SCHOLARLY COMMUNICATION IN THE DIGITAL ENVIRONMENT: WHAT DO AUTHORS WANT?

Findings of an international survey of author opinion: project report

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Executive summary

This report summarises the key findings of a large-scale survey of journal authors' opinions, possibly the largest such survey ever carried out. We report here the views and attitudes of nearly 4,000 senior researchers from 97 countries in relation to what they want from the journals system at a time of change and uncertainty.

There is no longer any doubt that the journals crisis is real. Institutional purchasing power is failing to keep up with the proliferation of new titles, itself a phenomenon being driven by the differentiation of knowledge into more specialised and coherent specialties at the frontiers of research. The fundamentals of supply and demand that operate in other markets do not seem to be transferable to journal publishing. Demand is highly inelastic: if you are a scholar in bibliometrics you simply have to have access to *Scientometrics*. You cannot substitute *Information Processing & Management* or the *New Zealand Library Review.*

What authors tell us they want from the journals systems reflects a view that has probably not changed much over the past four centuries. They want the ability to target a very specific group of key readers, narrowcasting to those working on similar problems, and they want the imprimatur of quality and integrity that a good peer-reviewed, high impact title can offer, together with reasonable levels of publisher service. The role that journals play in helping to structure specialist academic communities is underlined by the huge amounts of unpaid effort that researchers put into refereeing and editing work. Around 80% of our authors had engaged in peer-review activity in the previous twelve months. Even under the most conservative assumptions, commercial and society publishers are receiving a massive subvention from the research community in this respect.

Levels of awareness of the kinds of issues that are the focus of publishing seminars and library conferences are really surprisingly low among the research community. Knowledge of even the most hotly contested alternative business model, open access, is the preserve of only a minority – 82% of corresponding authors claim to know `nothing' or just `a little' about this development. There is clearly a need for the publishing community to raise awareness of these issues and to sensitise a largely complacent author population. Interest and understanding of copyright issues is also alarmingly low.

Many of the comments that authors made were very hostile towards commercial publishers. Authors are resentful of what they see as a perversion of the ethos of science (`information should be free') for market ends. They do not understand or appreciate the value added that publishers bring to the scholarly communication process: this is evident from many comments which reveal bemusement at the prices being charged for journals. Again, the publishing community needs to address this lack of understanding and to sell its services to authors and readers more effectively.

Authors' attitudes to the open access movement are generally positive, although there are significant reservations about quality and preservation in an increasingly digital information landscape. The key sticking point for commercial open access publishing is that there seems to be great resistance, both in principle and in practice to the question of author payment (`can't pay won't pay' seems to be the message). Unsurprisingly, authors want open access at both ends of the chain: as authors and as readers. Since authors question the value of what publishers are adding to scholarly communication, and since they feel they are already doing so much work themselves in preparing and reviewing for publication, it is hardly surprising that their perceptions of the costs needed to sustain the system are far lower than those of the publishers themselves.

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Within the overall author population there are of course differences. Older, more senior authors, seem much more wedded to the traditional subscription print-based model than their younger peers. These authors are more likely to self-publish on the web and to feel more positively towards the open access movement. It may well be that no one publishing business model size will fit all and that the scholarly communication market will diversify further to meet the different needs of junior and senior researchers.

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Part A: Study context and background

A1 Background

This study was commissioned by the Publishers' Association in November 2003 against the backdrop of a growing debate about the `journals crisis' and the possible role of new business models and technologies in easing some of the pressures being felt by commercial and society publishers in the scholarly marketplace. As well as being an important economic generator in its own right, journal publishing is a strategic activity: efficiently organised, it can bring enormous social benefits and opportunities.   Inefficiently organised, access to knowledge could well become a privilege for the few. This report aims to bring cold fact to a sometimes overheated debate about the future of scholarly publishing so that a rational debate can take place. The views expressed in this report are those of the authors alone and they do not represent a corporate position, either of City University or the Publishers' Association.

A2 Methodology

This report presents the findings of an international survey of authors' views on the current state of journal publishing, with a sharp topical focus on open access issues. The initial survey design took place in November 2003 and was largely based on closed questions, since its administration as a web-based questionnaire precluded a more qualitative approach. This report does however make extensive use of some of the unprompted comments made at the end of the questionnaire to underline certain points and to illustrate the complexity of some of the issues raised. A critical incident approach was used: authors were asked to ground their answers with respect to *their last published paper*. In some cases, it was clear from the respondents' comments that a few authors did not consider their last paper to be entirely typical of their research outputs, perhaps because they were seeking rapid dissemination for an article that had been rejected by a higher profile journal. Nonetheless, we believe a critical incident approach is essential: it minimises the danger of over-generalisation.

After three rounds of extensive piloting and testing on authors from various disciplines and countries, the survey was administered on ciber's behalf by NOP in 12-30 January 2004 and distributed to a randomised sample of 107,500 authors who had published an article in a peer-reviewed journal during the previous 18 months. Authors were sent an email message (see Section D) which contained a hypertext link, enabling them to link to the survey database hosted by NOP. The total number of useable, fully completed questionnaires was 3,787, from 97 different countries, and the response rate (see Table 1) is fairly typical of online surveys.   The subject and geographic profiles of the completed questionnaires are very similar to the sampling frame, so much so that no weightings have had to be applied for this analysis.   Given the considerable passions aroused in some quarters by issues such as open access, and the paucity of opinion research, we feel that the need for a robust large-scale survey spoke for itself.

Table 1: Survey response rate

Total sample	107,500
Not delivered (bounce backs)	16,000
Effective sample	91,500
Clicked on survey link	6,016
Did not complete	2,229
Non-completion rate	37%
Completed survey	3,787
Response rate (approx.)	4%

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A3 Survey demographics

The survey sample was derived from mailing lists supplied by the Institute for Scientific Information (ISI®) to a sample frame determined by ciber. It is fully representative of the disciplines (Figure 1) and geographies (Figure 2) populating their citation databases. The final list comprised the e-mails of corresponding authors, typically the most senior member of a research team, who had recently published in one or more of the world's 8,000 highest quality peer-reviewed journals. Duplicate names were identified and removed.

Figure 1: Survey respondents by broad discipline (Q21)
Number of respondents, n=3,787
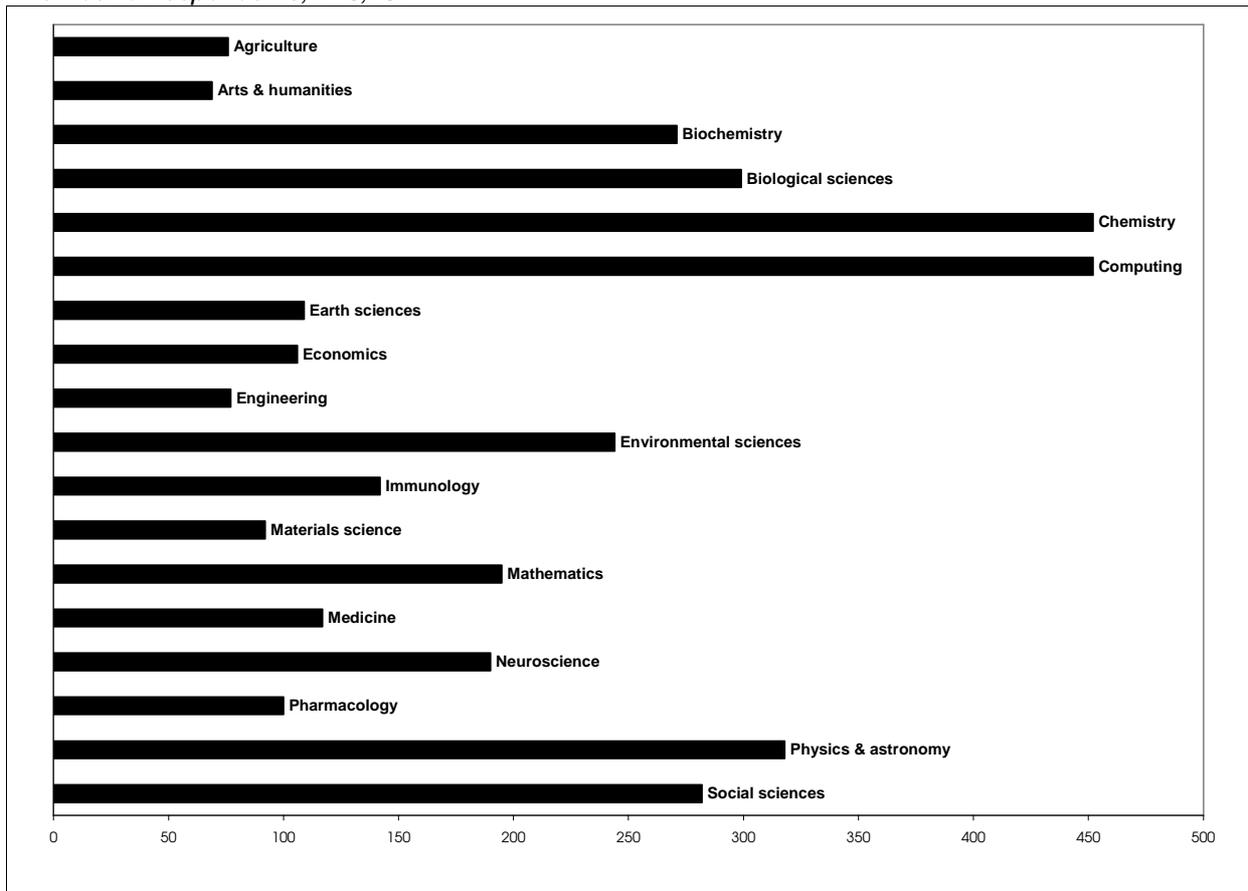
The sample is heavily dominated by men (80%) which is a sadly expected and predictable response given the generally unfavourable gender balance in the university sector at least. It will be noted from Figures 1 and 2 that the coverage of authors by regions draws heavily from North America (36%) and Western Europe (30%) and that biomedicine alone accounts for about 28% of all authors. This may seem surprising but ISI's editorial policy is to index only the highest quality journals, those that account for around 19 out of every 20 citations received in a particular discipline. This means that research of a primarily national orientation, as in much of the social sciences, for instance, or research that has low citation impact or is not peer-reviewed is excluded.

These factors, together with the senior status of the corresponding authors, lend this survey particular weight and authority.

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Figure 2: Survey respondents by broad geographic region (Q19)
Number of respondents, n=3,787
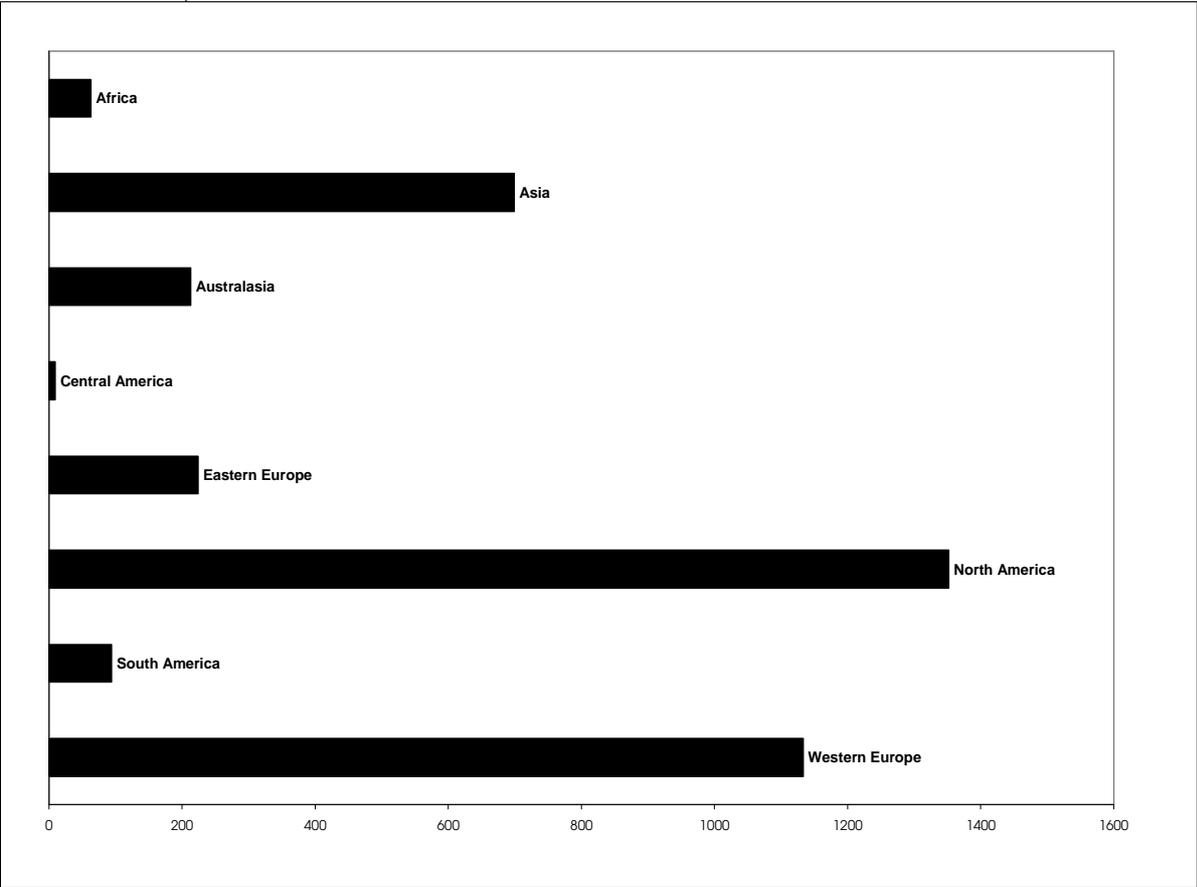
Figure 3: Survey respondents by employment sector (Q20)
Number of respondents, n=3,787

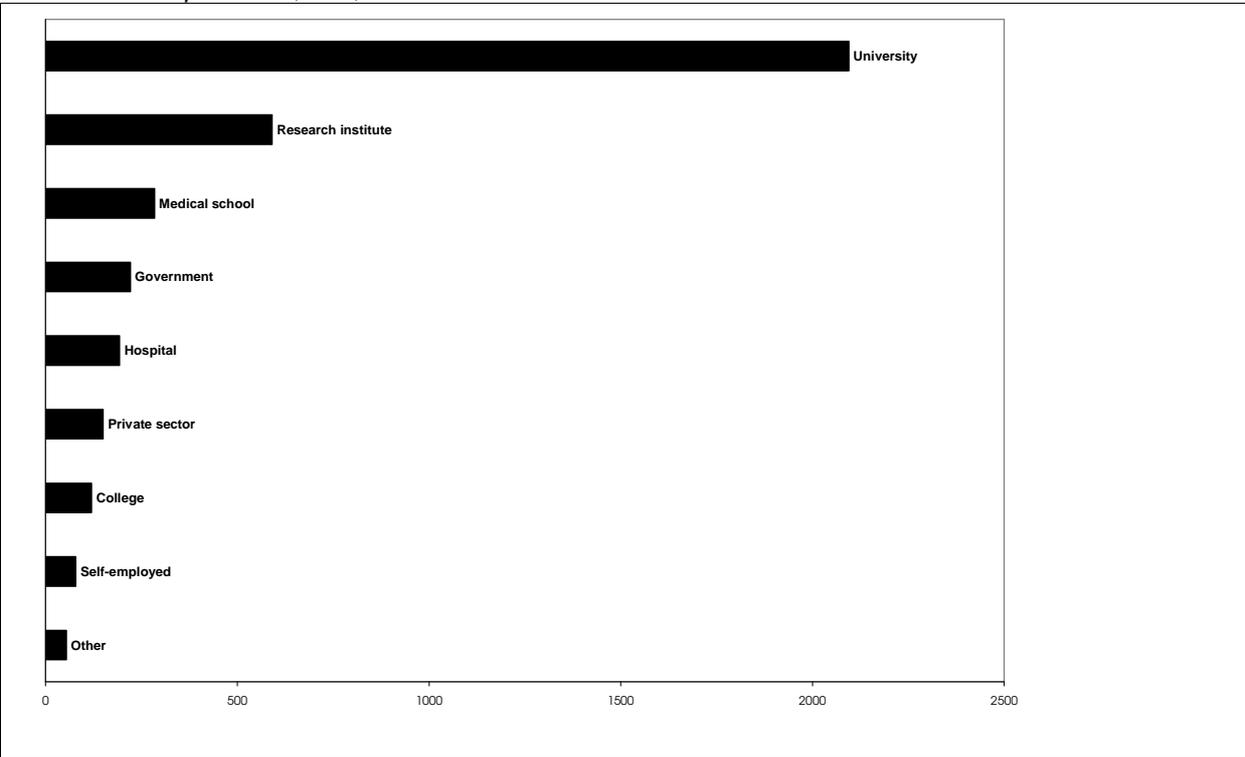scholarly communication in the digital environment: what do authors want?

Figure 3 shows that public domain research production is by no means the exclusive preserve of the academy, with more than a third (34%) of authors in our survey affiliating themselves with commercial organisations, government, hospitals or are working in a private capacity as self-employed consultants or carrying on their research into retirement.

This finding is consistent with sociological theory about the nature of knowledge production and the increasingly collaborative and applied nature of much funded and intra-mural research.

Figure 4: Survey respondents by age range (Q22)
Number of respondents, n=3,787
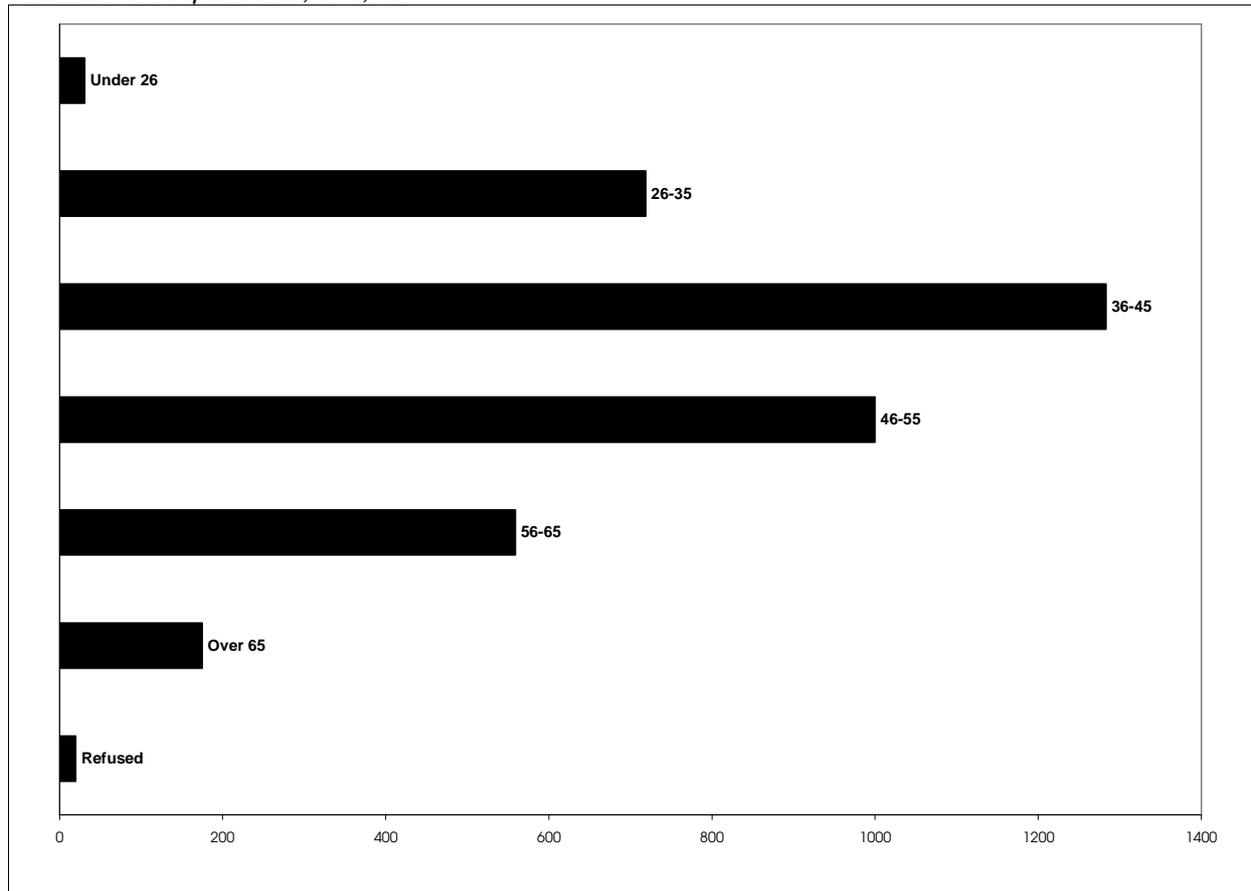
As might well have been expected given the nature of the survey sample, drawn from senior corresponding authors, the academic age profile of the respondents is distinctly middle-aged. Nearly half the respondents (46%) are baby boomers, aged 46 or older (Figure 4). These are almost certain to comprise very experienced researchers with a track record extending back at least 20 years. Many of their attitudes will have been formed during a period of relative prosperity for the university sector, at a time when the current difficulties facing institutional library budgets and the scholarly communication market were not yet evident. This point should be borne in mind later when we look at attitudes to the current journals system and to some of the alternative business models being proposed. We shall see that age is an important variable in explaining some aspects of behaviour.

In addition to their role as an author, which is the primary reason respondents were selected, it is striking to note (Figure 5) the extent to which the scholarly community supports the journal system through (voluntary or nominally paid) refereeing and editing duties. The traditional journal publishing model, a legacy of more relaxed days when gentlemen scholars communicated with one another as both the producers and consumers of knowledge seems

largely intact on this evidence: 80% percent of respondents said that they undertook journal refereeing duties in the previous year. If we were to assume that this finding is scaleable to the entire universe of authors represented in the ISI database and apply it to the estimated 1 million authors who have published in a peer-reviewed journal in the past year[1], and assume that each only put in one day's work, we would come to the staggering conclusion that the academic community made a contribution of at least 2,000 person years of voluntary effort into maintaining the quality of the journals system in 2003. Even at academic rates of pay, this is a considerable input in kind.

This estimate is of course a very, very rough and scarcely reliable indicator, but it makes a significant point about the strong social role that journals play in maintaining scholarly communities.

Figure 5: Survey respondents by roles carried out in previous 12 months (Q24)
Number of respondents, n=3,787

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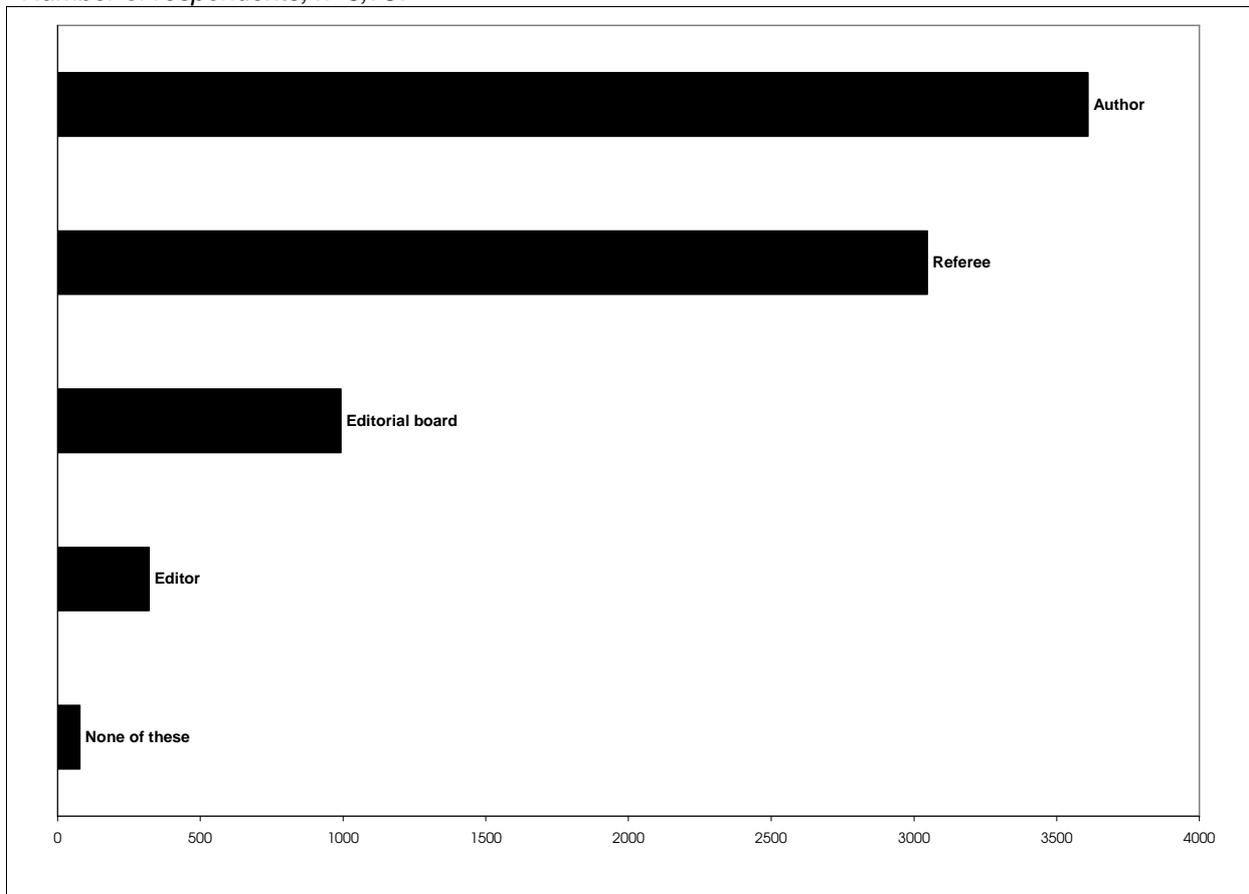
[1] Michael Mabe & Mayur Amin, Dr Jekyll and Mr Hyde: author-reader asymmetries in journal publishing, *Aslib Proceedings* 54(3) 2002, 149-157.

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Part B: Authors' views on the current system

The views expressed at the end of the survey, where an opportunity was given for respondents to add their own unprompted comments reveal a great deal of disquiet on their part about aspects of the current situation:

> *The academic publishing business model, as it currently stands, is heading for disaster.*

Authors are generally aware that there are serious issues to be faced, mostly around journal pricing and the perceived dissonance between the commercial and public good aspects of scientific communication:

> *I'd like to see a reduction in the excessive pricing for journals: academics provide content, referee it, and are then expected to pay through the nose for it. In my next life, I think I'll run a journal – it appears to be a licence to print money.*

As we shall see later when we consider authors' knowledge of open access, there is much confusion and ignorance of publishing business models. The value addition role of the publisher is by no means always understood or appreciated:

> *I am not sure where the costs arise in publishing. Nowadays the typesetting is in large measure handled by the authors; referees are unpaid; only the binding and distribution are done by the publishers. But journal prices seem very high.*

> *The survey made me realise that there are aspects of publishing, especially open access, which I don't know very much about. This is basically good, as finding out what you don't know is the first step toward knowledge. Although I'm not immediately certain about the best places to find the information – nor do I feel that this is a high priority – I'm sure I will pay more attention to such information when it comes my way, i.e. when I have occasion to.*

B1 How do they choose where to publish?

In this part of the survey we tried to establish some benchmarks by asking authors to indicate what they want from the journals system by focusing their attention on the factors that influenced their last choice of a journal outlet. Unsurprisingly, the most highly rated factor determining journal choice (Figure 6) was the fact that a particular title was perceived to offer the author access to a highly targeted, not necessarily the biggest, readership (`narrowcasting').  This was followed by a cluster of factors relating the quality and standing of the journal (impact factor, editorial board), then a group of `operational' issues regarding the journal's circulation, speed of refereeing, coverage by abstracting and indexing services and the availability of electronic copy.

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In their role as authors (authors are also readers, an important aspect which we explore later in this report), the price of the journal, hence its ultimate affordability, was perceived to be the least influential of the reasons they gave for publishing where they did. The survey showed that women were much more sensitive than men to the issue of the price of the journal to the reader when they last published, and were thus more likely to actively consider cheaper titles[2].

Figure 6: Factors influencing choice over where to publish (Q2)
Mean score (4=` very attractive'), n=3,787
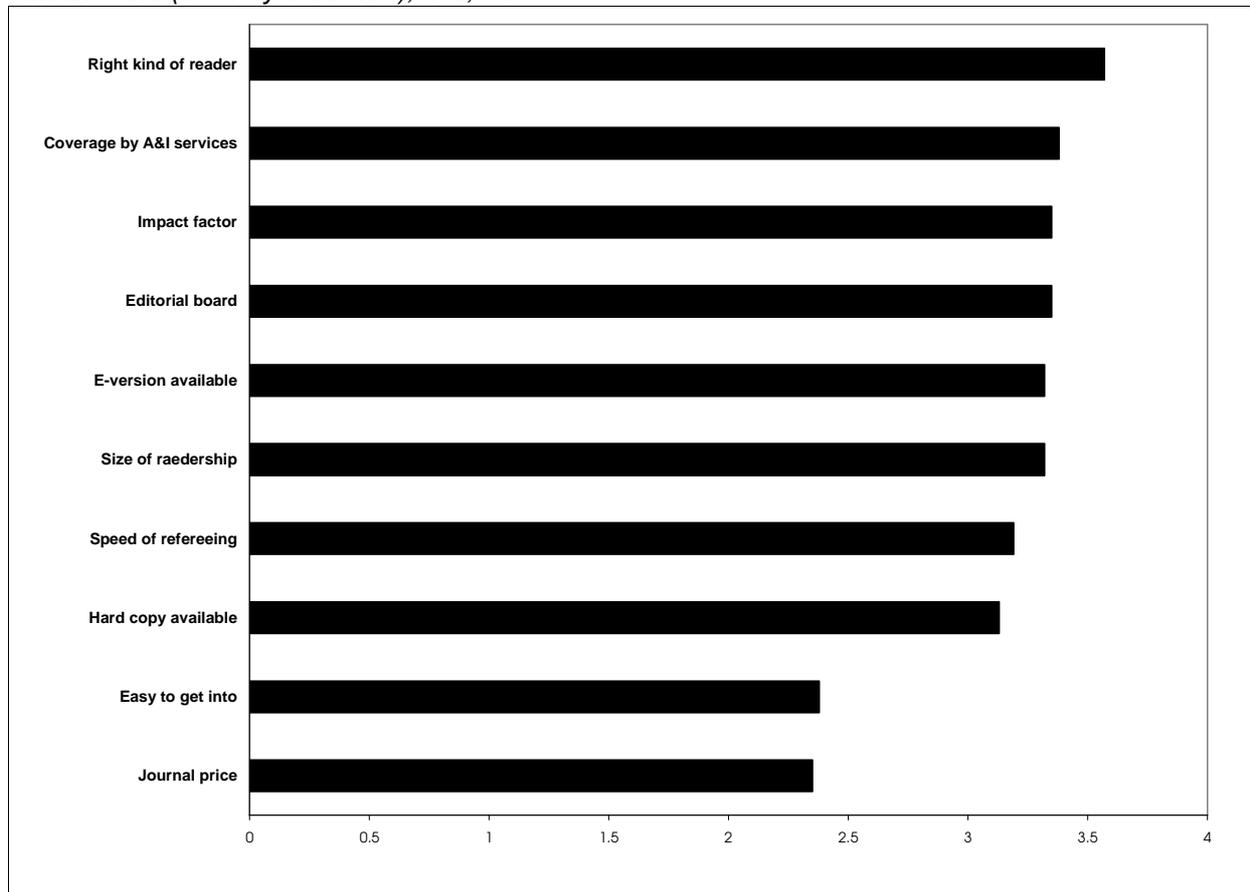
These findings reflect a view of what authors want from the publishing system that has probably not changed much over the past three and a half centuries: the ability to effectively target and communicate with their key readers, the imprimatur of authority and quality, together with reasonable levels of publisher service.

Within the overall population, however, there are indications of two, not mutually exclusive groups, for whom a different mindset is evident: those with actual experience of open access publishing and younger authors.

Authors who have had some experience of publishing in an open access medium place greater emphasis on

- speed of refereeing[3]
- the pricing of the journal in which they published[4]

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[2] χ^2=23.10, df=f, p=0.000
[3] χ^2=13.39, df=4, p=0.010
[4] χ^2=13.39, df=4, p=0.010

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- ease of acceptance[5]

and less emphasis on targeting `the right kind of readership'[6].

Regardless of their experience of open access, younger authors (i.e. those under 35) are much less exercised than their older colleagues (the over 35s) by

- impact factor[7]
- coverage by abstracting and indexing services[8]
- availability of a hard copy[9]

These findings suggest that younger and open access authors have different requirements in terms of what they are looking for from the publishing system.

> ***Despite being highly computer literate, I am strongly averse to publishing in journals that do not have print versions, and this will not change. The day I have no option but to publish in electronic format alone is the day I consider a change of career.***

The survey also elicited some interesting comments about the power of some `top' journals and their ability to make or break careers:

> ***`Top' journals act like marketing and recruiting agencies and essentially have a team of scientists that they support. These `top' journals, which often do not publish the best or most complete work, have far too much control and influence on science. Business running science does not work.***

> ***The over-emphasis on impact factors is forcing too many researchers to publish in journals which are not read by the audience they are meant for. A system in which the reading of a paper (e.g. downloads) is measured should be more useful.***

B2 Who do they want to read their articles?

It is very clear that authors publish in scholarly journals with the primary intention of reaching the narrowest and most tightly focused group of readers possible: researchers working on similar problems (Figure 7). On a five point scale, where 5=Strongly Agree, the mean rating for this group was 4.85. At the other end of the scale, the mean score for 'the general public' was only 2.42, with only 18% of authors rating this audience as of any real importance.

These findings perhaps emphasise the registration and validation functions of the journal over its communication role, certainly to non-specialist audiences.

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[5] χ^2=31.70, df=4, p=0.000

[6] χ^2=15.18, df=4, p=0.004

[7] χ^2=14.24, df=4, p=0.007

[8] χ^2=16.98, df=4, p=0.002

[9] χ^2=42.22, df=4, p=0.000

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> *While increased accessibility is critical if research is to be timely and reach relevant policy/decision makers, open access may not be the answer. Far more important is quality research (which the peer review process, though sometimes inadequate, seeks to ensure) and disclosure of conflict of interest – to pay to publish without a rigorous peer review process would simply be misguided, even downright dangerous.*

Figure 7: Key readership groups (Q3)
Mean score (5=`strongly agree'), n=3,787
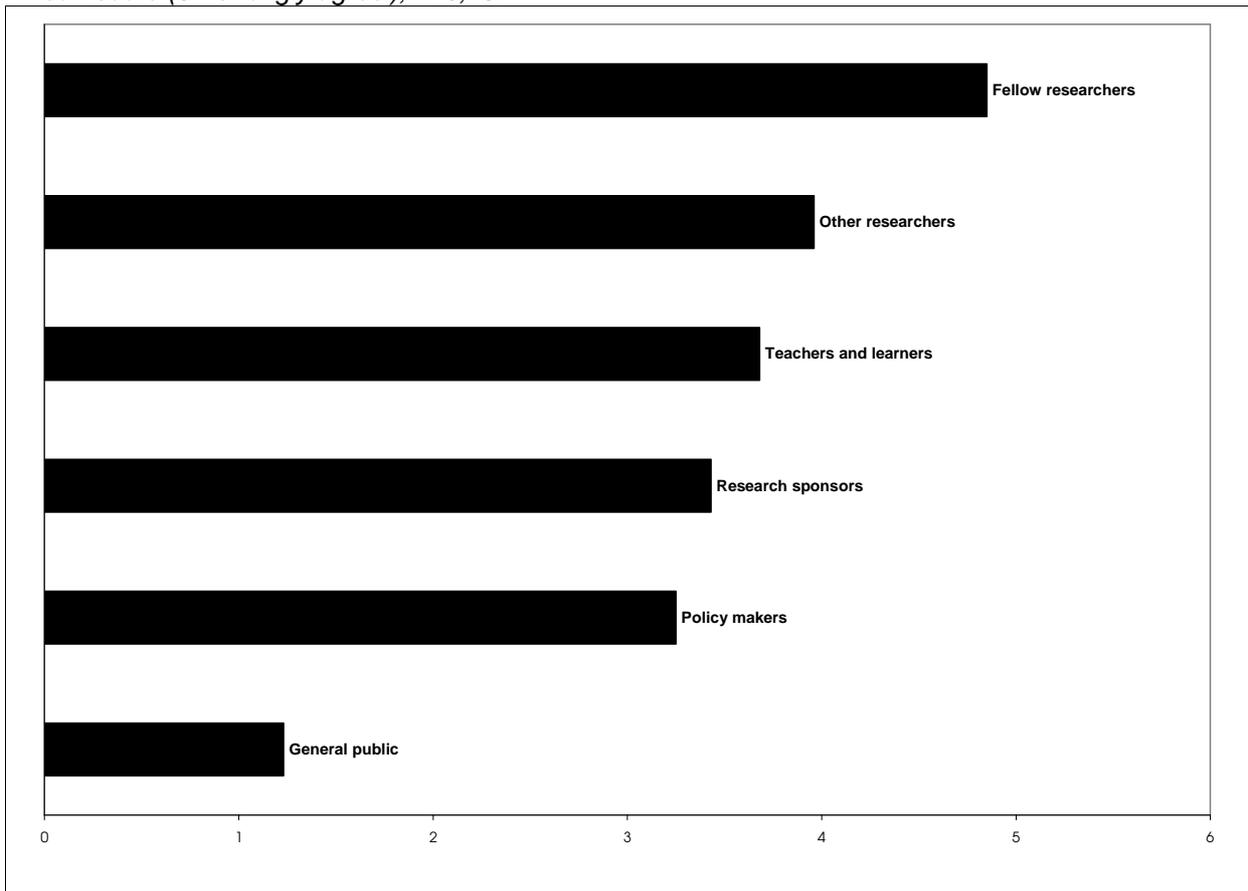
Opinion is not evenly distributed across the sample with respect to this question, however, and significant pattern emerges when authors with some experience of open access publishing are compared with the rest: they are much more concerned with reaching teachers and students[10] and members of the general public[11]. They clearly have a broader communications agenda. There are no significant differences with respect to other researchers, funders or policy makers.

Once again, sex rears its head: women are much more concerned than men that their articles reach and be used by teachers and learners[12].

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[10] χ^2=18.25, df=5, p=0.003
[11] χ^2=22.97, df=5, p=0.001
[12] χ^2=26.98, df=5, p=0.000

B3 What do they think about copyright?

A very surprising finding of this survey is the self-reported indifference of authors to the issue of copyright (Figure 8). Only 13% said that they took a `detailed interest' in the small print of the copyright agreement when they published their last article and, significantly, nearly half of all authors, 46%, admitted that they took no interest at all.

Even if there is an element of familiarity breeding indifference here, this finding must be a cause for concern for all parties involved in the scholarly communication chain, especially since that figure (`I took no interest') rises to a peak of 54% among those authors who also serve on editorial boards!

Most scientific authors publish for prestige, not money, so copyright is of little interest.

Figure 8: Interest in copyright (Q4)
Numbers of respondents, n=3,787
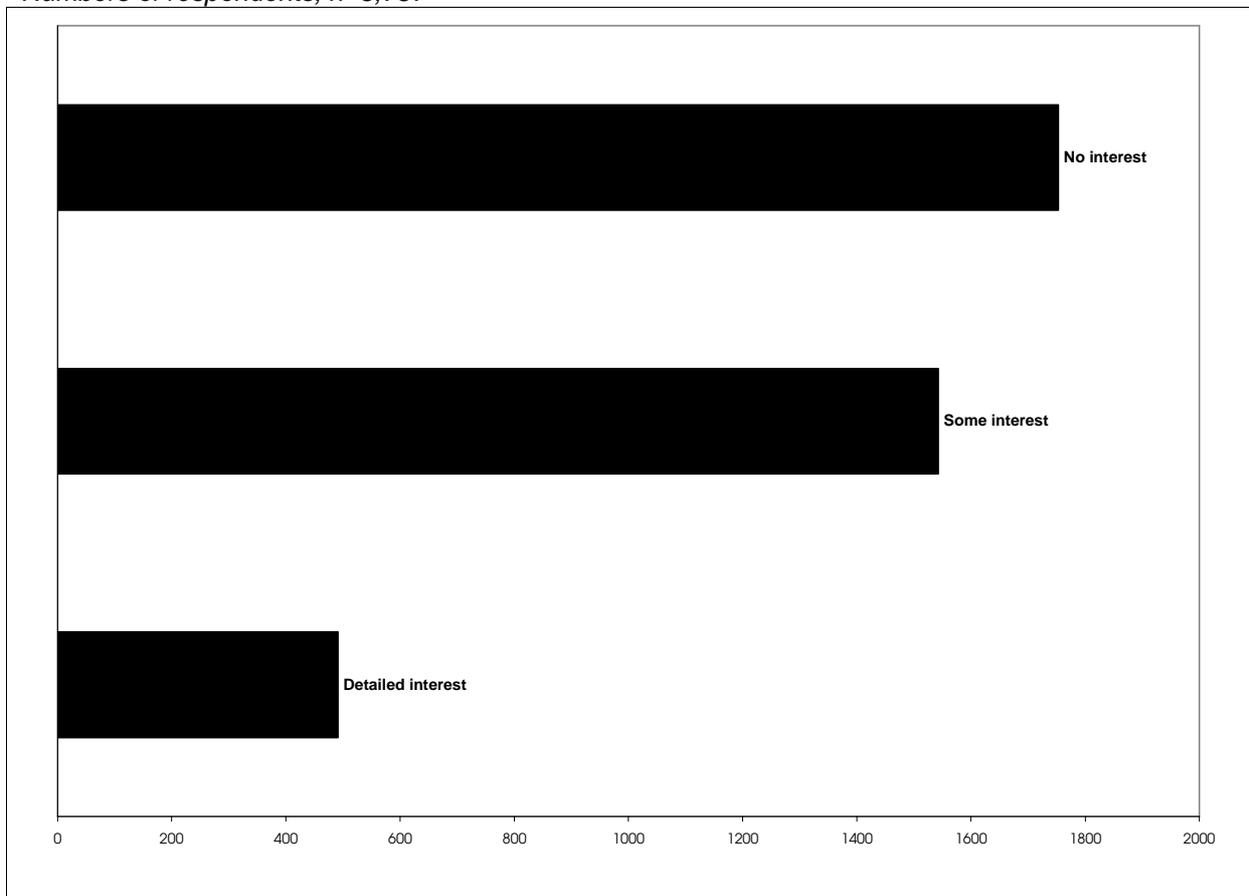
Interest in copyright is not evenly spread across the author population. Older authors generally take less interest in copyright than younger authors (54% of those aged 56 to 65 and 59% of those over 65 took no interest in copyright compared to 42% of those aged under 35)[13], possibly a function of their greater publishing experience: they think they've seen it all before, perhaps. Authors based in Eastern Europe and Asia were least likely to say that they took no interest in copyright; 31% of respondents based in these locations took

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[13] χ^2=10.31, df=2, p=0.006

no interest. However, surprisingly perhaps, respondents based in North America were most likely to take no interest, 55% reporting no interest[14].

Researchers based in hospitals were most likely to take a detailed look at the copyright (19% did so compared to 13% of respondents based in universities) while those in medical schools were least likely: only 8% did so[15]

Researchers in earth and planetary science (19.8%), material sciences (19.5%), computer science (18.3%) were most likely to take a detailed look at copyright while those in economics (3.9%) agriculture (6.6%) and Immunology and microbiology (7.6%) showed the least interest[16].

The comments at the end of the survey suggest that authors' views on copyright may be characterised as a mixture of indifference, ignorance ("confusing, an intractably difficult area, it's unclear what the author is allowed to do") and principled resentment aimed primarily at commercial publishers ("information should be free").

Figure 9: Views on copyright (Q5)
Mean score (5=`strongly agree'), n=3,787
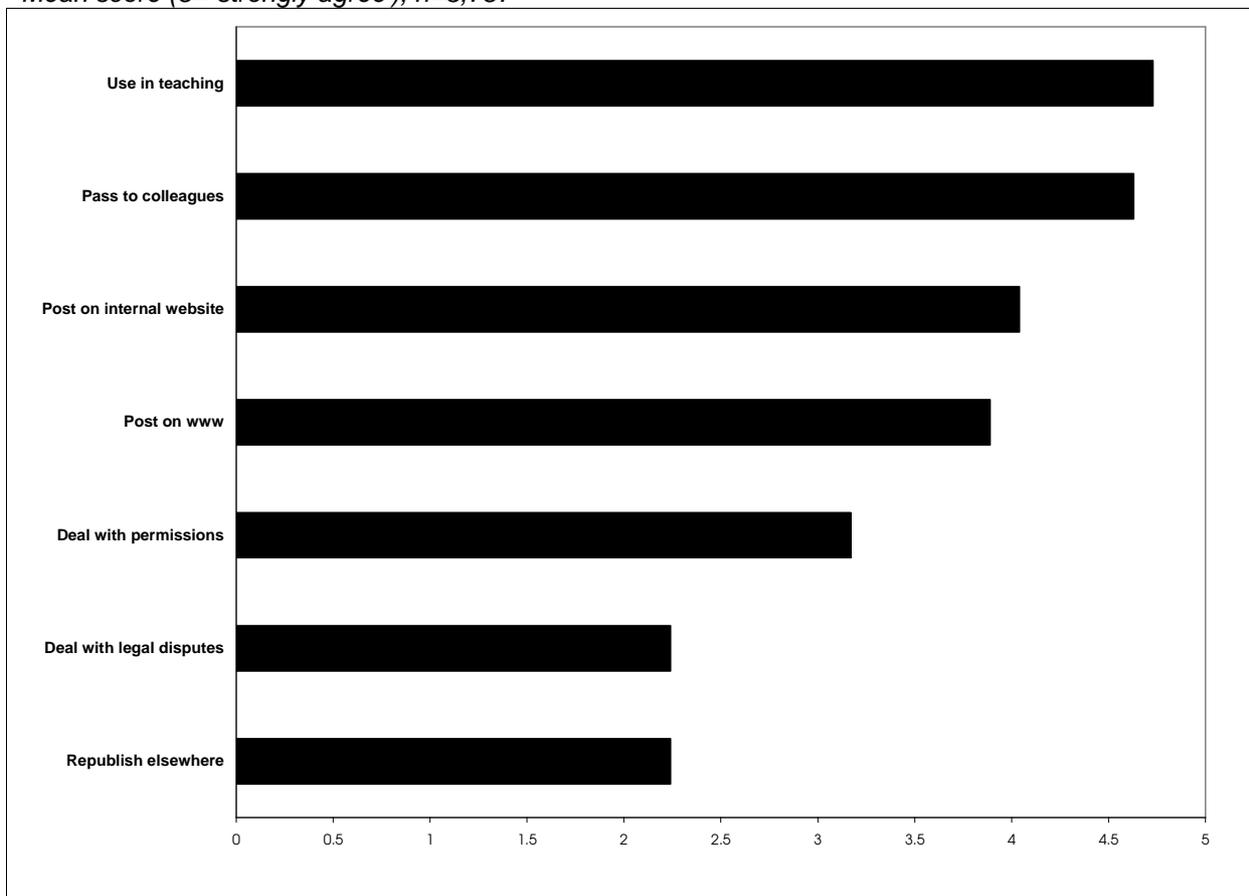
Several authors made the point that they felt copyright agreements to be far too restrictive and suggested alternative models: the most popular of which was that rights should be shared more equitably between author and publisher. Some felt that publishers' rights should be strictly time-limited, or that authors should license their intellectual property to the publisher, while retaining the copyright themselves.

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[14] χ^2=151.4, df=df, p=0.000
[15] χ^2=33.6, df=16, p=.006
[16] χ^2=104.8, df=34, p=.000

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> *I believe that the copyright for scholarly articles should be limited at most one year.*

Few authors spoke out in favour of the current copyright regime. One comment, highly pertinent to the open access debate, underlines the role of copyright in constructing information markets.

> *If economics were a more honest profession, there would be more studies devoted to documenting the inefficiency of copyrights than are devoted to showing gains from trade liberalization. The potential gains from eliminating copyright protection are far greater.*

B4 What are their views as readers?

While it is not of course true that all readers are authors, the reverse can rarely if ever be the case. In this section, we explore the perceptions of authors as readers and users of the journal literature.

A surprising finding of the survey is the very high level of reported satisfaction with access to the journals literature: 61% of authors said that this was currently `good' or `excellent', meaning that they have access to all or at least most of the materials they need (Figure 10). Only 10% of authors said that matters were `poor' or `very poor'. There are geographic variations here, as might be expected, with authors from Central America and Easter Europe reporting much lower levels of satisfaction.

Figure 10: Current access to the journals literature (Q16)
Mean score (5=`Excellent'), n=3,787
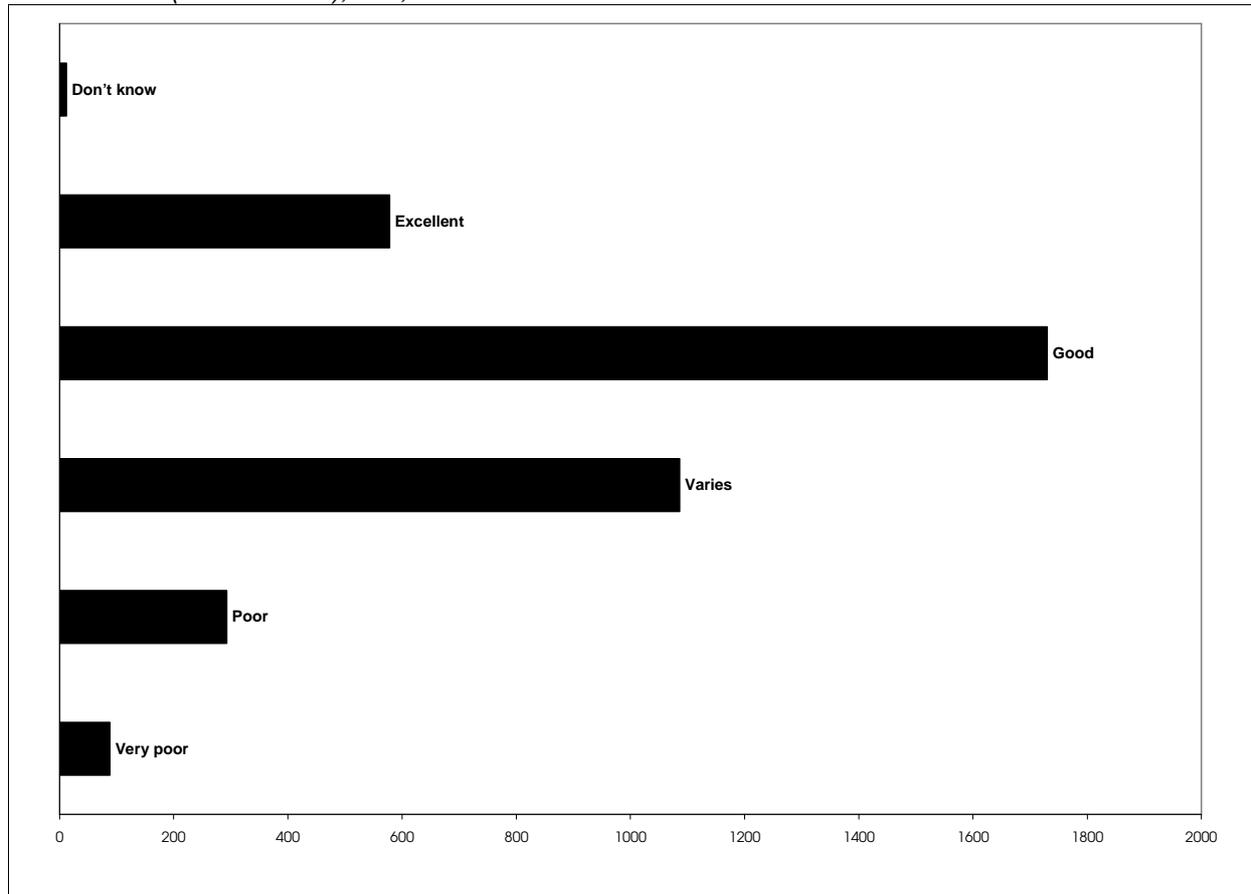
Although I'd be considered to be too young to be accused of nostalgia, I do miss the quiet reflection coaxed by a library, where each journal was an invitation to discover thoughts carefully prepared. In these electronic days, we seem to have lots of intellectual snacks but fewer healthy meals.

Journals are important, particularly if the information we produce needs to reach our neighbors who are missing out on contemporary Western technology. It is important that they are aware of what we produce because we live in the same global village. What happens there soon reaches us, e.g. SARS, latest chicken flu virus.

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Figure 11: Current access compared with five years ago (Q17)
Mean score (5=`Excellent'), n=3,787
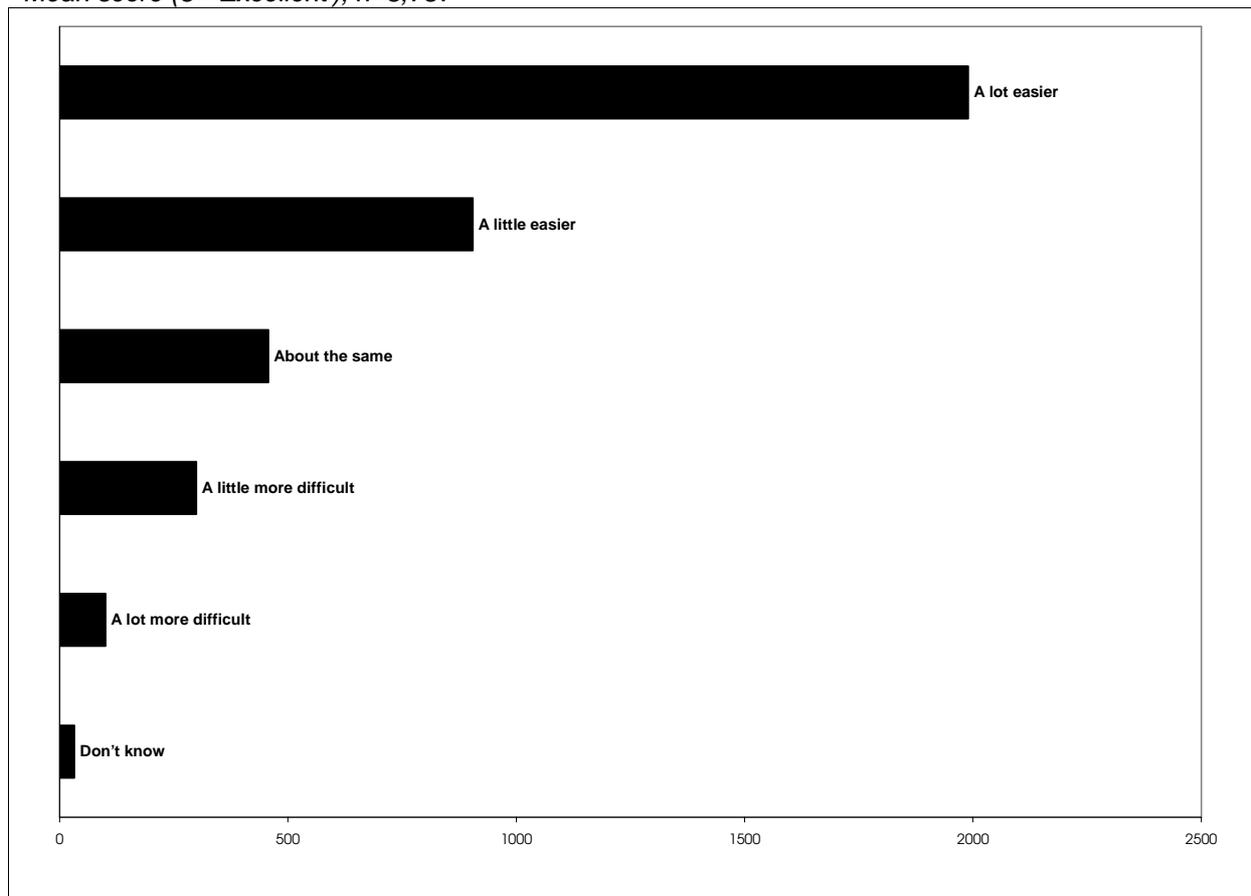
To set these findings into context, we asked authors how their perceived level of access today compared with that five years ago. Here, an even higher proportion, 76%, feel that journal access is a `lot easier' or a `little easier' than it was five years ago (Figure 11). There is much less geographic variation with respect to this question than for the previous one about current levels of satisfaction.

It is highly probably that the shift towards electronic delivery and the bundling of services has done much to foster a `feel good' factor amongst authors as readers.

Whether this situation will still obtain in a further five years' time, as expectations inevitably rise, is another question. This is a question that needs to be constantly kept under review.

# Part C: Authors' attitudes to emerging publishing models

C1   Self-publishing

Many authors make some of their materials available from their home page or Departmental web site. Since no obvious third party is involved in this form of information dissemination, we refer to it here as 'self-publishing'. Nearly a third (32%) of respondents have used the web in this way, while just over half (53%) said that they might consider doing so in the future. A small minority, 12%, dismissed this as a possibility.

Men are more likely than women to self-publish: 34% of men had compared to 25% of women[17]. Not surprisingly, younger authors are more likely to self-publish: 40% of those aged under 35 said yes compared to 33% of 36 to 45 year olds and 31% of those aged 46 and over[18]. About a third (31%) of those aged over 65 said that they had no intention compared to an expected value of about 13%.

Figure 12: Self-publishing on www (Q8)
Numbers of respondents, n=1,223
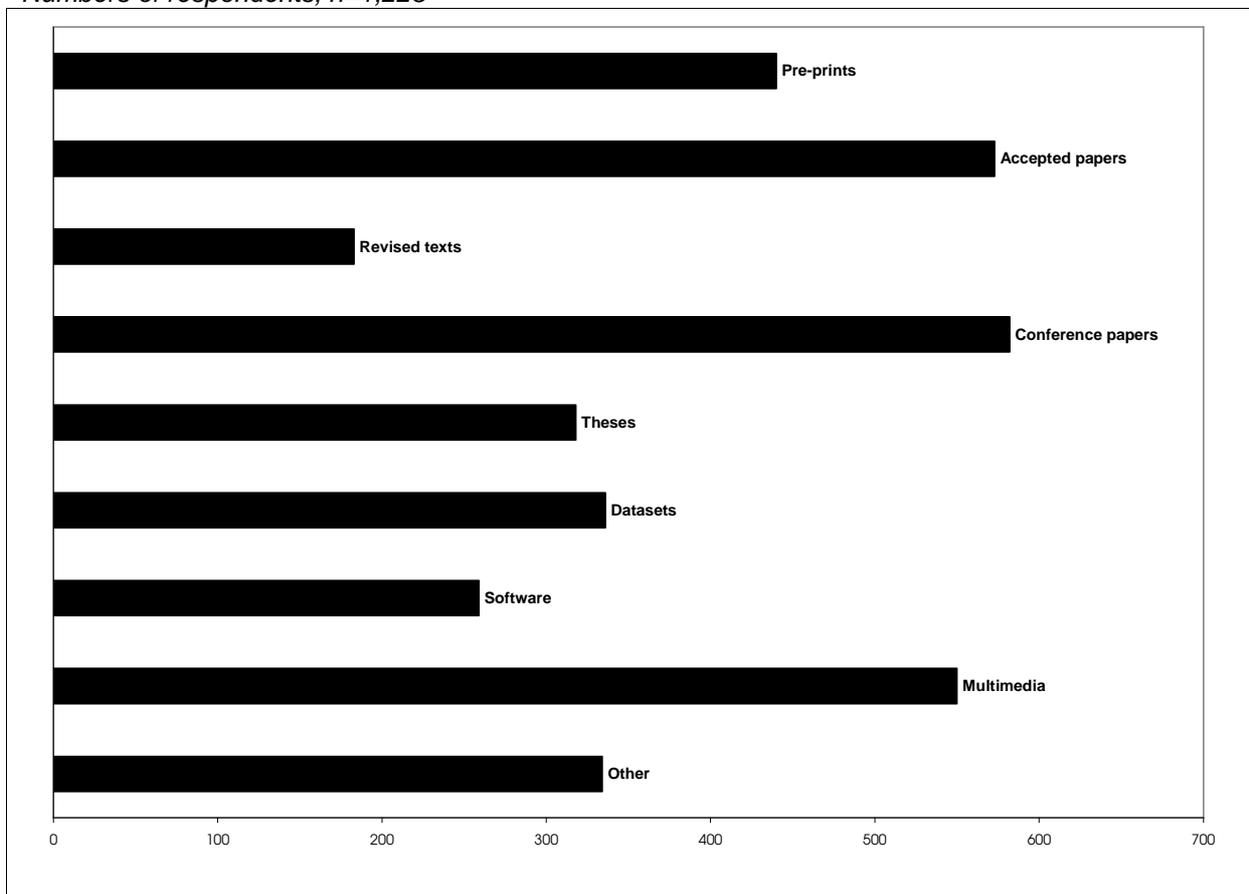
Respondents based in North America (41%) or Western Europe (36%) were likely to have said that they had while those based in Africa (13%) and Asia (20%) were least likely to have done so. Those authors most likely to put material on the web were those publishing in computer science, economics and business, mathematics, and physics and astronomy.

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[17] χ^2= 25.1. df=3, p=0.000
[18] χ^2=91.8, df=10, p=0.000

The most popular formats were conference papers (48%), papers that have been accepted for publication (47%) and other creative works, like photographs, audio or video (45%). There was relatively little interest in publishing the revised texts of previously published work with comments (15%).

The limitations of this mode of dissemination are as obvious as the attractions, especially when considered in relation to authors' previously disclosed preference for narrowcast communications:

> *I have self-published in the past but found the selling tiresome. I have disposed of all my intellectual property rights to publishers now …*

Several authors made the suggestion that a nominal charge could be made to help them to self-publish their copyrighted works legitimately:

> *I would like to suggest to allow the authors of a paper (for a small fee between $20-$150) to make the reprint accessible on their web site and to be allowed to promote it with e-mail.*

C2   Institutional repositories

As understood here, an `institutional repository' is a collection of scholarly materials in digital form that is managed—at an institutional level—by a research community, typically a university or a sectoral grouping. Researchers can deposit materials in these repositories, subject to copyright, with the host institution providing the infrastructure for these materials to be properly organized, archived and disseminated.

Just about a fifth (21%) of respondents said that they had deposited scholarly material in an institutional repository, just over half (55%) said that they might do so in the future while 15% said that they had not and further had no intentions to (Figure 16). More men than women said that they had deposited scholarly material in an institutional repository 23% compared to 15% of women[19]. Younger authors were more likely to say yes: 28% of those aged under 35 said yes compared to 21% of 36 to 45 year olds and 23% of those aged 46 and over[20]. No significant geographic effect was evident. Those publishing in computer science, mathematics and engineering were the most likely to have published their work via an institutional repository.

Attitudes to publishing in purely electronic formats are mixed:

> *I strongly believe that classical print journals will disappear – at best they will survive as an appendix to an electronic journal / repository. The IT issues with large, searchable, fully indexed and cross-referenced archives are currently being worked out and reasonable solutions should appear within a decade or so.*

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[19] χ^2=21.5, df=3, p=0.000
[20] χ^2=52.6, df=10, p=0.000

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I suppose the biggest fear I have in the concept of centralized archiving of electronic manuscripts might be summarized in the film `Silent Runner'. When the centralized money ran out, the archives were destroyed …

Figure 13: Publishing in institutional repositories (Q10a)
Numbers of respondents, n=804
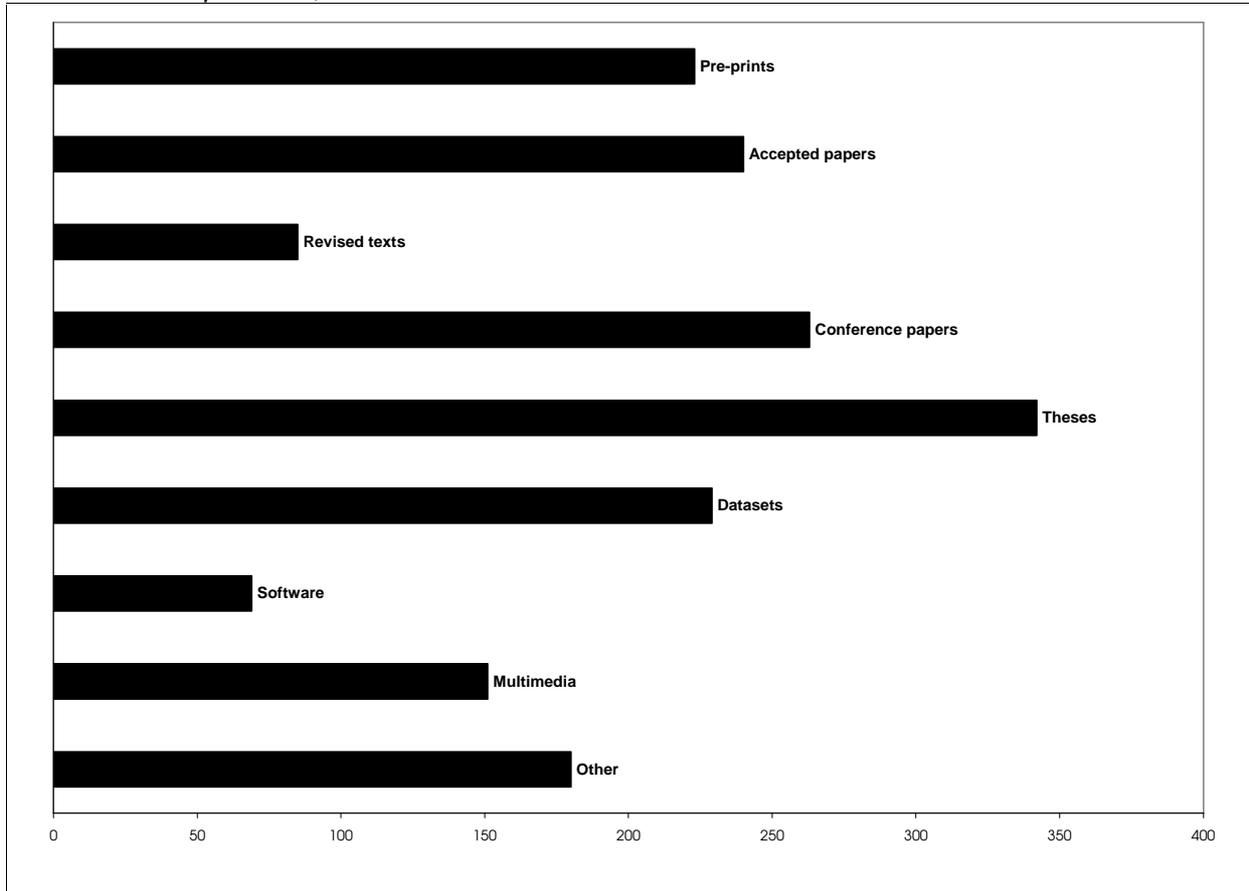
C3   Open access publishing

`Open access' in its broadest and most useful meaning refers to scholarly information that is free at the point of use, typically on the web. This is typically the situation with respect to materials that are self-published or institutionally archived.

For the purposes of this survey, however, we use the term in a narrower context to refer to journals that *"use a funding model that does not charge readers or their institutions for access. In an open access journal, readers are able to read, download, copy, distribute, and print papers and other materials freely from the web.   The costs are met by charging authors for publishing services provided by a third party".*

This reverses the logic of the traditional subscription journal where authors gain access to the system 'for free' while the reader, or their proxy, the acquisitions librarian, pays. Commercial open access publishers, like *BioMed Central,* offer all the services associated with a traditional publisher: peer-review, indexing and searching capabilities and helping authors to target and enlarge their readership through marketing and promotional activities.

> *I strongly feel that the open access movement has the potential to greatly improve scientists' access to research and thus greatly accelerate the process of discovery. This will serve the greater good of scientists, patients and society. I also do not think that traditional publishers will be destroyed by the change in publishing models if they adapt to the new conditions. The total amount of profit to be made in the industry may shrink, but there will always be an opportunity to run successful businesses in this area.*

The findings of ciber's survey suggest strongly that the passionate debates about publishing business models taking place in the pages of *The Bookseller* and the *Times Higher* are of little concern to the majority of senior active researchers. More than a third (34%) admitted they know `nothing at all' about open access journals while 48% said they `knew `little' (Figure 14). This is particularly surprising in the context of a self-selecting sample of authors who felt sufficiently minded to complete a questionnaire framed in terms of new developments in journal publishing.

Figure 14: Knowledge and awareness of open access publishing (Q10b)
Numbers of respondents, n=3,787
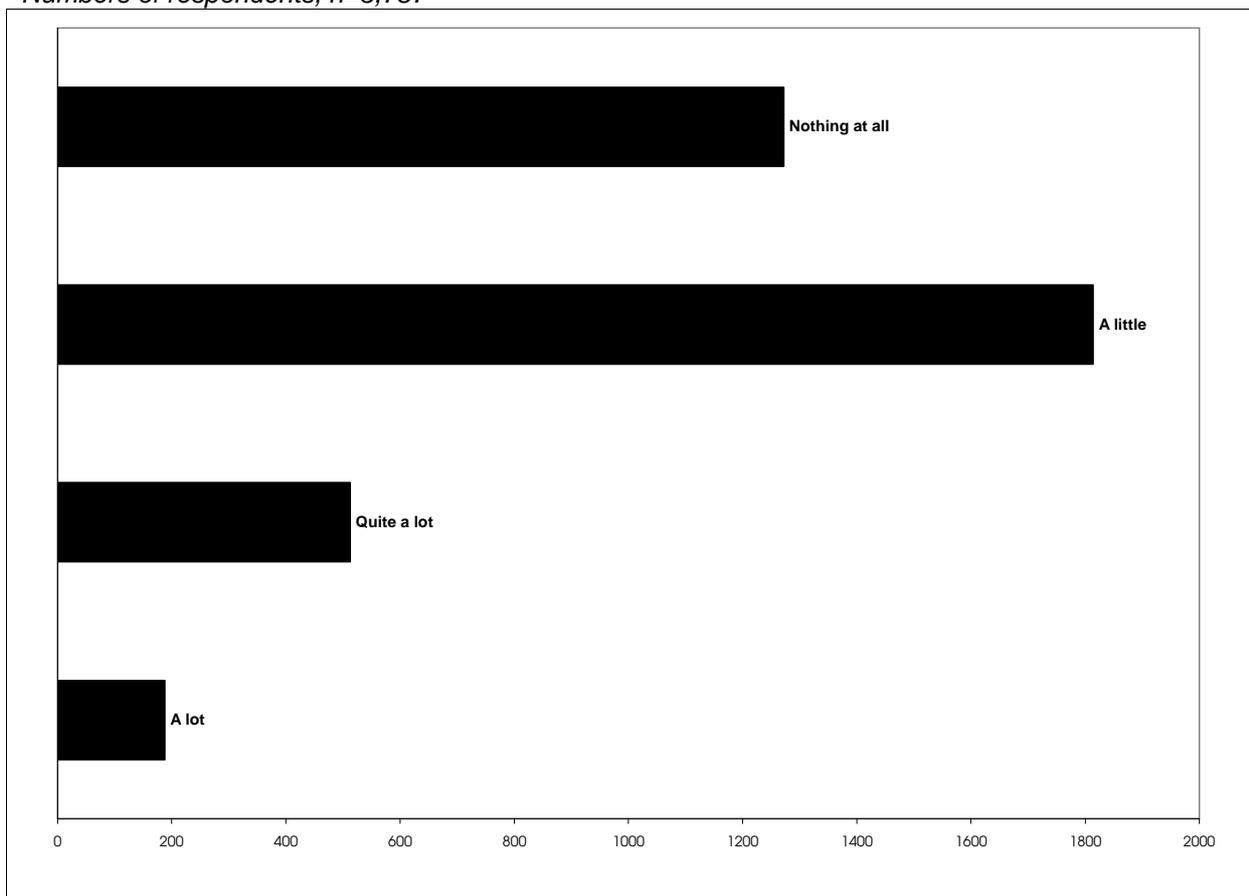
Men[21] were more likely to say they knew something about open access (20% said they knew either `a lot' or `quite a lot', compared with 16% of women). Researchers in government and commercial organisations had the least knowledge: only 10% said that they knew either `a lot' or `quite a lot' about it compared to 19% of universities and 23% of medical schools.[22]

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[21] χ^2=9.0, df=3, p=0.03
[22] χ^2==55.6, df=24, p=0..000

scholarly communication in the digital environment: what do authors want?

Relatively few authors in the survey (11%) had had any previous experience of publishing in an open access environment.

These findings point to an urgent need to raise awareness of new and emerging business models more widely across the scholarly community so that opinions can sharpen and a proper debate take place.

We then asked respondents about their views and perceptions of the open access model, as we defined it above, having excluded those who had previously indicated that they knew `nothing at all' about the topic.  When prompted, they found the idea of reader open access very appealing.   In fact, authors' perceptions of `commercial' open access seem to be generally positive, with unrestricted access to scholarly information being the value associated by far the most strongly with this form of publishing. Typically, respondents seem to associate the idea of open access with reasonably high quality, well indexed electronic materials that are free at the point of use. *They do not strongly associate open access with a potential business model in which the costs of the system are borne by the authors themselves.*   Nor do they seem to have many significant reservations about archival functions and the continuity and preservation of the scholarly record in a predominantly electronic environment (Figure 15).

Figure 15: Concepts associated with open access (Q12)
Mean score (4='Very strongly agree'), n=2,515
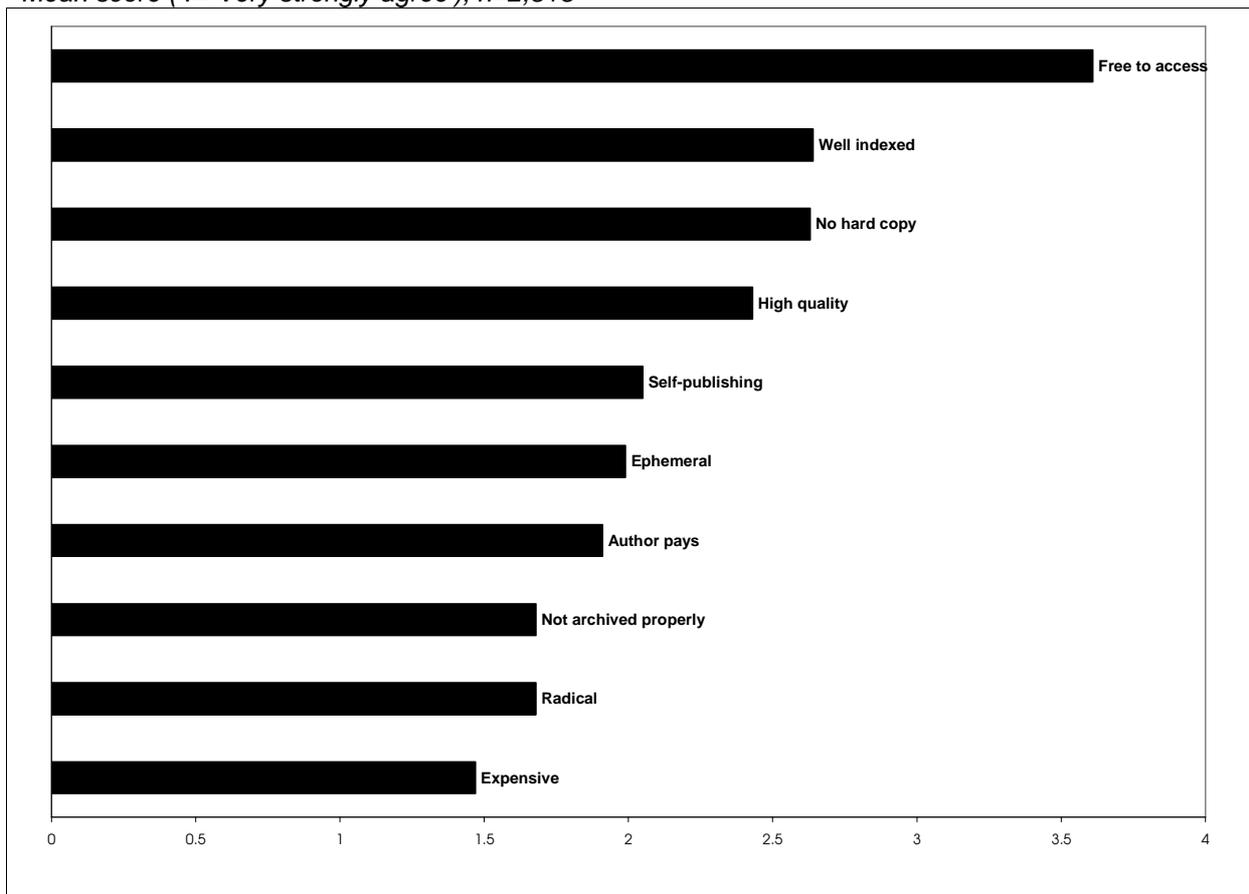
The views of those authors with some actual experience of open access publication, as opposed to simply claiming some knowledge of the subject, are telling, however. They are very much more likely than the population as a whole to associate open access with

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- high quality[23]
- well-indexed[24]
- cutting edge[25]

and to disagree with the proposition that open access journals are associated with

- author pays to publish[26]
- ephemeral[27]
- self-publishing[28]
- no hard copy journal[29]
- not archived properly[30]
- no career advantage for authors[31]

These findings should of course be tempered by the fact that many authors admit that they know relatively little about the open access movement.

However, perceptions are critically important at this early stage in the debate, and the overall tenor of the views expressed here towards on open access is definitely positive.

Respondents were asked to offer their views on what the future in an open access world might look like (Figure 16).

---

[23] χ^2=118.21, df=4, p=0.000
[24] χ^2=68.66, df=4, p=0.000
[25] χ^2=23.75, df=4, p=0.000
[26] χ^2=38.64, df=4, p=0.000
[27] χ^2=28.80, df=4, p=0.000
[28] χ^2=31.78, df=4, p=0.000
[29] χ^2=71.12, df=4, p=0.000
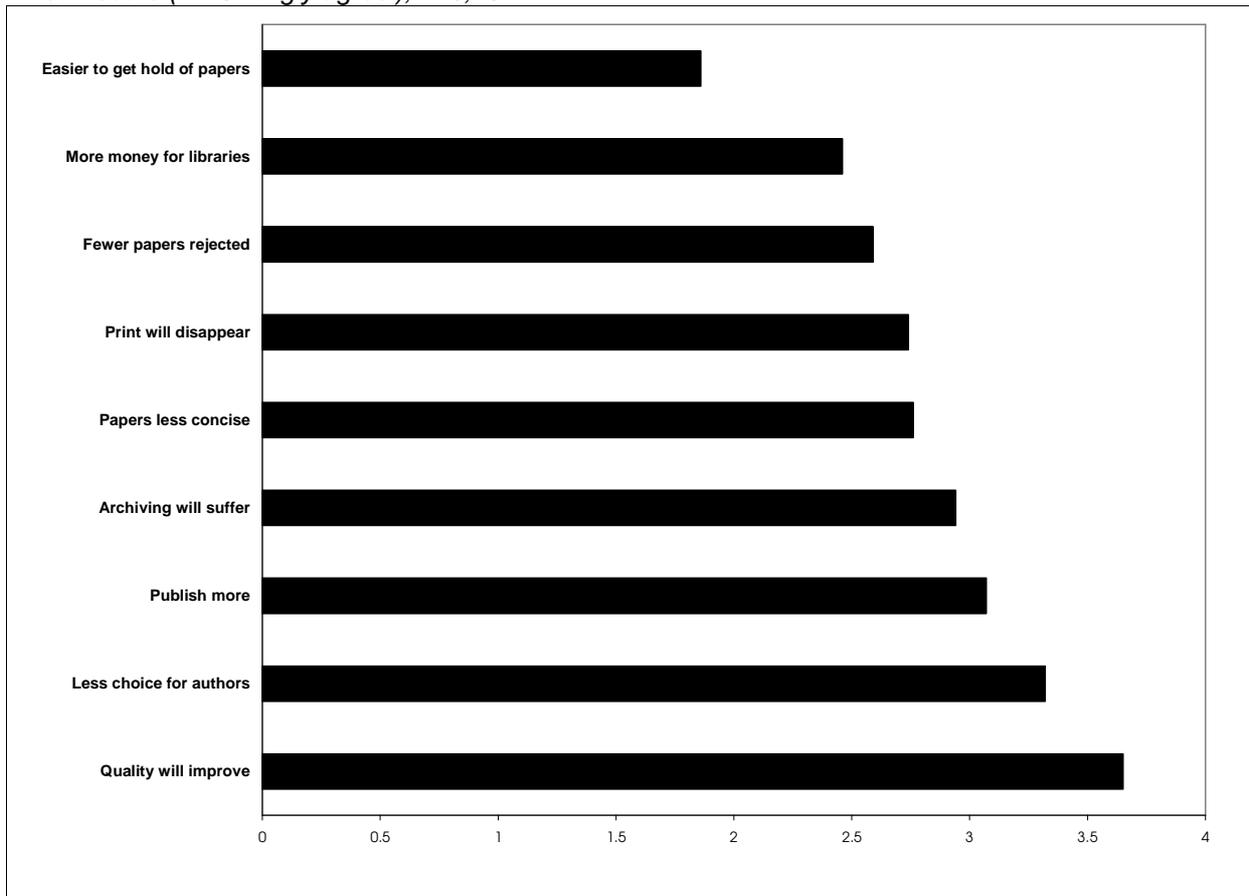[30] χ^2=33.54, df=4, p=0.000
[31] χ^2=42.72, df=4, p=0.000

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Figure 16: The future in an open access world (Q15)
Mean score (1=`Strongly agree'), n=3,787

Authors seem to hold strongly to the view that a move to open access systems would yield benefits in terms of easier access to journal articles and that libraries, freed of costly subscriptions, would have more money to spend (Figure 8). The view that access would become easier tends to be more strongly held by younger authors[32] and by researchers in Africa and Asia[33] .

This question elicited some perceptions of open access that are perhaps less positive: authors felt that fewer papers would be rejected (while simultaneously tending to the view that authors would not publish more, a finding which needs closer examination) and that papers might well become less concise as market power shifts from the reader to the author. There was little support for the proposition that the quality of papers would improve in an open access regime.

Authors with open access experience tend to believe, more than the rest, that:

- authors will publish more[34]
- quality of papers will improve[35]
- publishers will improve their services to authors[36]
- it will be easier to get hold of papers[37]

---

[32] χ^2=30.7, df=10, p=0.001
[33] χ^2=26.6, df=12, p=0.009

[34] χ^2=25.25, df=5, p=0.000
[35] χ^2=57.22, df=5, p=0.000
[36] χ^2=28.64, df=5, p=0.000

scholarly communication in the digital environment: what do authors want?

- open access journals are expensive[38]

and to disagree that:

- papers will become less concise[39]
- fewer papers will be rejected[40]
- authors will have less choice over where they publish[41]

Once again, age is a major determinant of attitudes:

Younger authors (under 35) are less likely to agree that open access means:

- no career advantage[42]
- authors will publish more[43]
- archiving will suffer[44]
- rejection rates will go down[45]

and to agree that:

- the quality of papers will improve[46]
- libraries will have more money to spend[47]
- it will be easier to get hold of papers[48]

While they are generally receptive to aspects of the commercial open access model, respondents seem to want free access at both ends of the chain: as authors and as readers.

A preliminary factor analysis of author opinions (Table 2) suggests that there are a number of attitudinal subgroups within our sample of open access authors, in respect of where they think open access is heading. Factor analysis is a statistical technique that helps to understand the underlying structure of a set of survey responses by identifying a small number of general factors, like `diet' or `lifestyle' in a medical survey, that can be inferred from more detailed information about what patients said they had for breakfast and what time they went to bed.

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[37] χ^2=19.89, df=5, p=0.001
[38] χ^2=30.20, df=4, p=0.000
[39] χ^2=38.71, df=5, p=0.000
[40] χ^2=34.32, df=5, p=0.000
[41] χ^2=19.82, df=5, p=0.001
[42] χ^2=25.67, df=5, p=0.000
[43] χ^2=27.97, df=5, p=0.000
[44] χ^2=19.49, df=5, p=0.002
[45] χ^2=30.17, df=5, p=0.000
[46] χ^2=28.34, df=5, p=0.000
[47] χ^2=19.27, df=5, p=0.002
[48] χ^2=18.82, df=5, p=0.002

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Table 2: Factor analysis

	Explains 54% of variance		
	22%	21%	11%
Authors will publish more	.368	.590	
Authors will have less choice over where they publish	.714		
The quality of papers will improve		.747	-.352
Fewer papers will be rejected	.708		
Publishers will improve their services to authors		.642	-.326
Papers will become less concise	.735		
Libraries will have more money to spend		.569	.318
Print journals will gradually disappear			.800
It will be easier to get hold of papers		.607	
Archiving will suffer	.665		

The first group (`opportunists'), although they have personally published in an open access medium, are very negative about this form of publishing. They feel strongly that it will result in authors having less choice where they publish, that fewer papers will be rejected, that papers will become less concise, and that archiving will suffer.

The second group (`utopians') believes that open access will lead to publishers improving their services to authors, and believe that the quality of papers will improve, libraries will have more money to spend and feel that it will be easier to get hold of papers. They also believe that open access will result in more papers being published.

The third group (`pessimists') thinks that open access will result in the death of the printed journal. They believe (weakly) that open access will result in libraries having more money to spend, but they do not think that the quality of papers will improve nor that a shift to open access will result in improved services to authors.

Only a relatively small minority (38%) of the authors surveyed had had any prior experience of paying a publisher to cover the costs of page charges, colour reproductions, etc. This issue is highly sensitive, judging from many of the comments made both in principle ("information should be free", "a parody of the ethos of science") and in practice ("author charges move the system towards one more akin to advertising").

When asked to speculate how much they would be prepared to defray the costs of publishing an article in the *best* open access journal in their field, almost half (48%) indicated that they would not accept such a business model under any circumstances (Figure 17).

Figure 17: Preparedness to pay author charges (Q14)
Numbers of respondents, n=3,787
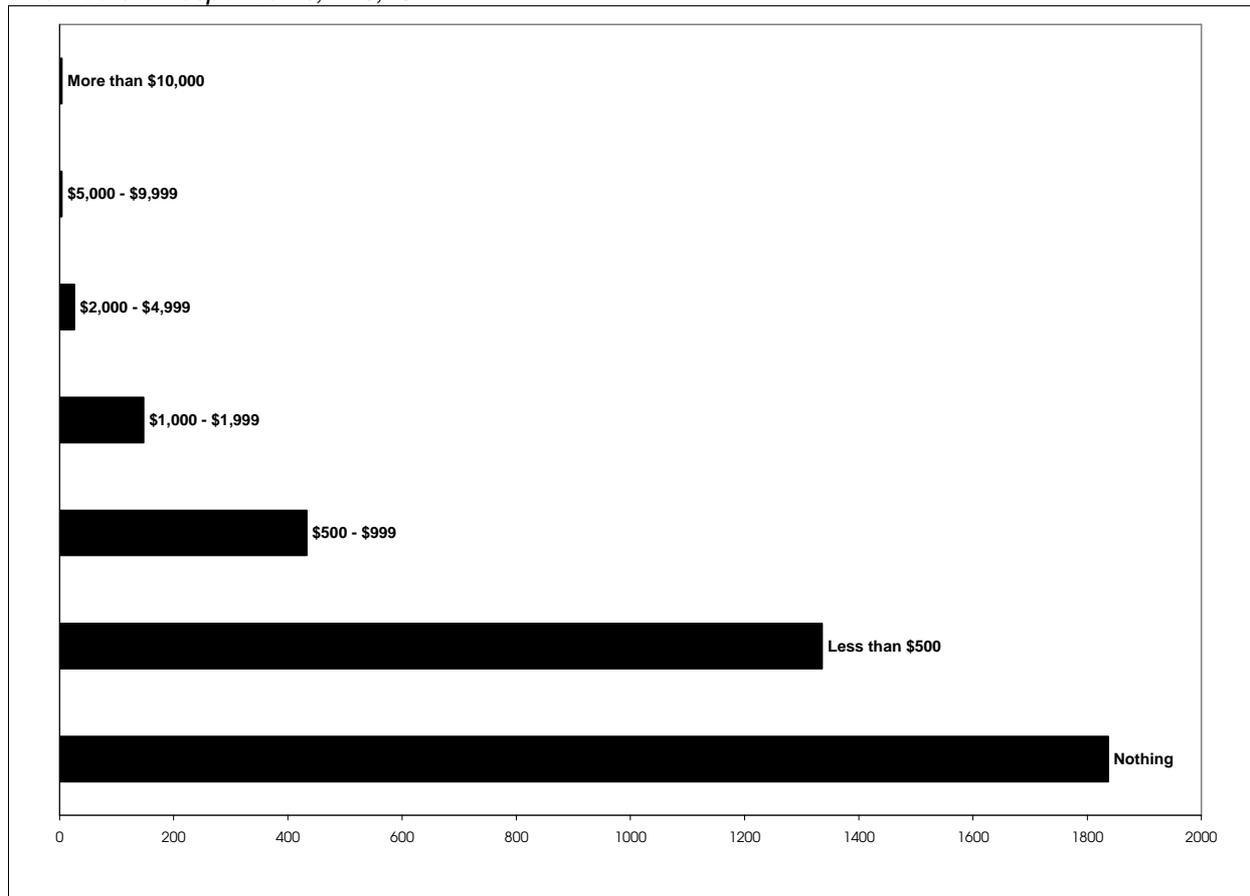
Even if it were assumed that authors are prepared to pay charges at the upper end of the ranges indicated above, the data here support the view that an optimistic global average estimate of authors' willingness to pay may lie somewhere around US$ 400 per article. This is of course a hypothetical and somewhat artificial exercise, but may be useful in signalling authors' early views on this critical issue. No difference was evident between younger and older authors in this respect.

The scales used in the survey would appear, inadvertently, to have caused some bemusement:

$500 is roughly my annual research allowance.

As an author I would be willing to pay at most $200 to publish a paper. I answered that I would not be willing to pay anything because the upper level of $500 on the lowest response seems far too high.

I would expect open access journals to be very inexpensive to produce. Thus, I thought your question about the range of prices charged to authors to be rather odd – I would expect prices to be on the order of $100-$300, not $500-$5,000!

Outright hostility.

If authors have to pay this will restrict the views presented in journals to a controlling elite.

And appeals to higher realms of justice.

I believe academic journals should be financed by taxes on multinational corporations administered by some global institution like the UN or World Court and be freely available on the internet, globally in perpetuity. I strongly support a global ban on privately owned and run journals, including national organisations. All journals should be owned by the whole human race.

There is little evidence here of much stomach on the part of authors to pay author charges at anything remotely near the rates that some commercial publishers claim are necessary for a long-term sustainable business model to develop. In fact, there is outright hostility.

This is a disturbing finding.

scholarly communication in the digital environment: what do authors want?

Part D: Questionnaire

Content of e-mail message to survey respondents

You are invited to take part in this survey which is being undertaken at a time of uncertainty in the world of scholarly journal publishing. New business models are being proposed, experimented with, and debated. Change is in the air.

The findings of this survey will give a powerful voice to authors to express their preferences and concerns. The results will be widely disseminated and will help to shape the debate about new publishing models by providing key decision makers in government and industry with the facts.

The survey is being conducted by the Centre for Information Behaviour and the Evaluation of Research (ciber), an independent think tank in the field of information science at City University London. You have been selected because you have published recently. Your response is important to ensure we achieve a good representation of the scholarly community.

All replies are confidential and will only be used in combination with those of other participants. You can read further information about our survey site by clicking here.

If you have any concerns about this survey not being genuine, or would like further information about ciber, please contact Dr Ian Rowlands on ir@soi.city.ac.uk.

If you wish, you will be able to view the main findings from the survey at the end of February at http://www.soi.city.ac.uk/organisation/is/research/ciber

The questionnaire should take you around 20 minutes to complete; please bear with us, your views are very important and, without them, the publishing community will not be able to take note of what their most valuable stakeholders, their authors, really want out of the system.

To begin the survey, please click on the link below or you can copy and paste this link to your browser address box and then press [enter].

Please do not double click on this link as it may affect the starting procedure of this survey.

You will be able to see how other authors responded to a key question about why they publish where they publish at the end of the survey in real time. If you have any problems or technical issues with the questionnaire please email: cibersurvey@nopworld.com

You have received this e-mail in the genuine belief that its contents would be of interest to you. To not receive these messages from ISI(R) or other carefully selected companies, please click on this link.

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About you as an author: what do you want from the journals system?

In this first section we hope to find out what you want as an author from the journal system. To avoid over-generalization, we ask that you think about your latest published paper.

1. What was the title of the last journal in which you published?

Enter full journal name

Refused

2. How attractive or unattractive to you were the following factors when deciding to publish in that particular journal?
Tick one box in each row

Very Unattractive / Quite Unattractive / Quite attractive / Very attractive / Don't know

Speed of refereeing
Standing of the editorial board
Impact factor
The price of the journal
Size of readership
The right kind of readership
Available in an electronic version
Available as conventional hard copy
Easy to get accepted
Coverage by abstracting services

**YOU WILL BE ABLE TO SEE HOW EVERYONE ELSE
ANSWERED THIS QUESTION AT THE END OF THE SURVEY**

3. To what extent do you agree or disagree that when you published your paper, you hoped that it would be read by the following groups of readers?

Tick one box in each row

Strongly Disagree / Disagree a little / Neither agree nor disagree / Agree a little / Strongly Agree/ Don't know

Researchers in your own specialty
Researchers in other areas
Those involved in teaching and learning
Your funding body
Policy makers / opinion formers
The general public

4. When you submitted your paper, how active an interest did you take in the copyright implications of publishing with that particular journal?

Tick one box only

I took a detailed interest
I took some interest
I took no interest

scholarly communication in the digital environment: what do authors want?

5. More generally, to what extent do you agree or disagree that you would like to be able to use your published research in the following ways?

Tick one box in each row

Strongly Disagree / Disagree a little / Neither agree nor disagree / Agree a little / Strongly Agree / Don't know

Republish it elsewhere in its entirety
Personally deal with any permission requests
Post it on an internal web site
Post it on the world wide web
Use it freely in teaching and learning
Deal personally with any legal disputes when copyright is infringed
Pass on in electronic form to a colleague or other interested party

6. Have you ever published a paper in an electronic journal with no print equivalent?

Tick one box only

Yes, I have
No, but I may in the future
No, nor do I intend to do so
I don't know

7. Have you ever made any scholarly materials that you have created available from your home page or web site?

Tick one box

Yes, I have   GO TO QUESTION 8
No, but I may in the future   GO TO QUESTION 9
No, nor do I intend to do so   GO TO QUESTION 9
I don't know   GO TO QUESTION 9

8. What kinds of materials have you made available in this way?

Tick as many boxes as apply

Pre-prints of papers that have been submitted for publication
The text of papers that have been accepted for publication
Revised texts of published work with comments
Conference papers
Doctoral theses and dissertations
Datasets arising from projects
Computer software
Other creative works (e.g. photographs, video, audio)
Other

About you and `institutional repositories'

An `institutional repository' is a collection of scholarly materials in digital form that is managed—at an institutional level—by a research community, typically a single university. Researchers can deposit materials in these repositories, subject to copyright, with the host institution providing the infrastructure for these materials to be properly organized, archived and disseminated.

9. Have you ever deposited any scholarly materials that you have created in an institutional repository?

Tick one box

Yes, I have   GO TO QUESTION 10
No, but I may in the future   GO TO QUESTION 11
No, but I may in the future   GO TO QUESTION 11
No, nor do I intend to do so   GO TO QUESTION 11
I don't know   GO TO QUESTION 11

10a. If so, what kinds of materials have you deposited in this way?

Tick as many boxes as apply

Pre-prints of papers that have been submitted for publication
The text of papers that have been accepted for publication
Revised texts of published work with comments
Conference papers
Doctoral theses and dissertations
Datasets arising from projects
Computer software
Other creative works (e.g. photographs, video, audio)
Other

About you and `open access' journals

In this section we want to explore your awareness and attitudes to `open access' journals.

10b. How much do you know about 'open access' journals?

Tick one box only

A lot
Quite a lot
A little
Nothing at all   GO TO QUESTION 13

11. Have you ever published a paper in an open access journal?

Tick one box only

Yes
No
Don't know

12. How strongly do you associate the following characteristics with open access journals?

Tick one box in each row

Do not associate / Associate a little / Quite strongly associate / Very strongly associate / Don't know

Free to access
Author pays to publish
High quality
Ephemeral
Self-publishing
No hard copy journal
Radical
Not archived properly
Well indexed

ciber

Expensive
Cutting edge
No career advantage for authors

13. Have you ever paid a publisher to have a paper published?

Tick one box only

Yes
No
I don't know

Open access journals use a funding model that does not charge readers or their institutions for access. In an open access journal, readers are able to read, download, copy, distribute, and print papers and other materials freely from the web. The costs are met by charging authors for publishing services provided by a third party.

14. If all journals were open access, what do you consider would be a reasonable payment to have your paper published *in the best journal in your field?*

Tick one box only

I'm not prepared to pay anything
Less than US $ 500
US $ 500 - 999
US $ 1,000 – 1,999
US $ 2,000 – 4,999
US$ 5,000 – 9,999
More than US $ 10,000

15. To what extent do you agree or disagree with the following statements about open access journals?

Tick one box in each row

Strongly disagree / Disagree a little / Neither agree nor disagree / Agree a little / Strongly agree / Don't know

Authors will publish more
Authors will have less choice over where they publish
The quality of papers will improve
Fewer papers will be rejected
Publishers will improve their services to authors
Papers will become less concise
Libraries will have more money to spend
Print journals will gradually disappear
It will be easier to get hold of papers
Archiving will suffer

About you as a reader

In this section we are going to ask you some questions about your satisfaction with the current journals system as a reader.

16. How would you describe your current level of access to the journal literature?

Tick one box only

Very poor: I always have great difficulty getting the journals I need
Poor: I frequently have difficulty getting the journals I need

Varies: I sometimes have difficulty getting the journals I need
Good: I have access to most of the journals I need
Excellent: I have access to all the journals I need
Don't know

17. How does your current level of access to journal papers compare with 5 years ago? Would you say that access has become…

Tick one box only

A lot more difficult / A little more difficult / About the same / A little easier / A lot easier / Don't know

About you and your job

In this section we need to ask a few more questions so that we can determine whether authors' views are shared across the whole research community or whether there are significant differences of opinion.

18. Are you

Female
Male

19. Where do you work?

Tick one box only

Africa
Asia
Australasia
Central America
Eastern Europe
North America
South America
Western Europe

20. What kind of organisation do you work for?

Tick one box only

College
Commercial organisation
Government
Hospital
Medical School
Research Institute
Self-employed (e.g. consultant)
University
Other

21. Which of these broad subject headings best describes the content of your *latest* published paper?

Tick one box only

Agriculture
Arts and humanities
Biochemistry, genetics and molecular biology
Biological sciences
Chemistry / chemical engineering

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Computer sciences / IT
Earth and planetary sciences
Economics / business and management
Engineering and technology
Environmental sciences
Immunology and microbiology
Materials science
Mathematics
Medicine / allied health / veterinary science
Neuroscience
Pharmacology, toxicology and pharmaceutics
Physics and astronomy
Social sciences

22. What is your age range?

Tick one box only

Under 26
26-35
36-45
46-55
56-65
Over 65
Refused

23. How many refereed journal papers have you written or co-written?

Enter the numbers in each box

… in the past three years?   Don't Know / Not Sure
…so far in your career? Don't Know / Not Sure

24. Which of these roles, if any, have you undertaken in the past year?

Tick as many boxes as apply

Author of journal articles
Referee for journal articles
Editorial board member
Journal editor
None of these

Thank you

Thank you for taking part in this important survey: your opinions are greatly appreciated ….

Finally, do you have any specific views or concerns that you would like to bring to our attention regarding copyright, institutional repositories, journal pricing, open access, self-publishing or the design of this questionnaire?

Enter your comments
No further comment

Here are results for all responses to the question about factors taken into consideration when publishing.