thus to adequately fulfil their responsibility to disseminate information. As a result, more and more libraries worldwide are looking for alternatives, and not just for reasons of cost.

In the medium term, this situation is likely to seriously limit the effectiveness of the German and indeed the global system of education and science. It must be the task of politicians to counter this threat. Modern copyright law that is in line with the demands of the information and knowledge society plays a key role here. This law must be couched in unambiguous terms that reflect the interests of authors, and thus of science and scholarship. It is clear, from this demand, that this is not primarily a cost-saving exercise designed to relieve public-sector budgets.

The proposed amendments to German copyright law, the so-called 'second basket' of the implementation of the EU directives currently under discussion, does not take proper account of this dimension. At best, it can only represent a small intermediate step in view of the altered requirements of the information and knowledge society. To date, current law favours specialist publishers, who, from the point of view of education and science policy, make a contribution to added value, which, while important, should not be exaggerated. Rather, modern copyright law, both science and research-friendly, must look more favourably

on those generating current knowledge, and also at modern forms of distribution.

At present, academic research findings are made available to no more than a small group, sometimes at excessive cost. This conflicts with the demands of a knowledge society with future potential, for which untrammelled access to information and knowledge at a proportionate cost is a precondition. The monopolised prices currently held by international publishers are disproportionate.

What is needed at this point is a paradigm shift. The principle must be that knowledge produced by public funds is seen as public property, and is thus made available to the public comprehensively, unimpeded and at appropriate cost. According to this principle, and irrespective of the selected means for Open Access publication, the future will see not just the user, but indeed the actual producer of knowledge bearing the costs in the publication and distribution chain. The Internet is a prime candidate for the medium of dissemination of academic information, as it opens up new paths for the publication of research results. Herein lies the great merit and value of the Open Access approach pursued by research organisations.

The sustainable concepts are obvious. It is regrettable that policymakers are once again looking to apply outdated approaches in their second round of reforms.

The most fundamental task for policymakers today must be to create forward-looking framework conditions that provide an incentive for tomorrow's knowledge society — and this must include copyright law. Without a so-called 'third basket' of the implementation of the EU directives that takes into account the concerns of education, science, scholarship and research, this cannot be achieved.

Open Access from the Point of View of the Coalition for Action 'Copyright for Education and Research'

By Rainer Kuhlen, Chair of Information Science, University of Konstanz; Spokesman for the Coalition for Action 'Copyright for Education and Research' (Aktionsbündnis 'Urheberrecht für Bildung und Wissenschaft')

The Coalition for Action 'Copyright for Education and Research' (Aktionsbündnis 'Urheberrecht für Bildung und Wissenschaft', ABU) was formed in the context of the current debate surrounding the reform of German copyright law. It aims to represent the interests of education and science and scholarship in a liberal treatment of knowledge and information dissemination *vis a vis* the legislator. The basis of the ABU is the Göttingen Declaration of 2004, signed by 6 academic organisations, 328 learned societies and 5 500 individuals (as of April 2007). Its central message is as follows: 'In a digitised and networked information society, access to global information for the purposes of education and science must be guaranteed at all times from any place!' This is certainly compatible with the goals of Open Access.

The ABU can only indirectly promote the implementation of the principle of Open Access in education and science. Generally, Open Access is not impaired by copyright. Copyright grants authors publishing rights. An Open Access publication, however, means that the author's exploitation rights are no longer exclusive. However, it is the authors' decision whether to also make their work available for commercial exploitation through contractual agreements. In any case, the author's personal/moral rights are not affected by Open Access. Some of the problems in the overlapping areas of Open Access and copyright are as follows:

- It would be easier for many authors to start applying Open Access if Section 38 of the German Copyright Law was changed so that authors of contributions to periodically published collections could have their exploitation rights (for non-commercial purposes) restored after a maximum period of six months from the date of the commercial publication of their work and so that one could not even waive this right contractually. The time delay may not be in the spirit of Open Access, but this regulation could inspire many authors to make their work freely available after an embargo period of this type.
- A difficult question is whether, in addition to being encouraged to make their work available for Open Access publication, authors should also be obliged to deposit, in parallel at least, any work resulting from research supported by public funds in the Open Access repositories of their institutions. This is currently a controversial issue, since, for some, not only the questions of 'whether', 'when'

and 'how' constitute academic freedom, but also the question of 'where'. For others, the question of 'where' should not be left exclusively to the free choice of the individual. The ABU tends to support the latter opinion, so that, in line with the goal of the Göttingen Declaration, all of the knowledge produced with the help of public funds can be made publicly available. Of course authors should continue to be allowed to choose freely where they publish their work commercially, so long as the Open Access publication is guaranteed without delay.

- A considerable part of the knowledge that should be openly accessible is contained in so-called 'orphaned' works. On the basis of their publication dates, these works are still protected by copyright, but their authors can only be located with great difficulty or not at all. Due to this uncertain legal situation libraries often do not dare to digitalise these culturally important items, whatever their media form, and make them freely accessible to the public. So far, legislators have not solved the problem of orphaned works. The ABU has been active in this area with suggestions, and has in principle joined the German Research Foundation's (DFG) demand on the EU to solve this situation by considering and treating these works as if they were in the public domain until a rights holder objects. From the point of view of the DFG and the Coalition for Action, it is imperative for the freedom of research and education that the digitalisation of orphaned works or works in the public domain does not justify the creation of new copyrights or exploitation rights of the digitalised original. A similarly liberal solution should be found for works that are no longer in print.

The ABU sees Open Access as well as free licensing forms such as 'creative commons' that support authors' information autonomy as promising solutions to the regulatory impasses of current copyright law without fundamentally questioning it.

Open Access and Consumer Protection:

The View of the Federation of German Consumer Organisations

By Patrick von Braunmühl, Federation of German Consumer Organisations

Access to science, scholarship and research is part of consumer protection. It is in the consumer's interest to be able to access as much information as possible on the Internet. People from all levels of society should have equal opportunities when it comes to accessing information. Open Access can meet this need by making scientific and scholarly literature available online publicly and free of charge so that anyone who is interested can read, download, copy, distribute, print, search and reference the full-text version of an academic work and use it in any other desired way, without fearing financial, legal or technical barriers beyond those concerning Internet access itself (cf. BOAI: Budapest Open Access Initiative).

Free access is justified when the public has contributed to the funding of science and research, and thus the publication. Users should not pay more than once: first with their taxes, which fund research and quality assurance, and then for the right to access the published results, for example in libraries. Moreover, libraries must not be forced to buy, at expensive prices, research results subsidised by public funds. They no longer have these kinds of financial means.

Limiting consumer rights when it comes to digital media is a general problem. It is not just a question of prices. The exploiting organisations, in this case the publishing houses, control the use of the media according to their own ideas, limiting and/or even monitoring them. Terms of use and licence agreements of considerable length written in complicated language are often not comprehensible to consumers but threaten high penalties in the event of violations, which tend to occur due to ignorance.

In the current discussion on the reform of German copyright law (the so-called 'second basket'), a solution was initially suggested which in our opinion would have been in the interest of consumers as well as authors. It would have given every scientist and scholar, even when they had granted exclusive licences to one publisher, the right to make their contribution publicly accessible after a period of six months after initial publication. Unfortunately, this proposal was rejected. A regulation along these lines would have benefited academics, since it is fundamentally in their interest to dispose of their work and to make it accessible to as many people as possible. Consumers would have obtained easy, free of charge and rapid access to important data. Moreover, the six-month period during which publishers would have retained exclusive rights would have meant that even their interests would not have been seriously impaired.

The free publishing of material on the Internet contains the potential for an active culture, and science and scholarship in which the user does not just consume, but also creates. This creativity must not be destroyed or restricted by high prices, protective measures in the terms of use or licensing agreements, or by technical measures. Instead, all those interested should be given the opportunity to participate in scientific and scholarly results and thereby eventually to deliver new information and discoveries which could be of huge significance to academia and society as a whole, for example in the medical or ecological sectors.

Open Access can provide a larger audience with insights into the academic and research domain. This would both accelerate research and development processes themselves and benefit the economy as well as society as a whole. The added value generated by science could be greatly increased by Open Access. Unfortunately, the advantages and benefits of Open Access have not yet been sufficiently recognised in the political arena.

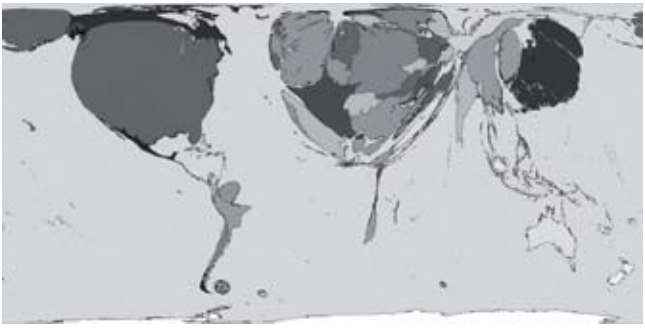
German Development Cooperation and Open Access

By Peter Rave, German Technical Cooperation, GTZ

In the context of the global structural change from agricultural and industrial societies to knowledge societies, knowledge has become a basic factor for sustainable economic and social development[73]. One of the goals of German development cooperation at university level is the independent development and acquisition of knowledge, as well as its application to local needs and problems in the partner countries[74]. In this context, Open Access to digital research repositories and virtual research environments harbours great potential for developing countries.

The digital and academic divide

To ensure that scientists and scholars in our partner countries, particularly in Sub-Saharan Africa, can share in current research results, it is generally necessary to first overcome what is known as the 'digital divide': weak infrastructure for information and communications technologies (ICT), high access costs and/or lacking deregulation of telecommunications providers, as well as a lack of local ICT service-providers and experts. This digital divide slows down communication with international research institutions, access to international library initiatives[75], and also the production, archiving and distribution of (electronic) publications (cf. diagram). Looked at in this way, the digital divide reinforces the existing academic divide between developed and developing countries.



The size of the countries is proportional to the percentage of all scientific and scholarly publications published there by authors in 2001. (Source: http://www.worldmapper.org/posters/worldmapper_map205_ver5.pdf)

73 Cf. 'Knowledge for Development', *World Development Report 1998–1999*, http://www.worldbank.org/wdr/wdr98/overview.pdf.

74 Currently there are approx. 70 partner countries, see: www.bmz.de/de/laender/partnerlaender/laenderkonzentration/index.html.

75 E.g. International Network for the Availability of Scientific Publications (INASP) (http://www.inasp.info/), Programme for the Enhancement of Research Information (PERI) (http://www.inasp.info/peri/), Initiative Electronic Information for Libraries (eIFL.net) (http://www.eifl.net/), Health InterNetwork Access to Research Initiative (HINARI) (http://www.emro.who.int/HINARI).

Improved access in developing countries to ICT and the global communications networks has been the object of international initiatives[76] since the late 1990s. Germany supports these initiatives and treats the subject of ICT as an interdisciplinary issue, which, in conjunction with improvements in education and research, is intended to ease the way towards knowledge societies for partner countries.

Open Access approaches in German development cooperation

The Open Access approach of the KfW Entwicklungsbank (KfW development bank) focuses on infrastructure. The KfW is part of the consortium of development-finance institutions that is preparing the funding of the East Africa Submarine Cable System (EASSy). This will provide eastern and southern Africa with an inexpensive broadband connection to the international fibreglass communications network.

Further measures are necessary to ensure that academics and entrepreneurs can use such networks and further ICT to process knowledge and adapt them according to their needs. For this reason the GTZ and InWEnt (Capacity Building International, Germany) are implementing measures for capacity development and institution building in many educational and research institutions in partner countries. These measures increasingly focus on independent electronic production, archiving and distribution of digital contents, also via regional networks[77]. In addition, teaching and learning materials are also being offered in native languages, increasingly through the use of alternative licensing models such as creative commons (http://creativecommons.org/), which allow users far-reaching freedom when exploiting the contents[78].

Since Internet access is still severely restricted in many of the partner countries, innovative channels of distribution for digital resources must be tested. An example is the University of Addis Ababa, which has a bandwidth of only 6 Mbit/s (March 2007) at its disposal. In the context of the Ethiopian Capacity Building Programme[79] a so-called 'open toaster'[80] was developed together with the students at this university. The students are now able to select digital resources (free software and publications) via a touch screen and burn them directly on to CDs.

The measures presented here show how diversely the Open Access approach is being implemented within development cooperation and how much it contributes to overcoming the academic divide.

76 E.g. G8 ('Digital Opportunity Taskforce'), UN (ICT Taskforce, World Summit on the Information Society).
77 http://www.crystal-elearning.net/index_eng.html.
78 http://www.gc21.de/ibt/GC21/site/gc21/ibt/start.html.
79 http://www.ecbp.biz/index.php?id=homepage.
80 http://www.ecbp.biz/index.php?id=toaster.

The Media and Open Access:

The Point of View of Public Service Broadcasting

By Verena Wiedemann, Association of German Public Service Broadcasters

According to the Federal Constitutional Court of Germany, it is the task of public service broadcasting to be a medium and factor in the creation of public opinion. As a medium, we, the ARD (Association of German Public Service Broadcasters), convey the entire spectrum of opinions in Germany. We inform our listeners and viewers about current affairs in Germany and abroad, represent the cultural diversity of every region, and offer a public mirror of our social reality in all of its social, cultural and political facets. As a factor, we contribute, through our programmes, to the cultural diversity and democratic dialogue in German society. The conditions of access to our programmes are defined in the public interest by our legislators, and not by the market. The funding of the contents of and access to our public service channels takes place via a viewing and listening licence system organised on a public service basis and with the support of a socially acceptable fee. This allows us to unlock all of our programmes and make them accessible without additional payment.

Digitalisation is rapidly changing the ways in which audio-visual contents can be accessed. Theoretically, the ARD could open its audio-visual archives and give its users access to the cultural and political history of Germany, Europe and the world in the form of audio and video files. The ARD's current programming could also be made available to our viewers and listeners after the initial broadcast anywhere and at anytime via electronic retrieval.

However, things are unfortunately not that easy. All of these options cost money, both in terms of the technical transmission and in terms of the acquisition of the necessary rights. The 'right of public accessibility', which goes hand-in-hand with the on-demand provision of contents, is a separate right of the authors. It is not identical to the broadcasting rights in connection with a television programme. If for example the programmes currently on air are put online for one week, this right of use is still so close to the time of the initial broadcast on television that it can be taken as being part of the broadcasting right, which broadcasting institutions acquire in any case. It would however be very expensive if Open Access were granted to our entire archives, especially since the ARD's broadcasting institutions of the German Länder do not even possess retrieval rights on their older productions.

As for public access to the contents of public service broadcasting, there must be one basic principle in the knowledge society: contents for which the public have already paid in the form of licence fees must be made available to them

via all relevant platforms without further payment. This includes viewing/listening at a time of the viewer/listener's own choice, e.g. on-demand via the Internet. A further increase of our programmes' utility value for our licence-fee payers could be linked to the release of certain contents for non-commercial use by third parties. In this way ARD's contents could possibly contribute directly to the creative cultural process and to the generation of knowledge by third parties. Therefore, it would be worthwhile for public service broadcasters to consider the Open Access model of libraries and academic publications. Again the main concern is to create the prerequisites for enabling users to make optimum use of the resources of the knowledge society.

We therefore need a broad discussion about the conditions on which the ARD should allow access to and use of the treasures of knowledge and of the cultural heritage stored away in its archives. Should this access be funded entirely on the solidarity principle (by the general public via licence fees) or should these services be left in the hands of the free market for commercial exploitation, as is being demanded by commercial operators? These are fundamental questions for our society, because they will decide whether public service broadcasting can fulfil its potential to make a substantial contribution to the opportunities that the knowledge society in the 21st century offers to everyone.

CHAPTER 5:

International Context

National Initiatives in Europe

By Katja Mruck & Rubina Vock, Centre for Digital Systems, Freie Universität Berlin[81]

Introduction

The demand for free access to scientific and scholarly information, which was originally voiced in the North American natural sciences, has now reached 'old Europe': many initiatives that are important for the international Open Access movement are of European origin[82].

At the same time, a closer look at relevant position papers highlights national differences in the support accorded to Open Access in Europe.

- In Europe the 'Budapest Open Access Initiative'[83] was mainly signed by German, English, French, Italian and Spanish institutions, overwhelmingly by universities and university publishers, but more rarely by, for example, eastern European and Scandinavian institutions.
- The 'Berlin Declaration'[84] was signed by many associations of university rectors and research institutions in Belgium, Germany, France, the Netherlands, Switzerland and Spain, but, here too, eastern European countries and also Austria and the United Kingdom are hardly represented. In addition, 77 Italian universities signed the Berlin Declaration, but the national funding bodies and the conference of university presidents did not.
- Currently, it is the 'EU Petition'[85] that has the greatest distribution with almost 25 000 signatories (as of March 2007): besides institutions in the countries listed above, this petition has been signed by (funding) institutions and learned societies, for example, from Estonia, Lithuania, the Ukraine, Denmark, Norway and Sweden, as well as a few signatures from representatives of Greek, Polish, Romanian and Russian academic institutions.

Open Access in individual European countries

The following overview of national Open Access initiatives in Europe is necessarily fragmentary[86]. In addition, some countries do not have a well-developed Open Access debate (or if they do, it may only be accessed in that country's native language).

United Kingdom

Great Britain opened up the debate on Open Access early on, and in a very dedicated manner. In a comprehensive report, the House

81 We wish to thank Gudrun Gersmann, Stefan Gradmann and Norbert Lossau for their suggestions and additions.

82 On European initiatives see: Ramjoué, Celina in this volume; on the history of Open Access cf. Mruck, Katja/Gradmann, Stefan and Mey, Günter, 'Open Access: Wissenschaft als Öffentliches Gut', in: *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, 5(2) 2004: Art. 14, http://www.qualitative-research.net/fqs-texte/2-04/2-04mrucketal-d.htm.

83 http://www.soros.org/openaccess/.

84 http://oa.mpg.de/openaccess-berlin/berlindeclaration.html.

85 http://www.ec-petition.eu/.

86 The situation in Germany will not be described here since it is the detailed subject of the present volume. Further important developments in countries other than those briefly sketched in the following pages include the Swedish DiVA portal (Digitala Vetenskapliga Arkivet), through which 15 university repositories have so far been networked; see http://www.diva-potral.org/ and Hagerlid, Jan, 'Open Access in Sweden 2002-2005', 2006, http://www.kb.se/openaccess/dokumentation/janh_elpub_final.pdf.

of Commons Science and Technology Committee[87] investigated access possibilities to academic works, business models of traditional and Open Access publishers, as well as alternative forms of publication. On the basis of this appraisal, it was recommended that British universities set up repositories through which university publications could be archived and made freely accessible on the Internet, a recommendation that the Research Councils UK[88] also subsequently adopted. As the Directory of Open Access Repositories (OpenDOAR)[89] shows, many repositories are now available in Great Britain for the implementation of this recommendation.

The Wellcome Trust and the Joint Information Systems Committee (JISC) are two examples of important UK-based actors. Even though the Wellcome Trust, an independent charity organisation, has not signed any of the above-listed position papers, it requires the recipients of its funds to make articles accessible without charge in PubMed Central[90] no later than six months after they are published[91]. JISC, which is responsible for the use of new information and communications technologies in education and research in the UK, supports Open Access through various projects. Thus, for example, JISC supported the (further) development of Open Access publication models and improved metadata research between 2004 and 2006[92].

The Netherlands

In 2005, one of the most comprehensive national Open Access projects was launched in the Netherlands: DAREnet (Digital Academic Repositories)[93] manages the digital documents of every Dutch university, the National Library of the Netherlands, the Royal Netherlands Academy of Arts and Sciences, and Dutch research organisations. It is the only comprehensive network of digital academic repositories in any European state. At the end of March 2007, users had research access to more than 100 000 full-text documents. In addition, the full-text documents are automatically incorporated into the electronic inventory of the National Library of the Netherlands (e-depot).

Approximately 45 000 publications by more than 200 renowned Dutch academics are accessible via Cream of Science, a further project in the context of DAREnet. The availability of complete bibliographies (and in many cases full-text documents)[94] means greater visibility for the work of the academics involved and their universities; for

87 http://www.publications.parliament.uk/pa/cm200304/cmselect/cmsctech/399/399.pdf.
88 http://www.rcuk.ac.uk/; and http://www.rcuk.ac.uk/access/default.htm.
89 http://www.opendoar.org/.
90 http://www.pubmedcentral.nih.gov/.
91 See http://www.wellcome.ac.uk/doc_WTD002766.html.
92 On metadata and Open Access see: Horstmann, Wolfram, ch. 3 in this volume.
93 http://www.darenet.nl/.
94 Approximately 60% of the works are freely available as full texts; this is not possible for the other texts for legal reasons.

academic and general users, it means a well-developed availability of scientific and scholarly results.

France

The Open Access movement in France is coordinated in a very centralised manner, in particular by the Centre for Direct Scientific Communication (Centre pour la Communication Scientifique Directe) of the National Science Research Centre, CNRS (Centre National de la Recherche Scientifique). The Institute for Scientific and Technical Information (Institut de l'Information Scientifique et Technique)[95] of the CNRS provides in-depth information about Open Access on its website and has the objective of facilitating access to global research results.

In September 2005, numerous French research institutions came together to form a joint portal, the Hyper Articles en Ligne (HAL) (hyper articles online) archive[96]. Subsequently, amongst other things, the platform PubliCNRS, on which all of the CNRS laboratories had placed their publications, was integrated in HAL. In contrast to many other European states, France places a particular emphasis on archiving documents from the humanities and social sciences. With the TGE ADONIS[97] project launched in 2004, the CNRS hopes to create a central platform for the international dissemination of documents in the humanities and social sciences.

Italy

In reaction to the Berlin Declaration, a conference to promote the dissemination of academic publications in line with the Open Access principle was organised among others by the Conference of Presidents of Italian Universities (Conferenza dei Rettori delle Università Italiane) in November 2004. During this conference, the rectors of 32 Italian universities signed the 'Messina Declaration'[98] in support of the Berlin Declaration. Seventy-seven Italian universities have signed the Berlin Declaration, making Italy the country that has hitherto provided the largest number of signatories. While only a small percentage of Italian universities possesses institutional repositories, Italy does operate some international repositories, such as E-LIS[99], an Open Access archive for library and information sciences, and the archive of the International Centre for Theoretical Physics[100], through which scientists and scholars from all over the world, and particularly those from developing countries, can publish their academic documents (not just those from the field of physics) for free.

95 http://www.inist.fr/.
96 http://hal.archives-ouvertes.fr/.
97 http://www.tge-adonis.fr/.
98 http://www.aepic.it/conf/index.php?cf=1.
99 http://eprints.rclis.org/.
100 http://eprints.ictp.it/information.html.

Summary

We have attempted to sketch the development of Open Access by way of examples: the UK as one of the pioneers of European Open Access, the Netherlands as a national network of repositories currently unique in Europe, France as an academic organisation with a centralised character, where, unlike in many other countries, Open Access initiatives in the humanities and social sciences play an important role, and Italy, where declarations of intent for Open Access exist in all universities, but where the necessary infrastructure for the practice of Open Access is only developing gradually, and in a largely decentralised fashion.

What is not sufficiently present as yet are forums through which information can be disseminated more systematically and continuously than has so far been the case, and through which national players can communicate with one another. One possible idea would, for example, be a European enlargement of the Open Access information platform (www.open-access.net), supported by the German Research Foundation (DFG) amongst others, which was initially launched for the German-speaking area in May 2007.

European Initiatives

By Celina Ramjoué, Research Directorate-General, European Commission[101]

In addition to national activities, there are also Open Access initiatives on the European level.

CERN

The European Organization for Nuclear Research (CERN) is a pioneer in the area of Open Access. In 1953 the convention setting up CERN already noted that 'the results [of CERN's] experimental and theoretical work shall be published or otherwise made generally available'[102]. Building on this practice, in the digital age it has become customary for researchers in the field of nuclear research as well as in the field of physics generally to deposit their publications in electronic archives. In a statement issued in late 2003, CERN spoke out in favour of open electronic distribution of knowledge ('An electronic publishing policy for CERN'[103]) and in May 2004, it signed the Berlin Declaration. In March 2005, CERN published a document arguing for the Open Access publication model ('author pays' model). That same year, CERN set up a task force consisting of authors, publishers and research funding bodies, with the mandate to evaluate potential Open Access business models. Their report, published in June 2006, proposed what is known as the 'Sponsoring Consortium for Open Access Publishing in Particle Physics' model (SCOAP^3) to fund Open Access[104].

SCOAP^3 is a consortium made up of research institutions, funding bodies, and libraries that will take over the funding of a series of journals that are particularly important for nuclear research during several years of transition to the Open Access model. During this time, the idea is for publishers to be funded by the consortium instead of by subscriptions. The originality of the SCOAP^3 model lies in the fact that publishers maintain an important role and that authors do not have to finance the cost of publication themselves. A call for tender for SCOAP^3 is planned for 2007.

European Commission and associated bodies

Under article 164 of the Treaty establishing the European Community, measures for the 'dissemination and optimisation of the results of activities in Community research, technological development and demonstration' shall be implemented for the purpose of strengthening European research policy (Official Journal of the European Communities C 325/105, 24 December 2002).

From this perspective, optimised access, efficient dissemination and reliable preservation promote the achievement of the aims of the Lisbon strategy of 2000, which called for the

101 The views expressed here are those of the author and may not under any circumstances be regarded as stating an official position of the European Commission.
102 Article II.1, http://doc.cern.ch/archive/electronic/other/preprints//CM-P/cm-p00046871.pdf.
103 http://library.cern.ch/cern_publications/SIPBPubPol.17.11.03.htm.
104 http://library.cern.ch/OATaskForce_public.pdf.

European Union to become the most competitive and dynamic knowledge-based economic area by 2010. The underlying thought here is that a wide dissemination of scientific and scholarly information will create the foundation for further research and innovation.

Questions of access to and dissemination and preservation of academic information are dealt with by two EU Commissioners and two Directorates-General. The Directorate-General for Research, under the European Commissioner for Science and Research, Janez Potočnik, addresses them in the context of the creation of the 'European Research Area'[105]. The activities under the European Commissioner for Information Society and Media, Viviane Reding, and the relevant Directorate-General focus on the initiative 'i2010: Digital Libraries'[106] and deal with many of the relevant technical questions. An important example is the DRIVER project (Digital Repository Infrastructure Vision for European Research), whose goal is to network more than 50 European repositories.

In the light of the controversial debate on Open Access, the European Commission's Directorate-General for Research commissioned a Study on the economic and technical evolution of scientific publication markets in Europe[107]. In addition to delivering an analysis of the European academic publishing market, this study, published in spring 2006, was supposed to formulate recommendations for the European Commission.

One of the study's main findings is that the market for academic journals is not characterised by traditional competition and that it displays certain special features. According to the study, it is of fundamental significance that the purchasers of scientific and scholarly journals are not their readers, but universities and libraries. This means that researchers are generally not informed about the high prices of journal subscriptions. The study further observes that between 1975 and 1995 there was a price increase of 200 to 300 % above the rate of inflation, which only flattened out somewhat during the mid-1990s with the start of the digital age. The study also concludes that journal prices depend on academic discipline, publisher and academic quality. Further trends underlined by the study are cuts in library budgets and falling numbers of subscriptions.

The study formulates recommendations on the questions of access, market issues, and continuing debate and research. On the topic of access, it recommends that publicly funded research results should be publicly accessible shortly after their publication. Further recommendations on the subject of access concern experimenting with

105 http://ec.europa.eu/research/era/index_de.html.
106 http://ec.europa.eu/information_society/activities/digital_libraries/index_en.htm.
107 Dewatripont, Mathias et al., *Study on the Economic and Technical Evolution of the Scientific Publication Markets in Europe.* Final Report, commissioned by DG Research, European Commission, 2006, http://ec.europa.eu/research/science-society/pdf/scientific-publication-study_en.pdf.

business models, including dissemination as an evaluation criterion of academic work, and interoperability. With regard to market issues, the study proposes price strategies that promote competition and a close investigation of company mergers. In addition, a proposal is made to set up an advisory board for publication issues and to support further research on copyright, alternative forms of distribution, and technological developments.

At the end of 2006, two bodies associated with the European Commission spoke out explicitly in favour of Open Access. The Scientific Council of the European Research Council (ERC), which was set up in connection with the Seventh Framework Programme for Research and Technological Development, published a statement on Open Access in December 2006. This document underlines that 'it is the firm intention of the ERC Scientific Council to issue specific guidelines for the mandatory deposit in Open Access repositories of research results — that is, publications, data and primary materials —obtained thanks to ERC grants, as soon as pertinent repositories become operational'.[108]

The European Research Advisory Board (EURAB) recommended that the European Commission adopt an Open Access policy for publications that are financed by the Framework Programme for Research. The relevant document states that 'EURAB recommends that the Commission should consider mandating all researchers funded under FP7 to lodge their publications resulting from EC-funded research in an Open Access repository as soon as possible after publication, to be made openly accessible within 6 months at the latest.'[109]

In the run-up to a conference to take place in mid-February 2007 and to the planned adoption of a Communication from the European Commission on access, dissemination and preservation, Denmark's electronic research library (DEFF), the German Research Foundation (DFG), the Joint Information Systems Committee (JISC), the Scholarly Publishing and Academic Resources Coalition (SPARC) Europe and the Dutch organisation for the collaboration of higher education institutions (SURF) launched a petition supporting the recommendation of the study described above, which stated that publicly funded research results should be made publicly accessible shortly after publication. On 15 February 2007, this petition was handed over to Commissioner Potočnik with more than 20 000 signatures. Signatures can still be added (http://www.ec-petition.eu).

As a countermove, publishers and publishing associations issued the 'Brussels Declaration on STM Publishing' on 13 February. This

[108] http://erc.europa.eu/pdf/open-access.pdf.
[109] http://ec.europa.eu/research/eurab/pdf/eurab_scipub_report_recomm_dec06_ en.pdf.

declaration names a list of principles supported by the publishers, including the fact that they are responsible for the organisation of peer review and that a uniform change of the publishing system ('one size fits all') cannot work (http://www.stm-assoc.org/brussels-declaration/). This declaration was handed over to Commissioner Potočnik with approximately 40 signatures on 15 February. Signatures can still be added to this document, too.

The conference, entitled 'Scientific publishing in the European Research Area: access, dissemination and preservation in the digital age' organised by the European Commission in Brussels on 15 and 16 February 2007, attracted around 470 participants, primarily from Europe, but also from other continents. The conference was opened by Commissioner Potočnik and closed by Commissioner Reding[110]. This conference introduced the Communication adopted on 14 February 'on scientific information in the digital age: access, dissemination and preservation'[111]. This communication marks a milestone on the way to a European policy on access, dissemination and preservation, because it addresses these subjects together on a European level for the first time. Its objective is to 'signal the importance of [...] a) access to and dissemination of scientific information, and b) strategies for the preservation of scientific information across the Union [… and to point] to the need for a continuing policy debate.'

The last part of the communication sets out the Commission's position. It considers 'initiatives leading to wider access to and dissemination of scientific information' to be 'necessary' and states that 'fully publicly funded research data should in principle be accessible to all'. In addition it 'draws particular attention to the need for clear strategies for the digital preservation of scientific information.'

The European Commission aims at 'measures to promote better access to the publications resulting from the research it funds': 'project costs related to publishing, including Open Access publishing, will be eligible for a Community financial contribution' and 'specific guidelines on the publication of articles in open repositories after an embargo period' will be issued, possibly for programmes being managed by the European Research Council. Secondly, the European Commission wants to finance a number of projects on the topics of preservation and the networking of repositories. Thirdly, it intends to make a contribution to the public debate through studies and the promotion of research on the scientific publication system. In addition, a political debate is planned, which will include the European Parliament, the Council, the Member States, and concerned stakeholders.

[110] For details of the conference: http://ec.europa.eu/research/science-society/page_en.cfm?id=3459.

[111] COM (2007) 56 final, http://ec.europa.eu/research/science-society/document_library/pdf_06/communication-022007_en.pdf The quotations are reproduced from the original document, fn. 1 of which states: In this Communication, the terms ‚scientific' or ‚science' refer to research activity in all scholarly subjects, including social sciences and the humanities (translator's note).

Open Access in the United States

By Peter Suber, Earlham College, USA

The United States has a rich history of Open Access initiatives. In 1969 Americans built ARPANET, the direct ancestor to the Internet, for the purpose of sharing research without access barriers. In 1966 Americans launched the Education Resources Information Center (ERIC, www.eric.ed.gov) and MEDLINE[112], probably the first Open Access projects anywhere.

This article[113] presents the 10 most important current Open Access initiatives in the United States:

1. Paul Ginsparg launched arXiv (http://arxiv.org) in 1991. It now covers nearly every branch of physics as well as mathematics, computer science, quantitative biology, and nonlinear sciences. ArXiv is the oldest Open Access eprint archive still in operation, and also one of the largest and most heavily used. It has earned a central place in physics research worldwide.
   As a result of arXiv, a larger percentage of physicists deposit their work in Open Access archives, and search Open Access archives for the work of others, than researchers in any other field.
2. Brewster Kahle launched the Internet Archive in 1996. From the start it provided Open Access to its mirror of the historical Internet as well as to many special collections. The Internet Archive sponsors the Open Access Text Archive, Ourmedia (http://ourmedia.org/), and the new Open Education Resources project, and co-sponsors the Open Access Million Book Project with Carnegie Mellon University. The Internet Archive has agreed to host a forthcoming universal Open Access repository that would mirror and preserve all the other, willing repositories in the world, and accept deposits from scholars who don't have repositories in their institutions or fields[114].
3. The PLoS founders —Stanford biologist Patrick Brown, Berkeley biologist Michael Eisen, and Nobel laureate and former NIH Director Harold Varmus— decided that if existing publishers would not convert existing journals to Open Access, then they would have to become publishers themselves. PLoS (http://www.plos.org/index.html) currently publishes six Open Access journals and plans to add more. In 2005 *PLoS Biology* earned an impact factor of 13.9, the highest ranking in the category of general biology.
4. There are over a dozen open-source software packages for creating Open Access, Open Archive Initiative (OAI)-compliant repositories. One of the leading, DSpace

112 http://www.nlm.nih.gov/databases/databases_medline.html.
113 This article is a short version of Suber, Peter, 'Open Access in the United States', in: Jacobs, Neil (Ed.), *Open Access: Key strategic, technical and economic aspects*, 2006, http://eprints.rclis.org/archive/00006671.
114 See Suber, Peter, 'Getting to 100%,' *SPARC Open Access Newsletter*, April 2, 2005. http://www.earlham.edu/~peters/fos/newsletter/04-02-05.htm#oara.

(http://www.dspace.org), is American. It was developed by MIT and Hewlett-Packard, launched in 2002, and is now used in over 100 Open Access repositories worldwide.

5. Until Lawrence Lessig launched Creative Commons (http://creativecommons.org) in 2002, most Open Access initiatives gave no thought to Open Access-appropriate licenses. Most Open Access providers simply put work online with no license at all, leaving unclear which uses were permitted and which were not, and leaving users to choose between the delay of seeking permission and the risk of proceeding without it. CC licenses solved this problem and were quickly adopted by Open Access-inclined authors (including scholarly authors), musicians, filmmakers, and photographers. When PLoS and BioMed Central adopted CC licenses for their journals, many Open Access journals followed suit. Both Google and Yahoo now support filters that pick out content using CC machine-readable licenses. CC launched Science Commons in early 2005, it now has projects in Open Access publishing and archiving, Open Access data and databases, and licenses optimised for scientific content.
6. A large number of U.S. universities have adopted Open Access-friendly policies or resolutions[115]. Some of these university actions are policies to promote Open Access; some are resolutions by the Faculty Senate urging the adoption of such policies; and some are decisions to cancel expensive journals by the hundreds, accompanied by public statements on the unsustainability of the current subscription model and the need to explore alternatives. Only five universities in the world today — none in the U.S.— mandate Open Access to research articles published by faculty. (They are in Australia, Portugal, the UK, and two in Switzerland.) Of the 18 universities with Open Access archiving policies sufficiently strong to sign the Eprints Institutional Self-Archiving Policy Registry[116], only two are from the U.S.
7. The two most widely read discussion forums devoted to Open Access issues are U.S.-based: The American Scientist Open Access Forum[117], launched in 1998 and the SPARC Open Access Forum[118], launched in 2003.
8. The U.S. has several Open Access advocacy organisations: SPARC (http://www.arl.org/sparc) is a coalition of more than 200 research institutions founded in 1998. Its early focus was on introducing competition into the journal marketplace

[115] Suber, Peter, 'University actions for Open Access or against high journal prices', http://www.earlham.edu/~peters/fos/lists.htm#actions.
[116] http://www.eprints.org/openaccess/policysignup/.
[117] http://american-scientist-open-access-forum.amsci.org/archives/American-Scientist-Open-Access-Forum.html.
[118] http://www.arl.org/sparc/soa/index.html#forum.

and making journals more affordable. But since the Budapest Open Access Initiative in 2002, it has worked actively for Open Access. Public Knowledge (http://www.publicknowledge.org) was founded in 2001 to speak for the public interest in information policy.

While SPARC and Public Knowledge were active in promoting Open Access before Congress asked the National Institutes of Health (NIH) to develop an Open Access policy in mid-2004, the Open Access Working Group (OAWG)[119] and the Alliance for Taxpayer Access[120] (ATA) sprang into existence in order to support Open Access policy in the federal government. The OAWG consists mainly of different Library Associations. The ATA is a coalition of US-based non-profit organisations working for Open Access to publicly-funded research.

9. The largest and most visible U.S. initiative is the public-access policy of the NIH (http://www.nih.gov). In 2004, Congress instructed the NIH to develop a policy requiring Open Access to the results of NIH-funded research and require it to be available online within six months of its publication in peer-reviewed journals. The final version of the policy fell short of the Congressional directive, substituting a request for the requirement and extending the permissible delay to 12 months after publication. The policy 'strongly encourages' grantees to deposit their work in PMC 'as soon as possible' after publication. Open Access proponents criticised the weakness of the new policy, while opponents criticised its remaining strength[121].

   However, there are several reasons to think that the NIH will soon strengthen the policy in both of the critical respects. In particular two bills now pending before Congress: the CURES Act and the Federal Research Public Access Act of 2005. Chief among NIH's other notable Open Access initiatives is PubMed Central, the OAI-compliant repository where the NIH asks its grantees to deposit their work. PubMed Central and arXiv are the largest and most-used OA repositories in the world.

10. The American Center for Cures Act (called the CURES Act) was introduced in the U.S. Senate in December 2005. It would create a new agency within the NIH, the American Center for Cures, whose primary mission would be to translate fundamental research into therapies. In addition, the bill contains a notable provision on public access. The act would mandate Open Access to NIH-funded

[119] http://www.arl.org/sparc/oa/oawg.html.
[120] http://www.taxpayeraccess.org.
[121] Suber, Peter, 'The final version of the NIH public-access policy', *SPARC Open Access Newsletter*, March 2, 2005, http://www.earlham.edu/~peters/fos/newsletter/03-02-05.htm#nih.

research within six months of publication, and extend the same policy to all medical research funded by the larger Department of Health and Human Services.The Federal Research Public Access Act (FRPPA) was introduced in the Senate in May 2006. It would mandate Open Access to nearly all federally-funded research within six months of publication. The FRPAA Act directs all major federal agencies that fund research to adopt Open Access policies within a year and lays down strong guidelines for those policies. For this purpose, an agency is major if its research budget is $100 million/year or more. Ten agencies fall into this category. Both the CURES Act and FRPPA Act have bipartisan support in Congress, but as we go to press it's too early to assess their chances. If one of these bills is passed, then the world's largest funder of medical research will have one of the world's strongest Open Access policies.

National non-European Initiatives: Open Access in India — the Status Quo

By Mangala Hirwade, Shivaji Science College, Nagpur, Maharashtra (India)

India's national Open Access policy

The Right to Information Act, which came into effect in 2005, has had an impact on publicly financed research: since this act was passed, all citizens have had the right to know the results and social benefits of this type of research.

The Indian government expects authors to make their works accessible preferably free of charge if they are the result of publicly funded research. The special session on the subject of Open Access, which took place at the 93rd Science Congress in Rajendranagar (Hyderabad) on 6 January 2006, expressed a recommendation for an 'Optimal National Open Access Policy'. The recently formed National Knowledge Commission of India (NKC) and the National Association of Software and Service Companies of India (NASSCOM) together with other organisations support the 'open courseware' movement[122] in India for the purpose of improved distribution of knowledge resources. The NKC also formulates Open Access policies and guidelines for the sphere of higher education, research and development with the goal of improving access to research results and achieving their worldwide dissemination.

Open Access archiving

The Institute of Mathematical Sciences in Chennai, one of the first institutions in Open Access archiving in India, set up a mirror[123] for the Open Access archive arXiv in 1997. Even though there are more than 29 open repositories available in India, so far only 16 are listed in the Directory of Open Access Repositories (DOAR) (as of 6 April 2007).

Open Access journals

The Open J-Gate portal (http://www.openj-gate.com/), which was set up by Informatics India Ltd. in 2006, provides electronic access to global journal literature and contains 3 801 Open Access journals (as of 3 May 2007). Currently there are 108 Indian research journals providing Open Access to full texts. They are mostly published by six journal publishers: Medknow Publications, Indian Medlars Centre of National Informatics, Indian Academy of Sciences, Indianjournals.com, Kamla-Raj Enterprises and Indian National Science Academy. None of these Open Access journals demands an author's fee. They finance their operation by subscriptions, advertisements or grants.

[122] 'Open courseware' is freely accessible study material (ed.).
[123] A 'mirror' is the name given to an exact copy of data in computer networks (ed.).

Initiatives for open source software

The Open Source Software Resource Centre (OSSRC) was founded by IBM India, the Centre for Development of Advanced Computing (C-DAC) and the Indian Institute of Technology with the goal of significantly promoting the development of open source software in India.

The MAHITI.ORG (http://www.mahiti.org/) organisation provides services in the area of information and communications technology that are based on free/open source software, including a purely offline version of Wikipedia.org.

Open Courseware

The Indira Gandhi National Open University (IGNOU) and the National Council of Educational Research (NCERT) are leaders in the area of 'open courseware' (OCW). IGNOU produces materials for private study, offers educational television on different channels, and initiated the founding of the National Digital Repository for OCW. NCERT is in the process of making schoolbooks freely available — mainly in English, Hindi and Urdu — to students and teachers via its website (www.ncert.nic.in).

Metadata search services

India has six significant metadata search services: Open J-Gate, Search Digital Libraries (SDL), CASSIR, Seed, Knowledge Harvester@ INSA and the Cross Journal Search Service of Scientific Journal Publishing in India (SJPI).

Open Access — the perspective of scientists and scholars

Academics in India see the advantages of Open Access on the one hand in its simplified, free access to knowledge, which would particularly benefit developing countries, and, on the other hand, in its potential to reach a very large readership.

Many Indian academics, however, still do not consider Open Access an attractive proposition. Their criticism is that research institutions, funding bodies and government authorities are paying too little attention to the issue. They say that neither research institutions nor government bodies recognise Open Access publications or create incentives to publish research results via Open Access. According to

researchers, a complete and accessible repository of Open Access publications is missing, as are the necessary experience with Open Access publishing and the required infrastructure, e.g. in the form of hardware and electronic data links with high transmission rates. Finally, there is criticism that there is no national umbrella organisation which both upholds a clear policy in the area of Open Access and has the necessary competencies to promote it.

Many scientists and scholars believe that publishers of renowned journals would not accept the archiving of research works in Open Access repositories. In actual fact, however, even renowned journals allow authors to archive preprints and postprints. In addition, scientists and scholars fear that the assessment of the impact of their research results would be difficult if they were not published in standard journals. Not least, they argue, jobs and distinctions are often awarded on the basis of the impact factor of a journal in which relevant research works are published.

Despite these concerns, the National Institute of Technology in Rourkela decided in May 2006 that Open Access archiving of all of the institute's research works, including doctoral dissertations and master's theses, was mandatory.

Conclusion

So far, there are only a few open archives and Open Access initiatives in India, and there is still a long way to consolidation. Indian academia, however, under the active participation of government authorities and publishers, has taken a first step in this direction. Indian researchers see the value of Open Access journals and archives particularly in the increased visibility of information, the higher citation rate of articles, and the potential for knowledge to become usable more quickly by society.

International Initiatives

By Andreas Hübner, Helmholtz Association of German Research Centres

A large number of international Open Access initiatives strive for the implementation of the idea of Open Access. A few of the most important ones are introduced below.

WSIS (World Summit on the Information Society)

After the Internet became a mass medium during the 1990s and the relevance of 'information as a raw material' within the global society became more and more clear, politicians increasingly had to address the question of a global framework for the information society. Following some (trans)national initiatives, this resulted in the idea of a 'World Summit on the Information Society', which was taken up by the UN in 2001. The summit was held in two phases as part of the implementation of the UN Millennium Declaration: in Geneva in 2003, and in Tunis in 2005. One of the summit's special features was the participation not just of governments but of all involved stakeholders, i.e. business representatives and civil society.

The Declaration of Principles and the Plan of Action passed in Geneva after some tough wrangling about wording are not binding under international law, but were rather formulated as an appeal. Amongst other things, they refer to improved access to information. Unlike the (sometimes very advanced) debate on Open Access in developed countries, the documents passed by the summit also focus on measures to overcome the global digital divide, in other words they also focus on the development of basic technologies and infrastructure in the world's less developed regions as a prerequisite for Open Access to information. The Declaration of Principles states with regard to Open Access: 'We strive to promote universal access with equal opportunities for all to scientific knowledge and the creation and dissemination of scientific and technical information, including Open Access initiatives for scientific publishing'[124].

The Plan of Action is intended to guarantee the concrete implementation of the visions and tenets formulated in the Declaration of Principles by 2015. One of the plan's eleven central points of action is entitled 'Access to Information and Knowledge' and formulates recommendations for governments and others, in order to achieve improved access to information. One of the measures the Plan of Action states in this regards is the following: 'Encourage initiatives to facilitate access, including free and affordable access to Open Access journals and books, and open archives for scientific information'[125]. In order to implement the different

[124] http://www.itu.int/dms_pub/itu-s/md/03/wsis/doc/S03-WSIS-DOC-0004!!PDF-E.pdf. paragraph 28.
[125] http://www.itu.int/wsis/docs/geneva/official/poa.html. paragraph C3, 10 i.

courses of action, first consultation meetings were held in October 2006, where UNESCO was confirmed as an official facilitator for the areas 'Access to Information and Knowledge' and 'E-science', amongst others. At the same time working topics were developed.

The documents passed by WSIS in Geneva are the lowest common denominator to which the UN's 192 Member States could agree. As a result, they are carefully formulated and concerned with balancing interests, not least when it comes to Open Access. This was particularly criticized by representatives of civil society, causing them to formulate their own final document, which speaks more clearly and sees itself as an important supplement to the official documents. The documents passed by WSIS in Tunis (Tunis Commitment and Tunis Agenda for the Information Society) do not go any further than the documents passed in Geneva with regard to Open Access, but they do expressly confirm them.

OECD (Organisation for Economic Cooperation and Development)

In contrast to the documents passed by WSIS, which take a more comprehensive look at the world's less developed regions, the OECD, as the coordinating committee of the 30 leading developed countries in the area of economic policy, is mainly concerned with the impact of Open Access on economics and research policy.

In January 2004, a Declaration on access to publicly funded research data was passed. In addition to the OECD states, China, Israel, the Russian Federation, and South Africa also signed the document. Amongst other things, they acknowledge their commitment to the principles of balance, transparency, good scientific and scholarly practice, and the observation of quality and security standards. In this spirit, the OECD Council's recommendation regarding access to publicly funded research data was published in December 2006. This document expresses a clear recommendation for the signatory states to legislate towards Open Access. In addition, the OECD Council seeks to monitor the implementation of the recommendation in the individual states and to adapt the guidelines to new developments in technology and scientific practice if need be.

Besides Open Access to data, the OECD also adopted a position with regard to Open Access in the entire area of publicly funded scientific and scholarly publishing. A report was published in September 2005, which provides

detailed descriptions of economic structures and added-value chains, as well as of existing and new business models based on online access. It concludes with 'Challenges and Policy Considerations'. This report, like the declaration on the subject of research data (see above), recommends maximum access to research results in order to obtain greater social benefit.

While the OECD has made a statement on Open Access to research data in the binding form of a declaration whose implementation is to be monitored, Open Access to general research results has so far only been recommended in the above-mentioned report.

IFLA (International Federation of Library Associations and Institutions)

Founded in 1927, IFLA sees itself as the leading global representation of libraries and information services. IFLA feels committed to the principle of Open Access, particularly with regard to access to academic literature in developing countries. In the past few years, several declarations on Open Access have been passed, such as the 'IFLA Statement on Open Access to Scholarly Literature and Research Documentation' (February 2004). This statement states IFLA's support of the principles underlying Open Access, including the defence of authors' rights, opposition to any kind of censorship, affordable access for individuals in developing countries, and the support of sustainable Open Access publication models.

In 1997, IFLA set up the committee on 'Free Access to Information and Freedom of Expression'. This committee deals with article 19 of the United Nations Universal Declaration of Human Rights in so far as it is relevant to libraries. With regard to freedom of opinion, this article demands that everyone should be able to seek, receive and impart information and ideas regardless of frontiers. Important IFLA/FAIFE documents include the 'IFLA Internet Manifesto' (May 2002) and the 'IFLA/UNESCO Internet Manifesto Guidelines' (September 2006). Amongst other things, the Internet Manifesto calls upon the international community and national governments to promote the development of information structures and worldwide Internet access. The guidelines mainly address libraries and go into some detail *inter alia* regarding programmes for Internet access as well as the development of services in libraries in order to make strategy decisions in these areas easier.

UNESCO (United Nations Educational, Scientific and Cultural Organisation)

UNESCO supports the creation of Knowledge Societies in which everyone has access to information and knowledge. It places its emphasis on education and development and includes ethical, social and political perspectives.

The UNESCO Recommendation concerning the Promotion and Use of Multilingualism and Universal Access to Cyberspace, which was passed in autumn 2003, calls for the promotion of Open Access solutions: 'Member States and international organisations should encourage Open Access solutions including the formulation of technical and methodological standards for information exchange, portability and interoperability, as well as online accessibility of public domain information on global information networks'[126]. Member States report back every four years on their implementation of this 'Cyberspace Recommendation'.

UNESCO is significantly involved in the process of the 'World Summit on the Information Society' and plays an important role in the implementation of the Geneva Plan of Action. For one, it has been named an official facilitator of the Action Lines 'Access to Information and Knowledge' and 'E-science'. In addition, UNESCO is working with many other initiatives in the area of access to information and knowledge, where it takes on a supporting and facilitating role, as for example with the formulation of the IFLA/UNESCO Internet Manifesto Guidelines. They state that 'unhindered access to information is essential to freedom, equality, global understanding and peace'[127].

SPARC (Scholarly Publishing and Academic Resources Coalition)

SPARC was founded in 1998 with its seat in Washington DC (USA) as an international alliance of university and research libraries. Originally concerned with increasing competition in the publications market with the goal of lowering journal prices, SPARC has now become an important international action platform, which is developing new communication models for academic publishing in cooperation with other initiatives and partners and is committed to Open Access. More than 220 mainly North American libraries are members of SPARC (as of January 2007). In addition, several large library organisations from all

[126] http://portal.unesco.org/en/ev.php-URL_ID=17717&URL_DO=DO_TOPIC&URL_SECTION=201.html. paragraph 18.
[127] http://www.ifla.org/faife/policy/iflastat/Internet-ManifestoGuidelines.pdf.

around the world are associated members. SPARC Europe was founded in 2001 as an independent spin-off of SPARC and currently has more than 100 members. These are also associated, as are the more than 600 libraries of SPARC Japan, which started work officially in December 2006. SPARC provides information on authors' rights (development of an addendum to authors' contracts), supports openly accessible and inexpensive journals (Publisher Partner Program), and offers strategic and practical advice for publishers who wish to get involved in Open Access publishing (Publisher Assistance Program). SPARC is supported by US-lobby groups such as the Open Access Working Group (OAWG) and the Alliance for Taxpayer Access (ATA) and thus plays an important role in the political arena, particularly in the United States.

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