JISC Disciplinary Differences Report

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Introduction

Objectives of study

The main objectives for this study were to:

- Inform JISC of the needs of academic researchers in different disciplines for information resources
- Help JISC to understand the barriers and opportunities facing researchers both in access to research resources and in publishing their work
- Help JISC to understand the implications for the Research Assessment Exercise.

Project team

The project was carried out by a team comprising Sue Sparks and Hugh Look, consultants from Rightscom Ltd, Jill Taylor-Roe Dr John Fitzgerald of the University of Newcastle, Professor Charles Oppenheim of Loughborough University and Dr Valerie Bence, until recently a postgraduate student at Loughborough University. The project was managed by Hugh Look. Alain Renaud of Rightscom provided technical support.

Methodology

The main effort was committed to a web-based survey, answered by 780 UK research academics in a wide variety of institutions and departments. All the RAE Units of Assessment were covered by the responses. This forms the basis of the main body of the report.

The questionnaire was designed by Rightscom with advice from the other participants, and tested and evaluated by academics at the University of Newcastle before use. A workshop was held at the University of Newcastle after the survey ended to discuss some of the findings. Loughborough University provided background information on the RAE and provided general advice on issues throughout the study.

The survey was supplemented by desk research carried out by Rightscom and Loughborough University, and with information drawn from Dr Bence's Ph.D. thesis.

Rightscom managed the project and wrote this final report.

Deliverables

The primary project deliverable is this report, which includes a detailed analysis of the survey and much background information from the desk research. Raw data from the survey is also being made available to JISC in the form of both Excel spreadsheets and data from the SPSS statistical analysis package.

Outcome

The survey identified several important areas in which preferences and behavior vary between disciplines. These include both access to different types of information resources and the channels for communicating research results. However, some areas show less differences in practice between disciplines than some commonly-stated assumptions suggest. It also indicates the impact of the RAE on academics' publishing practice and academics' attitudes to alternative forms of publication.

In addition to the key conclusions, the survey also provides detailed information on the behaviour and preferences of academics across a wide range of different disciplines which may be able to help JISC with decision-making on resource provision as well as strategy.

Executive Summary

Overview and aims

1. The major developments taking place in scholarly publishing present researchers in the UK with many new opportunities and challenges.
2. Differences between disciplines, both in terms of resources used and means of dissemination of results, are widely believed to be significant.
3. This report aims to provide a more factual basis to some of these assumptions through a survey of UK-based academic researchers

Relevant literature

4. There is an extensive literature on the subject of academic disciplines and on scholarly information-seeking behaviour and attitudes and practices in scholarly communication
5. Some of the literature examines the practices of particular disciplines and postulates theoretical frameworks for understanding disciplinary differences
6. In recent years there have been some contributions stimulated by the possibilities of supplementary and alternative communication and publishing channels opened up by digital technologies and particularly the Internet.
7. These seek to analyse and explain differences in the propensity of different subject disciplines to embrace technologies and to use alternative publishing platforms
8. Several studies have found disciplinary differences in the use of e-resources
9. Other studies have found differences in the propensity of researchers in different fields to engage in self-archiving
10. Various frameworks have been put forward to place subject fields into categories, relative or absolute, according to the nature of scientific inquiry, collaboration patterns and cultural factors
11. These are helpful in framing useful questions and interpreting different behaviour patterns in subject fields
12. They have been used to suggest that different groups are likely to evolve characteristic ways of using Information and Communication Technologies
13. Specific research has been done recently by a member of the project team, analysing the composition of submissions to the RAE in 2001 by 10 Units of Assessment, spread across the disciplines
14. A recurring theme of this study is the impact of the RAE on the means of dissemination sought by UK researchers, in creating a dominant form in all subject disciplines - the journal article

The survey: overview

15. The survey was designed to test some of the more widespread assumptions about the ways in which subject discipline affects information-seeking behaviour and modes of communication and collaboration
16. We specifically sought to understand whether the resources provided by higher education institutions were differentially satisfactory for the different disciplinary groups
17. We also wanted to verify or otherwise the notion that it is difficult for interdisciplinary researchers and those in non-textual disciplines (art, design, drama, music etc) to find appropriate outlets for their research output
18. To provide some contextual information, we asked respondents to give their experience level and department size. A much higher proportion of the scientists (medical, biological and physical/engineering) were in departments of more than 15 researchers

Key findings: resources and information-seeking behaviour

19. In terms of the single most essential resource, what stands out is the importance of journal articles for the medical and biological sciences; the importance of e-prints (pre and post) in the physical sciences and engineering; the broader mix in social sciences and the particular importance of books in languages and area studies
20. The responses show that there is a broad spread of discovery tools in use, rather than an overarching reliance on search engines
21. Informal information-seeking is more likely to be face-to-face, by telephone or by email rather than using other technologies. Reading email newsletters was most popular among arts and humanities and social science respondents
22. Most respondents in three of the five main groupings did not report problems in gaining access to research resources. Lack of reported problems was correlated with the availability of a research assistant of some kind, and this was more likely in the sciences
23. However, in two of the five groupings, a majority reported problems and in the rest the minority was large
24. The main problems were in gaining access to journals, conference proceedings, books and databases, but significant groups also had problems getting funds to travel to access resources and also getting access to proprietary information
25. There was no difference across disciplines in relation to journal articles as a problem, but others were more discipline-specific

Key findings: communication, collaboration and publishing

26. The second overarching theme of the survey was research collaboration and communication, informal and formal
27. In terms of informal collaboration and communication, the results partially confirmed some of the theoretical typologies, in that ‘harder’ disciplines were more likely to collaborate in the research process, and be prepared to use less formal methods to disseminate results, while ‘softer’ ones were more likely to

communicate work-in-progress informally but rely on more formal means of dissemination

28. Means of dissemination are highly varied across disciplines, with certain fields being much more likely to produce monographs and others patent applications, software or exhibitions, as might be expected. The journal article (in all forms – pre-print, post-print and final publication), book chapter and conference were shared across fields
29. The survey results show that the consensus among most Units of Assessment is that journal articles have the biggest influence on RAE score. However, monographs were chosen by almost as many respondents in arts and humanities and in language and area studies, as journal articles.
30. When asked about journal preferences, the biggest groups in all disciplines were most likely to think that the prestige of the journal is more important than the type
31. A majority in medical/biological sciences and in social science reported problems in disseminating results in preferred outlets, but not a majority in the other three groups
32. The biggest problems encountered in publication were pressure of space in highly-rated journals and slow speed of reviewing and decision making by journals
33. The volume of output differed across disciplines in terms of journal articles and conference proceedings, with the sciences producing more papers than arts and humanities or languages/area studies which were also grouped together, with social sciences in between
34. The degree of joint authorship followed the same patterns as the output volumes

Copyright and self-archiving: knowledge, attitudes and practice

35. Up to a quarter of researchers (with the highest percentages in social sciences and arts and humanities) do not know their copyright position in relation to journals or books
36. The overwhelming majority of researchers in all disciplines do not know if their university has an institutional repository
37. There is slightly higher awareness of subject-based repositories and this varied significantly between groups, with physical scientists having the greatest awareness
38. Depositing behaviour among those that are aware of repositories varied considerably with half of physical scientists depositing routinely in the IR against 18% of medical and biological scientists. The highest proportion of respondents depositing in subject archives was also among physical scientists (44%) but the lowest was in arts and humanities
39. There is a high level of awareness of current debates about open access across the board
40. The majority of researchers in all disciplines favour research funding bodies mandating self-archiving

Research assessment, peer review and innovation in scholarly communication

41. The vast majority of researchers in all disciplines think the RAE skews both the practice and dissemination of research
42. A surprisingly large minority of scholars think traditional peer review is ripe for replacement. The majority for traditional peer review was smallest in medical and biological sciences and social sciences
43. Most scholars across the disciplines think journal articles will remain relevant to their discipline in the next ten years, but they also think new forms of dissemination will grow in importance
44. A workshop was held at Newcastle University to discuss the survey results and it particularly threw additional light on the issues surrounding publishing interdisciplinary work and also on the question of where certain disciplines would choose to publish if the RAE impact was not the main determinant.

1. Background

This report has been commissioned by JISC to contribute to the knowledge of the Scholarly Communications Group in relation to the needs and attitudes of different disciplines within the higher education research community.

The major developments taking place in scholarly publishing present researchers in the UK with many new opportunities and challenges. Differences between disciplines are widely believed to be significant: for example, the relative importance of monographs in humanities, the multiplicity of forms of research in the creative and performing arts (objects, performances, video etc.) the increasing importance of datasets as a research output, and the different ways in which research funding is obtained. As part of its continuing commitment to ensuring that all subject areas are provided with the best resources and ways of working, JISC decided to commission research to give a more factual basis to assumptions about the differences between disciplines found in current practices, needs, issues and problems in of scholarly communication. There is already a body of scholarship on the differences between disciplines, both in terms of theoretical frameworks, typologies and so on, and empirical research into information and communication practices. Though a good part of the latter is about US-based researchers, many of the conclusions and observations are relevant given the international nature of scholarship. The next section looks at the literature to see what frameworks and insights can taken from it to inform the questions asked and the subsequent analysis of the survey results.

2. Overview of the literature

There is an extensive literature on the subject of academic disciplines and a huge and rapidly expanding body of information and research on scholarly information-seeking behaviour and attitudes and practices in scholarly communication. There is not such a large literature which looks in detail at the point where these concerns intersect. Many contributions on scholarly communication issues are concerned with scholars as a whole, with perhaps some bias towards the sciences. A number are focused on the practices of a particular disciplinary group. Both of these types of work do address many of the same topics as this report and can contribute to understanding more generic aspects of the issues and also may provide confirmatory or contrasting evidence about particular disciplines. The most relevant for our purposes are those which also focus on the similarities and differences between disciplines in relation to scholarly communication and research and also those which postulate theoretical frameworks for understanding disciplinary differences. In recent years there have been some very relevant and interesting contributions in these areas, partly stimulated by the possibilities of supplementary and alternative communication and publishing channels opened up by digital technologies and particularly the Internet. These seek to understand whether and in what ways disciplines differ in their propensity to adopt and use such new channels and technologies.

We start by looking at some general studies of scholarly communication and information use which contain some detail on disciplinary differences.

2.1 Generic studies with some relevant content

A report by Carole Tenopir in 2003[1] examined and summarised a number of studies of library user behaviour in relation to information use, not in relation to authoring practices. The most relevant studies were those by Tenopir and King, which looked only at scholars rather than students. This report summarises a whole series of studies undertaken by Tenopir and King over about 25 years, mainly of scientists. They found that the amount of reading varies by both work field and workplace, with scientists reading more journal articles than engineers, and medical faculty reading the most. Physicists and astronomers are among the most enthusiastic users of electronic articles, "partly because the digital e-print archives (arXiv.org), the Astrophysics Data System and the e-journals of the American Astrophysical Society were designed specifically to facilitate their natural work patterns".

However, even those covering students can be useful in that they may explore the cultures prevailing within disciplines, which are being transmitted from teaching staff to students. An example is the Superjournal study[2], which also has the advantage of being in the UK. This study of scientists and social scientists (faculty and students) started in 1995 and ended in 1998. Clearly, as a study of the extent or frequency of e-journal use it is now out of date, but observable differences in the way different disciplinary groups approach information may still be relevant. The study, which used a variety of methods including focus groups, log files, interviews and observations, found that there were different types of user which partly mapped to discipline:

- journal-focused; these people focused on 4-5 journal titles and 50% full-text (mainly scientists)
- topic-focused; these people searched by subject rather than journal, used many articles (mainly social scientists)
- article-focused; these people searched only one journal (mainly scientists)

Scientists were also more concerned about keeping up to date, and more worried that they weren't finding all the articles they needed to find. Social scientists seemed more task-driven than scientists.

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[1] Tenopir C. Use and Users of Electronic Library Resources: An overview and analysis of recent research studies, Council on Library and Information Resources Aug. 2003. http://www.clir.org/pubs/abstract/pub120abst.html

[2] http://www.superjournal.ac.uk/sj/baserept.htm

A study by DLF/CLIR/Outsell [3] (covered by the Tenopir report but specifically also looked at here) published in November 2002, produced an extensive dataset, based on thousands of telephone interviews with faculty and students at a range of institutions in the USA. It found that there were differences in the use of electronic resources according to subject discipline. Asked whether they used electronic sources "All/most/some or none" of the time, 65% of law respondents used e-resources all the time, dropping to 56% in business, 48% in the biological sciences and engineering, 46% in the physical sciences and maths, 37% in the social sciences and 25% in the arts and humanities. However, a very tiny proportion of respondents in any discipline responded that they never used e-resources – the highest being 3.8% in the arts and humanities.

In terms of unmet information and content needs, 76% of law respondents reported no unmet needs, compared with 54% of business, 54% of arts and humanities, 51% of physical sciences and maths, 48% of social sciences, 41% of engineering, and 42% of biological sciences. "More online journals" was the major unmet need across all groups, though substantial groups of arts and humanities, physical science, maths, biological science and social science wanted more print journals. These findings broadly fit with our own in relation to the overall proportion of researchers reporting problems accessing resources and also the finding that the principal problem is access to journals. The biggest problem identified across all groups by the DLF/CLIR/Outsell study is 'having enough time', followed by 'knowing what's available' and 'having access to all information from one place'.

A report by Key Perspectives published this year[4] has a number of elements which are relevant in the context of this study.

- The study found that there was not a major difference between disciplines when it came to ease of access to resources: 54% of respondents said they had easy access to most of the articles they need for their work: the lowest percentage of respondents reporting this level of ease were in Law and Politics (41%); Humanities (44%), Business & Management (47%) and Psychology (49%).
- The age of needed articles (i.e. how long ago most articles needed were published) varied considerably by discipline group, with the peak age in humanities being about 20 years ago, in chemistry, engineering and medicine 10 years ago, and computer science, life sciences and information science 5 years ago.
- Data on the number of articles published shows that the most papers per year are published by respondents in engineering, materials science and technology. Scholars in humanities, and library and information science publish the fewest.

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[3] DLF/CLIR/Outsell study, Dimensions and use of the scholarly information environment. http://www.clir.org/pubs/reports/pub110/contents.html

[4] Swan A, Brown S. Open access self-archiving; An author study, Key Perspectives Ltd May 2005

- The study also investigated users' information-seeking behaviour and motivations to publish, but not by disciplinary area.
- The main focus of the study was on self-archiving, where both the propensity to self-archive and the type of self archiving varied considerably by discipline, with the greatest overall propensities being in physics, maths and computer science. Humanities, law and politics and business and management scholars were more likely to post articles on web pages than in subject or institutional archives.
- The study draws attention to the fact that people other than the scholar may be involved in archiving the scholars' work, and that the scholar may not even been aware that this is being done.

The survey was international.

The findings on resource access and the relationship between discipline and number of journal articles published are similar to our own, though we found a lower incidence of self-archiving, partially explained by a narrower definition in our survey (not including archiving on personal or departmental web pages).

2.2 Studies of cultural differences between disciplines and impacts on scholarly communication

The seminal work on the distinct cultural identities of academic disciplines is by Becher[5]. After interviewing academics in twelve disciplines, he created a taxonomy relating knowledge structures in a field with the cultural characteristics of the corresponding academic community. This was summarised in a paper by Jenny Fry[6] :

Table 1: Taxonomy of knowledge structures (after Becher)

Group	Knowledge	Culture
Physical Sciences e.g. Physics	Cumulative; atomistic (crystalline/tree-like); concerned with particulars, qualities, simplification; resulting in discovery/explanation	Competitive, gregarious; politically well-organised; high publication rate; task-oriented
Humanities (e.g. history) and Pure Social Sciences (e.g. anthropology)	Reiterative; holistic (organic/river-like); concerned with particulars, qualities, complication;	Individualistic, pluralistic; loosely-structured; low publication rate; person-oriented

[5] Becher, T. *Academic tribes and territories: Intellectual enquiry and the cultures of disciplines.* 1st ed. Buckingham: Study for Research into Higher Education (SRHE) and the Open University Press, 1989.

[6] Fry, Jenny The Cultural Shaping of ICTs within Academic Fields: Corpus-based Linguistics as a Case Study, *Literary and Linguistic Computing*, (published by OUP on behalf of the Association for Literary and Linguistic Computing), forthcoming

	resulting in understanding/interpretation	
Applied Sciences (e.g. mechanical engineering) 'hard-applied'	Purposive, pragmatic (know-how via hard knowledge); concerned with mastery of physical environment; resulting in products and techniques	Entrepreneurial, cosmopolitan; dominated by professional values; patents substitutable for publications; role oriented
Applied Social Sciences (e.g. education) 'soft-applied'	Functional, utilitarian (know-how via soft knowledge) concerned with enhancement of (semi-) professional practice; resulting in protocols and procedures	Outward-looking; uncertain in status; dominated by intellectual fashions; publication rates reduced by consultancies; power oriented

Becher also used an analogy with urban and rural ways of life when describing scholarly communities. He argued that communities with a high people-to-problem ratio, such as high-energy physics, are like urban populations: a busy, occasionally frenetic pace of life, a high level of collective activity, close competition for space and resources, and a rapid and heavily used information network. By contrast, fields such as modern linguistics display the opposite characteristics, though offering some frenetic moments, occasions for communal involvement and a potential for spreading rumour and gossip. He argues that competition is a prominent characteristic of 'urban' disciplines, but a division of labour is more likely in 'rural' disciplines. However, collaboration is also more likely in 'urban' disciplines as there is more overlap between people and problems. Speed of results appearing is also more important in the fast 'urban' world.

To some extent our study confirms these notions, for example, physical scientists are more likely to disseminate via pre-prints and to self-archive, but less likely to circulate drafts of work among colleagues than are social scientists, which tends to support the idea of a networked community in science, wanting to disseminate quickly and alert to each others' results but also more competitive because of working on common problems, than in social science.

Fry herself argues for a finer-grained approach which is based on specialist fields, and which also takes account of interdisciplinary work. Her paper examines corpus-based linguistics (the empirical analysis of naturally occurring language) as a case study, which she says straddles the boundary between applied and pure social sciences. She is also somewhat critical of Becher for sharing a common physical science orientation which tends to see other disciplines in terms of the absence of science characteristics. Fry's work examines the cultural shaping of Information and Communications Technologies (ICTs) within intellectual fields, which is clearly very relevant to this report. She builds on Whitley's[7] framework of analysis, which places fields in relation to two factors: mutual dependency (the degree to which scholars are dependent on particular groups of colleagues to make competent contributions to collective intellectual goals) and task uncertainty (the unpredictability of research task outcomes). For example, twentieth century chemistry is a field with relatively high levels of mutual dependency and lower

[7] Whitley, R The intellectual and social organisation of the sciences. Oxford, Clarendon Press, 1984

levels of task uncertainty; sociology would rank lower in dependency and higher in uncertainty. Relative is a key word here: there is no absolute measure of these factors, only a positioning of one field relative to another. However, this is useful in doing comparative studies. In another paper[8] Fry discusses her work on three fields: high energy physics, corpus-based linguistics and social/cultural geography, which places them in the Whitley typology, and also extends that to look at the relationship between their mutual dependence/task uncertainty positioning and the appropriation and use of ICTs within their communication practices. These are summarised in two tables in the paper, one of which is reproduced here.

Table 2 : Relationship between degree of 'mutual dependence' and 'task uncertainty' and the production and use of digital resources

Field	High energy physics	Corpus based linguistics	Social/cultural geography
Culture	High degree of mutual dependence, with low degree of task uncertainty	Moderate degree of mutual dependence with moderate degree of task uncertainty	Low degree of mutual dependence with high degree of task uncertainty
Differential role of informal and formal communication	Speedy establishment of knowledge claims via informal communication system of conference papers and pre-prints. Publication mainly serves citation criteria	Need to communicate a high concentration of technical information supported in conference proceedings, reports and manuals	Formal communication system important due to lower levels of interpersonal recognition (e.g. low people to problem ratio) and need to justify goals, approaches and techniques in literature. Informal communication system determined by individual groups and specific social networks
Role of ICTs in communication system	Tightly coordinated system for the informal dissemination of research results via integrated digital networks; production of centralised field-based digital resources	Quest for the development of a coordinated system for the informal dissemination of research results hindered by local ICT infrastructures; decentralised locally produced field-based digital resources	Non-production of field-based digital resources; reliance on commercially produced generalist digital resources; ICT infrastructure determined at the level of the employing institution [rather] than the field or discipline

Source: Fry. J. Scholarly Research and Information Practices, A Domain Analytic Approach

[8] Fry, Jenny. Scholarly Research and Information Practices, A Domain Analytic Approach, Information Processing and Management, Sept 2004

Fry concludes that where there are tightly coordinated systems of collaboration and dissemination within a community, the result is not just the passive use of digital resources provided by others, but the creation of networks and resources specific to the field and often international in nature. Looser, intellectually pluralistic fields rely more heavily on face to face contact for informal collaboration, combined with more reliance on formal communication for community-wide dissemination and reputation building. This fits to some extent with our findings (see survey section) that if anything, the arts/humanities and language/area studies scholars are a little more conservative when it comes to expecting innovation in publication or a move away from the journal article, but more likely to circulate research results around an informal network of colleagues and peers.

A paper by Stephen and Harrison[9] puts forward the view that it is essential to have a disciplinary focus when building electronic systems and resources for scholarly use. They suggest that existing e-resources fail to allow scholars within a field to search and retrieve material on the basis of discipline, both because of the way they are constructed and because they have insufficient historical depth. "When an electronic service for scholars is expansive, multidisciplinary and ahistorical, it is not possible to pursue questions within the disciplinary frameworks that may originally have given them sensibility." Because scholars cannot guide their searches through the discipline-specific meaning of a concept, a keyword search approach yields a great deal of tangential material. They appeal for a discipline-focused approach to designing e-resources:

"Academic disciplines are discernible microcultures, communities with traditions of intellectual activity and normative behavior that in many cases extend for generations. Disciplinary members share assumptions about intellectual priorities and narrative accounts of the discipline's evolution, and their shared support of the discipline's forms of procedure perpetuate the discipline's traditions and its system of status conferral. Central to each discipline is its own periodical literature, and disciplinary members are usually thoroughly aware of the prestige hierarchy within that set of journals and annuals…It is precisely because disciplines are such distinct cultures that electronic systems designed to speed scholarly communication, such as Paul Ginsparg's preprint server in high-energy physics (Ginsparg, 1994), may be revolutionary in particular fields but completely irrelevant in many others (e.g., within most of the social sciences and humanities, where speed of distribution of pre-prints has virtually no bearing on the advancement of knowledge). Similarly, e-mail discussion lists may play a vital role in one field but are never used in another, and article archives that emphasize recent materials suffice in particular fields while including older materials may be the only appropriate model for other fields."

A paper by Kling. Spector and McKim[10] argues that the reliance on a narrow range of alternative publishing models, such as self-archiving on web sites or e-print repositories

[9] Stephen T and Harrison T Building Systems Responsive to Intellectual Tradition and Scholarly Culture, The Journal of Electronic Publishing, University of Michigan Press, Vol 8, Issue 1, Aug 2002 http://www.press.umich.edu/jep/08-01/stephen.html

[10] Kling R, Spector L and McKim G: Locally controlled scholarly publishing via the internet: The Guild Model. The Journal of Electronic Publishing, University of Michigan Press, Vol 8, Issue 1, Aug 2002 http://www.press.umich.edu/jep/08-01/kling.html

"yields less value than many have hoped for." They believe this is because a model which works well in one discipline may not transfer to another where authors have different practices and expectations in relation to credit assignment and quality indicators. They propose a model they call guild publishing, based on existing examples like the research manuscript series sponsored by some academic departments and research institutes, encompassing working papers, pre-prints, technical reports, discussion papers etc. Quality is assured mainly by the author's membership in the 'guild' whether this is a faculty such as the Harvard Business School (HBS Working Papers) or a multi-institution collaboration such as the Berkeley Roundtable on the International Economy (BRIE), which publishes a free to the reader BRIE Working Paper series.

A conference was held in October 2003 on the subject of disciplinary change[11], which featured a number of relevant presentations. In one, John Unsworth[12] argues that although humanities scholars may be lone wolves in formal authorship, they are much less so in informal communication. He also suggests that humanities scholars increasingly participate in electronically networked communities of interest, via email itself and other more structured electronic forums. He goes further to suggest that computers are enabling real collaborative efforts by humanities scholars that were not possible before. They have also enabled the creation of digitized primary resources, and more innovatively, digital secondary resources, or databases not just of primary sources but with annotation, commentary and secondary material.

Another presentation by Barbara O'Keefe[13] suggested that the social sciences appeared to be late adopters of technology, partly because they are only "modestly collaborative" and partly because they make use of datasets provided by government and other third parties, reducing the need for scholar-created archives and resources. But she also argued that technology was changing social science in three ways: the subject itself (media and technology are increasingly subjects for study); the methods (technology allows sharing of data, text mining, network analysis, simulation and visualisation etc) and the literature (access, tools, synthesis).

Valerie Bence (a member of the project team) has recently submitted a PhD at Loughborough University, *Research assessment and scholarly communication: via a demographic analysis of journal submissions to ten Units of Assessment in the 2001 RAE.* This thesis examines submission data to ten UoAs in the 2001 Exercise to see "how closely, or even whether, they 'fitted' within the subject area of the UoA.s". The thesis develops and uses three perspectives, the policy perspective (research assessment via published output); the communication perspective (scholarly communication) and the academic perspective (disciplinary and subject boundary perspective. Literature reviews for these perspectives include some of the sources already discussed, such as Becher, and Kling and McKim, but also look in detail at work on interdisciplinary boundaries. Chapter 4 of the thesis specifically examines disciplinary boundaries and subject mapping. It comments on the work of ISI founder Eugene

[11] Scholarly Tribes and Tribulations: How Tradition and Technology Are Driving Disciplinary Change**.** October 17, 2003 Westin Grand Hotel Washington, D.C. http://www.arl.org/scomm/disciplines_program.html

[12] Unsworth, J. The Humanist: "Dances with Wolves" or " Bowls Alone"?

[13] O'Keefe, Barbara. Impact of Tradition and Technology on the Social Sciences

Garfield[14], and its recent Chief Scientist, Henry Small[15], who both produced maps of subject fields based on co-citation data. One of the advantages of visualisation of subject fields in this way is that it can identify emerging fields and work which crosses established boundaries. She also refers to the work of Clark[16], who has noted the expansion in the number of disciplines and the fragmentation of subjects as one of the key features of recent developments in higher education. She also cites the PREST study [17] which found in 2000 that 83% of university staff were collaborating with researchers from another discipline or intended to do so, and work by Evaluation Associates (commissioned by the funding bodies to examine whether assessment discriminated against interdisciplinary research) in 1999 which estimated that 46% of research time by UK academics was spent on interdisciplinary research and 10% were fully interdisciplinary researchers.[18]

In the thesis, conclusions are drawn from the micro level of the data analysis for ten UoAs within the 2001 RAE (see table 3 for an analysis of the type of submissions) and on a wider (macro) level shows that the three perspectives developed from this work are inextricably linked. The future assessment of research output is considered from this viewpoint. Interdisciplinary activity, boundary critical submissions and assessment are becoming increasingly important and must be considered before the 2008 RAE. In addition, it is proposed that the recent debate and developments over e-publication, Open Archive Initiatives and institutional repositories should be considered in parallel with future HE evaluation, both in terms of process and outcome. The next logical step is to link the 'required' deposit of research output to institutional depositories for automatic use in future assessment exercises, as suggested by Harnad et al.

It is concluded that research assessment is now an intrinsic part of the scholarly communication process and arguably the final link in the knowledge production chain.

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[14] Garfield, E. *Mapping the World of Science.* Keynote address 150th Anniversary Meeting of the AAAS Philadelphia: PA, 14/2/1998.

[15] Small, H. Visualizing science by citation mapping. *Journal of the American Society for Information Science,* 1999, **50** (9), 799-813.

[16] Clark, B. Substantive growth and innovative organisations: new categories for HE research. *Higher Education*, 1996, **32,** 417-430.

[17] PREST**,** *Impact of the RAE and the future of quality assurance in the light of changes in the research landscape.* April 2000, Final report prepared for HEFCE, pg. 6. Policy Research in Engineering, Science and Technology: University of Manchester, p. 36.

[18] Higher Education Funding Council for England. *Interdisciplinary Research and the Research Assessment Exercise,* RAE 1/99, April 1999, Report for HEFCE by Evaluation Associates, p.5.

Table 3: Analysis of submissions of publications in ten U0As, 2001 Research Assessment Exercise

	Umbrella Group I Medical and Biological Sciences				Umbrella Group II Physical Sciences and Engineering				Umbrella Group III Social Sciences				Umbrella Group IV Area Studies and Languages				Umbrella Group V Arts and Humanities			
	UoA 4	%	UoA 13	%	UoA 25	%	UoA 29	%	UoA 36	%	UoA 43	%	UoA 45	%	UoA 50	%	UoA 57	%	UoA 61	%
A. Authored book	4.0	0.2	52.0	1.0	86.0	1.4	17.0	0.5	910.0	17.1	429.0	4.3	89.0	18.4	1416.0	22.3	348.0	21.3	53.0	4.2
B. Edited book	0.0	0.0	30.0	0.6	22.0	0.4	0.0	0.0	53.0	1.0	77.0	0.8	36.0	7.5	605.0	9.5	78.0	4.8	18.0	1.4
C. Chapter in book	1.0	0.1	166.0	3.2	342.0	5.5	37.0	1.0	1436.0	27.0	861.0	8.7	155.0	32.1	1916.0	30.2	596.0	36.5	118.0	9.3
D. Journal article	**1842.0**	**99.1**	**4751.0**	**92.5**	**3356.0**	**54.4**	**3249.0**	**90.5**	**2777.0**	**52.1**	**7977.0**	**80.2**	**189.0**	**39.1**	**1843.0**	**29.1**	**510.0**	**31.2**	**743.0**	**58.8**
E. Conference contribution	5.0	0.3	116.0	2.3	2296.0	37.2	264.0	7.4	15.0	0.3	295.0	3.0	2.0	0.4	44.0	0.7	39.0	2.4	268.0	21.2
F. Patent/published patent application	0.0	0.0	0.0	0.0	15.0	0.2	21.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
G. Software	2.0	0.1	0.0	0.0	11.0	0.2	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	6.0	0.1	1.0	0.1	0.0	0.0
H. Report for external body	0.0	0.0	10.0	0.2	5.0	0.1	3.0	0.1	87.0	1.6	80.0	0.8	0.0	0.0	5.0	0.1	0.0	0.0	47.0	3.7
I. Confidential report for ext'l body	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
J. Internet publication	0.0	0.0	5.0	0.1	9.0	0.1	0.0	0.0	34.0	0.6	18.0	0.2	4.0	0.8	38.0	0.6	11.0	0.7	11.0	0.9
K. Internet publication (via subscript.)	1.0	0.1	1.0	0.0	6.0	0.1	0.0	0.0	2.0	0.0	6.0	0.1	0.0	0.0	9.0	0.1	0.0	0.0	1.0	0.1
L. Performance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0.4	0.0	0.0	0.0	0.0
M. Composition	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.2	12.0	0.2	0.0	0.0	0.0	0.0
N. Design	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
O. Exhibition	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
P. Artefact	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0
Q. Scholarly edition	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.1	9.0	0.1	1.0	0.2	312.0	4.9	31.0	1.9	1.0	0.1
R. Other form of assessable output	2.0	0.1	4.0	0.1	17.0	0.3	0.0	0.0	11.0	0.2	184.0	1.9	6.0	1.2	108.0	1.7	21.0	1.3	4.0	0.3
	1858	100	**5135**	100	**6166**	100	**3591**	100	**5328**	100	**9942**	100	**483**	100	**6342**	100	**1635**	100	**1264**	100

Source: Bence, V. *Research assessment and scholarly communication: via a demographic analysis of journal submissions to ten Units of Assessment in the 2001 RAE.* PhD Thesis, Loughborough University, 2005

Breakdown of publication types

This Table shows the breakdown of submitted publication types for the ten UoAs studied. The main points of note from this analysis are:-

- Journal articles ranged from 29.1% (of total submitted output) for UoA 50 English Language and Literature to 99.1% for UoA 4 Clinical Dentistry.
- Seven out of the ten UoAs studied had more than 50% of their submitted output in the form of journal articles, (UoAs 45, 50 and 57 being below this figure).
- Disciplinary differences in the pattern of publications and outputs.
- Authored books showed increasing importance in Umbrella groups III, IV and V.
- The second most popular form of research output (overall) were Chapters in Books. In UoAs 50 and 57 these outnumbered journal article submissions.
- Percentages of Scholarly Editions submitted only reached whole numbers (in percentage terms) in the same two UoAs.
- Conference Contributions were the highest in UoAs 25 (37.2%) and 61 (21.2%).
- Output types J (Internet publication) and K (internet publication, subscription) numbered less than 1% (in percentage terms) for all UoAs studied. However, these do not include e-journals which are part of type D (Journal articles).
- In the ten UoAs studied, Journal articles accounted for 65% of all submitted output, slightly less than the 69.7% for the RAE overall (see Table 11).

3. The survey

The survey was designed to test some of the more widespread assumptions about the ways in which subject discipline affects information-seeking behaviour and modes of communication and collaboration. In addition, we specifically sought to understand whether the resources provided by higher education institutions were differentially satisfactory for the different disciplinary groups in the context of the debate about whether journal 'big deals' have tended to favour scientists by squeezing funds for the acquisition of other subject journals or other types of material e.g. books. We also wanted to verify or otherwise the notion that it is difficult for interdisciplinary researchers and those in non-textual disciplines (art, design, drama, music etc) to find appropriate outlets for their research output. Debates have also arisen recently over whether different disciplinary groups are more or less aware of the opportunities for alternative publication and dissemination (e.g. open access journals, open access archives) and more or less disposed to use them.

However, it should be clear from the theoretical frameworks we have discussed that it is by no means agreed how disciplines should be defined. Ideally, scholars define their own discipline, but that would lead to inevitable difficulties in analysis of the results of a survey. We have relied on what may be considered an overly parochial measure: the Unit of Assessment. The advantage is that these are categories every research-active scholar in the UK will be familiar with, and are mutually exclusive (though we have taken into account that people may submit under more than one, and so we have asked for both primary and additional UoAs). These are fairly fine-grained, though probably more so in the hard sciences and humanities than in the social sciences. These UoAs can then be aggregated into Umbrella Groups to give a broader-brush approach and to try to produce sample sizes capable of being tested for statistical significance. 750 completed questionnaires were received, with coverage across all UoAs. More detail on the sample and the survey methodology is in Appendix A.

3.1 The questionnaire

The entire questionnaire forms Appendix B. It was divided into sections, covering the following areas:

- Unit of Assessment (primary and any supplementary). This was a mandatory question because it was critical, but with the added benefit of making it unlikely that someone without significant research activity would complete the survey
- Data on length of experience as a researcher and size of department
- Relative importance of different types of research and discovery resources, access to research resources, problems in getting access and informal methods employed to find information
- Dissemination of results and publishing, including formal and informal methods; problems in so doing; journal publishing preferences;
- Copyright awareness and the nature of agreements with publishers
- Awareness and use of open archives

- Attitudes to the RAE, peer review and to the future of scholarly communication, from researcher and author standpoints

The analysis of the results will follow under these same broad headings. Note: UoAs have been aggregated into Umbrella Groups as follows (2008 UoAs):

Umbrella Group 1: UoAs 1-16 – Medical and biological sciences
Umbrella Group 2: UoAs 17-29 Physical sciences, maths and engineering
Umbrella Group 3: UoAs 30 -46 Social sciences
Umbrella Group 4: UoAs 47-58 Languages and area studies
Umbrella Group 5: UoAs 59-67 Arts and humanities

No umbrella grouping would be without problems. There are specific issues in nursing and public health research for example which are very different from those in laboratory-based research. It is recognised that the last umbrella group in particular does place some diverse disciplines together; for example, philosophy and history with arts, design and music. Where there are particular issues for what might loosely be called the 'performing arts' and those employing non-textual sources or means of dissemination, we have drawn attention to these separately.

3.2 Unit of Assessments (primary and secondary)

Overall, slightly less than half (44.7%) of all respondents stated that there were other units of assessment besides their primary one where they could submit work, or with which they could make joint submissions. There was a greater frequency of secondary UoAs in the sciences and social sciences than in the languages/area studies and arts and humanities. This is an indication of both interdisciplinary work and also of the difficulty of fitting subject areas inside units of assessment. This is lower than the PREST study finding but is on a narrower criterion i.e. actual submission, rather than joint work. It perhaps fits more with the Evaluation Associates report showing that 46% of academic research time is spent on interdisciplinary research. As we have seen there has been concern that it may be harder to place interdisciplinary research in highly-rated journals and that RAE panels may value it less highly than 'purer' research. This recurs in the question about publishing problems later on.

3.3 Experience level and department size

To provide some contextual information, we asked respondents to give their experience level and department size. Overall, about a third of respondents were in the groups employed from 1-5 years and over 15, with nearly 20% in the 5-10 year band and 14% in the 10-15 year band. The languages and area studies respondents were grouped more in the over 15 year band, while the social scientists were slightly more likely to be in the 1-5 year band than the sample as a whole and arts and humanities respondents were more likely to be in the two least-experienced bands.

Table 4: Approximately how many years have you been employed as a research-active academic?

% within Umbrella Group

		Approximately how many years have you been employed as a research-active academic?				
		1-5 years	5-10 years	10-15 years	Over 15	Total
Umbrella Group	Medical and biological sciences	32.7%	16.7%	15.4%	35.2%	100.0%
	Physical sciences and engineering	25.7%	19.0%	11.9%	43.3%	100.0%
	Social sciences	35.3%	21.4%	13.8%	29.5%	100.0%
	Languages and area studies	26.0%	8.0%	12.0%	54.0%	100.0%
	Arts and humanities	36.9%	27.2%	19.4%	16.5%	100.0%
Total		31.6%	19.6%	14.3%	34.4%	100.0%

In terms of department size, 70-80% of the scientists (medical, biological and physical/engineering) were in departments of more than 15 researchers, while 62% of social scientists and only 38-40% of arts, humanities and languages staff were in 15+ departments. There is a significant difference between disciplinary groups χ^2 (12) = 86.750, p<.01.

Table 5: Approximately how many research-active academic staff are there in your department?

% within Umbrella Group

		Approximately how many research-active academic staff are there in your department?				
		1-5	5-10	10-15	Over 15	Total
Umbrella Group	Medical and biological sciences	5.0%	15.6%	10.0%	69.4%	100.0%
	Physical sciences and engineering	1.0%	7.2%	10.1%	81.6%	100.0%
	Social sciences	7.7%	13.1%	17.1%	62.2%	100.0%
	Languages and area studies	4.1%	20.4%	36.7%	38.8%	100.0%
	Arts and humanities	15.5%	19.4%	24.3%	40.8%	100.0%
Total		6.1%	13.4%	15.9%	64.6%	100.0%

Some other variables will be cross-tabulated with these contextual ones in later sections.

3.4 Research resources

3.4.1 The essential resource

The first substantive, rather than contextual, question was about the single most essential resource used to do research (it was emphasised in the questionnaire that this was not about teaching and learning resources). Several elements stand out here: the overwhelming importance of journal articles for the medical and biological sciences; the importance of e-prints (pre and post) in the physical sciences and engineering; the broader mix in social sciences and the particular importance of books in languages and area studies. Other textual and non-textual sources are essential to significant groups within languages and area studies and the arts and humanities. Datasets feature across the board as essential to a significant minority, especially in medical and biological sciences and social sciences.

Table 6: What is the single most essential resource you use, the one that you would be lost without?

% within Umbrella Group

		Umbrella Group				
		Medical and biological sciences	Physical sciences and engineering	Social sciences	Languages and area studies	Arts and humanities
	Pre-prints		5.8%	1.4%		1.0%
	Post-prints		6.3%	.9%		3.9%
	Journal articles	90.7%	71.6%	69.3%	28.0%	27.2%
	Conference proceedings		5.8%	.5%		1.0%
	Books	.6%	1.4%	9.2%	50.0%	35.9%
	Datasets	4.3%	3.4%	7.8%	2.0%	2.9%
	Technical reports		1.0%			
	Govt or NGO reports	1.2%		2.3%		
	Legal sources			.5%		
	Other textual			3.7%	10.0%	14.6%
	Non-textual	.6%		.5%	2.0%	8.7%
	Other	2.5%	4.8%	4.1%	8.0%	4.9%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

Looking at the results of this question by Unit of Assessment (see table 43 in Appendix C) allows a more nuanced picture to emerge, for example:

- Primary care, nursing, epidemiology and public health and community-based clinical subjects produce more varied choices of essential resources, including datasets and reports
- Nearly 100% of the respondents in the hospital clinical and other medical and biological sciences chose journal articles, as did those in agriculture, food science and veterinary studies and earth and environmental sciences

- In chemistry nearly 90% chose journal articles, with a small showing for post-prints
- In physics, the proportion nominating journal articles was 65% with 12% going for datasets, 9% naming pre-prints and 6% post-prints
- In pure mathematics, only a third named journal articles, with 44% nominating pre-prints and 11% post-prints
- The second highest score for pre-prints was in statistics and operational research, at 25%
- In computer science, journal articles were named by 49%, while 20% went for post-prints and 15% for conference proceedings
- Conference proceedings were the single essential resource for 20% in electrical and electronic engineering, where 68% went for journal articles
- In the rest of engineering, journal articles were the dominant choice of 80-90%
- Metallurgy and minerals saw a 75%-25% split between journal articles and post-prints
- Architecture and the built environment was 50-50 journal articles and books and the same in archaeology, whereas town and country planning was 100% for journals
- Geography and environmental studies was 77% journals and 11% datasets
- Datasets are essential to 18% of economists and econometricians, with 55% opting for journal articles, 18% for pre-prints and 9% for post-prints
- Other textual sources are significant as the single essential resource in both the languages and area studies UOAs, but also anthropology, theology and most particularly history
- Non-textual sources are seen as essential by sizeable groups in drama dance and performing arts and music and by smaller groups in art and design and communication studies

We also asked about the most heavily-used resource, which could be the same or different from the most essential resource. In fact this question yielded nearly identical replies.

3.4.2 Use of discovery tools

We were also very interested in how users found research resources. The responses show that there is a broad spread of discovery tools in use. The largest groups regarding search engines as the “most essential” reference source were found in the physical and social sciences, and in the arts and humanities, at around 36%. Looking at the detail within the umbrella group for physical sciences shows that computer scientists, earth scientists, applied mathematicians and electronic engineers are more likely to view search engines as “most essential” than are physicists. Search engines were also chosen by about half of sociologists and education specialists. Search engines seemed to be least significant in the medical and biological sciences, at only 14.8% of respondents citing them. Subject-specific online gateways were chosen by 23% of the medical and biological scientists, while 21% of this group named citation databases and 18% subject specific abstracts and indexes. These were also ‘most essential’ to 21% of physical sciences and engineering researchers and 22% of social scientists. General

bibliographic resources were seen as most essential by nearly half of language and area studies researchers and nearly 30% of arts and humanities.

Table 7: What search tool or reference source is most essential to you, the one you would be lost without?

% within Umbrella Group

	Umbrella Group				
	Medical and biological sciences	Physical sciences and engineering	Social sciences	Languages and area studies	Arts and humanities
Other	13.0%	5.7%	6.7%	8.0%	3.9%
Subject-specific abstracts and indexes	18.5%	20.6%	22.4%	6.0%	13.6%
Subject-specific online gateways	22.8%	3.3%	6.7%	2.0%	2.9%
General bibliographic resources	9.9%	11.5%	15.2%	46.0%	29.1%
Citation databases	21.0%	21.5%	9.9%	4.0%	3.9%
Search engines	14.8%	36.4%	35.9%	24.0%	36.9%
Works of reference		1.0%	3.1%	10.0%	9.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

3.4.3 Informal research and information resources

Turning to a question about the less formal research and information resources used on a regular basis, we found that by far the most popular methods across all groups were “asking a colleague face to face or on the telephone” and “emailing a colleague or peer”. These showed no significant differences across the main groups. Reading email newsletters was the next most popular informal activity, and the only one where the differences were significant between the disciplinary groups (χ^2 (4) = 22.005 significant at p <.01). Reading blogs and posting queries to email lists were minority activities. Posting queries was most popular in the arts and humanities and reading blogs in the social sciences. None of these activities was found to be significantly related to length of experience (in this case proxy for age).

Table 8: Informal resources

% within Umbrella Group

		Asking a colleague	Emailing a colleague or peer	Reading email newsletters	Posting an enquiry to an email list	Reading blogs
Umbrella Group	**Medical and biological sciences**	**80.2%**	**87.0%**	**17.9%**	**11.7%**	**4.3%**
	Physical sciences and engineering	**81.9%**	**81.9%**	**21.9%**	**12.4%**	**4.3%**
	Social sciences	**76.0%**	**78.2%**	**35.6%**	**15.1%**	**7.1%**
	Languages and area studies	**74.0%**	**80.0%**	**16.0%**	**12.0%**	**2.0%**
	Arts and humanities	**76.7%**	**79.6%**	**31.1%**	**21.4%**	**6.8%**

3.4.4 Problems in gaining access to research

One of the key questions asked was "Do you encounter problems gaining access to the resources you need to carry out your research?" The majority in three of the five groups said they did not, with only a small majority in medical and biological sciences and arts and humanities reporting problems. There was no significant difference between the groups (χ^2 (4) = 5.297). This result is in accord with the work by Swan and Brown which found no major difference between subject groups when reporting ease of access to resources. Nevertheless, even in the groups where a majority did not report problems, over 40% of respondents did experience problems, and overall it was almost 50-50.

Table 9: Do you encounter problems gaining access to the resources you need to carry out your research?

% within Umbrella Group

		Yes	No	
Umbrella Group	Medical and biological sciences	52.5%	47.5%	100.0%
	Physical sciences and engineering	42.4%	57.6%	100.0%
	Social sciences	46.7%	53.3%	100.0%
	Languages and area studies	48.0%	52.0%	100.0%
	Arts and humanities	53.4%	46.6%	100.0%
Total		47.7%	52.3%	100.0%

Looking at the larger sized individual units of assessment, the main groups reporting problems are in philosophy, psychology, economics, English and history.

Figure 1: Resource problems in selected social science UoAs

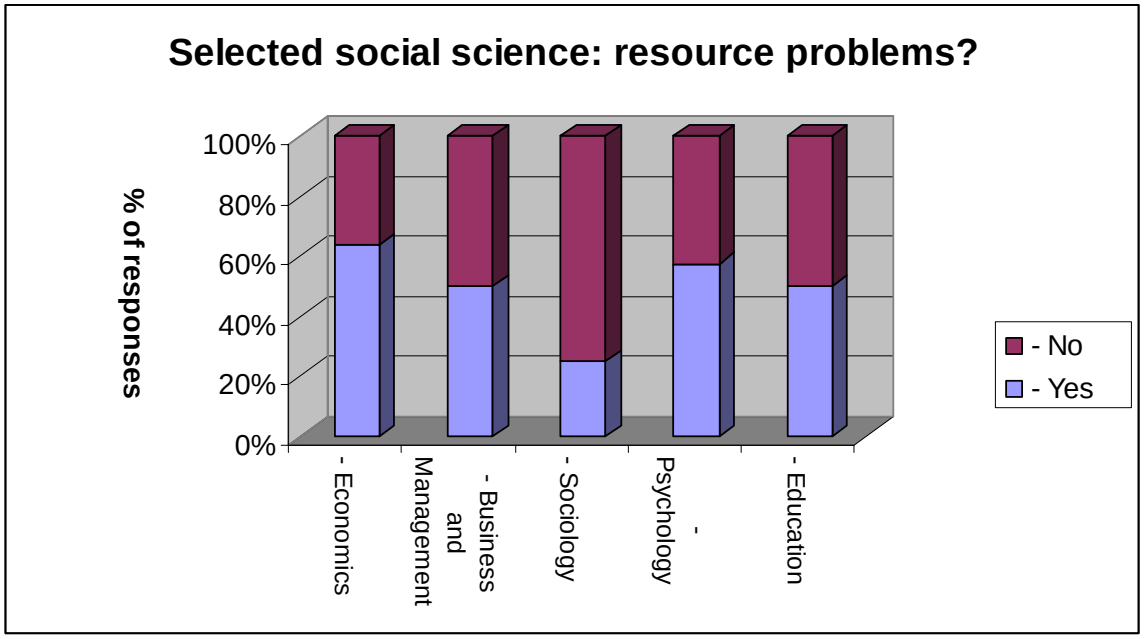
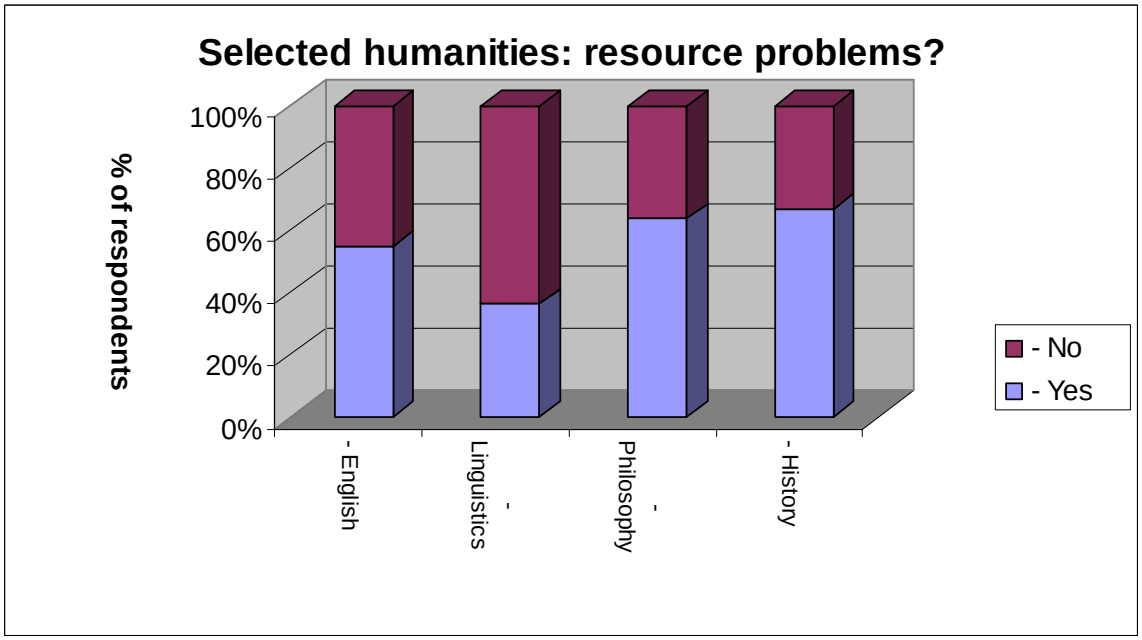


Figure 2: Resource problems in selected humanities UoAs



The major reported problems were access to journal articles, books and conference proceedings but other problems are gaining access to travel funds and proprietary information. The importance of journals is somewhat lower in languages and arts/humanities, in contrast with the importance of books. There was no significant difference between disciplines where access to journals was concerned, but there was in relation to access to books: χ^2 (4) =31.275, p.<.01 and (at a lower level of confidence) to conference proceedings χ^2 (4) = 10.404, p<.05. Lack of access to conference proceedings is most important in physical sciences and engineering. Funds for travel are most important in both languages/area studies and arts and humanities. The difference is significant χ^2 (4) = 60.153, p.<.01. A difference in access to proprietary information is not significant between the groups.

Table 10: Access to research resources: What are the main problems you encounter?

	Medical and biological sciences	Physical sciences	Social sciences	Languages and area studies	Arts and humanities
Library does not take the journals I need	89.4	82.0	81.9	79.2	69.1
Library does not buy the books I need	18.8	31.5	38.1	62.5	61.8
Library does not subscribe to the databases I need	22.4	36.0	34.3	16.7	32.7
I cannot get access to the conference proceedings I need	18.8	44.9	25.7	12.5	23.6
Key information is proprietary	10.6	12.4	17.1	8.3	12.7
I need to travel to access resources and funding isn't available	9.4	14.6	24.8	58.3	58.2

Figure 3: Resource problems detail in selected social science UoAs

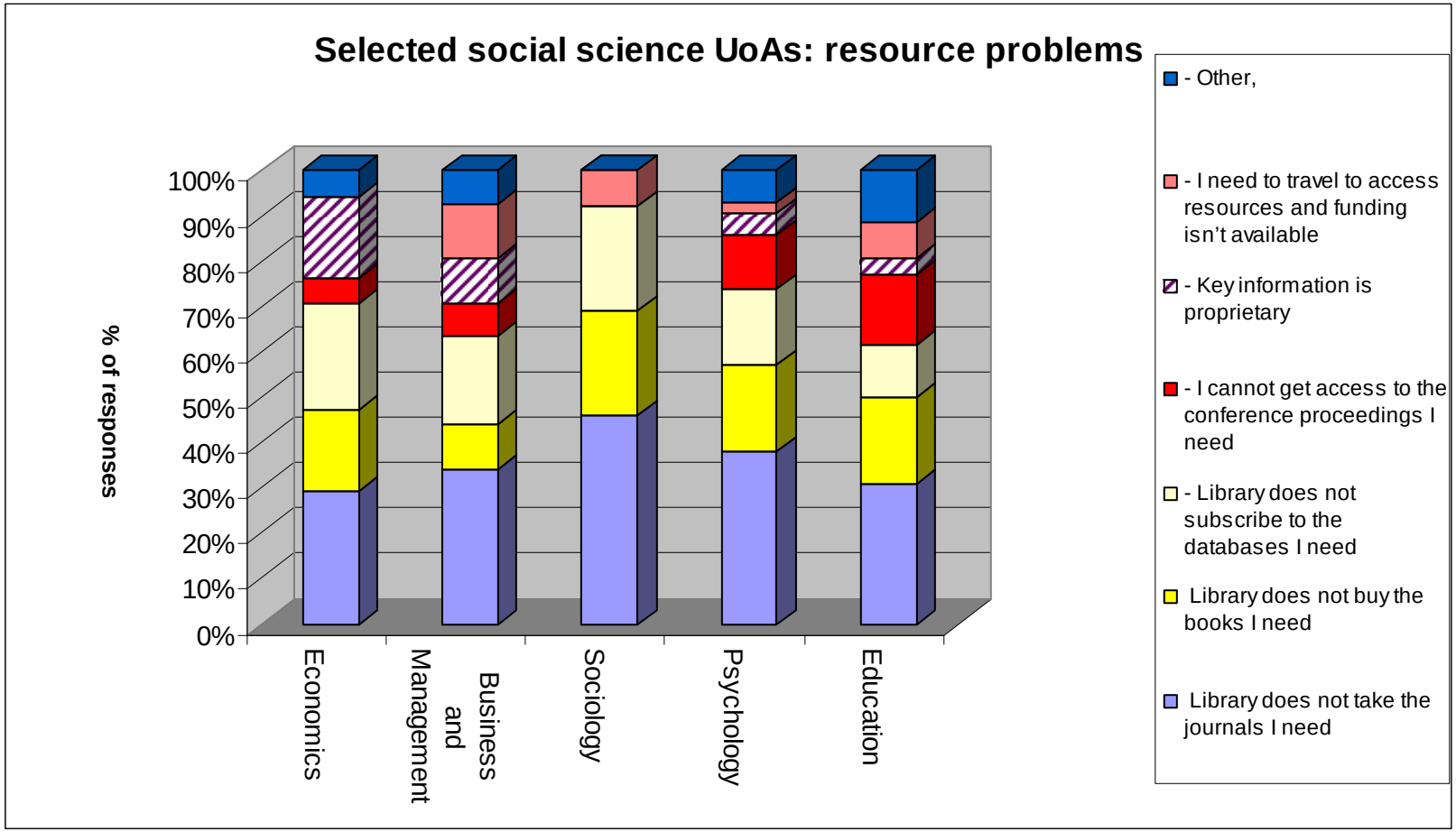


Figure 4: Resource problems detail in selected languages and humanities UoAs

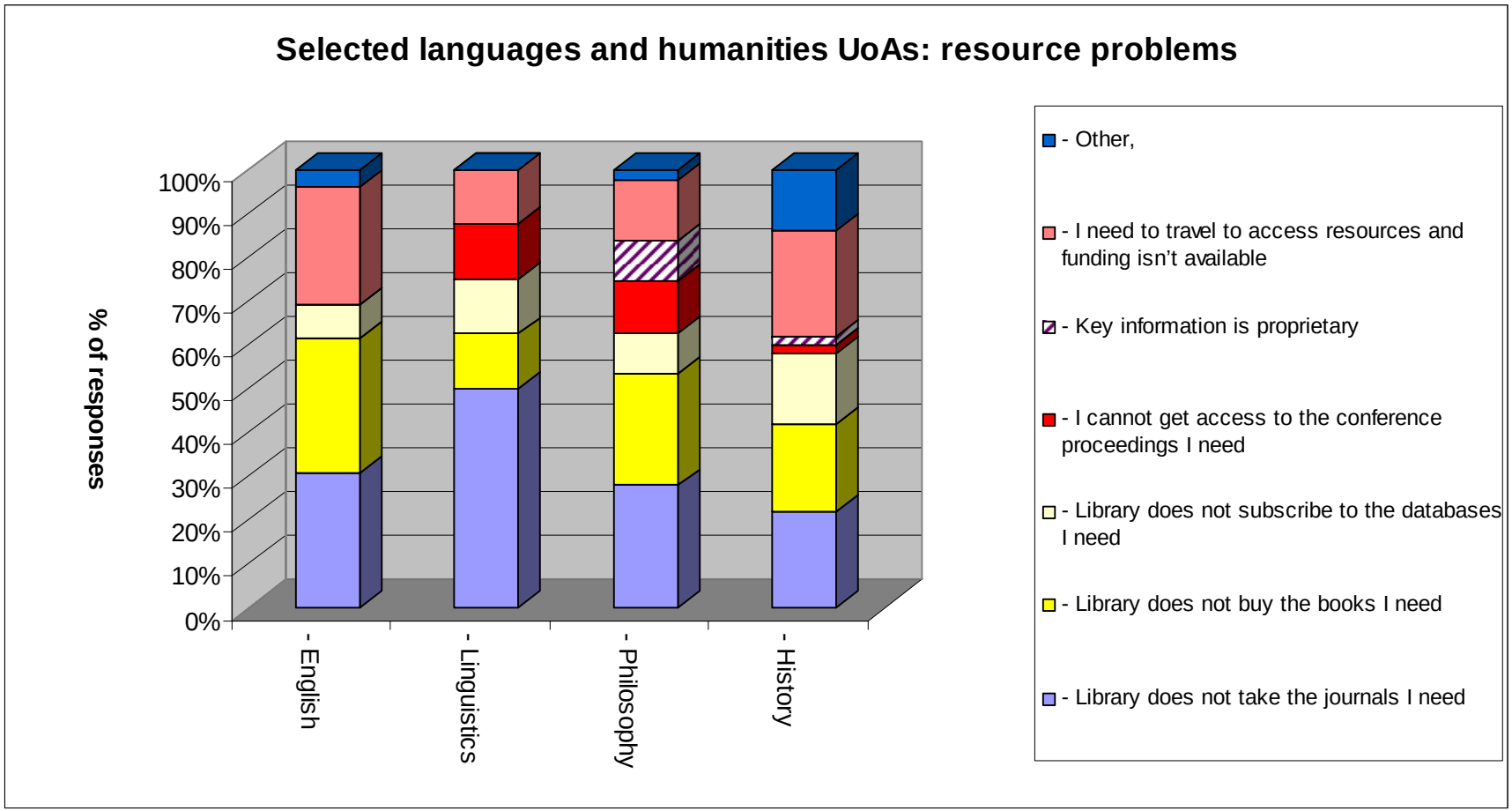


Figure 5: Resource problems detail in selected science UoAs

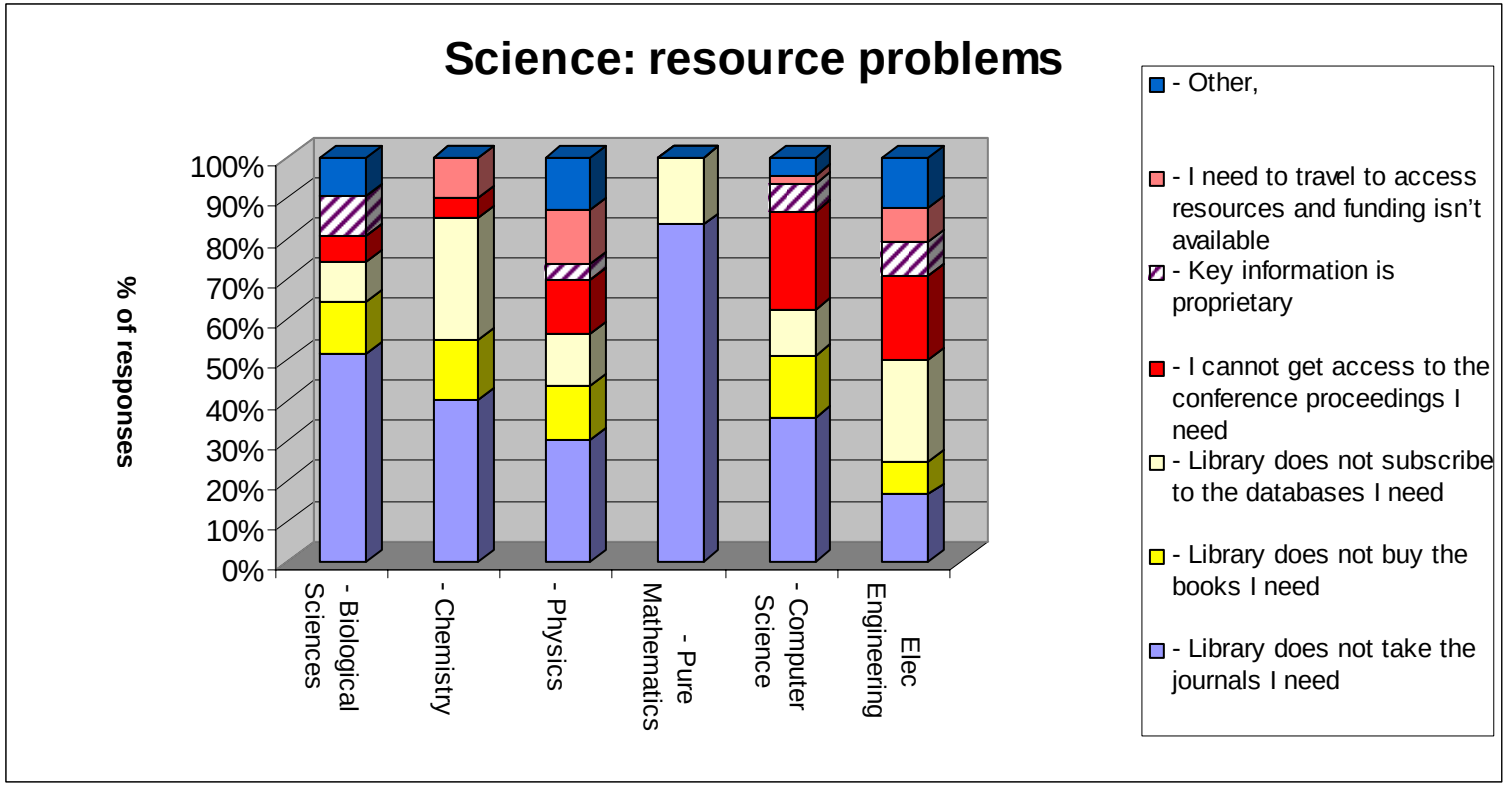
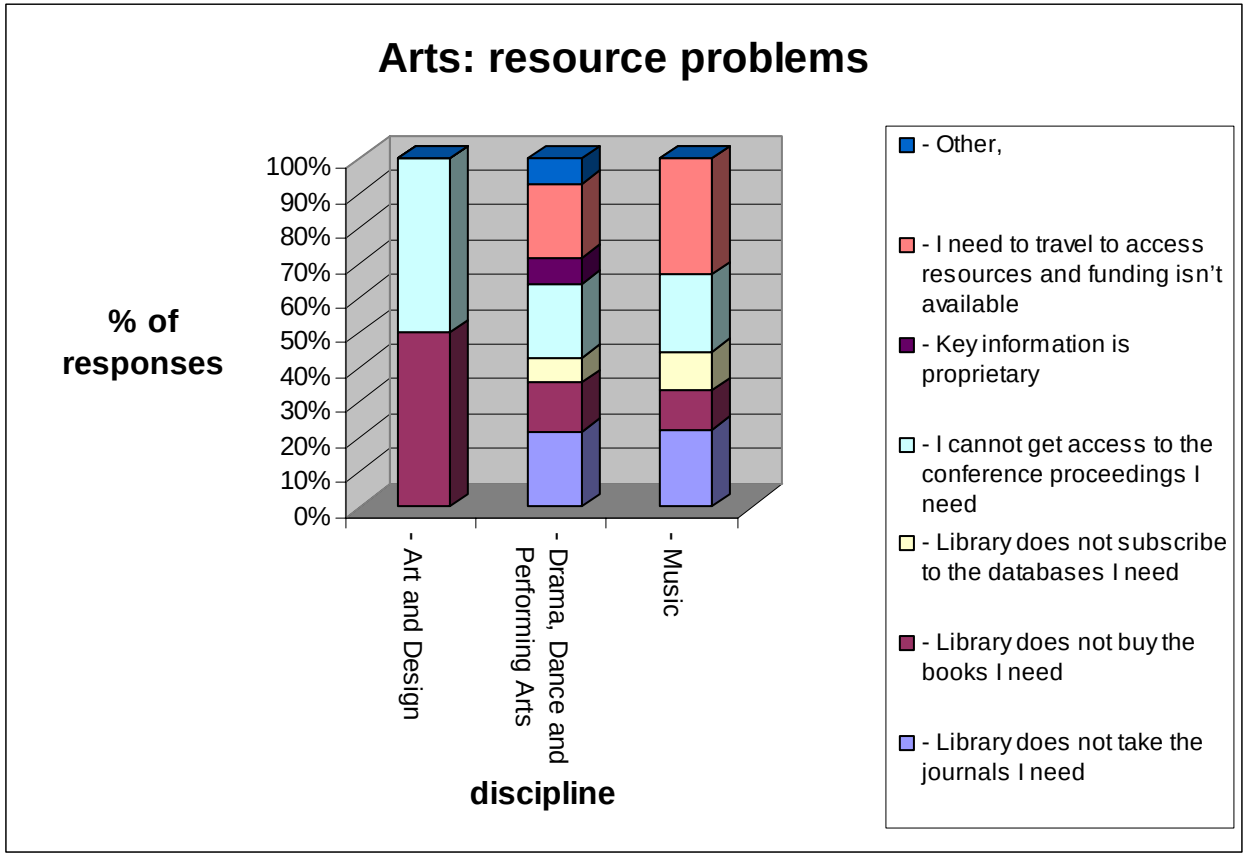


Figure 6: Resource problems detail in selected arts UoAs



3.4.5 Other problems

We also gave respondents the opportunity to refer to other problems they may face.

- A number were concerned about access to electronic databases off campus and from overseas while travelling
- There were particular problems with foreign language sources e.g. a lack of catalogues and indexes for French archives; need for Chinese language materials; “difficult to obtain Bengali language materials here”; “difficult to know about Spanish and Venezuelan sources from here, let alone access them”
- Non UK based material hard to obtain and citation indexes don’t cover many journals
- Information is contained in very ‘grey’ sources, such as consultancy reports
- Opening hours of local authority archives are poor
- A number complained that some journals still aren’t available electronically
- The cost of interlibrary loans and photocopying; time taken to get ILLs – of concern to a number of respondents
- Lack of time to explore data; ‘Hideous’ amounts of paperwork and admin kill research time
- Access to full text rather than abstracts unavailable
- State of the art data not in the public domain (motor engineering)
- Primary sources such as manuscripts can only be accessed by travelling; hard to fit in travel time to access primary resources around other responsibilities
- Long lead times to access European earth observation (remote sensing) data; unlike open US policy
- Delays in getting books, books lost, books only in libraries closed to non-members
- Citation indexes not as available as they used to be
- TV and video material is not accessibly archived and available
- Ephemeral nature of recorded performance

3.4.6 Research assistance

We also asked if people had assistance in carrying out their research. Only 25% of physical scientists and 30% of biological and medical researchers had no research help, but nearly 50% of social scientists, 82% of arts and humanities and 88% of language and area studies scholars had no help. This was a significant difference (χ^2 (4) = 144.49 p<.01).

Table 11: Research help

% within Umbrella Group

		Research help		Total
		Help	None	
Umbrella Group	Medical and biological sciences	69.8%	30.2%	100.0%
	Physical sciences and engineering	74.8%	25.2%	100.0%
	Social sciences	51.1%	48.9%	100.0%
	Languages and area studies	12.0%	88.0%	100.0%
	Arts and humanities	18.4%	81.6%	100.0%
Total		54.7%	45.3%	100.0%

If we look at reported access problems cross tabulated with research assistance, we find that those who have help are less likely to report problems. This is a significant difference (χ^2 (1) = 9.246 p<.01).

Table 12: Do you encounter problems gaining access to the resources you need to carry out your research? * Research help

% within Do you encounter problems gaining access to the resources you need to carry out your research?

		Research help		Total
		Help	None	
Do you encounter problems gaining access to the resources you need to carry out your research?	Yes	48.9%	51.1%	100.0%
	No	59.9%	40.1%	100.0%
Total		54.7%	45.3%	100.0%

We also looked at reported problems versus experience level. This was found to be significant (χ^2 (3) = 10.866 p<.05).

Table 13: Approximately how many years have you been employed as a research-active academic? * Do you encounter problems gaining access to the resources you need to carry out your research?

% within Approximately how many years have you been employed as a research-active academic?

		Do you encounter problems gaining access to the resources you need to carry out your research?		
		Yes	No	Total
Approximately how many years have you been employed as a research-active academic?	1-5 years	56.1%	43.9%	100.0%
	5-10 years	47.6%	52.4%	100.0%
	10-15 years	43.9%	56.1%	100.0%
	Over 15	41.9%	58.1%	100.0%
Total		47.8%	52.2%	100.0%

Experience level is likely to be important both in terms of sheer know-how (though with digital resources this may be less likely to be the case), but also because the more senior academics are more likely to have the clout and probably the funds to be able to travel to access sources and go to conferences.

Of course, as might be expected, it is more likely that someone employed for longer is also more likely to have help with their research. This is a significant difference ($\chi^2(3) = 32.652$, $p<.01$). Help with research does not affect access per se to resources, but certainly may affect the respondents' view of the ease with which they can be found.

Table 14: Approximately how many years have you been employed as a research-active academic? * Research help

% within Approximately how many years have you been employed as a research-active academic?

		Research help		
		Help	None	Total
Approximately how many years have you been employed as a research-active academic?	1-5 years	40.1%	59.9%	100.0%
	5-10 years	56.5%	43.5%	100.0%
	10-15 years	58.9%	41.1%	100.0%
	Over 15	65.1%	34.9%	100.0%
Total		54.6%	45.4%	100.0%

It would appear that in terms of ease of access to research resources, this has a significant relationship with experience level and the availability of research help, but not with the disciplinary group.

3.5 Research communication

The second overarching theme of the survey was research collaboration and communication, informal and formal; the means of dissemination, the problems faced by scholars in different disciplines, the amount of output, copyright and views on current issues and the future.

3.5.1 Collaboration and informal communication of results

We found that the most frequently used forms of informal communication within the research process are

- Inviting colleagues to comment on work
- Sending drafts of work by email for comment
- Face to face research collaboration

There are significant differences by disciplinary group. Medical and biological scientists are not as likely as social scientists to email drafts for comment, but are as likely to invite colleagues to comment on work; physical scientists are not as likely as other groups either to invite comments on work or email drafts; social scientists, languages and area studies and arts and humanities scholars are less likely to be involved in face to face research collaboration. A small proportion of researchers reported being involved in using online collaborative spaces – highest at 13% for physical sciences - or writing blogs.

These findings fit with the typologies of disciplines explored earlier: the ‘hard’ sciences are more likely to engage in team collaboration, but particular fields in the physical sciences especially are also highly competitive, which may act against any dissemination of results before the pre-print or conference stage; ‘softer’ sciences and the arts/humanities are characterised by low people-problem ratios, so scholars are more likely to be working alone on problems than in collaborations, but also belong to informal social and subject networks for support and comment.

Table 15: Less formal means of communication and collaboration

	Medical and biological sciences	Physical sciences	Social sciences	Languages and area studies	Arts and humanities
Inviting colleagues to comment on your work	86.2	70.4	83	91.7	88.2
Sending drafts of work by email for comment by peers	64.8	58.1	74.4	66.7	74.5
Face to face research collaboration with peers in other institutions	67.3	71.9	47.1	33.3	33.3
Participating in email discussion lists	13.8	15.8	19.7	18.8	14.7
Contributing to online forums or discipline-focused community web sites	5.7	8.9	12.6	4.2	6.9
Writing a blog	1.3	0.5	1.8	0	1
Using a shared online space to collaborate e.g. collaboratory, wiki	6.3	13.3	3.6	2.1	2.9

Significant: inviting colleagues χ^2 (4) = 26.771, p <.01; sending drafts χ^2 (4) =18.365, p<.01; face to face collaboration χ^2 (4) = 62.762, p < .01.

3.5.2 Means of dissemination

We asked respondents to tell us how they disseminated their work; they could tick as many options as they wanted. This shows a varied picture with clear differences in that some forms of dissemination are much more used in some fields than others e.g. monographs, patents, technical reports, software, exhibitions and artefacts. However there are many common ones, especially all manifestations of journal articles (preprint, postprint and published articles); conference proceedings, and book chapters.

Table 16: All means of dissemination used

	Medical and biological sciences	Physical sciences	Social sciences	Languages and area studies	Arts and humanities
Pre-prints	21.3	36.7	40.8	34	29.1
Post-prints	40	46.4	38.6	40	33
Presentation	84.4	75.4	75.3	70	68
Journal article	91.3	87.9	96.9	98	95.1
Other periodical article	27.5	24.2	37.7	32	30.1
Monograph	11.3	9.2	30	84	70.9
Other book	20.6	14.5	34.1	64	57.3
Chapter in book	50	38.6	67.7	84	71.8
Peer reviewed conf. proceedings	62.5	76.8	65.9	64	62.1
Non-peer reviewed conf. proceedings	35.6	33.8	36.3	30	23.3
Third party reports – government/NGO	23.1	20.3	40.4	10	6.8
Third party reports - companies	9.4	21.3	15.2	4	1.9
Technical reports	7.5	30.9	9.4	4	0
Patent applications	9.4	9.7	0.4	0	1
Datasets	11.3	8.7	9.9	10	6.8
Software	5	25.6	4.9	4	3.9
Artefacts	0.6	1.9	0.9	0	1.9
Exhibitions	2.5	4.3	3.1	0	5.8
Performances	0.6	1	1.8	4	7.8

We also asked scholars to choose the three most important means of dissemination in terms of effectiveness at communication with their peers; impact on their and their department's RAE score and impact on securing other means of research funding. We were trying to establish in particular if they favoured one method for peer communication and another to gain credit. This has certainly been a theme of commentary on the effects of the RAE on publishing itself[19][20]. It has often been suggested that it is the RAE which is partly driving the creation of new journals, pressure on space in the most highly rated journals, and a deadline-driven publication culture which leads to bulges in article

[19] Walford. L. The Research Assessment Exercise: its effects on scholarly journal publishing. Learned Publishing 2000:13 (1) 49-52

[20] Mynott J. Publishing: A view from Cambridge University Press. In: The intellectual consequences of the RAE. History of the Human Sciences 1999: 12 (4), 127-31

submission. The Publishers' Association response to the HEFCE consultation on the RAE in November 2002 had this to say[21]:

"While it might be thought that the increased pressure on academics to publish as a result of the RAE has been a boon to the publishing industry, in reality it has had a number of perverse unintended effects on the type, timing and quality of proposals and manuscripts submitted to publishers. There has also been a marked increase in pressure on the editorial boards and journal staff that support the peer-review system, and a discrimination against certain journals because of their impact factor weighting…..Whilst the weight that journal articles give to RAE submission compared with books, book chapters and other 'outputs' is supposed to depend on the discipline and the views of the panel conducting the assessment, there seems to be a general view that publishing journal articles is the most effective way of getting a good rating in the RAE. The pressure to chalk up frequent publications (and the increased general pressures of academic life) is more conducive to journal papers, narrow research monographs, collections of essays and conference volumes than to major works of scholarship and synthesis, which generally require a longer gestation period. As a result, a larger proportion of the most ambitiously broad ranging and potentially influential major academic works now seem to originate in the USA or continental Europe."

The role of academic journal articles in the RAE was discussed in an article by Bence and Oppenheim[22]. They noted that while overall submissions fell slightly between the RAEs of 1996 and 2001, the submission of journal articles increased, in spite of efforts to stress the equitable treatment of all work.

The survey results do show that the consensus among most UoAs is that journal articles have the biggest influence on RAE score. Monographs were chosen by almost as many respondents in arts and humanities and language and areas studies as journal articles. It is interesting to note that in any case, publications are seen as the key influences on RAE score. It is obvious that presentations to meetings are likely to be viewed as a powerful means of peer communication but with relatively little impact on the RAE, because of their ephemeral nature. But it is notable that most forms of publication are chosen more frequently in the context of impact on the RAE than in the context of effective peer communication. The gap is especially wide in the case of journal articles in physical sciences (71.4% most effective peer communication; 91.4% biggest influence on RAE score), peer reviewed conference proceedings in medical and biological (34.2% most effective peer communication; 17.5% biggest impact on RAE) and monographs in languages and area studies (64% most effective peer communication; 92% biggest influence on RAE score). It must be stated that overall, there is quite a close fit between effective peer communication and influence on RAE score for journal articles.

[21] PA response to Joint Funding Bodies' Review of Research Assessment: A response from the Publishers Association to the Higher Education Funding Council for England, November 2002 http://www.publishers.org.uk/paweb/paweb.nsf/0/1995387D8D1487C080256C80004EB41D?opendocument

[22] Bence, V and Oppenheim, C. The role of academic journal publications in the UK Research Assessment Exercise Learned Publishing, 2004: 17 (1) 53-67

Looking at the detailed results in the arts at UoA level, these show that performances and artifacts are not viewed as significant in either effective peer communication or in having an influence on RAE score. Half of respondents in music and in drama dance and performing arts disseminate via performances, but these do not feature in the top three in the other questions. Exhibitions are rather different: a quarter of respondents in History of Art, Architecture and Design and 18% in Art and Design named exhibitions as one of the three main most effective forms of dissemination for peer communication, and this was carried though to impact on RAE score (25% in History of Art, and 36.5% in Art and Design).

Bence's analysis of the actual submissions within ten UoAs for the 2001 RAE (see table 3 above) allows a different perspective: journal articles constituted 65% of all submitted output (69.7% for the RAE overall). Seven of the ten UoAs studied had more than 50% of their submitted output in the form of journal articles. Within the two UoAs in medical and biological sciences (clinical dentistry and nursing), over 90% of submissions were journal articles; in one UoA in physical sciences and engineering (chemical engineering), journal articles were 90.5% but in the other (computing science) only 54.4%. In the two social science UoAs, journal articles made up 80.2% in one (business and management studies) and 52.1% in the other (law). In the languages and areas studies UoAs, American Studies' submissions were 39.1% journal articles, in English Language and Literature, 29.1%. In the arts and humanities, 58.8% of library and information management's submissions were journal articles, against 31.2% of those in classics and ancient history. (Note: these UoAs are different numbers in our survey because of the change from 2001 to 2008 categories).

Of course, the imponderable here is the effect that the outcomes of the 2001 RAE have had on the attitudes of scholars about what impact their various submissions had, and whether it has reinforced a tendency to see journal articles as the gold standard.

Table 17: Means of dissemination: % of respondents placing in top three in terms of peer communication and RAE score

	Medical and biological sciences		Physical sciences		Social sciences		Languages and area studies		Arts and humanities	
	Most effective peer-to-peer	Biggest influence on RAE score	Most effective peer-to-peer	Biggest influence on RAE score	Most effective peer-to-peer	Biggest influence on RAE score	Most effective peer-to-peer	Biggest influence on RAE score	Most effective peer-to-peer	Biggest influence on RAE score
Pre-prints	6.8	0.6	21.4	2.4	12.6	1.4	10	0	2.9	1
Post-prints	14.3	16.3	22.3	11.5	11.2	7.7	10	4	5.9	1
Presentation	51.6	7.5	46.6	6.2	39.9	4.1	26	0	31.4	2
Journal article	85.7	91.3	71.4	91.4	82.1	95	84	94	84.3	87.3
Other periodical article	6.2	7.5	4.4	8.1	6.3	4.1	4	4	4.9	1
Monograph	2.5	7.5	4.4	14.4	14.8	39.2	64	92	54.9	79.4
Other book	3.1	3.8	1	6.2	8.1	13.5	18	12	17.6	20.6
Chapter in book	10.6	11.9	5.3	18.7	14.3	22.5	46	56	25.5	33.3
Peer reviewed conf. proceedings	34.2	17.5	45.1	35.4	34.5	14.9	12	10	16.7	12.7
Non-peer reviewed conf. proceedings	5	6.9	1.9	1	7.2	3.2	0	0	0	1
Third party reports – government/NGO	14.9	0.6	7.3	1	9.9	0.5	0	0	1	0
Third party reports - companies	0.6	0	3.4	1.4	0.4	0.5	0	0	0	1
Technical reports	0.6	0.6	7.8	1.4	0.9	0.5	0	0	0	1
Patent applications	0.6	6.9	0	6.7	0	0	0	0	0	0
Datasets	1.9	0	1.5	0	0	0	0	0	1	0
Software	0	2.9	2.9	0	0	0	2	0	1	0
Artefacts	0	0	0	0	0	0	0	0	1	2
Exhibitions	0	0	0	0	0	0	0	0	4.9	5.9

3.5.3 Journal type preferred

We asked respondents to state their preferences (or none) in relation to the type of journal in which they prefer to publish. Substantial percentages in each discipline group agreed most with the statement that "the prestige of the journal matters more than the type" though this group was in the majority only in medical and biological sciences and languages and area studies. However, it is probably logical to also bracket these with the groups whose departments have a preferred list of journals. Social scientists seem to be most likely to be in departments where this is the case. A fifth of physical scientists and engineers, and over 10% of medical/biological and social scientists prefer to publish in society journals and around a fifth of social scientists and those in the arts and humanities prefer to publish in traditional commercial journals. Open Access journals were favoured by 8% of physical and biological/medical scientists and almost the same proportion of social scientists and arts and humanities scholars. The largest proportion of those with no preference was in languages and area studies.

Table 18: Thinking only about journal articles, which statement best expresses your position about where you wish to place your work?
% within Umbrella Group

		Thinking only about journal articles, which statement best expresses your position about where you wish to place your work						Total
		Prefer to publish in traditional commercial journals	Prefer to publish in OA journals	Prefer to publish in society journals	The prestige of the journal matters more than the type	My department has a preferred list of journals	I have no preference	
Umbrella Group	Medical and biological sciences	12.3%	8.0%	11.7%	54.3%	7.4%	6.2%	100.0%
	Physical sciences and engineering	17.2%	8.1%	20.6%	38.8%	10.0%	5.3%	100.0%
	Social sciences	20.2%	6.3%	11.2%	39.0%	14.3%	9.0%	100.0%
	Languages and area studies	18.0%		8.0%	58.0%		16.0%	100.0%
	Arts and humanities	22.3%	6.8%	10.7%	45.6%	4.9%	9.7%	100.0%
Total		17.8%	6.8%	13.7%	44.4%	9.4%	7.9%	100.0%

There may well be a significant relationship here between disciplinary group and preferred journal type but it could not be securely established with the data we had.

3.5.4 Problems in publishing in preferred outlets

Looking at the degree of problems faced by different groups in publishing in preferred outlets, only medical and biological sciences and social sciences had a majority reporting problems. The relationship is significant between disciplinary group and whether or not there is a reported problem. χ^2 (4) = 36.131 p<.01. There is no significant relationship between size of department and reported publishing problems, or between length of experience and reported problems.

Table 19: Do you encounter problems in publishing/dissemination in your preferred outlets?

% within Umbrella Group

		Do you encounter problems in publishing/dissemination in your preferred outlets?		
		Yes	No	Total
Umbrella Group	Medical and biological sciences	51.2%	48.8%	100.0%
	Physical sciences and engineering	28.1%	71.9%	100.0%
	Social sciences	50.2%	49.8%	100.0%
	Languages and area studies	24.0%	76.0%	100.0%
	Arts and humanities	36.9%	63.1%	100.0%
Total		40.7%	59.3%	100.0%

3.5.5 Type of problems

We asked all those respondents who reported problems i.e. just over 40% of the total, to give us some detail about them and gave them a list of possible problems, covering publishing and wider dissemination issues. They were able to tick as many as were applicable. Clearly, in some UoAs the numbers are becoming very small when those not reporting problems are excluded. The major problems across the board are “pressure on space and/or high rejection rate in journals highly-rated in the RAE” and “slow speed of reviewing and decision-making in the publication process”. Arts and humanities and especially language and area studies scholars also experienced significant problems due to “fewer monographs being published” ; perhaps surprisingly, “Funding is not available to pay page charges or other fees to publish” was nominated by a third of medical and biological scientists. Sizeable minorities, ranging from a fifth in social sciences to around a third in medical and biological sciences reported not having sufficient funds available to attend the right conferences”. A quarter of respondents in social sciences and arts and humanities, and 18-19% in medical and physical sciences said that they “cannot find an appropriate outlet for interdisciplinary research.” Looking at individual UoAs, the highest percentages reporting interdisciplinary problems were in

archaeology (50%) epidemiology and public health (43%), sports related studies (33%), European studies (33%), cardiovascular medicine, dentistry and statistics and operational research (25%).

Arts and performing arts scholars did not report any sizeable problem with finding appropriate outlets for creative or performing arts research overall. However, a third of music scholars reported that they could not find an appropriate outlet for their research, and 12.5% of drama, dance and performing arts scholars. Figure 9 shows that outlets for interdisciplinary research are a problem in art and design, but outlets for creative research is a problem in music, along with page charges. For Dance, drama and performing arts, fewer monographs being published is an issue. There are some comments on the problems of music scholars in the Comments section.

Table 20: Detailed problems in publishing/dissemination

	Medical and biological sciences	Physical sciences	Social sciences	Languages and area studies	Arts and humanities
Pressure on space and/or high rejection rate in journals rated highly in RAE	91.6	77.6	81.4	75	84.2
Slow speed of reviewing and decision making in the publication process	61.4	75.9	83.2	83.3	81.6
Funding is not available to pay page charges or other fees to publish	31.3	19	13.3	25	7.9
Fewer monographs being published	2.4	0	16.8	66.7	36.8
No funding available to attend the right conferences	34.9	27.6	20.4	25	23.7
Cannot find an appropriate outlet for my interdisciplinary research	18.1	19	24.8	16.7	26.3
Cannot find an appropriate outlet for my creative or performing arts research	0	0	0.9	8.3	13.2

Looking at some of the larger UoAs shows the following patterns of problems:

Figure 7: Selected science UoAs, dissemination problems

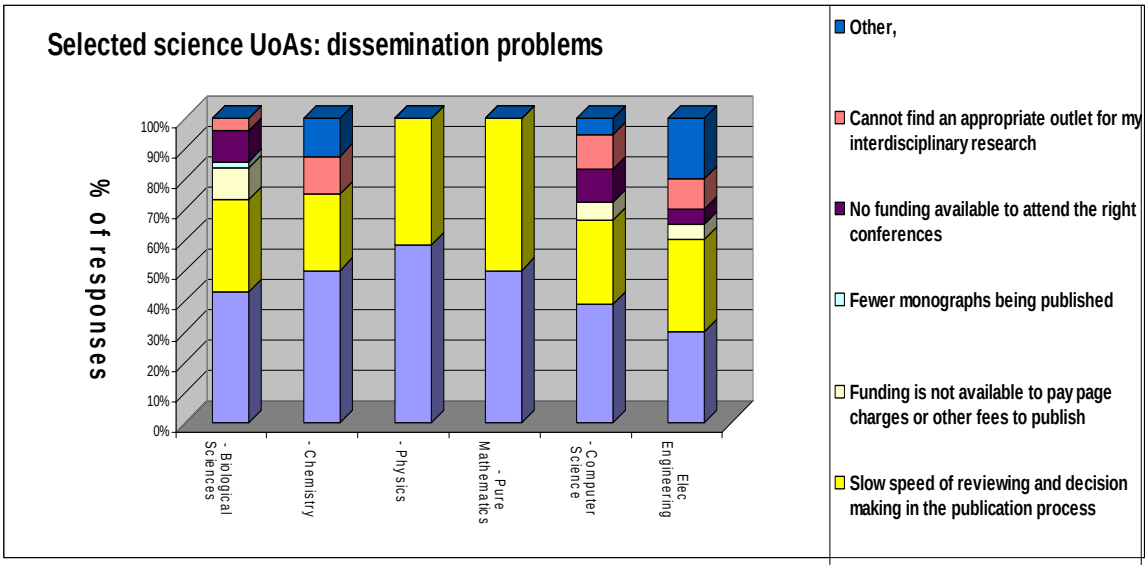


Figure 8: Selected social science UoAs, dissemination problems

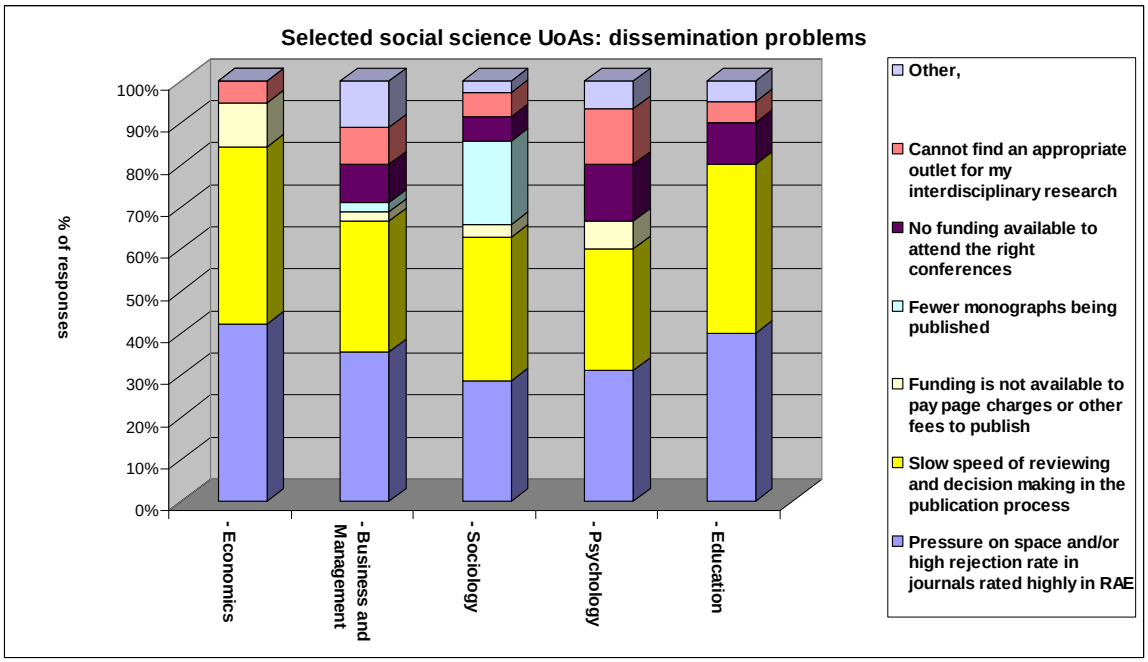


Figure 9: Selected language and humanities UoAs, dissemination problems

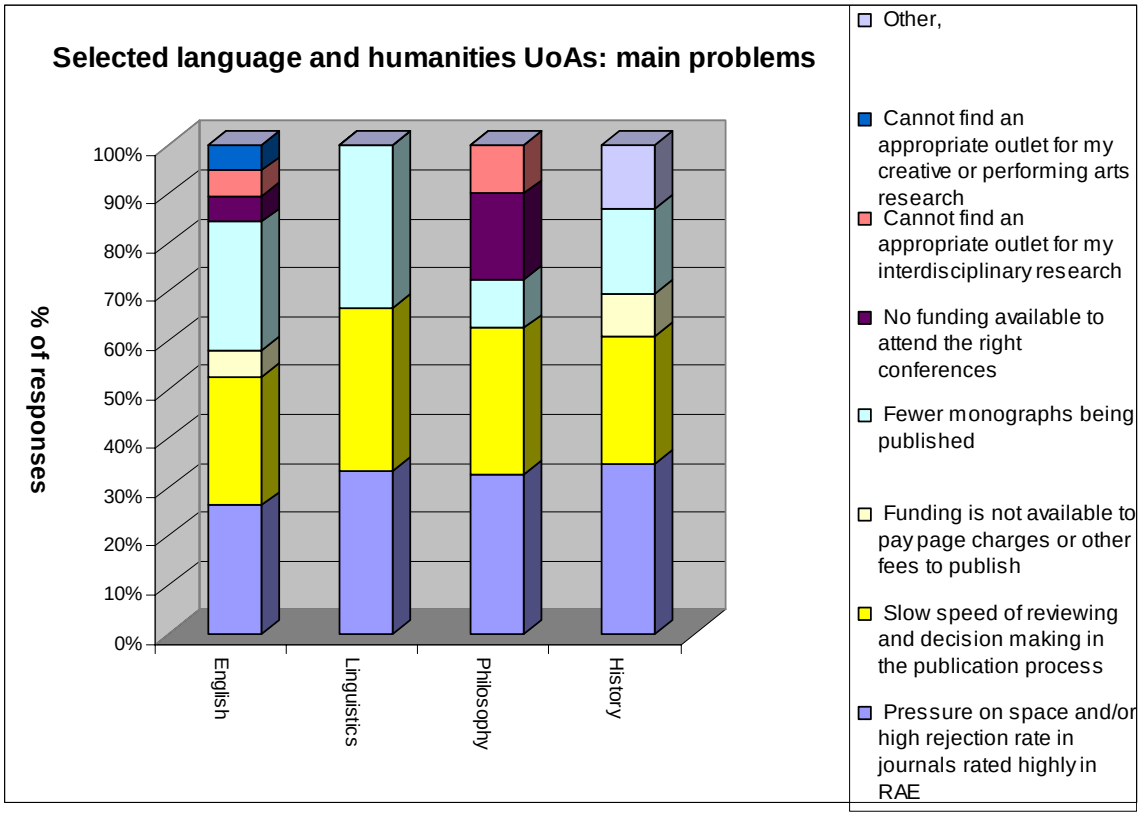
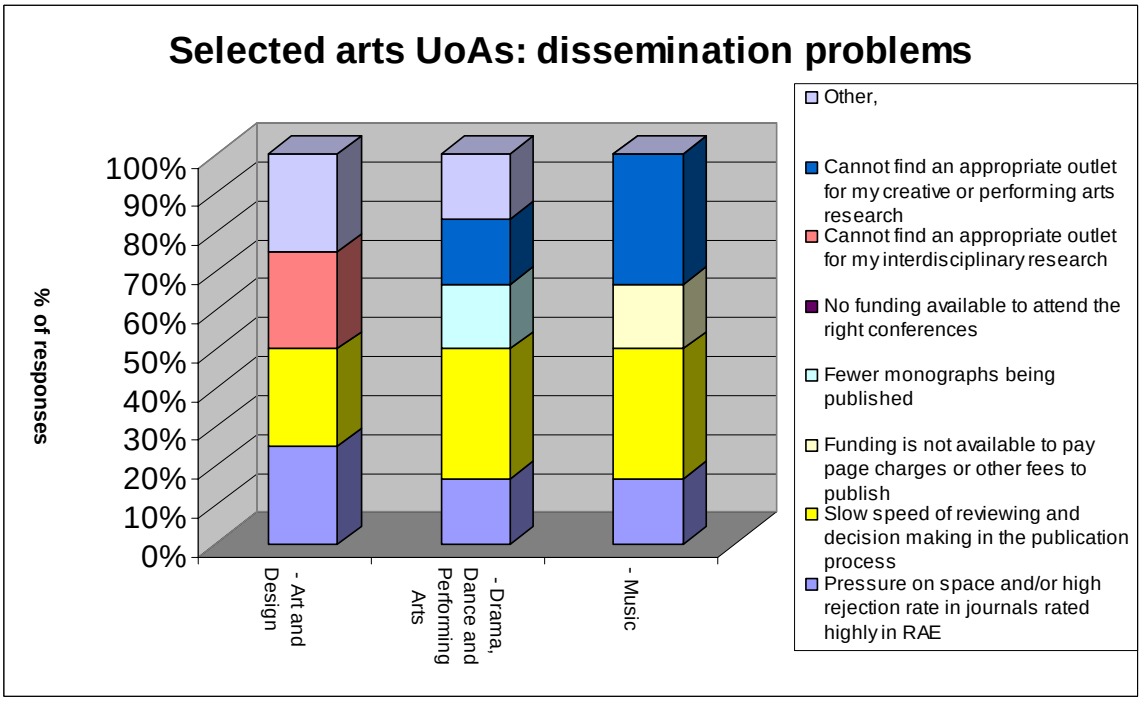


Figure 10: Selected arts UoAs, dissemination problems



3.5.6 Volume of publishing activity

We asked respondents for an indication of their volume of published output in a typical three-year period. The overall mean number of journal articles was 5.75. The difference between means in umbrella groups was significant: arts and humanities was closer to languages and area studies, and physical sciences and medical and biological sciences were also close together, with social sciences in between. Comparing means on peer-reviewed conference proceedings (overall mean 4.40) also showed a significant difference, with a similar pattern to that in journal articles. In other types of output there was either no significant difference (book chapters) or insufficient numbers of cases in some groups (e.g. technical reports and artefacts) to perform a test. This clearly reflects the fact that some types of output are particular to some disciplines, whereas others, such as articles and book chapters, occur across the board.

Table 21: In any three-year period, what would be your typical output? Journal article

Student-Newman-Keuls

		Subset for alpha = .05		
Umbrella Group	N	1	2	3
Arts and humanities	96	2.77		
Languages and area studies	49	3.10		
Social sciences	210		4.98	
Physical sciences and engineering	197			7.37
Medical and biological sciences	154			7.44
Sig.		.684	1.000	.937

Means for groups in homogeneous subsets are displayed.
a Uses Harmonic Mean Sample Size = 106.030.

b The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

In any three-year period, what would be your typical output? Journal article

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2274.450	4	568.612	16.263	.000
Within Groups	24509.172	701	34.963		
Total	26783.622	705			

Table 22: In any three-year period, what would be your typical output? Peer-reviewed conference proceedings

Student-Newman-Keuls

Umbrella Group	N	Subset for alpha = .05	
		1	2
Languages and area studies	25	2.28	
Arts and humanities	52	2.58	
Social sciences	136	3.82	3.82
Medical and biological sciences	104		4.82
Physical sciences and engineering	164		5.51
Sig.		.092	.058

Means for groups in homogeneous subsets are displayed.
a Uses Harmonic Mean Sample Size = 60.756.
b The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

In any three-year period, what would be your typical output? Peer-reviewed conference proceedings

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	551.358	4	137.840	8.371	.000
Within Groups	7838.001	476	16.466		
Total	8389.360	480			

3.5.7 Joint authorship

This question of output volume would be expected to relate to joint authorship, so we also asked what proportion of work is typically jointly authored. Overall, 10.5% of respondents answered 'none' and 21.9% answered 'all' but there were large differences between groups. 36% of arts and humanities answered none, compared with 2.5% of medical and biological scientists and 1% of physical scientists, 10% of social scientists, and 24% of language and area studies scholars. Nearly 44% of medical and biological scientists answered 'all' and a further 42% 'more than 75%'. A third of physical scientists reported that all their output was jointly authored, and a further 48% that more than three-quarters of their output is jointly authored. If the category 'under 25%'is added to 'none' then 78% of language/area studies and of arts and humanities respondents are accounted for. Social science respondents were more equally spread, with a 22% in the under 25% category, nearly 30% in the 50% group and 37.5% in the more than 75% or all categories combined.

The difference between groups was significant χ^2 (16) =385.996 p=<.01.

Table 23: Typically, roughly what proportion of your output is jointly authored?
% within Umbrella Group

		Typically, roughly what proportion of your output is jointly authored?					
		None	Under 25%	50%	More than 75%	All	Total
Umbrella Group	Medical and biological sciences	2.5%	3.1%	8.8%	41.9%	43.8%	100.0%
	Physical sciences and engineering	1.0%	3.9%	14.0%	47.8%	33.3%	100.0%
	Social sciences	10.5%	22.4%	29.7%	28.8%	8.7%	100.0%
	Languages and area studies	24.0%	54.0%	12.0%	8.0%	2.0%	100.0%
	Arts and humanities	36.0%	42.0%	15.0%	5.0%	2.0%	100.0%
Total		10.5%	17.8%	17.5%	32.3%	21.9%	100.0%

3.6 Copyright and self-archiving

3.6.1 Copyright agreements

We asked respondents to describe their copyright agreements with publishers, firstly for journal articles or refereed conference proceedings, and secondly for books.

Looking at journal articles/conference proceedings, nearly a quarter of social scientists and arts and humanities scholars did not know the copyright position, compared with nearly 18% of medical/biological and physical scientists. Another third to a half in all areas replied that it varies by publisher – though in reality there could be some 'don't knows' in there too. The highest proportions reporting that publishers license self-archiving were 38% in physical science and 27% in medical and biological sciences, with 23% in social sciences and around 15% in languages and arts/humanities. A fairly uniform proportion across the groups – 8-13% - reported that publishers prohibit all other uses.

Table 24: When you make an agreement with a publisher to publish a journal article or refereed conference publication, what is the copyright position

% within Umbrella Group

	When you make an agreement with a publisher to publish a journal article or refereed conference publication, what is the copyright position?							Total
	Publisher holds copyright and licenses to self-archive	Publisher holds copyright and licenses delayed self archive	You retain copyright and license publisher	Publisher holds copyright and prohibits other use	Depends on publisher	Don't know	Don't publish in journals	
Medical and biological sciences	27.2%	2.5%	1.3%	11.4%	39.9%	17.7%		100.0%
Physical sciences and engineering	38.0%	3.8%	1.9%	13.0%	24.5%	17.8%	1.0%	100.0%
Social sciences	23.4%	2.8%	2.8%	12.4%	33.5%	24.8%	.5%	100.0%
Languages and area studies	16.7%	6.3%	14.6%	10.4%	37.5%	14.6%		100.0%
Arts and humanities	14.7%		2.9%	7.8%	48.0%	24.5%	2.0%	100.0%
Total	26.7%	2.9%	3.0%	11.6%	34.6%	20.6%	.7%	100.0%

This appeared to show significant differences but not enough confidence could be placed in the test because of the lack of expected frequencies in a substantial proportion of cells.

As far as books are concerned, a surprisingly high proportion reported that self-archiving is permitted; however because a third or more of medical and biological and physical scientists don't publish books and nearly 20% more don't know the copyright position, this is not enormously important. The don't knows were a smaller group in arts and humanities and language/area studies than they were in the journal question, signalling perhaps that academic authors do pay more attention to contracts where money is involved. But they were nearly as large a proportion in the social sciences.

Table 25 * When you make an agreement with a publisher to publish a book, what is the copyright position?

% within Umbrella Group

		When you make an agreement with a publisher to publish a book, what is the copyright position?						
		Publisher holds copyright and licenses to self-archive	You retain copyright and license publisher	Publisher holds copyright and prohibits other use	Depends on publisher	Don't know	Don't publish books	Total
Umbrella Group	Medical and biological sciences	15.6%	1.3%	8.1%	20.6%	20.0%	34.4%	100.0%
	Physical sciences and engineering	15.5%	3.4%	9.7%	13.1%	18.9%	39.3%	100.0%
	Social sciences	18.5%	9.3%	11.6%	19.0%	23.6%	18.1%	100.0%
	Languages and area studies	12.5%	20.8%	14.6%	33.3%	16.7%	2.1%	100.0%
	Arts and humanities	18.8%	13.9%	8.9%	36.6%	13.9%	7.9%	100.0%
Total		16.7%	7.3%	10.1%	21.1%	19.7%	25.2%	100.0%

3.6.2 Self-archiving practices

We tried to discover first of all the level of awareness of institutional or subject-based repositories in different disciplines; and then the whether respondents do in fact deposit in them, and finally, if they are aware but do not deposit, what are the main barriers to so doing.

3.6.3 Awareness of institutional repositories and relevant open archives

The majority of respondents in all groups do not know if their university has an institutional repository. Awareness was just as high or higher in social sciences and languages/area studies as in physical sciences, while it was higher in arts and humanities than in medical/biological sciences.

Respondents were somewhat more aware of subject-based open archives relevant to their discipline; nearly half of physical scientists and engineers were aware of such open archives. Nearly a third of social scientists, arts and humanities scholars and

medical/biological scientists were aware, as were over a quarter of language/area studies scholars.

Table 26: Does your university have an institutional repository (IR)?

% within Umbrella Group

		Does your university have an institutional repository (IR)?			
		Yes	No	Don't Know	Total
Umbrella Group	Medical and biological sciences	13.6%	6.2%	80.2%	100.0%
	Physical sciences and engineering	15.2%	17.1%	67.6%	100.0%
	Social sciences	12.9%	19.1%	68.0%	100.0%
	Languages and area studies	18.0%	18.0%	64.0%	100.0%
	Arts and humanities	7.8%	21.4%	70.9%	100.0%
Total		13.3%	16.0%	70.7%	100.0%

The difference between disciplines is significant χ^2 (8) = 20.028 p<.05

Table 27: Are you aware of open archives appropriate to your discipline?

% within Umbrella Group

		Are you aware of open archives appropriate to your discipline?		
		Yes	No	Total
Umbrella Group	Medical and biological sciences	29.6%	70.4%	100.0%
	Physical sciences and engineering	42.9%	57.1%	100.0%
	Social sciences	32.4%	67.6%	100.0%
	Languages and area studies	26.0%	74.0%	100.0%
	Arts and humanities	29.1%	70.9%	100.0%
Total		33.9%	66.1%	100.0%

The difference is significant χ^2 (4) = 11.495, p <.05

3.6.5 Self archiving behaviour

The questions about self-archiving behaviour were only responded to by those who were aware of IRs or subject archives. Of those, there was a considerable variation, with half of physical scientists depositing routinely in the IR being the highest proportion (50%) and 18% of medical and biological scientists being the lowest. The highest proportion of respondents depositing in subject archives was also among physical scientists (44%) but the lowest was in arts and humanities (15.6%) whereas the other groups were about the same at around a third. Neither dataset was testable for significance with the requisite degree of confidence.

Table 28: Do you routinely deposit your research in the IR?

% within Umbrella Group

		Do you routinely deposit your research in the IR?		
		Yes	No	Total
Umbrella Group	Medical and biological sciences	18.2%	81.8%	100.0%
	Physical sciences and engineering	50.0%	50.0%	100.0%
	Social sciences	24.1%	75.9%	100.0%
	Languages and area studies	33.3%	66.7%	100.0%
	Arts and humanities	37.5%	62.5%	100.0%
Total		33.0%	67.0%	100.0%

Table 29: Do you deposit in open archives?

% within Umbrella Group

		Do you deposit in open archives?		
		Yes	No	Total
Umbrella Group	Medical and biological sciences	30.6%	69.4%	100.0%
	Physical sciences and engineering	44.0%	56.0%	100.0%
	Social sciences	32.9%	67.1%	100.0%
	Languages and area studies	38.5%	61.5%	100.0%
	Arts and humanities	15.6%	84.4%	100.0%
Total		34.5%	65.5%	100.0%

3.6.6 Barriers to self archiving

The main barriers to self archiving appear to be that researchers are 'too busy' and that they lack knowledge of how to go about it and or do not see it as an important channel. Sizeable groups were concerned about copyright and publishers' attitudes (fitting with the fact that many academic authors do not know what agreements they have with publishers over journal articles) and the quality of the archive in which their work would sit. Few people seemed worried that it might be a step to universities claiming copyright over authors' work. However, excluding all those who were unaware of subject-based open archives and IRs left only 160 respondents. There does not seem to be a major difference between disciplinary groups, except that fewer physical scientists felt they did not know how to go about it than other groups.

Table 30: If you are aware of appropriate IRs/open archives but do not deposit your research in them, what are the barriers to you doing so (multiple answers permitted).

	Medical and biological sciences	Physical sciences	Social sciences	Languages and area studies	Arts and humanities
Uncertainty over whether you retain copyright or are licensed to deposit	21.9	24.5	23.4	0	20
Concerned about publishers' attitudes	18.8	20.4	17	28.6	12
Don't know how to go about it	50	18.4	25.5	42.9	28
Don't regard it as an important channel of dissemination	28.1	30.6	27.7	42.9	36
Concerned about whether everything in the archives is of comparable standard	21.9	20.4	12.8	28.6	12
Concerned that it may be a step to the university claiming copyright over my work	3.1	0	4.3	14.3	0
Too busy	28.1	51	34	57.1	28

3.7 Attitudes to research evaluation, the serials crisis and the future of scholarly communication

Respondents were first asked if they were aware of current debates on open access. About two-thirds were aware, across all the groups, the highest being medical and biological sciences and the lowest arts and humanities. The difference was not significant. This level of awareness was higher than might have been expected – given lack of awareness of institutional repositories for example - and more uniform.

Table 31: Are you aware of the current debates about open access to scholarly communication?

% within Umbrella Group

		Are you aware of the current debates about open access to scholarly communication?		
		Yes	No	Total
Umbrella Group	Medical and biological sciences	72.2%	27.8%	100.0%
	Physical sciences and engineering	69.9%	30.1%	100.0%
	Social sciences	62.5%	37.5%	100.0%
	Languages and area studies	64.0%	36.0%	100.0%
	Arts and humanities	60.2%	39.8%	100.0%
Total		66.4%	33.6%	100.0%

Respondents were offered a series of statements and invited to register their degree of agreement or disagreement. The majority of researchers in all subject groups agreed or strongly agreed with funding bodies mandating deposit in open archives. A quarter to a third did not agree, however, and this was highest in arts and humanities and languages/area studies. On open access journals, support from those groups was a bit higher; the lowest level of agreement here was in the physical sciences. Researchers also agreed overwhelmingly with a different proposition – that journals should be free to authors and institutions should allocate enough funds to buy scholars what they need. The final proposition was the least popular – a central body buying all the needed resources – though still supported by a majority overall, with more support in the sciences and social sciences than in languages and humanities/arts.

Table 32: Research funding bodies should mandate all researchers to deposit their results in open archives

% within Umbrella Group

		Research funding bodies should mandate all researchers to deposit their results in open archives				
		Strongly agree	Agree	Disagree	Strongly disagree	Total
Umbrella Group	Medical and biological sciences	30.8%	44.0%	22.0%	3.1%	100.0%
	Physical sciences and engineering	29.6%	40.9%	23.2%	6.4%	100.0%
	Social sciences	41.2%	41.2%	15.3%	2.3%	100.0%
	Languages and area studies	31.1%	33.3%	35.6%		100.0%
	Arts and humanities	29.2%	36.5%	22.9%	11.5%	100.0%
Total		33.4%	40.6%	21.3%	4.7%	100.0%

Table 33: Scholarly journals should be open access and free to the reader, with institutions and funding bodies paying the cost of publication for authors

% within Umbrella Group

		Scholarly journals should be open access and free to the reader, with institutions and funding bodies paying the cost of publication for authors				
		Strongly agree	Agree	Disagree	Strongly disagree	Total
Umbrella Group	Medical and biological sciences	38.1%	41.3%	16.9%	3.8%	100.0%
	Physical sciences and engineering	35.0%	32.5%	26.5%	6.0%	100.0%
	Social sciences	34.1%	44.4%	19.6%	1.9%	100.0%
	Languages and area studies	41.3%	43.5%	13.0%	2.2%	100.0%
	Arts and humanities	34.4%	36.5%	21.9%	7.3%	100.0%
Total		35.8%	39.2%	20.8%	4.2%	100.0%

Table 34: Journals should be free for authors to publish in and universities should allocate sufficient funds for libraries to purchase what scholars need

% within Umbrella Group

		Journals should be free for authors to publish in and universities should allocate sufficient funds for libraries to purchase what scholars need				
		Strongly agree	Agree	Disagree	Strongly disagree	Total
Umbrella Group	Medical and biological sciences	35.8%	42.8%	18.9%	2.5%	100.0%
	Physical sciences and engineering	44.8%	37.3%	11.9%	6.0%	100.0%
	Social sciences	43.0%	46.3%	9.3%	1.4%	100.0%
	Languages and area studies	54.3%	32.6%	13.0%		100.0%
	Arts and humanities	46.9%	37.8%	13.3%	2.0%	100.0%
Total		43.2%	40.9%	13.0%	2.9%	100.0%

Table 35: A central body should buy all the resources for researchers on a national basis

% within Umbrella Group

		A central body should buy all the resources for researchers on a national basis				
		Strongly agree	Agree	Disagree	Strongly disagree	Total
Umbrella Group	Medical and biological sciences	23.3%	29.6%	35.2%	11.9%	100.0%
	Physical sciences and engineering	22.4%	33.2%	35.2%	9.2%	100.0%
	Social sciences	19.6%	29.6%	38.2%	12.6%	100.0%
	Languages and area studies	25.6%	20.9%	41.9%	11.6%	100.0%
	Arts and humanities	20.0%	26.3%	38.9%	14.7%	100.0%
Total		21.7%	29.6%	37.0%	11.7%	100.0%

We then asked respondents to express their degree of agreement or disagreement with several statements about the process of research evaluation and about new forms of dissemination/publication.

On peer review, the majority of the respondents in all groups disagreed or strongly disagreed that traditional peer review was flawed, but the majority was not overwhelming in the social sciences (56.3% disagreed) or medical and biological sciences (55.7% disagreed). It was over 70% in physical sciences and 65.3% in arts and humanities. The difference is significant χ^2 (12) = 25.255, p< .05.

Table 36: Traditional peer review is flawed and ripe for replacement

% within Umbrella Group

		Traditional peer review is flawed and ripe for replacement				
		Strongly agree	Agree	Disagree	Strongly disagree	Total
Umbrella Group	Medical and biological sciences	14.5%	28.9%	49.7%	6.9%	100.0%
	Physical sciences and engineering	9.9%	18.2%	53.7%	18.2%	100.0%
	Social sciences	10.6%	33.6%	45.6%	10.1%	100.0%
	Languages and area studies	12.2%	26.5%	51.0%	10.2%	100.0%
	Arts and humanities	9.9%	24.8%	55.4%	9.9%	100.0%
Total		11.2%	26.6%	50.5%	11.7%	100.0%

There was a large measure of agreement with the statement that the RAE skews the practice of research, across all groups. There was slightly more disagreement with the notion that the RAE skews dissemination, but still the great majority in each group agreed.

Table 37: The research assessment exercise skews the practice of research

% within Umbrella Group

		The research assessment exercise skews the practice of research				
		Strongly agree	Agree	Disagree	Strongly disagree	Total
Umbrella Group	Medical and biological sciences	53.5%	34.4%	10.8%	1.3%	100.0%
	Physical sciences and engineering	43.3%	37.4%	15.8%	3.4%	100.0%
	Social sciences	53.2%	35.0%	11.4%	.5%	100.0%
	Languages and area studies	48.0%	40.0%	10.0%	2.0%	100.0%
	Arts and humanities	65.3%	23.8%	10.9%		100.0%
Total		51.8%	34.3%	12.3%	1.5%	100.0%

Table 38: The research assessment exercise skews the dissemination of research

% within Umbrella Group

		The research assessment exercise skews the dissemination of research				
		Strongly agree	Agree	Disagree	Strongly disagree	Total
Umbrella Group	Medical and biological sciences	48.7%	35.3%	14.7%	1.3%	100.0%
	Physical sciences and engineering	34.2%	38.2%	24.1%	3.5%	100.0%
	Social sciences	51.2%	35.0%	13.4%	.5%	100.0%
	Languages and area studies	41.7%	31.3%	25.0%	2.1%	100.0%
	Arts and humanities	52.0%	30.0%	16.0%	2.0%	100.0%
Total		45.4%	35.0%	17.8%	1.8%	100.0%

Researchers were then asked to agree or disagree with two statements about the form of future dissemination of results. A large majority disagreed that journal articles will become increasingly irrelevant over the next ten years as a means of communicating research. The hard sciences were most likely to agree with about a quarter in medical/biological and physical sciences agreeing or strongly agreeing. Twenty per cent of arts and humanities agreed. But it appears that people think that traditional forms will thrive alongside alternatives, as the great majority agreed or strongly agreed that "new forms of dissemination that exploit digital platforms will become increasingly important in my discipline in the next ten years". The highest level of disagreement came from languages and area studies scholars.

Table 39: The journal article will become increasingly irrelevant as a means of communicating research in the next ten years

% within Umbrella Group

		The journal article will become increasingly irrelevant as a means of communicating research in the next ten years				
		Strongly agree	Agree	Disagree	Strongly disagree	Total
Umbrella Group	Medical and biological sciences	3.8%	22.9%	55.4%	17.8%	100.0%
	Physical sciences and engineering	10.3%	16.7%	48.0%	25.0%	100.0%
	Social sciences	3.7%	15.7%	56.9%	23.6%	100.0%
	Languages and area studies	8.3%	6.3%	66.7%	18.8%	100.0%
	Arts and humanities	5.1%	15.2%	51.5%	28.3%	100.0%
Total		6.1%	16.9%	54.0%	23.1%	100.0%

Table 40: New forms of dissemination that exploit digital platforms, such as open archives and electronic-only monographs will become increasingly important in my discipline within ten years

% within Umbrella Group

		New forms of dissemination that exploit digital platforms, such as open archives and electronic-only monographs will become increasingly important in my discipline within ten years				
		Strongly agree	Agree	Disagree	Strongly disagree	Total
Umbrella Group	Medical and biological sciences	16.0%	59.0%	22.4%	2.6%	100.0%
	Physical sciences and engineering	26.5%	51.5%	19.0%	3.0%	100.0%
	Social sciences	20.9%	55.5%	22.7%	.9%	100.0%
	Languages and area studies	25.0%	39.6%	33.3%	2.1%	100.0%
	Arts and humanities	16.0%	59.0%	20.0%	5.0%	100.0%
Total		21.0%	54.5%	22.0%	2.5%	100.0%

3.8 Comments

We clearly cannot reproduce all the comments we received, many of which were on the subject of the future of scholarly communication. This is a selection of some of these comments:

- For many reasons I believe very strongly in the need to develop, and indeed to give assistance, and to help coordinate, the development of free-to-use web publishing of Journals. But I know very well that this pulls in exactly the opposite direction to current directions in Journal publishing, which are becoming milch-cows for publishers as never before.

- The commercial journal publishers operate a grossly extortionate policy that hinders academic research.

- Publicly funded research should be open access. Independent researchers should be able to publish without cost. In an ideal world universities would be able to afford access (particularly on-line access) although charges by some publishers are outrageous

- Publicly funded research should be available to all. Journals will continue to dominate in my field for the foreseeable future.

- Personally I would like to see the best British journals electronically archived and free as these are the ones I need to access. The money for this could be allocated centrally. This seems to be the path taken by the French for mathematics journals (NUMDAM) and the resource is excellent. A similar thing also seems to be available from Germany. This not only is a real boon to researchers from UK universities with small holdings in journals, but will also help for many much poorer international institutions, especially if the trend catches on to other countries willing to publicise their best work. Weaker journals could be left to the present system.

- It is unrealistic to place the cost of publication on universities, as they have enough funding problems already. Likewise, although it would be ideal if universities could purchase all relevant journals, it would be far too expensive. I think the British Library is the best option, as a central repository but I question whether interlibrary loans (in particular journal article photocopies) have to be so expensive.

- The change is inevitable - however I don't suppose it will be swift in Mathematics. A few really strong on-line journals will make a big difference. What separates Mathematics (and some theoretical physics) from other disciplines is that the majority of authors already type their work in a typesetting language (TeX) so that it is possible for everyone to produce well-typeset publishable documents.

- In an ideal world the methods to achieve access to researchers do not matter. Whether this is through self archiving, OA Journals or institutions receiving more money for their library budgets does not matter to me as a researcher - though I suspect self archiving or open access publishing are the only viable options.

- Humanities journals tend to be cheap (I have personal subscriptions to several, costing in total GBP150 each year) so the open access debate is less relevant.

- Resources should be available to all researchers regardless of nationality (both for access to published papers and as an outlet for the products of their research), with publication subject only to peer-review. If this means rationing the number of papers that are published, then so be it.

- Journals should provide refereeing services to authors. The papers might exist only in the open archives. Essentially, you pay to have your paper assessed, if you want to.

- Open-access will remain pretty irrelevant for researchers as long as their entire career depends upon placing monographs with the most heavily sought after university presses -- pretty much the opposite of open access for either authors or consumers of these expensive tomes.

- RAE definitely skews the practice and dissemination of research. It is arguable whether that is a good or bad thing. Although anomalies definitely exist, overall research quality has definitely improved since the RAE.

- The RAE skews the practice of research by forcing us to churn out journal articles before we are really ready, and it puts pressure on us to deliver four publications in top international journals every RAE period. This distorts practice by influencing the type of research that is done: it must deliver publishable results within a year or two, in order to get published in time for the next RAE submission.

- The RAE in Electrical and Electronic Engineering has been a particularly insidious influence on research, because it has laid emphasis on funding income as well as output. This is biased against small departments and individual academics doing inexpensive research and in favour of 'research managers' leading teams with expensive needs for equipment and facilities.

- We still need peer-review that is open and transparent for scientific literature to be assessed. Electronic publication and repositories should not change this process.

- It is currently difficult to get funding for publication of research and some journals charge high fees to publish some articles (e.g. those involving colour pictures). There seems to be a long way to go to get to a stage where publishers will allow free dissemination of peer-reviewed published data - but this is where we should be aiming for in the future. Most of the peer-review is conducted by academics who do not charge for their time.

- Journal articles may become the start of the process with peer commentary leading to a larger discussion

- The pressures to publish in highly rated journals makes it very difficult for researchers to choose to publish in journals with progressive copyright policies

- Criticism for publishing outside of the RAE confines has been a cause for research-active staff to leave this department.

- Major problems in practice-based artwork (music), both in publishing work in RAE-valid outlets, and in accessing commercially sponsored outputs for research purposes (a vicious circle).

- I respond as a musicologist, but we have many expert practice-based members of staff for whom there is currently no research-valid mode of publication

- The RAE does skew research and publication. As a young researcher I have been advised not to write book chapters, or indeed anything that doesn't go into an international peer-reviewed journal (i.e. something obviously RAE-able). However, books and peer-reviewed conference volumes last longer on the shelf and are constantly referred to. They are good for research, but apparently not for the RAE or jobs.

4. Validation workshop

A validation workshop was held on 23rd June in Newcastle University. Attendance was not as strong or varied as we had hoped, but it was not a very good time of the academic year to hold it, with many people heavily involved in marking and exam boards. We had representatives of biological science, chemistry, computing science, mathematics, education, linguistics and law. The discussion was however very useful, and particularly illuminated issues around publication and the RAE, and the problems and opportunities associated with interdisciplinarity. It also confirmed that dissemination/publishing is much more of a concern to researchers than is access to resources. The discussion was divided into access to resources and publishing/dissemination issues. In each case, some outline results were presented and attendees invited to discuss them, being particularly encouraged to point out where we may have missed issues and problems that affect them.

4.1 Access to resources

A common issue concerned the desire to see online access to journal back files extending further back in time. It was also clear that desktop and off campus access to journals, and a greater range of journals, is greatly welcomed, along with other electronic tools and services. When asked about conference proceedings as a resource, the audience felt that some disciplines only attended conferences if they felt it would be the only way to get the proceedings, and others felt that good work would get published anyway, or they may press the library to buy the proceedings at a later date.

Biologists

- E-publishing changes have radically improved access to journal articles, but publishers' archives often do not stretch back far enough.
- Cost does preclude access to some expensive journals and this may be critical in some cases.
- Genetics information is generally publicly available but some commercial information can be difficult to get.

Education

- Agreed that some publishers back files do not extend far enough back, and hoped that publishers will move towards making more back issues available online
- Journal alerts with tables of contents are very useful in keeping up to date
- Electronic access to Inter Library Loans is much appreciated
- Deals made by the library with publishers for groups of journal titles were important as it can be very difficult to prioritize which titles to take when constrained by budgets. Flexibility and open-ended deals would be much appreciated, since sometimes titles could be needed at short notice.

Computing

- Confidentiality can impair access in this field i.e. in software development (especially where raw data is involved). Cost is not always the access barrier.
- Need access to older material than is online. This would be useful for reviewing a subject area and/or for tracking references back.

Law

- UK databases are good, but it can be difficult to obtain international information e.g. from the Far East.

4.2 Research dissemination

Common points concerned the impact of the RAE on decisions about where to publish, and about difficulties faced by interdisciplinary researchers. Whilst interdisciplinary work seems to be encouraged nationally and groups and teams are being put together, it is not clear where the output is meant to go – which can be constrained by the discipline based structure of the RAE. Some disciplines are harder to place than others. It was felt generally that there are problems over where to publish within disciplines when the structure is driven/determined by the RAE, therefore the importance of UoAs cannot be ignored. As there always has to be a lead name on a publication, they will often identify which discipline to target, since interdisciplinary work has no natural home. Most people hoped that this area will develop highly regarded outlets.

There was a discussion about the significance of disciplines in general. Education felt that although working in the School of Education Studies, their identity was more with social science in general. Biologists felt that there is a certain comfort level with the jargon etc within the field but that this becomes more difficult outside, therefore might impair interdisciplinary work. A biologist who is working with geographers acknowledged there were methodology differences which posed some problems.

In discussing whether new forms of peer review could take over from traditional peer review, only computing felt that collaborative peer review was an important issue and may evolve to other subject areas. There was no general agreement on that.

Biology.

- They look to place work in SCI listed titles with high impact factors, especially the ‘discovery’ journals, i.e., Nature, Science. Still feels that journal articles are the most important form of communication.
- Page charges can skew decisions on where to publish – again budgetary constraints.
- Aware of the increase in Open Access and pay-to-publish journals. Titles like PLoS aim to be the same standard as the ‘discovery’ titles, perhaps this should be built into budgets in the future.

Education

- This department is conscious of the RAE and is being ‘strategic’ in placing work in the ‘top’ education journals. Timescale is important – now is almost too late to be submitting. It was also felt that generating ‘lists’ of titles, usually in departments can limit creativity, especially on interdisciplinary work.
- The School of Education at Newcastle also includes Linguistics, so their RAE return will probably be split between the separate Education and Linguistics UoAs but it does present problems and possibly opportunities.
- Professional journals are important to the field but not counted for RAE purposes, therefore some work has to be in two versions, academic and practitioner, leading to an unbalanced publication portfolio.
- Experience here is that some educational journals are more receptive to interdisciplinary work. Multi disciplinary projects are increasingly getting published within journals in the field.

Chemistry

- It was felt that interdisciplinary work may not be ranked highly enough by ‘pure’ chemistry RAE panelists.

Computing

- Agreed with education that professional journals are important in the field but not in the RAE
- Felt that people in the computing field tend to remember information from meetings, conferences and workshops more than from journal articles. Hardly anyone reads the journals, everyone reads the conference proceedings but you have to publish in the journals for legitimacy. More interdisciplinary work is disseminated via conferences than by journals.
- It was felt that many professors in this field would be keen on self-archiving but there were still some concerns over copyright and quality. There would be no reluctance in his dept to self-archive either on their own Web site or institutional site once technology and copyright issues resolved.
- Hoped that this survey had taken to opportunity to address changes in publication models, e-access etc.
- New, creative research outlets are also worth considering, i.e, web portals, web blogs etc, although it was felt that this could be quite a small niche but worth considering perhaps as well as publishing.

5. Conclusions

- We found a number of areas where differences between disciplines were statistically significant.
- Disciplinary differences do not appear to be significant in relation to overall ease of access to resources, nor to access to journals
- Of those reporting problems in access to resources, problems in relation to access to books and funds to travel in order to access resources are important for specific disciplinary groups (language and area studies and arts and humanities); this is true to a lesser extent for conference proceedings for physical and social sciences
- Having research help is a significant difference between disciplinary groups, with scientists much more likely than non-scientists to have research assistance
- There are significant differences between the groups in relation to finding appropriate outlets for publication. A majority in medical and biological sciences and social sciences reported problems, Of those reporting problems, all groups have problems with pressure on space in highly-rated journals, and with slow speed of reviewing and decision-making but problems finding appropriate outlets for interdisciplinary research are mainly in social sciences and arts and humanities
- Article output is significantly different in the different disciplinary groups, with means clustering in three groups: 'hard' sciences, the social sciences and the arts/humanities/languages. The degree of joint authorship is also significantly different and follows similar patterns
- There are clear disciplinary differences in the spread of resources used, though journal articles cross many disciplinary boundaries in their importance
- The survey revealed other important patterns of resource use and research dissemination
- In terms of discovery strategies, total 'Googlization' does not appear to have occurred yet; researchers continue to use a range of bibliographic tools and resources
- Informal information-seeking was more likely to be through personal contact than via mediated networks such as email lists
- On the basis of our survey and other work, notably that by Valerie Bence, we conclude that the Research Assessment Exercise is extremely important in decisions taken by UK-based researchers about where to disseminate their work. They also overwhelmingly believe that it skews the process of research as well as its dissemination
- Peer-reviewed publications are viewed as the critical output of research and within that, journal articles are viewed by the largest percentage of respondents in all groups as having the biggest influence on RAE score, ahead of monographs and peer-reviewed conference proceedings
- However, there is a mismatch in some disciplinary groups between what researchers feel they most need and where they feel they must publish. Only in medical and biological sciences did the percentage naming journal articles as the resource they would be lost without match the percentages regarding journal articles as the biggest influence on their RAE score, though journal articles were

cited by a majority as the single essential resource in all the sciences and in social science.

- Our findings as regards the level of knowledge of the author's own copyright position are not surprising in the light of other studies, but they are a matter for concern and may suggest the need for an education campaign for academic authors
- The level of awareness of debates about open access is high, perhaps due to extensive publicity surrounding the House of Commons Select Committee Report last year
- A majority of researchers in all disciplinary groups are supportive of the idea that research funding bodies should mandate the deposit of results in open archives
- A tentative conclusion from the research is that a combination of the widespread availability and relative ease of use of electronic journals together with the belief that writing journal articles is the best way to improve RAE scores is leading to some convergence between disciplines, both in their use of resources and in their publication patterns.

Appendix A

Methodology

The survey was designed and tested with input from academic staff at Newcastle University. It was available online from 11 May to 12 June 2005. A letter was sent to all registrars in UK HE institutions, asking for their co-operation in distributing an attached email explaining the project and inviting people to complete the survey (with a link to the web-based questionnaire) to all members of the academic staff. Only one registrar informed us that they felt it would not be appropriate to distribute the survey. We received 750 completed questionnaires by the end of the survey period. Every UoA was represented except Celtic Studies (though this was represented as a secondary UoA). The distribution was compared with statistics obtained from HESA showing the numbers of academic researchers selected for assessment in each UoA in 2001 – this is not perfectly aligned in some cases as we used the UoA categories for the 2008 RAE, not those for the 2001 Exercise. In particular, there have been some significant changes in the medical and healthcare categories.

Table 41

Academic Staff in Category A, A* or C selected for assessment in the 2001 RAE by UOA, 2001/02

Unit of Assessment	**Total**	**sample, Primary UoA**	**Sample, secondary UoA**	**sample as %**
(01) Clinical Laboratory Sciences	1143	19	23	1.66
(02) Community-based Clinical Subjects	1252	24	21	1.92
(03) Hospital-based Clinical Subjects	2480	25	8	1.01
(04) Clinical Dentistry	432	4	0	0.93
(05) Pre-Clinical Studies	154	8	8	5.19
(06) Anatomy	150	..		
(07) Physiology	271	..		
(08) Pharmacology	167	..		
(09) Pharmacy	412	3	3	0.73
(10) Nursing	579	9	4	1.55
(11) Other Studies and Professions Allied to Medicine	977	14	9	1.43
(13) Psychology	1240	33	12	2.66
(14) Biological Sciences	2430	43	17	1.77
(15) Agriculture	454	13	3	
(16) Food Science and Technology	99	..		
(17) Veterinary Science	342	..		
total Agriculture, Food, Vet	895	13	3	1.45
(18) Chemistry	1309	18	8	1.38
(19) Physics	1625	35	8	2.15
(20) Earth Sciences	552	13	16	
(21) Environmental Sciences	532	..		
(22) Pure Mathematics	486	9	3	1.85

(23) Applied Mathematics	709	13	5	1.83
(24) Statistics and Operational Research	349	4	7	1.15
(25) Computer Science	1483	40	17	2.70
(26) General Engineering	999	11	4	1.10
(27) Chemical Engineering	275	7	1	2.55
(28) Civil Engineering	520	15	4	2.88
(29) Electrical and Electronic Engineering	829	25	2	3.02
(30) Mechanical, Aeronautical and Manufacturing Engineering	1019	16	5	1.57
(31) Mineral and Mining Engineering	82	..	..	
(32) Metallurgy and Materials	396	4	8	1.01
(33) Built Environment	594	2	2	0.34
(34) Town and Country Planning	365	2	1	0.55
(35) Geography	1174	19	5	1.62
(36) Law	1279	14	4	1.09
(37) Anthropology	267	7	1	2.62
Development Studies		2	2	
(38) Economics and Econometrics	795	11	3	1.38
(39) Politics and International Studies	1050	15	7	1.43
(40) Social Policy and Administration	930	17	4	
(41) Social Work	376	..	..	
Total social work and policy	1306	17		1.30
(42) Sociology	848	24	14	2.83
(43) Business and Management Studies	2383	32	14	1.34
(44) Accounting and Finance	210	8	2	3.81
(45) American Studies	104	1	4	0.96
(46) Middle Eastern and African Studies	135	1	3	0.74
(47) Asian Studies	131	4	4	3.05
(48) European Studies	515	3	2	0.58
(49) Celtic Studies	84	0	1	0.00
(50) English Language and Literature	1478	20	4	1.35
(51) French	427	3	1	0.70
(52) German, Dutch and Scandinavian Languages	247	1	2	0.40
(53) Italian	94	2	0	2.13
(54) Russian, Slavonic and East European Languages	76	1	2	1.32
(55) Iberian and Latin American Languages	195	3	0	1.54
(56) Linguistics	200	11	2	5.50
(57) Classics, Ancient History, Byzantine and Modern Greek Studies	316	1	2	0.32
(58) Archaeology	481	2	1	0.42
(59) History	1646	24	8	1.46
(60) History of Art, Architecture and Design	319	4	0	1.25
(61) Library and Information Management	275	13	1	4.73
(62) Philosophy	435	22	6	5.06
(63) Theology, Divinity and Religious Studies	400	8	1	2.00
(64) Art and Design	1944	11	2	0.57
(65) Communication, Cultural and Media Studies	352	19	8	5.40
(66) Drama, Dance and Performing Arts	379	8	1	2.11
(67) Music	497	6	1	1.21

(68) Education	1916	18	16	0.94
(69) Sports-related Subjects	290	6	1	2.07
(99) Unknown	16			
Total	**46970**	**780**	**331**	1.66

Source for staff statistics: HESA

Where areas were under-represented we attempted to secure more responses via targeting disciplines directly, through subject-based email lists and other means such as direct approaches to institutions specialising in arts and music. This was not entirely successful, and it is clear that some areas remain under represented e.g. Art and Design, architecture, town and country planning and some languages. On the other hand, we had a large response from philosophy and linguistics relative to their numbers. As we allowed respondents to remain anonymous, we cannot be completely sure about the institutional spread. However, most respondents did leave email addresses in order to be entered into the prize draw we offered. In terms of institutions, all types of university are represented. It does appear that some of the larger research-intensive universities contributed disproportionately, however.

Many of the questions we asked permitted respondents to make multiple responses. This reduced the number of instances in which tests for statistical significance could be performed, but this may be a lesser evil than forcing an artificially rigid response.

Appendix B

Disciplinary Differences and Needs Questionnaire[23]

We would like to start by asking a few questions about you and your work. As this is a study of disciplinary needs and differences, you must enter your primary RAE Unit of Assessment before continuing.

1. What is your main research field by Research Assessment Exercise category?

(Unit of Assessment plus description drop-down menu; m*andatory field*)

2. Are there other Units of Assessment that your work may be submitted in or with which you jointly submit e.g. interdisciplinary research?

(UOA plus description drop down menu; *non mandatory field*)

3. Approximately how many years have you been employed as a research-active academic?

4. Approximately how many research-active academic staff are there in your department?

Now we would like to know about the resources you use when you are doing your research (NOT for lectures, seminars etc or for preparing handouts and other teaching materials).

5. What is the single most essential resource you use, the one that you would be lost without? Tick one only

   Pre-prints i.e. non-refereed versions of papers which may or may not have been submitted to a journal
   Post-prints i.e. refereed and corrected authors' versions of published papers
   Journal articles (print/electronic)
   Conference proceedings
   Books
   Datasets
   Technical reports
   Patent information
   Government or intergovernmental/NGO publications
   Other textual sources, (e.g. historical records, literary works, newspapers) please specify
   Non-textual sources (e.g. music scores, artefacts, audio/video), please specify
   Other, please specify

[23] As this was a web-based questionnaire, the respondents were automatically routed to the next relevant question, but we have included instructions (e.g. go to question 22), here for clarification

6. What resource do you use most heavily? Tick one only (This may be the same or different to your answer to the previous question).

   Pre-prints i.e. non-refereed versions of papers which may or may not have been submitted to a journal
   Post-prints i.e. refereed and corrected authors' versions of published papers
   Journal articles (print/electronic)
   Conference proceedings
   Books
   Datasets
   Technical reports
   Patent information
   Government or intergovernmental/NGO publications
   Other textual sources, (e.g. historical records, literary works, newspapers) please specify
   Non-textual sources (e.g. music scores, artefacts, audio/video), please specify
   Other, please specify

7. What other resources are valuable to you? (tick all that apply)

   Pre-prints i.e. non-refereed versions of papers which may or may not have been submitted to a journal
   Post-prints i.e. refereed and corrected authors' versions of published papers
   Journal articles (print/electronic)
   Conference proceedings
   Books
   Datasets
   Technical reports
   Patent information
   Government or intergovernmental/NGO publications
   Other textual sources, (e.g. historical records, literary works, newspapers) please specify
   Non-textual sources (e.g. music scores, artefacts, audio/video), please specify
   Other, please specify

8. What secondary bibliographic or reference source is most essential to you, the one you would be lost without? Tick one only

   Subject-specific abstracts and indexes
   General bibliographic tools
   Citation databases
   Search engines
   Works of reference
   Other, please specify

9. What secondary bibliographic or reference source do you use most heavily? Tick one only (This may be the same or different to the answer to the previous question)

Subject-specific abstracts and indexes
General bibliographic tools
Citation databases
Search engines
Works of reference
Other, please specify

10. Which of the following less formal information sources do you use on a regular basis? Tick all that apply

    Asking a colleague (face to face or telephone)
    Emailing a colleague or peer
    Posting an enquiry to an email discussion list
    Reading blogs
    Reading email newsletters
    Other, please specify

11. Do you encounter problems gaining access to the resources you need to carry out your research?

    Yes/No

    If No, go to **question 13**

12. What are the main problems you encounter? (tick all that apply)

    Library does not take the journals I need
    Library does not buy the books I need
    Library does not subscribe to the databases I need
    I cannot get access to the conference proceedings I need
    Key information is proprietary
    I need to travel to access resources and funding isn't available
    Other, please specify

13. Do you have any assistance in carrying out your research?

    PhD student
    Research Associates/Assistants
    Other, please specify
    None

We would now like to turn to how you collaborate in research and how you disseminate the results of your research

14. Which of the following less formal means of communication or collaboration in the research process do you use on a regular basis? Tick all that apply

    Inviting colleagues to comment on your work
    Sending drafts of work by email for comments by peers

Face to face research collaboration with peers in other institutions e.g. in the process of sharing experimental or computing facilities
Participating in email discussion lists
Contributing to online forums or discipline-focused community web sites
Writing a blog
Using a shared online space to collaborate (e.g. virtual meetings, collaboratory, portal, wiki)
Other, please specify

15. How do you disseminate the results of your work? (tick all that apply)

Pre-prints i.e. non-refereed versions of papers which may or may not have been submitted to a journal
Post-prints i.e. refereed authors' final versions of papers accepted for publication
Scholarly journal article
Other periodical article
Monographs
Other books e.g. edited collections
Chapter in book
Peer-reviewed conference proceedings
Non-peer reviewed conference proceedings
Reports for third parties (Government/intergovernmental/NGOs)
Reports for third parties (companies)
Technical reports
Patent applications
Datasets
Software
Artefacts
Performances
Exhibitions
Other, please specify

16. Which of these is the most effective means of communicating with your peers? (tick a maximum of three)

Pre-prints i.e. non-refereed versions of papers which may or may not have been submitted to a journal
Post-prints i.e. refereed authors' final versions of papers accepted for publication
Scholarly journal article
Other periodical article
Monographs
Other books e.g. edited collections
Chapter in book
Peer-reviewed conference proceedings
Non peer-reviewed conference proceedings
Reports for third parties (Government/intergovernmental/NGOs)
Reports for third parties (companies)
Technical reports
Patent applications
Datasets

Software
Artefacts
Performances
Exhibitions
Other, please specify

17. Which do you think has the biggest influence on your own and your department's RAE score? (tick a maximum of three)

    Pre-prints i.e. non-refereed versions of papers which may or may not have been submitted to a journal
    Post-prints i.e. refereed authors' final versions of papers accepted for publication
    Scholarly journal article
    Other periodical article
    Monographs
    Other books e.g. edited collections
    Chapter in book
    Peer-reviewed conference proceedings
    Non peer-reviewed conference proceedings
    Reports for third parties (Government/intergovernmental/NGOs)
    Reports for third parties (companies)
    Technical reports
    Datasets
    Patent applications
    Software
    Artefacts
    Performances
    Exhibitions
    Other, please specify

18. Which is most likely to help you in securing other sources of research funding? (tick a maximum of three)

    Pre-prints i.e. non-refereed versions of papers which may or may not have been submitted to a journal
    Post-prints i.e. refereed authors' final versions of papers accepted for publication
    Scholarly journal article
    Other periodical article
    Monographs
    Other books e.g. edited collections
    Peer-reviewed conference proceedings
    Non peer-reviewed conference proceedings
    Reports for third parties (Government/intergovernmental/NGOs)
    Reports for third parties (companies)
    Technical reports
    Datasets
    Patent applications
    Software
    Artefacts
    Performances

Exhibitions
Other, please specify

19. Thinking only about journal articles, which statement best expresses your position about where you wish to place your work

    "I prefer to publish in traditional commercial journals (subscription-based)"
    "I prefer to publish in open access journals (free to the reader, author or funder pays)"
    "I prefer to publish in learned society journals"
    "The prestige and/or impact factor of the journal matter more than the type of journal"
    "My department has a preferred list of journal titles in which I try to place my work"
    "I have no preference"

20. Do you encounter problems in publishing/dissemination in your preferred outlets?

    Yes/No

    If No, go to **question 22**

21. What are the main problems you encounter? (tick all that apply)

    Pressure on space and/or high rejection rate in journals rated highly in RAE
    Slow speed of reviewing and decision-making in the publication process
    Funding is not available to pay page charges or other fees to publish
    Fewer monographs being published
    No funding available to attend the right conferences
    Cannot find an appropriate outlet for my interdisciplinary research
    Cannot find an appropriate outlet for my creative or performing arts research
    Other, please specify

We would like to get some idea of the typical volume of publishing activity in different disciplines

22. In any three-year period, what would be your typical output? (indicate the number of each type where appropriate)

    Scholarly journal article
    Other periodical article
    Monographs
    Other books e.g. edited collections
    Chapter in book
    Peer-reviewed conference proceedings
    Non peer-reviewed conference proceedings
    Reports for third parties (Government/intergovernmental/NGOs)
    Reports for third parties (companies)
    Technical reports
    Datasets

Patent applications
Software
Artefacts
Performances
Exhibitions
Other, please specify

23. Typically, roughly what proportion of your output is jointly authored?

    None/under 25%/50%/more than 75%/all

    Comments…

We now want to ask about copyright and archiving practice

24. When you make an agreement with a publisher to publish a journal article or refereed conference publication, what is the copyright position?

    Publisher holds copyright but licenses you to use the material e.g. on your website and for self-archiving
    Publisher holds copyright but licenses you to self-archive with a time delay after publication
    You retain copyright and license publisher for the particular use
    Publisher holds copyright and prohibits other uses
    Depends on the publisher
    Other
    Don't know
    Don't publish in journals/refereed conference publications

    Comments….

25. When you make an agreement with a publisher to publish a book, what is the copyright position?

    Publisher holds copyright but licenses you to use the material
    You retain copyright and license publisher for the particular use
    Publisher holds copyright and prohibits other uses
    Depends on the publisher
    Other
    Don't know
    Don't publish books

    Comments….

26. Does your university have an institutional repository (IR)?

    Yes/no/don't know

27. If the answer is yes, do you routinely deposit your research in it?

    Yes/no

28. Are you aware of open archives appropriate to your discipline?

    Yes/no

29. If yes, do you deposit in them?

    Yes/no

30. If you are aware of appropriate IRs/open archives but do not deposit your research in them, what are the barriers to you doing so (tick all that apply)?

    Uncertainty over whether you retain copyright or are licensed to deposit
    Concerned about publishers' attitudes
    Don't know how to go about it
    Don't regard it as an important channel of dissemination
    Concerned about whether everything in the archives is of comparable standard
    Concerned that it may be a step to the university claiming copyright over my work
    Too busy
    Other, please specify

Finally, we would like to hear your views abut future changes in scholarly communication

31. Are you aware of the current debates about open access to scholarly communication?

    Yes/no

32. In your opinion, what steps should be taken to ensure that all scholars can access the research materials they need? Please indicate your level of agreement or disagreement with the following statements
    (Strongly agree/agree/disagree/strongly disagree)

    "Research funding bodies should mandate all researchers to deposit the results of their research in open archives"
    "Scholarly journals should be open access and free to the reader, with institutions and funding bodies paying the cost of publication for authors"
    "Journals should be free for authors to publish in and universities should allocate sufficient funds for libraries to purchase what scholars need"
    "A central body should buy all the resources for researchers on a national basis"

    Please add your own views (if you want to) here:

33. Please indicate your level of agreement or disagreement with the following statements:
(Strongly agree/agree/disagree/strongly disagree)

“Traditional peer review is flawed and ripe for replacement”
“The research assessment exercise skews the practice of research”
“The research assessment exercise skews the dissemination of research”
“The journal article will become increasingly irrelevant as a means of communicating research in the next ten years”
“New forms of dissemination that exploit digital platforms, such as open archives and electronic-only monographs, will become increasingly important in my discipline in the next ten years.”

Please add further comments if you wish on this or any other aspect of the survey here.

Thank you very much for taking part in this survey.

To enter the prize draw, click here and enter your email address.

Table 42: RAE2008 Units of assessment and main panels

Main panel	UOA	UOA name
A	1	Cardiovascular Medicine
	2	Cancer Studies
	3	Infection and Immunology
	4	Other Hospital Based Clinical Subjects
	5	Other Laboratory Based Clinical Subjects
B	6	Epidemiology and Public Health
	7	Health Services Research
	8	Primary Care and Other Community Based Clinical Subjects
	9	Psychiatry, Neuroscience and Clinical Psychology
C	10	Dentistry
	11	Nursing and Midwifery
	12	Allied Health Professions and Studies
	13	Pharmacy
D	14	Biological Sciences
	15	Pre-clinical and Human Biological Sciences
	16	Agriculture, Veterinary and Food Science
E	17	Earth Systems and Environmental Sciences
	18	Chemistry
	19	Physics
F	20	Pure Mathematics
	21	Applied Mathematics
	22	Statistics and Operational Research
	23	Computer Science and Informatics
G	24	Electrical and Electronic Engineering
	25	General Engineering and Mineral & Mining Engineering
	26	Chemical Engineering
	27	Civil Engineering
	28	Mechanical, Aeronautical and Manufacturing Engineering
	29	Metallurgy and Materials
H	30	Architecture and the Built Environment
	31	Town and Country Planning
	32	Geography and Environmental Studies
	33	Archaeology

Main panel	UOA	UOA name
I	34	Economics and Econometrics
	35	Accounting and Finance
	36	Business and Management Studies
	37	Library and Information Management
J	38	Law
	39	Politics and International Studies
	40	Social Work and Social Policy & Administration
	41	Sociology
	42	Anthropology
	43	Development Studies
K	44	Psychology
	45	Education
	46	Sports-Related Studies
L	47	American Studies and Anglophone Area Studies
	48	Middle Eastern and African Studies
	49	Asian Studies
	50	European Studies
M	51	Russian, Slavonic and East European Languages
	52	French
	53	German, Dutch and Scandinavian Languages
	54	Italian
	55	Iberian and Latin American Languages
	56	Celtic Studies
	57	English Language and Literature
	58	Linguistics
N	59	Classics, Ancient History, Byzantine and Modern Greek Studies
	60	Philosophy
	61	Theology, Divinity and Religious Studies
	62	History
O	63	Art and Design
	64	History of Art, Architecture and Design
	65	Drama, Dance and Performing Arts
	66	Communication, Cultural and Media Studies
	67	Music

Source: Guidelines for Submission (2008), HEFCE June 2005.

Appendix C

Detailed results

Table 43 Primary UoA * What is the single most essential resource you use, the one that you would be lost without? Crosstabulation

% within Primary UoA

		What is the single most essential resource you use, the one that you would be lost without?												
		Other	Pre-prints	Post-prints	Journal articles	Conference proceedings	Books	Datasets	Technical reports	Govt or NGO reports	Legal sources	Other textual	Non-textual	Total
Primary UoA	Cardiovascular medicine				100.0%									100.0%
	Cancer Studies				100.0%									100.0%
	Infection and Immunology				100.0%									100.0%
	Other hospital based clinical				100.0%									100.0%
	Other lab based clinical				100.0%									100.0%
	Epidemiology and public health				85.7%		14.3%							100.0%
	Health services research				76.9%			15.4%		7.7%				100.0%
	Primary care	25.0%			75.0%									100.0%
	Psychiatry, neuroscience, clinical psychology	8.3%			83.3%			8.3%						100.0%
	Dentistry				75.0%					25.0%				100.0%
	Nursing and	22.2%			44.4%			22.2%					11.1%	100.0%

midwifery												
Allied health professions				100.0%								100.0%
Pharmacy				100.0%								100.0%
Biological sciences				97.7%			2.3%					100.0%
Pre-clinical and human biological sciences				100.0%								100.0%
Agricultural, veterinary and food science				92.3%			7.7%					100.0%
Earth systems and environmental science				92.3%			7.7%					100.0%
Chemistry	5.6%		5.6%	88.9%								100.0%
Physics	2.9%	8.8%	5.9%	64.7%		2.9%	11.8%	2.9%				100.0%
Pure mathemematics	11.1%	44.4%	11.1%	33.3%								100.0%
Applied mathematics		7.7%		84.6%		7.7%						100.0%
Statistics and operational research		25.0%		75.0%								100.0%
Computer Science and Informatics	7.7%	5.1%	20.5%	48.7%	15.4%	2.6%						100.0%
Electrical and electronic engineering	4.0%	4.0%		68.0%	20.0%		4.0%					100.0%
General engineering and mineral and mining engineering	9.1%			81.8%	9.1%							100.0%
Chemical engineering				85.7%				14.3%				100.0%
Civil	13.3%			86.7%								100.0%

engineering													
Mechanical, aeronautical and manusfacturing engineering				93.8%			6.3%						100.0%
Metallurgy and materials			25.0%	75.0%									100.0%
Architecture and the built environment				50.0%		50.0%							100.0%
Town and Country planning				100.0%									100.0%
Geography and environmental studies	5.6%			77.8%			11.1%				5.6%		100.0%
Archaeology				50.0%		50.0%							100.0%
Economics and econometrics		18.2%	9.1%	54.5%			18.2%						100.0%
Accounting and finance				75.0%			12.5%				12.5%		100.0%
Business and management studies	6.3%			65.6%		9.4%	9.4%		3.1%		6.3%		100.0%
Library and information management				69.2%	7.7%	7.7%	7.7%					7.7%	100.0%
Law				44.4%		33.3%			11.1%	11.1%			100.0%
Politics and international studies	13.3%			60.0%			6.7%		6.7%		13.3%		100.0%
Social work and social policy		5.9%		76.5%		5.9%			11.8%				100.0%
Sociology				60.9%		13.0%	21.7%				4.3%		100.0%
Anthropology				57.1%		14.3%	14.3%				14.3%		100.0%
Development studies				50.0%		50.0%							100.0%

Psychology	12.1%		3.0%	84.8%								100.0%
Education				72.2%		22.2%	5.6%					100.0%
Sports related studies				83.3%		16.7%						100.0%
American studies and anglophone area studies						100.0%						100.0%
Middel Eastern and African Studies						100.0%						100.0%
Asian Studies				25.0%		50.0%				25.0%		100.0%
European studies				66.7%						33.3%		100.0%
Russian, Slavonic and East European Studies	100.0%											100.0%
French	33.3%					66.7%						100.0%
German, Dutch and Scandinavian Languages						100.0%						100.0%
Italian				50.0%		50.0%						100.0%
Iberian and Latin American Languages	33.3%			33.3%		33.3%						100.0%
English Language and Literature				15.0%		70.0%				15.0%		100.0%
Linguistics	9.1%			54.5%		18.2%	9.1%				9.1%	100.0%
Classics, Ancient History, Byzantine and Modern Greek						100.0%						100.0%
Philosophy		4.5%	9.1%	59.1%		27.3%						100.0%
Theology, Divinity and Religious			12.5%			75.0%				12.5%		100.0%

	Studies													
	History				4.2%		33.3%	8.3%				50.0%	4.2%	100.0%
	Art and Design	18.2%		9.1%	36.4%	9.1%	18.2%						9.1%	100.0%
	History of Art, Architecture and Design	25.0%			25.0%		50.0%							100.0%
	Drama, Dance and Performing Arts				12.5%		50.0%					12.5%	25.0%	100.0%
	Communication, Cultural and Media Studies	10.5%			36.8%		36.8%					5.3%	10.5%	100.0%
	Music				16.7%		16.7%	16.7%					50.0%	100.0%
Total		4.3%	2.2%	2.6%	65.9%	1.9%	11.6%	4.7%	.3%	.9%	.1%	3.8%	1.6%	100.0%

Table 44: Do you encounter problems gaining access to the resources you need to carry out your research?

% within Primary UoA

		Do you encounter problems gaining access to the resources you need to carry out your research?		
		Yes	No	Total
Primary UoA	Cardiovascular medicine	50.0%	50.0%	100.0%
	Cancer Studies	75.0%	25.0%	100.0%
	Infection and Immunology	50.0%	50.0%	100.0%
	Other hospital based clinical	66.7%	33.3%	100.0%
	Other lab based clinical	66.7%	33.3%	100.0%
	Epidemiology and public health	57.1%	42.9%	100.0%
	Health services research	46.2%	53.8%	100.0%
	Primary care	50.0%	50.0%	100.0%
	Psychiatry, neuroscience, clinical psychology	61.5%	38.5%	100.0%
	Dentistry	100.0%		100.0%
	Nursing and midwifery	44.4%	55.6%	100.0%
	Allied health professions	64.3%	35.7%	100.0%
	Pharmacy	66.7%	33.3%	100.0%
	Biological sciences	41.9%	58.1%	100.0%
	Pre-clinical and human biological sciences	62.5%	37.5%	100.0%
	Agricultural, veterinary and food science	30.8%	69.2%	100.0%
	Earth systems and environmental science	61.5%	38.5%	100.0%
	Chemistry	44.4%	55.6%	100.0%
	Physics	28.6%	71.4%	100.0%
	Pure mathememtics	55.6%	44.4%	100.0%
	Applied mathematics	61.5%	38.5%	100.0%
	Statistics and operational research	50.0%	50.0%	100.0%
	Computer Science and Informatics	42.5%	57.5%	100.0%

Electrical and electronic engineering	28.0%	72.0%	100.0%
General engineering and mineral and mining engineering	18.2%	81.8%	100.0%
Chemical engineering	14.3%	85.7%	100.0%
Civil engineering	66.7%	33.3%	100.0%
Mechanical, aeronautical and manusfacturing engineering	56.3%	43.8%	100.0%
Metallurgy and materials	50.0%	50.0%	100.0%
Architecture and the built environment		100.0%	100.0%
Town and Country planning		100.0%	100.0%
Geography and environmental studies	52.6%	47.4%	100.0%
Archaeology	100.0%		100.0%
Economics and econometrics	63.6%	36.4%	100.0%
Accounting and finance	62.5%	37.5%	100.0%
Business and management studies	50.0%	50.0%	100.0%
Library and information management	30.8%	69.2%	100.0%
Law	42.9%	57.1%	100.0%
Politics and international studies	46.7%	53.3%	100.0%
Social work and social policy	47.1%	52.9%	100.0%
Sociology	25.0%	75.0%	100.0%
Anthropology	42.9%	57.1%	100.0%
Development studies	50.0%	50.0%	100.0%
Psychology	57.6%	42.4%	100.0%
Education	50.0%	50.0%	100.0%
Sports related studies	33.3%	66.7%	100.0%
American studies and anglophone area studies	100.0%		100.0%
Middel Eastern and African Studies		100.0%	100.0%
Asian Studies	50.0%	50.0%	100.0%
European studies	33.3%	66.7%	100.0%

	Russian, Slavonic and East European Studies	100.0%		100.0%
	French	33.3%	66.7%	100.0%
	German, Dutch and Scandinavian Languages		100.0%	100.0%
	Italian	50.0%	50.0%	100.0%
	Iberian and Latin American Languages	66.7%	33.3%	100.0%
	English Language and Literature	55.0%	45.0%	100.0%
	Linguistics	36.4%	63.6%	100.0%
	Classics, Ancient History, Byzantine and Modern Greek	100.0%		100.0%
	Philosophy	63.6%	36.4%	100.0%
	Theology, Divinity and Religious Studies	75.0%	25.0%	100.0%
	History	66.7%	33.3%	100.0%
	Art and Design	9.1%	90.9%	100.0%
	History of Art, Architecture and Design	75.0%	25.0%	100.0%
	Drama, Dance and Performing Arts	50.0%	50.0%	100.0%
	Communication, Cultural and Media Studies	36.8%	63.2%	100.0%
	Music	50.0%	50.0%	100.0%
Total		47.7%	52.3%	100.0%

Table 45: Primary UoA * Do you encounter problems in publishing/dissemination in your preferred outlets? Crosstabulation

% within Primary UoA

		Do you encounter problems in publishing/dissemination in your preferred outlets?		
		Yes	No	Total
Primary UoA	Cardiovascular medicine	75.0%	25.0%	100.0%
	Cancer Studies	75.0%	25.0%	100.0%
	Infection and Immunology	50.0%	50.0%	100.0%
	Other hospital based clinical	41.7%	58.3%	100.0%
	Other lab based clinical	100.0%		100.0%
	Epidemiology and public health	57.1%	42.9%	100.0%
	Health services research	53.8%	46.2%	100.0%
	Primary care	50.0%	50.0%	100.0%
	Psychiatry, neuroscience, clinical psychology	53.8%	46.2%	100.0%
	Dentistry	50.0%	50.0%	100.0%
	Nursing and midwifery	44.4%	55.6%	100.0%
	Allied health professions	57.1%	42.9%	100.0%
	Pharmacy	66.7%	33.3%	100.0%
	Biological sciences	48.8%	51.2%	100.0%
	Pre-clinical and human biological sciences	62.5%	37.5%	100.0%
	Agricultural, veterinary and food science	23.1%	76.9%	100.0%
	Earth systems and environmental science	46.2%	53.8%	100.0%
	Chemistry	27.8%	72.2%	100.0%
	Physics	22.9%	77.1%	100.0%
	Pure mathememtics	11.1%	88.9%	100.0%
	Applied mathematics	7.7%	92.3%	100.0%
	Statistics and operational research	75.0%	25.0%	100.0%
	Computer Science and Informatics	22.5%	77.5%	100.0%

Electrical and electronic engineering	32.0%	68.0%	100.0%
General engineering and mineral and mining engineering	36.4%	63.6%	100.0%
Chemical engineering	14.3%	85.7%	100.0%
Civil engineering	53.3%	46.7%	100.0%
Mechanical, aeronautical and manusfacturing engineering	25.0%	75.0%	100.0%
Metallurgy and materials	25.0%	75.0%	100.0%
Architecture and the built environment		100.0%	100.0%
Town and Country planning		100.0%	100.0%
Geography and environmental studies	42.1%	57.9%	100.0%
Archaeology	50.0%	50.0%	100.0%
Economics and econometrics	72.7%	27.3%	100.0%
Accounting and finance	62.5%	37.5%	100.0%
Business and management studies	59.4%	40.6%	100.0%
Library and information management	30.8%	69.2%	100.0%
Law	35.7%	64.3%	100.0%
Politics and international studies	40.0%	60.0%	100.0%
Social work and social policy	52.9%	47.1%	100.0%
Sociology	50.0%	50.0%	100.0%
Anthropology	57.1%	42.9%	100.0%
Development studies	50.0%	50.0%	100.0%
Psychology	57.6%	42.4%	100.0%
Education	50.0%	50.0%	100.0%
Sports related studies	50.0%	50.0%	100.0%
American studies and anglophone area studies	100.0%		100.0%
Middel Eastern and African Studies		100.0%	100.0%
Asian Studies	25.0%	75.0%	100.0%
European studies	66.7%	33.3%	100.0%

	Russian, Slavonic and East European Studies		100.0%	100.0%
	French		100.0%	100.0%
	German, Dutch and Scandinavian Languages		100.0%	100.0%
	Italian	50.0%	50.0%	100.0%
	Iberian and Latin American Languages		100.0%	100.0%
	English Language and Literature	30.0%	70.0%	100.0%
	Linguistics	9.1%	90.9%	100.0%
	Classics, Ancient History, Byzantine and Modern Greek		100.0%	100.0%
	Philosophy	59.1%	40.9%	100.0%
	Theology, Divinity and Religious Studies	50.0%	50.0%	100.0%
	History	37.5%	62.5%	100.0%
	Art and Design	18.2%	81.8%	100.0%
	History of Art, Architecture and Design		100.0%	100.0%
	Drama, Dance and Performing Arts	25.0%	75.0%	100.0%
	Communication, Cultural and Media Studies	31.6%	68.4%	100.0%
	Music	33.3%	66.7%	100.0%
Total		40.7%	59.3%	100.0%