DFG infobrief
Research Funding — Facts and Figures 2/2005

Open Access to Scientific Knowledge: Experiences and Opinions of DFG-Funded Researchers

Results of an empirical study on publishing habits and information acquisition with particular emphasis on open access

ALEXIS-MICHEL MUGABUSHAKA AND JOHANNES FOURNIER

After signing the "Berlin Declaration on Open Access to Scientific Knowledge", the Deutsche Forschungsgemeinschaft (German Research Foundation, DFG) commissioned a study on the major factors that determine publication behaviour and information acquisition across scientific disciplines. The study aimed at providing the DFG with empirical data that could be used to improve its funding programmes. This newsletter reports on the study's main results.[1]

1. Study concept and execution

The study is based on a large-scale survey[2] of scientists who received funding from the DFG between 2002 and 2004. A sample of 1,600 people, stratified into four scientific disciplines (humanities and social sciences, life sciences, natural sciences and engineering sciences) was selected. Within these four categories, a further distinction was made between established researchers and researchers at an early stage of their career (i.e. scientists who were being funded within the framework of one of the DFG's programmes for young researchers). A random sampling was drawn within each stratum, whereas the proportion of researchers in their early career was set at one-fifth.

The survey was carried out during October and November 2004 and respondents took part using either printed or online questionnaires. With its high response rate of 64 percent, the survey is representative both in terms of the distribution of the scientific disciplines and in terms of the professional status of the respondents.

2. Selected results

2.1 The three cultures of scientific communication

The first section of the questionnaire dealt with four aspects: (1) how different forms of publication were used to access information, (2) the international orientation of publishing activities, (3) the main criteria used in selecting journals for researchers' own publications, and (4) the publishing habits of the respondents themselves over the last five years.

Analysis of this set of questions reveals large differences between the scientific disciplines. In the life and natural sciences, scientific journals are the dominant form of accessing information. Nearly all the respondents in these disciplines frequently use journal articles to obtain information about the latest developments in their subject. Papers in edited volumes are the second most important form of publication, being used

1. DFG (2005). Publikationsstrategien im Wandel? (www.dfg.de/zahlen_und_fakten/)
2. The survey was carried out by the Gesellschaft für Empirische Studien (Society for Empirical Studies, GES) in Kassel.

by around 40 percent of the respondents. In the engineering sciences, the latest developments are also accessed mainly through journal articles (91 percent of respondents), although articles in conference proceedings, which are used frequently by around 85 percent of respondents, are almost as important. The humanities and social sciences use a wide range of different types of publications. In addition to journal articles, which are frequently used by 94 percent of respondents, articles in edited volumes and monographs are also very important. Almost three-quarters of respondents say they often use these media to acquire information.

The scientists' publishing habits correlate with this picture. In all scientific disciplines, nearly all scientists have published at least one journal article in the past five years, while other publishing media have been used to different degrees. Around 92 percent of the engineering scientists have published a paper in conference proceedings, while in the other scientific disciplines this applies to approximately two-thirds of respondents (humanities and social sciences and natural sciences) or less than half of respondents (life sciences). Scholars in the humanities and social sciences are more likely to publish articles in edited volumes (80 percent) and monographs (60 percent). The survey analysis therefore confirms the commonly held division – despite the uncontested importance of journals to scientific communication in all disciplines – into a scientific journal culture in the natural and life sciences, the proceedings-oriented culture of engineering scientists and the monograph-focused culture of scholars in the humanities and social sciences.

When it comes to selecting a journal in which to publish their own articles, in all disciplines the specialist focus of the journal, the quality of peer review of the articles submitted, the international distribution and the journal's reputation all play an important part. The frequency with which a journal is cited is more likely to be considered important in the life and natural sciences. These disciplines are also distinguished by a predominantly international focus for the publication of their own work. Over 90 percent of respondents in the natural and life sciences address their publications "overwhelmingly" to scientists outside Germany and almost all their publications are in English. This attitude, albeit somewhat less marked, is shared by their colleagues in the engineering sciences. Here, three-quarters of respondents say that their work (80 percent of which is written in English) is addressed overwhelmingly to scientists outside Germany. In contrast, in the humanities and social sciences, in which 41 percent of respondents' own work was published in German, less than half of all respondents (43 percent) stated that their work was primarily aimed at the international community in their field.

All in all, this shows that publishing cultures vary markedly between disciplines. Differences in publishing behaviour have therefore not yet been levelled out by the arrival of the internet and its related opportunities for electronic publication, by rising cost pressures or by the "pressure to publish" associated with evaluations; rather, the subject-specific publishing cultures appear to be very stable. The persistence of different subject cultures in the natural and life sciences, engineering sciences, humanities and social sciences calls for differentiated perspectives when reviewing the importance of new forms of publishing under open access in the research disciplines.

2.2 Open access publications: observations and opinions

For the purposes of the study, the concept of "open access", which is often defined in different ways, was operationalised in relation to the three main areas in which it has developed: open access journal articles, electronic postprints and electronic preprints (see figure 1).

Nearly four in every ten respondents stated that they were aware of open access journals in their subject. Here the engineering sciences are the exception, as only a quarter of those in this discipline had knowledge of open access journals. Half of the natural scientists who responded had heard of preprint servers, as opposed to only a quarter of the humanities scholars

and social scientists and one-fifth of the engineers. However, only one in ten life scientists knew about preprint servers (see table 1).

Even lower than the awareness level of the different types of publication is the actual number of publications in open access platforms. Only one in ten respondents had previously published at least one article in open access journals. Only one in seven publish the interim results of their research as preprints. Here the proportion fluctuates according to discipline: 35 percent of natural scientists, but only 8 percent of the humanities scholars and social scientists use this resource. "Self-archiving", on the other hand, is the most used open access publication option. One in four respondents have made at least one of their journal articles available to the wider public, on the internet as a free downloadable archive copy, after it has appeared in a "conventional journal".

Respondents are clearly aware of the advantages of "open access" for improving access to scientific research. Over two-thirds of respondents feel that open access can make a contribution; around the same portion of the respondents believe that open access will change the publishing landscape in the long term. However, the majority of respondents (60 percent) expressed scepticism about the scientific quality of open access publications and were doubtful that these publications would receive proper recognition from their peers in the research fields. Around two-thirds of all respondents fear that free access publications are not taken into account sufficiently in the assessment of individual scientific performance or when reviewing applications for funding. Around three-quarters are of the opinion that publications in open access are cited less frequently than conventional publications; 70 percent believe that open access contributions are not referenced in bibliographical systems as often as conventional publications. These concerns decrease, however, in line with the amount of experience respondents already have with electronic publications.

The strong approval rating for open access publications in terms of improving access to scientific research is therefore balanced against concerns relating to their lack of prominence and the status accorded to them by fellow peers. In response to the question why they had not yet published anything in open access journals, most respondents cited – in addition to lack of knowledge of such journals – the level of distribution, which was estimated to be low, and their often poorly perceived reputation in specialist circles. This is confirmed by the following statements made by some of the scientists surveyed:

"I wish to be taken seriously by my peers. As far as I know, they don't read open access journals either."

(male, professor, analytical chemistry)

"The open access journals in my field do not (yet) reach my target group. Their reputation is not (yet) good (enough)."

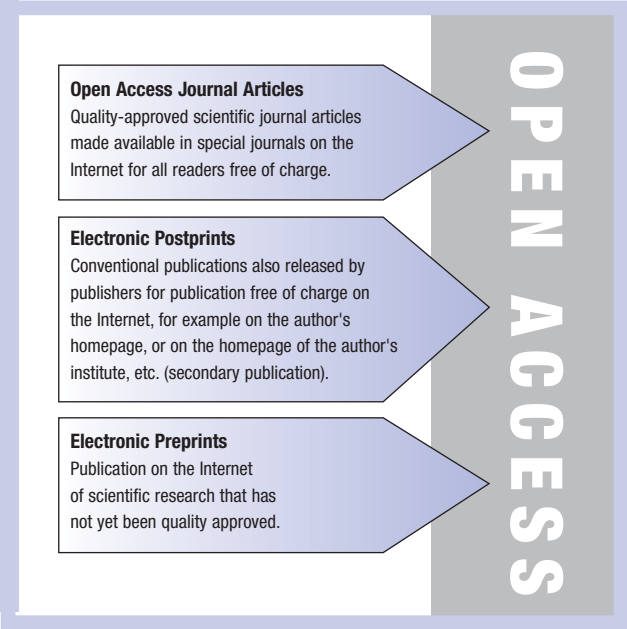
(male, professor, mathematics)

In particular, scientists still in the early stages of their professional careers were much more likely to be sceptical about open access journals.

"Because I'm still only at the beginning of my scientific career, it is immensely important that awareness of my work is as widespread as possible. However, at the moment this does not seem to me to be the case with current open access journals."

(male, early-stage researcher, molecular chemistry)

Figure 1: Open access - terminology



The results above show that the scientists surveyed have published relatively little of their own work in open access journals. This is largely due to lack of awareness of the many different ways in which publications can be made accessible free of charge, but also to sceptical attitudes towards the status of open access journals in specialist circles. On the other hand, the respondents welcomed the opportunity being provided by open access to improve access to scientific research.

2.3 Open access publications: funding measures and proposals

With regard to concrete proposals to promote open access, there is relative agreement across disciplinary boundaries that incentives should be offered to established publishers to make the articles they publish available also on the internet free of charge (see figure 2). Eighty-six percent of respondents who felt that

Table 1: Publishing activities on open access platforms in the last five years by scientific discipline (percent)

	Humanities and Social Sciences	*Life Sciences*	*Natural Sciences*	*Engineering Sciences*	*All*
Open Access Journals					
Have published at least one article in an OA journal	9.2	7.1	13.4	10.4	10.2
Have never published an article in an OA journal	28.4	38.8	27.5	14.5	27.5
Know of no OA journals in my field	62.4	54.2	59.1	75.1	62.2
Count	(229)	(240)	(298)	(221)	(988)
Electronic Preprints					
Have published at least one article on a preprint server	8.0	12.6	34.5	10.7	17.6
Have never published an article on a preprint server	5.5	12.6	13.9	9.6	10.6
Know of no preprint servers in my field	86.5	74.9	51.6	79.7	71.7
Count	(200)	(207)	(252)	(187)	(846)
Electronic Postprints					
Have published at least one journal article as an electronic postprint	18.4	24.7	31.3	30.8	26.7
Have never published a journal article as an electronic postprint	81.6	75.3	68.7	69.2	73.3
Count	(201)	(219)	(268)	(201)	(889)

Question: Are you aware of any open access journals in your subject field?

Question: How many articles have you published over the last five years?
Do these include any that have appeared in open access journals?

Question: In some subjects it is possible to make interim results of scientific research available in an electronic archive for downloading free of charge from the internet (preprints).
Do you know of any such electronic archives in your subject?

Question: During the last five years, how many of your own articles have you published in conventional media, in other words used publishers to offer them to readers in printed or digital form for a price, and how many of these have you (or your publishers) also made available for free access on the internet?

promoting open access was a good idea were in favour of this proposal. In the same vein, the suggestion to invite scientists to make their own work available on the internet also met with strong approval (72 percent). Three-quarters of respondents were in favour of centralised, discipline-specific archives to be set up on the internet where authors could make their contributions available. Sixty-eight percent wished that publishing contracts would allow works also to be published on the internet.

Against the background of the lack of prominence of open access platforms, respondents advocated promoting debate about open access in universities and research institutions and improving advice and information about the opportunities of open access publishing.

The funding of open access journals is also considered important by a majority of respondents: 75 percent were in favour of strengthening these journals to make them capable of holding their own with conventional journals.

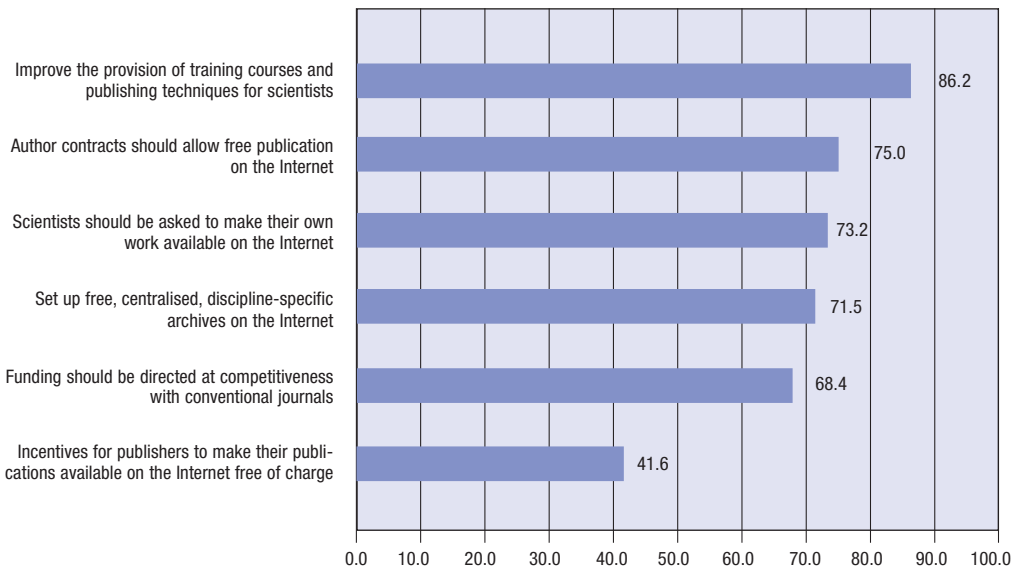
3. Summary

One of the study's main concerns was to remediate to the information deficit relating to the distribution and use of open access publications. The results show that changes in publishing technology (the internet) have not changed profoundly the publishing behaviour of various disciplines. One can still see three distinct subject cultures: the journal-dominated and internationally oriented natural and life sciences; the engineering sciences, for whom proceedings are also of major importance; and the humanities and social sciences, who use a wide range of different publishing media and are more strongly attached to the specialist community in their own country.

When it comes to open access, the general impression is that scientists are still unfamiliar with this publishing opportunity and have not yet used it much. When one looks at the different forms of open access, scientists seem to prefer self-archiving.

The reasons behind the rather modest publishing activities in open access can be found in the reserva-

Figure 2: Views on the pros and cons of open access (percent)



Question:
The series of statements above on open access are mentioned repeatedly in the current debate. Which do you consider to be relevant and which not?

(Scale of 1 = "extremely relevant" to 5 = "not at all relevant" ; here 1 and 2 have been conflated)

tions expressed about this publishing medium. Two-thirds of respondents believe that open access publications are given insufficient weight both in the assessment of individual research and in the approval of funding proposals. A majority have doubts about the quality standards of open access publications. At the same time, scientists see open access as an opportunity to improve access to scientific research in the long term. The overwhelming majority of respondents think that it is a good idea to promote the publication of scientific research under open access.

Thoughts on open access policy [1] must take into account both the reservations expressed and the fact that scientific studies are only published in organs that have a high reputation in their respective scientific community. In this regard, secondary publication of articles that have already been published elsewhere is an optimal solution. When asked about possible ways of widening the appeal of open access, scientists recommended first of all that work already published in established publications be made available on the internet. This could be done either by offering incentives to these publishers to offer their published articles on the internet, or by allowing the authors themselves to place their own work on the internet as secondary publications. According to the survey results, a second priority consists in intensifying the debate over open access and in providing better information about the different opportunities available for publishing in open access.

Finally, three-quarters of respondents were in favour of funding open access journals so that they can compete directly with the established journals. This desire arises from the acknowledgement that open access journals must first earn their place in the journal landscape. One researcher expressed it this way:

"Open Access journals have only recently become established in my subject area. It is not yet clear whether these journals have the same status as conventional journals (impact factor, etc.)"

(male, privatdocent, chemical-biological systems)

Open access journals will not be accepted until they can hold their own with the best journals in their field. The future inclusion of open access journals in bibliometric assessments [2] will show how far they are being taken seriously and valued by the scientific community.

1. *Roads to Knowledge: Activities for Promoting Open Access by the DFG Response to the study Publishing Strategies in Transformation? Results of a study on publishing habits and information acquisition with regard to open access (www.dfg.de/lis/)*

2. *Mc Veigh, M. E. (2004). Open Access Journals in the ISI Citation Databases: Analysis of Impact Factors and Citation Patterns. A citation study from Thomson Scientific. Thomson Corporation. http://www.isinet.com/media/presentrep/essayspdf/openaccesscitations2.pdf*

Lawrence, S. (2001). Online or Invisible? In: Nature, 411 (6837), p. 521

Antelman, K. (2005). Do open-access articles have a greater research impact? In: College & Research Libraries, 65 (1), p. 282-372.

DFG infobrief

IMPRESSUM

The DFG infobrief is published by
the Information Management section of the
Deutsche Forschungsgemeinschaft (DFG), Bonn.
Contact: Dr. Jürgen Güdler

Address: Kennedyallee 40, D-53175 Bonn
e-mail: juergen.guedler@dfg.de
Phone: +49 (0)228/885-2649
Layout: Designbureau Pi Heinz, Köln
Download address:
http://www.dfg.de/zahlen_und_fakten/ib/