

Social Networking Sites and their role in Scholarly Communications

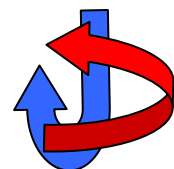
A Study for the Centre for Research
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1 Purpose of the study

The study was originally defined in a specification document produced by the Centre for Research Communications at the University of Nottingham, in which the Centre indicated it wished for a report on social networking sites and their role in scholarly communication. The Centre sought to identify the issues and opportunities presented to the community by relevant sites, indicating current use of the sites together with an informed prognostication of future use and effects. This specification was refined during the course of a meeting between the staff of the Centre and Duke and Jordan Ltd at Nottingham, in which the issues were more clearly defined as relating to the effect on Open Access publishing and to the behaviour of individual researchers. In particular, the Centre was interested to determine to what extent social networking sites are usurping the role of Open Access repositories and to what extent they are likely to do so in the future. The study therefore naturally needed to consider the relationship between Open Access repositories and social networking sites, both now and in the future. Furthermore, the study needed to examine the behaviour patterns of researchers in using different web locations for research communications and to attempt to predict future trends.

2 Approach

The approach we adopted to this study was fourfold:

- 1) Undertake a survey of a sample of researchers in UK universities. This was done by:
 - a) Trawling institutional websites to obtain a list of researchers to contact. The intention was to obtain a sufficient number of researchers' names that a satisfactory number of responses would be obtained when the people on this list were contacted with an online survey.
 - b) Sending all the people on the list an online survey questioning them both about their use of social networking sites in support of their active research and about their knowledge of Open Access and use of Open Access facilities. The intention here was to:
 - i) Assess respondents' usage of social networking sites in support of their research;
 - ii) Assess respondents understanding of Open Access and use of Open Access facilities;so that we could evaluate whether individuals understand enough about Open Access to use social networks in a way that does not contradict Open Access principles.
- 2) Conduct a parallel survey of postgraduate research students who would be contacted through their Heads of Department; the contact details of these Heads of Department would be obtained at the same time as trawling the institutional websites.
- 3) Seek individuals to interview from those responding to the survey; within the survey would be a question asking whether respondents would be prepared to be interviewed. The intention of these interviews would be to follow up points arising from the results of the survey.
- 4) Consider the documentation available in the public domain relevant to the study.

The results of this work are analysed and evaluated in this report.



3 Assessment of social networking sites targeted at researchers

The tables which follow summarise information about the 13 websites studied in the survey. The information has been collected from a combination of the websites themselves, those of their parent organisations (if they have a visible parent) and other searches, notably ones using Wikipedia. The information purports to describe the sites in terms of their business organisation, nationality, size and scope, the particular research processes supported, ease-of-use and presentation, with such statistics as we have been able to collect from the above sources. The table also indicates the numbers of users of each site amongst those responses we obtained to the online survey we conducted.

One of the sites, Academici, appeared to disappear as a social networking site during the course of our study. The entries in the table below show the position for Academici as it was in April 2011. During the course of the study, the contents of the site changed very substantially. It now appears to be an individual's blog site.

In these tables, we use the acronym ASN to refer to Academic Social Networking.



Basic data on sites

Name of site	Academia.edu	Academicici	CiteULike
Country of origin	Registered in USA, 2008	Dutch based in Leuven	Run by Oversity Limited, UK
Number of users involved	The site states that it has 380,000 enrolled	Claims 20,495 members	Not stated
Spread of Users	Not stated	Has a large number of working groups and knowledge networks, often with hundreds of members.	Not discernible
Spread of subject areas	Not stated	Limited as can be seen from above	Not discernible
Ownership of the site	A consortium of venture capital companies and individuals	It is apparently run by Peeters publishers, an international publishing house established in 1857.	Sponsored by Springer Verlag
Part(s) of the scientific process supported by the site	For following the outputs of other academics, users can find other research workers, provide articles for others to read. Gives statistics on downloads.	Knowledge workers can interact, collaborate, transfer knowledge and conduct commerce with each other, with commercial and governmental organisations.	Managing and discovering scholarly references, storing references, documents, discovering articles and resources, recommending articles, sharing references
Nature of materials available on site	Research articles	Hard to tell.	Many articles are not Open Access and are referenced through fee paid journals
Ease of use of the site	Not explored	Has some quirks	
Openness and presentation of the site	Homepage says little.	No.	Homepage is uninformative.
Constraints on use of site	Terms of use cover the usual areas		Terms and conditions mentioned respect of copyright, data protection, privacy and offensive material
Other comments	Homepage attract users by advertising members whose names are known to the general public.	As noted in the introduction to this section of the report, the site changed very substantially during the course of the study.	
No of articles held	Not stated	Not stated	5,082,920 claimed, not all full text
No of institutions	Not stated	Not stated	Not stated
Number of users in survey sample	5	0	3

Basic data on sites (continued)

Name of site	Epernicus Network	LinkedIn	Mendeley
Country of origin	USA	USA, 2002	UK
Number of users involved	Over 20,000 life scientists	100,000,000 in over 200 countries, over 5 million in the UK.	850,000. Some that were followed up seem to be inactive.
Spread of Users	Very localised, with a few US institutions as its main users.	People from all professions, worldwide	In use in many countries. Many users are either MSc or Ph.D. students.
Spread of subject areas	Life and health sciences	All business areas	
Ownership of the site	The parent, Epernicus, produces software for use in the of health care area	A publicly quoted company	Mendeley Limited, registered in England and Wales
Part(s) of the scientific process supported by the site	Is oriented towards enabling individual researchers to find others with expertise in particular areas - to find people within your existing scientific network.	Supports profiles and the concept of contacts. Support groups which support a limited form of moderated discussion.	"A free reference manager and academic social network that can help users organize their research, collaborate with others online, and discover the latest research."
Nature of materials available on site	Biographies of users	User profiles have headings for experience, education, Internet information, personal information and a summary.	
Ease of use of the site	Good	The site is easy to use	Good, showing the functionality of the site to the first-time visitor. A rich homepage and a number of assistance pages.
Openness and presentation of the site	Fairly limited but public biographies of the members of the network are available.	Much of a person's profile is available to search engines.	Good.
Constraints on use of site	Comprehensive, with good protection of IPR.	The user agreement as comprehensive and includes IPR	AUP has clear statements about respect of copyright and content standards.
Other comments		The site is not aimed specifically at academic researchers.	It is a software product available for a variety of platforms. It integrates with a number of other products.
No of articles held	Not stated	Not applicable	75,000,000, few seemed to be OA articles, some require the viewer to be in an academic Internet domain.
No of institutions	Not stated	Not applicable	21,000
Number of users in survey sample	0	18	5

Basic data on sites (continued)

Name of site	myExperiment	myScience	Peer Evaluation
Country of origin	UK	Switzerland	France
Number of users involved	Currently has 5135 members	Not stated, website stated to have 40,000 visitors per month	No evidence – couldn't find any management statistics.
Spread of Users	Appears fairly limited: most people seem to be involved in IT (computer science) or in bio-informatics.	Has portals covering Switzerland, UK, Germany, France and USA	No evidence
Spread of subject areas	Hard to tell	Covers science and engineering	No evidence
Ownership of the site	Funded by JISC and the Microsoft Technical Computing Initiative, support from Southampton, Manchester and Oxford in the UK	Parent company is Scimetrica GmbH. Site launched in 2007. Funding sources not publicised	Supported by ColDev, an Open Access initiative based in Paris http://www.collectivedevelopments.org/
Part(s) of the scientific process supported by the site	Has a Virtual Research Environment, enables researchers to share digital items associated with research plus sharing of workflows.	Gives an overview of science, research, universities, R&D companies and research centres in Switzerland	Gives access to primary data, working papers, articles and media. These can be discussed and openly peer-reviewed using site's facilities.
Nature of materials available on site	Has a large number of workflows.	Emphasises the number of job adverts available on the site. Includes information on living in Switzerland	There is access to abstracts of papers and links to original full text papers, but not on this site.
Ease of use of the site	Good	Not ascertained	Good, even though the site is described as beta.
Openness and presentation of the site	Good	Within its particular scope, good	Quite a lot of information is available but it isn't clear just how sustainable model is.
Constraints on use of site	None found.	None found	Under the terms of use, it looks as people could be invited to take part in surveys.
Other comments		It is not really a social networking site	Emphasis is on the review process. Excellent rationale
No of articles held	Not stated	Not applicable	Not stated
No of institutions	Not stated	Not stated	Not stated
Number of users in survey sample	0	0	0

Basic data on sites (continued)

Name of site	Quartzly	ResearchGate	SciSpace	Zotero
Country of origin	USA – Columbia University	Germany	Cambridge, UK	USA. Started in 2005
Number of users involved	Approximately 3400 members. Mentions nine US universities.	Claims over 800,000 people have joined	?	Not stated
Spread of Users	Targeted at people working in laboratories	It has advisors worldwide, senior and junior ones. These are distributed over many countries I	?	Not stated. Special-interest groups in the areas of Law and social sciences (but no other areas) were found
Spread of subject areas	Only found evidence of medical laboratory areas	Wide range of disciplines covered.	?	
Ownership of the site	Is based in USA, as Quartzly, LLC, but does not reveal its identity save for two email addresses	Backing is unclear. Offices in Cambridge, Massachusetts, as well as in Berlin.	Not clear. Appears to have been founded at a workshop in Cambridge as an offshoot.	Comes from George Mason University, USA, with funding from several major grant foundations
Part(s) of the scientific process supported by the site	Lab management. Provides information on use of reagents as an example.	Site talks of helping researchers to communicate and to download articles as well as collaborate	Offers scientists access control, tools for sharing and archiving articles, discussions and support of communities and working groups.	A tool to help researchers collect, organize, cite, publish and share research sources and find other users. Was a web page reference manager.
Nature of materials available on site	Claims to be an online suite of lab management tools for the academic.	A lot of content, much is discussion, some of it at a rather trivial level.	None visible	Above types of resource
Ease of use of the site	Well laid out and easy to follow.	Good, though much of the access is through small print at the bottom of the webpage.	Only a couple of pages visible to the outside world.	Claims to make handling references to webpages very easy
Openness and presentation of the site	Cannot ascertain level of years. Targeted at a US audience.	Not stated	From the open pages there is very little incentive to get involved.	Not particularly informative
Constraints on use of site	User agreement is comprehensive and includes forbidding harvesting.		No terms of use available	
Other comments		Uses “mentors”. Major areas are medicine and biology. Physics is a very small area.	Rather closed to the outside world	Majors on reference handling and not social aspects
No of articles held	Not stated	Not stated	Not stated	Not stated
No of institutions	Not stated	Not stated	Not stated	Not stated
Number of users in survey sample	0	2	0	3

Functional attributes of sites

Attribute /Site	Academia.edu	Academici	CiteULike	Epernicus Network	LinkedIn	Mendeley	myExperiment
URL	http://www.academia.edu/	http://www.academici.com/	http://www.citeulike.org/	http://www.epernicus.com/network	http://www.linkedin.com/	http://www.mendeley.com/	http://www.myexperiment.org/
Viewable articles	Yes	Maybe	Yes	Yes	No	Yes	Yes
Contacting other researchers	Yes	Maybe	Yes	Yes	Yes	Yes	Yes
Finding other researchers	Yes	Maybe	Maybe	Yes	Yes	Yes	Yes
Finding relevant materials	Yes	Maybe	Yes	Yes	No	Yes	Yes
Forming groups	Yes	Maybe	Maybe	Yes	Yes	Yes	Yes
Overall purpose	ASN site	Blog?	Academic reference manager	ASN site	Social network site for professionals	ASN site	ASN site with emphasis on experimental workflows
Origins	Academic social network site	Publisher driven site	Academic reference manager	Spin-off from clinical research support software	Social network site for professionals	Academic social network site	Project on the same topic
Assessment		Not an ASN site	A reference manager	Not a general-purpose ASN	Well-established, good		Not a general-purpose ASN site



Functional attributes of sites (continued)

Attribute /Site	myScience	Peer Evaluation	Quartzy	ResearchGate	SciSpace	Zotero
URL	http://Myscience.ch	http://peerevaluation.org/	http://www.quartzy.com/	http://www.researchgate.net/	http://www.scispace.com/	http://www.zotero.org/
Viewable articles	No	Yes	No	Yes	Yes	Yes
Contacting other researchers	Only from pages on the site	Yes	Yes	Yes	Yes	Yes
Finding other researchers	Only from pages on the site	Yes	Yes	Yes	Yes	Yes
Finding relevant materials	Only from pages on the site	Yes	Yes, relates to lab materials	Yes	Yes	Yes
Forming groups	Offers links to existing research networks	Yes	?	?	Yes	Yes
Overall purpose	Portal displaying science and job vacancies in Switzerland	ASN with emphasis on an open peer review process	Assistance to lab workers in life sciences	ASN site	ASN site	ASN site with emphasis on handling citations
Origins	Fresh start-up	Fresh start-up	?	?	Workshop	A citation manager
Assessment	Not an ASN site	Appears good, but no usage found in survey	Very specialised type of ASN		Appears weak on review support	Has evolved usefully



The preceding table gives an assessment of the sites studied in terms of the functional attributes expected of a social networking site designed for use by researchers. The information has been obtained from the websites used in the preceding two tables. In some cases the assessments were difficult to make. It can be seen that there are about six sites which can be called general-purpose academic social networking sites, Academia.edu, Mendeley, Peer Evaluation, ResearchGate, SciSpace and Zotero.

LinkedIn occupies a unique position. It is very well established in the business community for professionals to present their profiles and curricula vitae, and there are groups to which researchers belong, such as ones operated by learned societies with the broad purpose of informing members of forthcoming events. Although it is not an academic social networking site, academic researchers use it for the same purposes as their counterpart business professionals.

The proposition made by the site Peer Evaluation was considered to be particularly interesting as it clearly had been designed by academic researchers who wish to give strong and visible support to the peer review process within the overall ambit of an academic social networking site. We consider that this aspect of its design has been successful and that for this reason if no other, the site's facilities deserves attention for the thoughtful way that it supports peer evaluation.

The specialised nature of the majority of the remaining sites has been brought out in the table. We consider that because their use is generally specialised they would be expected to have futures only in the niches that they occupy.

4 The survey

4.1 Methodology

Fifteen UK universities were identified for the purpose of seeking survey respondents. The universities were chosen in approximately equal measure from the four University groupings, the 1994 group, the Alliance group, the Million+ group and the Russell group. Within each University about four departments were sought as candidates to be approached. We attempted to identify a spread of departments based on the panel areas of the 2008 research assessment exercise as shown in the table below.

Panel	Unit of Assessment	RAE title of Unit of Assessment
A	3	Infection and immunology.
B	9	Psychiatry, neuroscience and clinical psychology.
C	13	Pharmacy.
D	14	Biological sciences.
E	18	Chemistry.
E	19	Physics.
F	21	Applied mathematics.
G	24	Electrical and electronic engineering.
I	34	Economics and econometrics.
M	53	German, Dutch and Scandinavian languages.
O	66	Communication, cultural and media studies

Within a given panel area, the particular Units of Assessment shown in the table were sought within an institution. Using data from the research assessment exercise, we required at this stage that candidate departments had to have at least



10 members of staff listed as research active. We applied this criterion to facilitate the process of collection of names from departmental staff lists. Care was taken to form as far as possible a balanced sample of Units of Assessment across the sample of universities.

Staff of the Centre for Research Communications collected the names and contact details of research active staff in these departments. The target was to collect of the order of 500 names but in fact nearer 700 were provided. The aim was to provide a reasonably balanced sample of staff across a range of research disciplines. We sent the survey out to 680 departmental staff. After a suitable period, we sent reminders to those who had not replied.

In addition, for the departments that we had chosen, the Heads of Department were identified and an e-mail was sent to them asking them to forward the survey to the research students in the departments. The survey of research students contain an additional question about their University as this was not automatically built into the responses we received.

4.2 Survey analysis

4.2.1 Terminology

We sent out two surveys, one intended for staff undertaking research, the other intended for research students. There was some very slight crossover between the two in that we received responses from research students to the first survey and some from staff to the second. However, we have been able to differentiate between research students and others and we refer to all respondents who are not research students as staff in the analysis which follows.

4.2.2 The respondents

We received a total of 117 responses. Of these, 85 were from the survey of research staff and 32 were from the survey sent to research students. We admit to being disappointed by the level of response: only 9% of staff replied. In previous surveys that we have undertaken the response level has almost always been about 20%, so this level of response is markedly low.

As with any survey, the probability exists of sample bias due to interest in or aversion to the topic. It is therefore likely that those answering our survey had a greater than average interest in the use of social networking sites in support of their research. This could lead to an indication of greater use of social networking sites by our sample than is the case in the general population of researchers, which should be borne in mind in interpreting results.



Number of responses by panel number and University Group

Panel	1994	Alliance	Million+	Russell	Total
A	0	0	0	2	2
B	0	0	1	9	10
C	0	10	4	0	14
D	2	0	0	5	7
E	8	0	0	26	34
F	3	0	0	2	5
G	0	2	0	1	3
H	0	1	0	0	1
I	3	0	2	16	21
J	0	4	1	0	5
K	0	2	4	0	6
L	0	0	0	0	0
M	3	0	0	0	3
N	0	1	1	0	2
O	2	1	0	1	4
Total	21	21	13	62	117

The following table shows how respondents categorised themselves.

Number of responses by role and career stage

	Early Career Researcher	Mid Career Researcher	Late Career Researcher	Row Total
Professor		13	9	22
Head of Department		1	1	2
Reader		8		8
Principal Lecturer		1	1	2
Senior Lecturer	3	5	1	9
Lecturer	14	10	1	25
Research Fellow	7	3		10
Postgraduate Student	33	2		35
No role given	2	1	1	4
Column Total	59	44	14	117

Both these tables show a reasonable distribution of responses. Our view is that categorisation by career stage is of most use in this study.

4.3 Size of research group

We considered it possible that the use of social networking sites might be in some way related to the number of fellow researchers with whom individuals were in contact with in their own institutions. We therefore asked about the number of researchers in their own institution with whom our respondents were in close and loose contact about their active research. The following table shows the responses.



Average numbers of researchers by University Group with whom individuals are in contact in their own institution about their active research

	Average number of close contact researchers	Average number of loose contact researchers	TOTAL
1994	9.6	26.2	35.8
Alliance	9.2	22.7	31.9
Million+	12.7	21.4	34.1
Russell	8.1	19.8	27.9
ALL	9.1	21.8	30.9

Although, clearly, different individuals will have different interpretations of close and loose, it can be seen that the figures are similar for all four groups.

4.4 Awareness and use of specific social network sites

4.4.1 Awareness

We asked those we surveyed about a set of specific social network sites. These are listed below with their URLs and with the percentage of respondents having awareness of each site:

Site name	URL	Percentage of respondents having awareness of site
Mendeley	http://www.mendeley.com/	12
Zotero	http://www.zotero.org/	9
CiteULike	http://www.citeulike.org/	11
Academia.edu	http://www.academia.edu/	17
LinkedIn	http://www.linkedin.com/	62
Epernicus Network	http://www.epernicus.com/network	1
ResearchGate	http://www.researchgate.net/	3
myExperiment	http://www.myexperiment.org/	0
SciSpace	http://www.scispace.com/	0
Quartzy	http://www.quartzy.com/	0
Academici	http://www.academici.com/	1
Peer Evaluation	http://peerevaluation.org/	0
Myscience.ch	http://www.myscience.ch/	0

Given this lack of any awareness of myExperiment, SciSpace, Quartzy, Peer Evaluation and myScience.ch, we shall disregard them in future analysis. In addition, we found that there was no use by our respondents of either Epernicus Network or Academici and these will also therefore not figure in our further analyses. We shall restrict ourselves to Mendeley, Zotero, CiteULike, Academia.edu, LinkedIn and ResearchGate.

4.4.2 Use of social network sites

A number of respondents noted their use of Facebook and/or Twitter in connection with their research. Other sites mentioned by single respondents as being used included Xing (described on its homepage as “the professional business network with more than 10 million members worldwide”), Ning (which is also a platform for creating one’s own social networking site), Second Life (which claims “to provide a 3D world



where users can socialize, connect and create using free voice and text chat”) and Biomed Experts.

We asked about the extent of our respondents’ use of the sites listed in the above table, for:

- publishing material
- contact with other researchers
- finding other researchers
- finding relevant materials

For the last three of these activities, we also asked about their use of email, Twitter and events, such as conferences and symposia.

Here are the results as percentages of the total number of respondents. [The bottom left-hand cells of the table are greyed out because we did not ask about publishing material through the use of e-mail, Twitter or events.]



Extent of use of various media for scholarly communication (percentage of all respondents)

	Use for publishing material			Use for contact with other researchers			Use for finding other researchers			Use for finding relevant materials		
	A lot	A significant amount	A little	A lot	A significant amount	A little	A lot	A significant amount	A little	A lot	A significant amount	A little
Mendeley		1				3			2	2	1	3
Zotero						1			1	2		1
CiteULike						1			1			3
Academia.edu		1	3			5		1	4			3
LinkedIn			3	1	4	13		3	10			5
ResearchGate						2		1				2
email				60	15	3	11	12	30	14	15	21
Twitter				2	3	4	1	3	2	2	3	1
Events				26	31	17	17	31	23	12	31	24

There are two clear messages from this table. The first is that email and events continue to dominate as means of communication by researchers. The second is that, other than LinkedIn, no social networking site is used by more than 5% of our respondents for any one purpose. In terms of publishing material, which is the principal issue addressed by this study, just three sites show any use: Mendeley, Academia.edu and LinkedIn. None of these three show any indication of being used substantially for publication purposes. Typical of the responses we received was one from a user of Mendeley who said "I mainly use the desktop application for filing and sorting papers. I consequently have used the web interface a little."

The table can be summarised to

Percentage of respondents actually using the site

	For publishing material	For contact with other researchers	For finding other researchers	For finding relevant materials
Mendeley	1	3	2	5
Zotero		1	1	3
CiteULike		1	1	3
Academia.edu	4	5	5	3
LinkedIn	3	18	14	5
ResearchGate		2	1	2
email		79	53	50
Twitter		9	5	5
Events		74	71	67

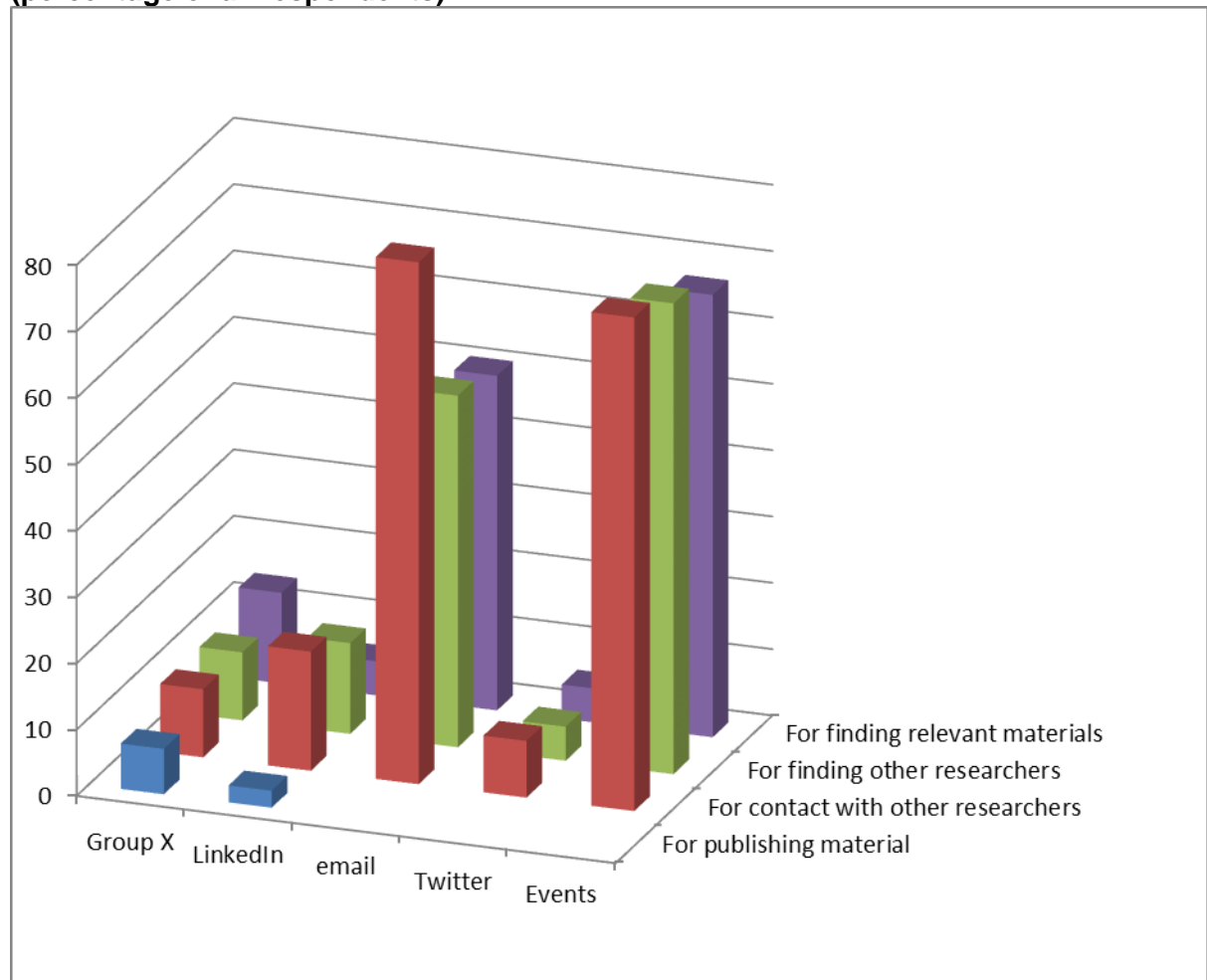
The next table shows, for each of the six social networking sites, the percentage of respondents who used that site for any purpose.

Mendeley	5
Zotero	3
CiteULike	3
Academia.edu	9
LinkedIn	19
ResearchGate	2

However, if we group Mendeley, Zotero, CiteULike, Academia.edu and ResearchGate and call them Group X, we find that 16% of respondents make some use of one or more of them. Alongside this, LinkedIn is used by 19% of respondents. The chart below shows the percentages of respondents using particular media for the purposes we asked about – note here that we did not ask about publication in respect of email, Twitter and Events.



**Use of different means of communication for different research purposes
(percentage of all respondents)**

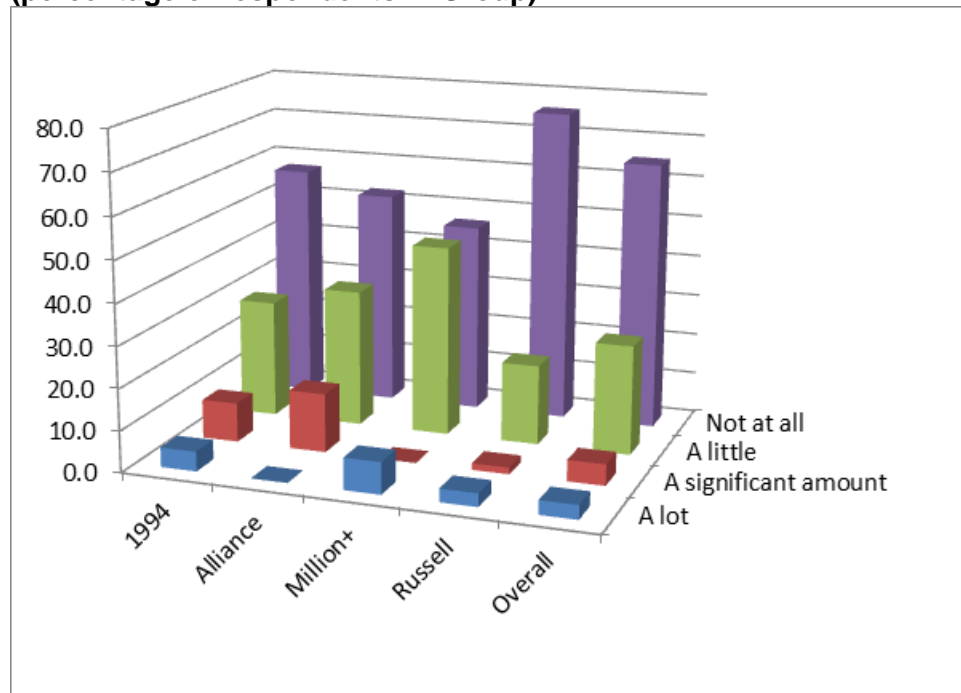


The high utilisation of both e-mail and events is noteworthy even if it is unsurprising. The Group X products are clearly used for all purposes but only by a minority. The level of use of the Group X products is not dissimilar to that of either Twitter or LinkedIn.

We also examined the extent to which different categories of respondent used social network sites (either Group X or LinkedIn). The next graph shows this by University Group.



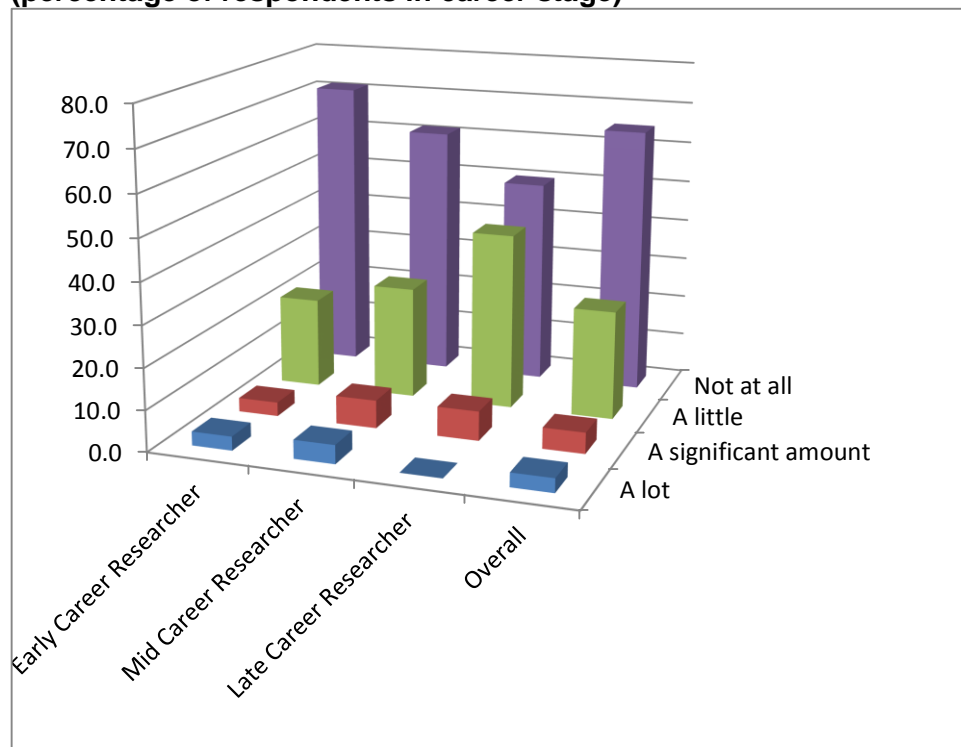
Users of social networking sites (Group X and LinkedIn) by University Group (percentage of respondents in Group)



Overall, about two thirds of all our respondents made no use at all of these sites. The graph also shows that very few researchers use these sites either a lot or significantly. It also suggests that the Russell Group respondents are significantly lower users of social network sites than the other groupings.

The next graph shows the results by career stage.

Users of social networking sites (Group X and LinkedIn) by career stage (percentage of respondents in career stage)



Because of the low cell counts in this graph, we do not consider any relationship between level of use and career stage can be adduced.

There was a range of comments from respondents on the use of social networking sites. One wrote "I do not use ANY social networking site" and another said "I avoid them like the plague". This view was however at the extreme. At the other end of the spectrum, another interviewee, an educationalist, was insistent that institutions should encourage engagement by staff in the technology by providing training followed up by continuing support. More prevalent was the view that social networks do not (yet) fit the bill. One respondent wrote "While I am certainly open to using social network sites, I am not really aware of what services they offer that can't be gained by contacting someone directly. Certainly, I'm not aware of any focussed discussion groups relevant to my area of research on social network sites, and if they aren't directly relevant then I simply wouldn't have time to engage with them on a regular basis." The issue of workload and therefore of the lack of time on the part of respondents to investigate these new forms of communication was repeated a few times.

Another, from the 30-39 age group, wrote "Social networks for science probably would work best if there was a community agreement to use them - but for now I think people build their networks through more traditional face to face and peer awareness methods. Perhaps the next generation who grow up 'adding friends' to networks will use these systems more." As the figures above show, there is not a huge difference in use across age ranges. The textual responses from our survey support this. However, a number of research students were articulate in their advocacy of the benefits of Facebook. One wrote "I use Facebook a lot for communicating with other researchers. It is also helpful when event invitations are used for conferences, allowing you to research attendees in advance in order to prepare any questions you may want to ask. My principle use is to maintain relationships with researchers in other parts of the country and to organise meetings with my fellow researchers in [my home institution]. [It enables me to maintain] constant relationships with other researchers, rather than relying on sporadic meetings at conferences." Another wrote succinctly that Facebook "is easily accessible and many use it."

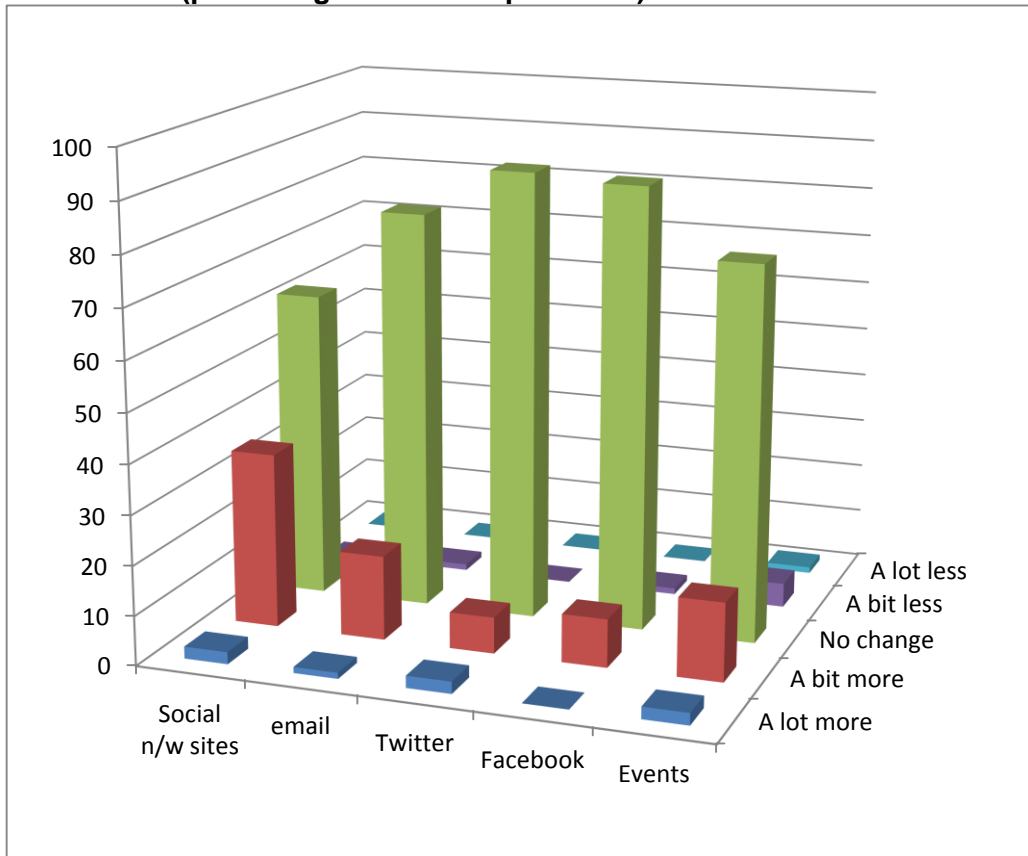
There was also definite, if small scale, evidence from the staff survey of the use of Facebook to support research work. One wrote "I am also on Facebook, and some (very few) researchers contact me via that route." Two biological scientists, one an interviewee, noted that US academics do use Facebook to support their research. One wrote "Facebook is a favourite with the Nordic community and some of my US contacts." Another respondent wrote "[I don't] really see the need for research specific social network [sites], especially as a limited number of people use them, whereas many people use Facebook."

4.4.3 Anticipated change in use of different means of communication in support of research

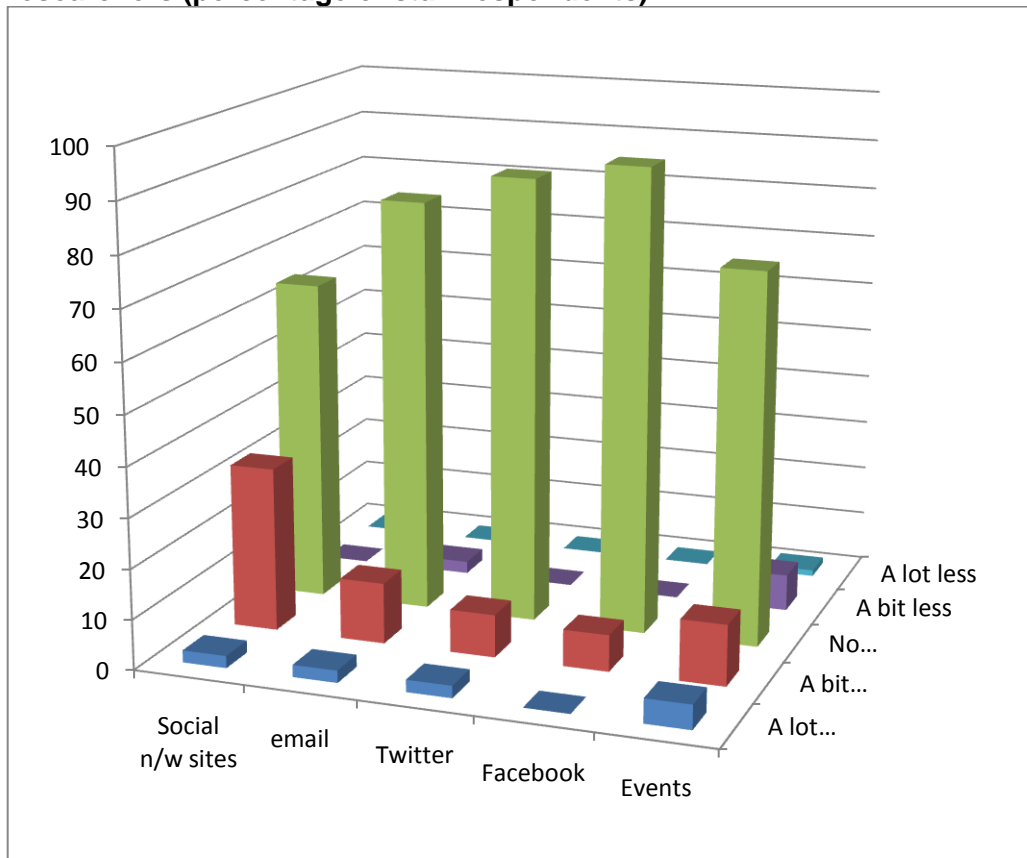
We asked respondents to indicate the extent to which they expected change in their use of different means of communication for the purposes of contacting other researchers, finding other researchers or finding relevant materials. The next three graphs show the results for staff respondents.



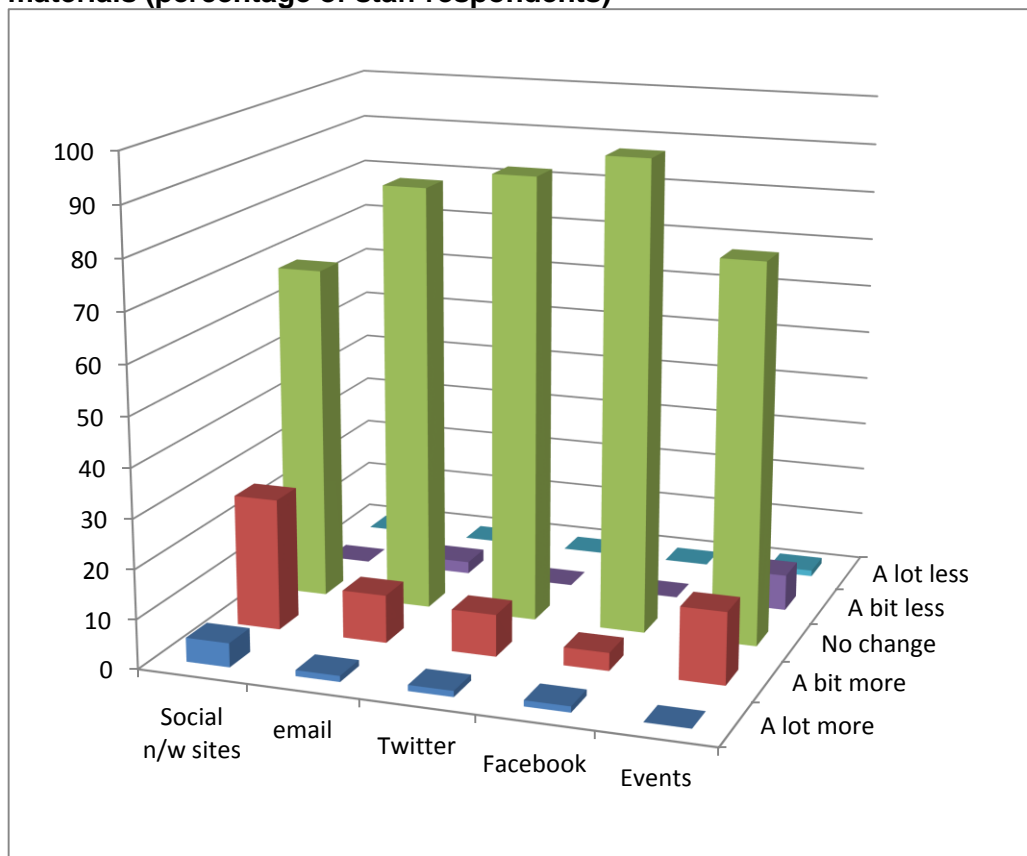
Expected change in use of different means of communication to contact other researchers (percentage of staff respondents)



Expected change in use of different means of communication to find other researchers (percentage of staff respondents)



Expected change in use of different means of communication to find relevant materials (percentage of staff respondents)



These three graphs all show very similar shapes. They show that researchers actually don't expect to change the way they work much. They also expect to use all the means of communication we asked about, including events, more rather than less in the future. The use of email is expected to hold up remarkably well against newer technologies such as Twitter and Facebook, which may not be surprising as it is a medium suited to important correspondence, allowing threads and archiving. Social network sites other than Facebook are, however, expected to be used more by a significant number of respondents – though still a minority.

We would have expected, in the present economic climate, to have seen an anticipation of a decline in conference attendance. One of our respondents however clarified this: "I would like to use electronic/virtual communication more and reduce my conference attendance but I expect that the expansion of conference numbers will offset this trend." There was no out and out prediction of a burgeoning use of social networking sites but one research student wrote, rather wistfully, "I think social networking in research is potentially underutilised in my institution. Researchers should share their experiences of networking with each other."

4.5 The impact on Open Access publishing

Key to this study is an assessment of the impact that these social networking sites may have on Open Access publishing and the movement promoting it. In particular, these sites can be marketed as an alternative to repositories and Open Access journals. The fact that academic publishers are involved in at least one of the sites we considered is noteworthy in this respect. It is worth also noting the comment in a recent article in the Economist on academic publishing¹ that "[academic publishers] have minimised the threat from Open Access journals, which seemed considerable a few years ago, in part by buying some of the best ones." Were researchers to consider that the placement of research articles or data on social network sites equates to Open Access publication, then the impact on Open Access repositories could be substantial and adverse. It would also hold the danger that, if the policy or business model of a given social network site changes, then the materials published on it might cease to be Open Access.

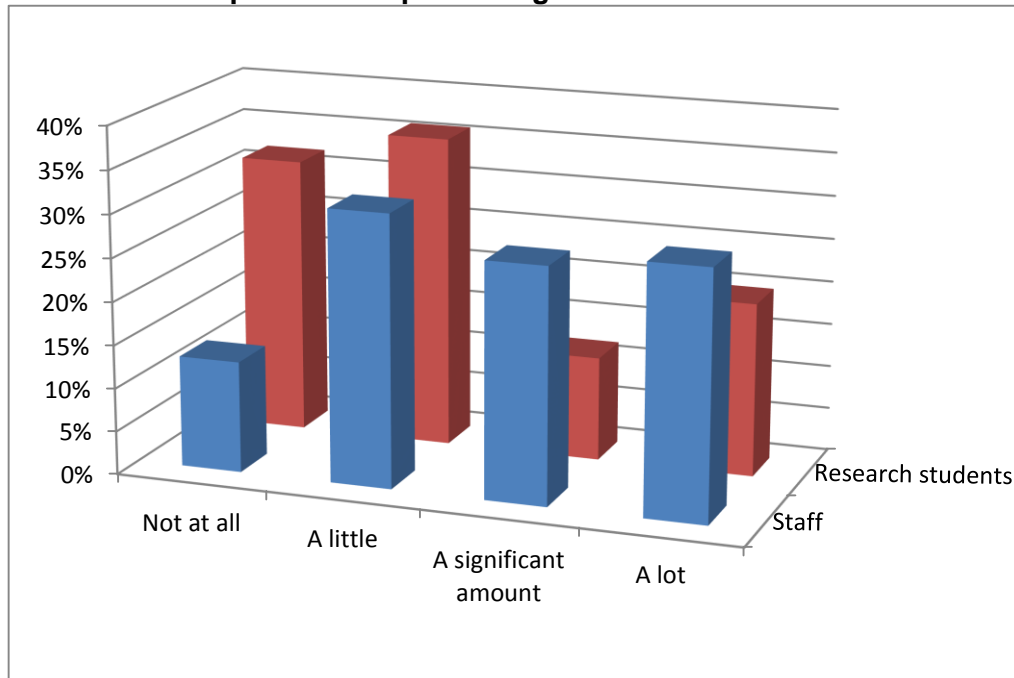
Our survey therefore examined the awareness and the attitudes of respondents to Open Access publishing vis-a-vis the social networking sites. This was done in part with a view to determining the extent to which they thought that social networking sites could begin to act as Open Access publication locations but also in part to examine the options for manoeuvre by the owners of repositories and Open Access journals.

We asked our respondents how aware they were of Open Access publishing. The first graph shows the awareness of Open Access publishing by staff and research student grouping.

¹ "Of goats and headaches": The Economist 28 May 2011, p 70



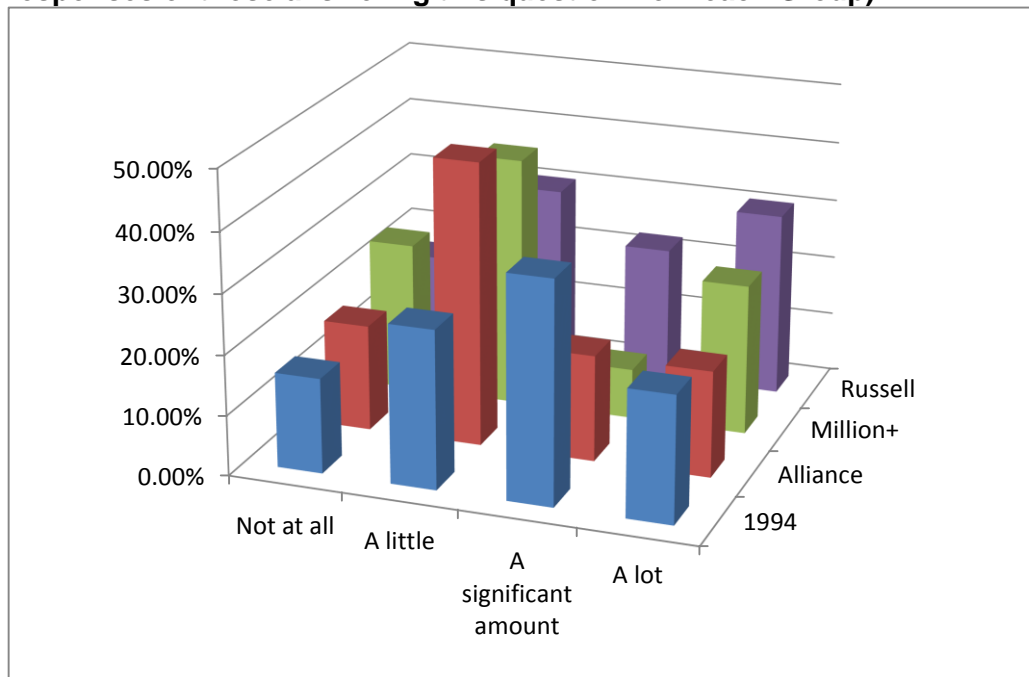
Awareness of Open Access publishing for staff and research students



This demonstrates a rather poor awareness of Open Access publishing amongst research students.

The following graphs show the responses graphed by percentage of those responding from each University Group.

Awareness of Open Access publishing by University Group (percentage of responses of those answering this question from each Group)

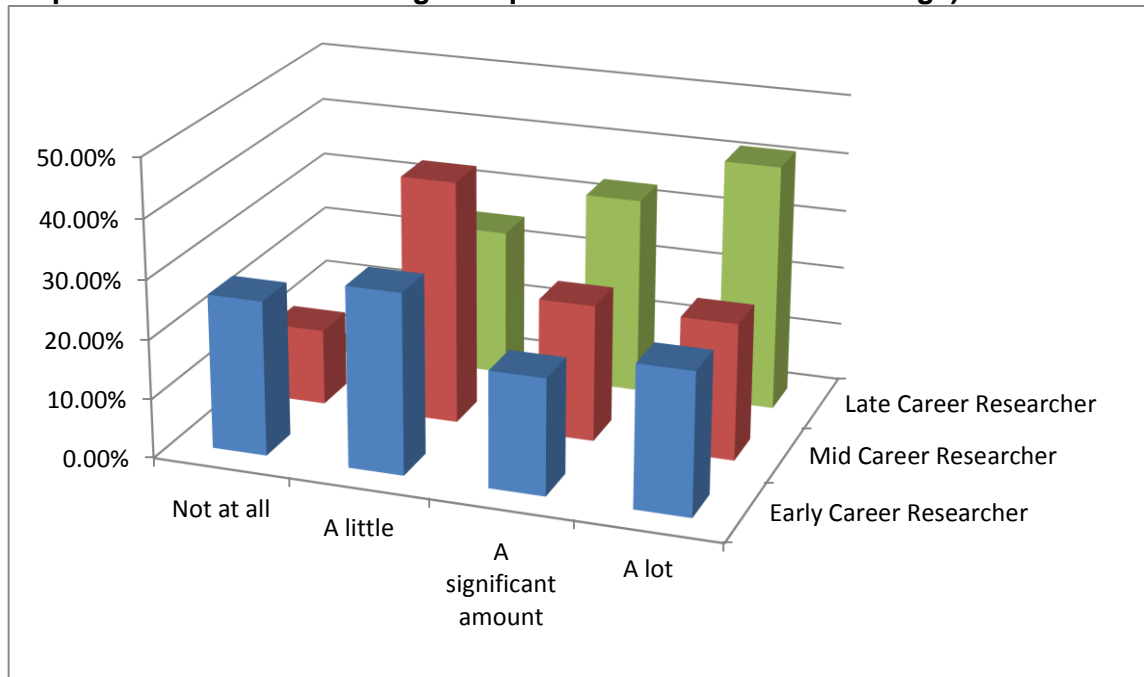


This graph suggests that awareness of Open Access publishing is higher at those universities which claim to be more research led.



The next graph shows the same information by career stage.

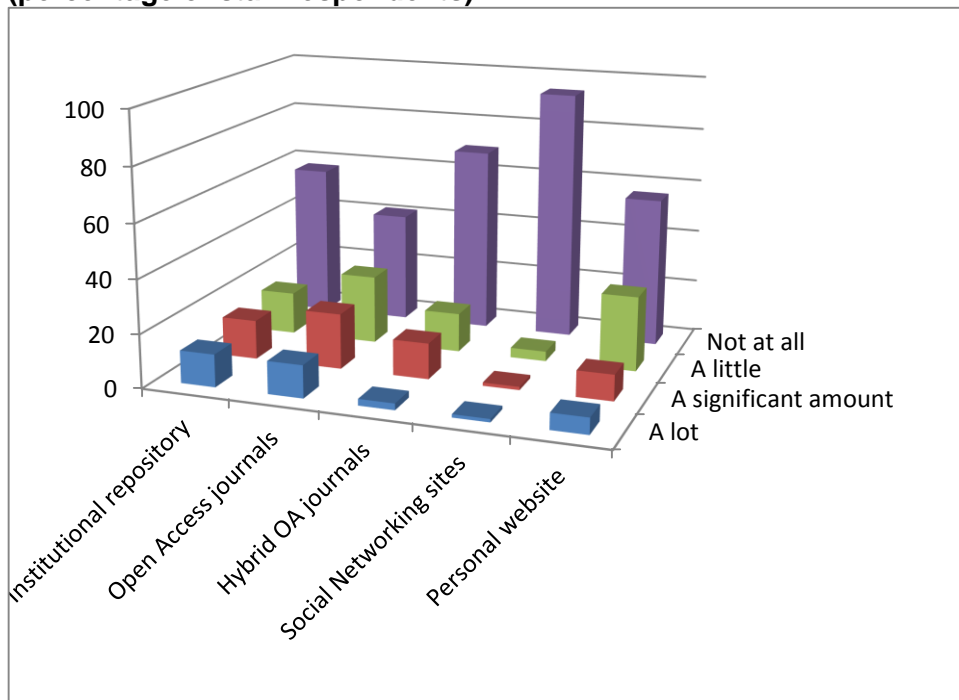
Awareness of Open Access publishing by career stage (percentage of responses of those answering this question from each career stage)



This graph suggests that the later into their career the researcher is, the more aware they tend to be of Open Access publishing.

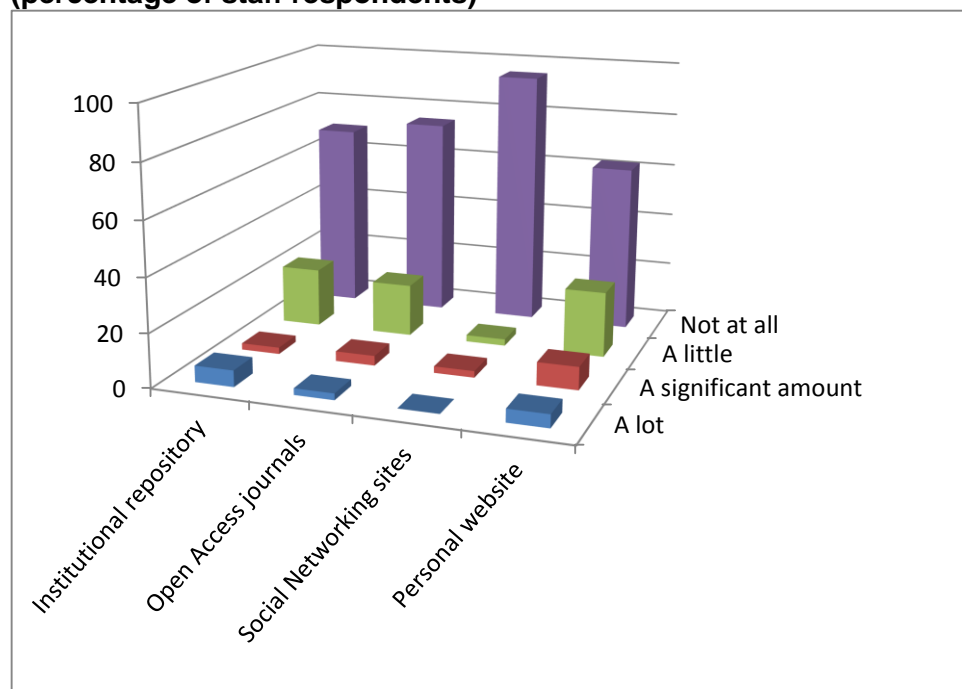
We asked how much our staff respondents used a range of locations for Open Access publication of peer-reviewed materials. The results are shown below.

Use of Open Access publication locations for peer-reviewed materials (percentage of staff respondents)



We asked a similar question about materials which had not been peer reviewed. The graph below shows our responses.

Use of Open Access publication locations for non-peer-reviewed materials (percentage of staff respondents)



These two graphs together show a fairly poor usage of Open Access publication routes.

We also asked about the extent to which respondents use different locations to search for material. The table below shows this as a percentage of those responding to this set of questions.

	A little	A significant amount	A lot
Google	16.5%	24.1%	55.7%
OpenDOAR	8.9%	0.0%	0.0%
Institutional repositories	26.6%	13.9%	24.1%

As is to be expected, Google wins by a long way. Disappointingly, OpenDOAR is used little. The significant level of use of institutional repositories could be considered surprising.

4.6 Relationship between the use of social networks and Open Access awareness

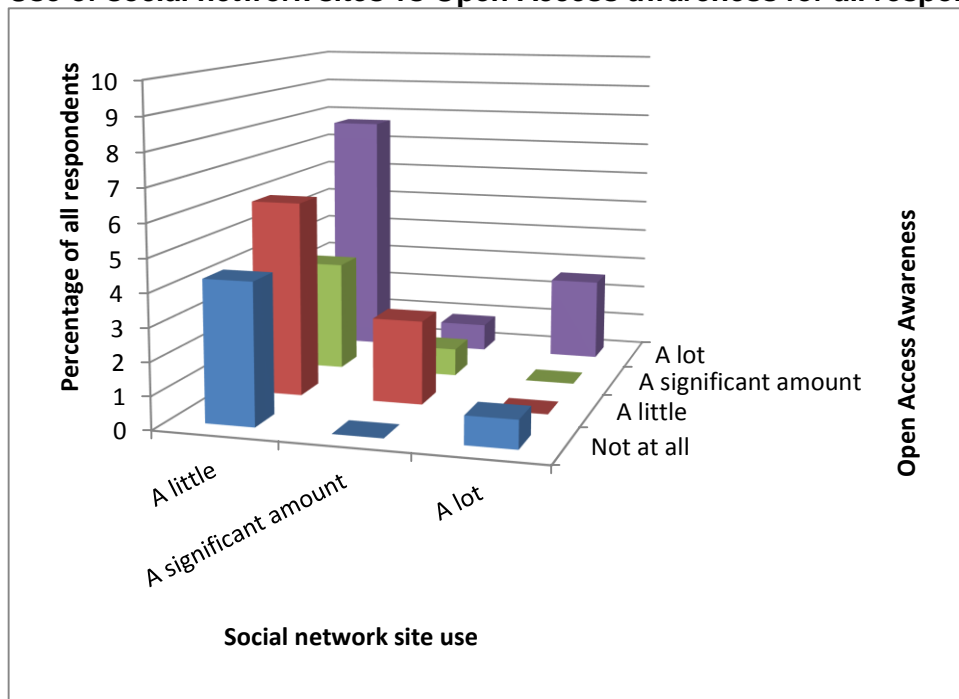
Given that we have data both on individual’s awareness of Open Access and their use of social network sites in support of their research, we have sought to look at the extent to which people using social network sites have an awareness of Open Access. There is a risk that researchers with poor knowledge of Open Access principles may consider deposition on a social network site as Open Access publication. It should not be seen as such. The future of social network sites is not



clear. For example, if a site with significant “Open Access” materials becomes defunct or is taken over, the materials may disappear from public access. We would therefore hope to find from our survey that those who use social networking sites to a significant extent have a good appreciation of Open Access, which should lead to an ability to use this knowledge to better use Open Access facilities.

The graph below shows the relationship between the use of social networks and Open Access awareness. We assessed the level of use of social network sites for an individual respondent by considering their responses to their level of use of any of the sites we cited. If any response was “A lot”, we take their use of social network sites to be “A lot”. If they had no response of “A lot”, we considered whether they had any response of “A significant amount” and, if they did, we take their use of social network sites to be “A significant amount”. We continue this process through “A little” to “Not at all”. It is to be noted that, given that only 30% of our respondents use social networking sites in association with their research, the figures in each cell are low and should therefore be treated with care.

Use of social network sites vs Open Access awareness for all respondents



We feel that, because of the low counts in each cell, no firm conclusions can be drawn.

We investigated the extent to which our respondents were encouraged to publish to institutional repositories and to social network sites by their institution, department and research group leader. The table below shows the responses as a percentage of all our respondents.



		To institutional repository			To social network site		
		A little	A significant amount	A lot	A little	A significant amount	A lot
Encouraged by	Institution	10.3	6.8	9.4	6.0	0.9	0.0
	Department	9.4	7.7	6.8	1.7	1.7	0.0
	Research Group leader	6.0	7.7	5.1	1.7	2.6	0.0

The evidence is therefore of very little encouragement to publish to social network sites. The encouragement to publish to the institutional repository is disappointingly low. This has to be a cause for concern to funding councils and other bodies seeking to raise the use of Open Access publication and to institutions investing in repositories.

5 Issues and opportunities presented by academic social networking sites

In this section we present a number of recommendations which are for the Centre for Research Communications. We recognise that some of them are beyond the scope of the Centre to implement by itself and in these cases we suggest that the Centre promotes them in the wider community.

5.1 Awareness

As reported in more detail in section 4.1, awareness of the sites was generally very low, with no less than five of the sites studied being unknown to respondents and a further two sites being known only to one. Evidence from the survey and interviews suggested that the most frequent way of people finding out about a site was by word-of-mouth or by invitation to join the site from colleagues.

5.2 Use made of academic social networking sites

There are about half a dozen general purpose academic social networking sites aimed at a wide audience² and of these there are five (Academia.edu, Mendeley, ResearchGate, SciSpace and Zotero) that we found are being used by UK researchers. CiteULike, which is oriented towards correcting and managing literature references, was also found to be in use within our sample. Only Mendeley and Zotero were used for any purpose “a lot” and then only to a level of 2% in each case, while 16% said they used one of these six sites to some extent. Thus in absolute terms the use of these sites is very low and it is dwarfed by the use of email and events.

Our examination of respondents’ profiles suggested that it was common for users to register on a site and then do little afterwards, and we have formed the view that many who said they used a site a little were little more than dormant users. This

² These sites are Academia.edu, Mendeley, Peer Evaluation, ResearchGate, SciSpace and Zotero. LinkedIn, for reasons discussed earlier in this report, is not taken to be an academic social networking site and the discussions of academic social networking software in this section do not refer to this LinkedIn, which although it is used by researchers, is not aimed at them.



accords with the findings of a study published by the Research Information Network (RIN), in July 2010³.

Researchers generally joined sites because they were invited by colleagues. The low level of use of these sites by most of those who have registered with them could have a number of causes, which are not mutually exclusive:

1. The sites have not met the expectation of the majority of people who have registered with them. Only a minority have found them useful.
2. The proposition made by these sites does not differ significantly from that provided by the established means of publishing or finding materials or finding and contacting other workers. The survey showed that the levels of use of email and events for all activities other than publishing were far higher than the corresponding use of these sites. Email also has the benefit, often under-recognised, of offering the user a readily accessible archive of all previous discussions. Email networks are also already built, working and well understood.
3. The effort of transition outweighs any gain. Researchers are busy people and most who have looked at the sites have concluded that they are a low priority to them.
4. Like the telephone, any site would be much more useful if everyone else was using it, and therefore accessible by this means. With a number of sites vying for use and usage levels being low, separate islands of communication are being formed.
5. In some research areas, there are already well established sites for sharing published material with peers. Physics and mathematics have arXiv, the e-print archive run from Cornell University Library and biology has PLoS BIOLOGY, a peer-reviewed Open Access journal that has gained wide acceptance. These facilities show what is possible and could be used as exemplars.

It may be noteworthy that our analysis of degree of use by career stage showed that the frequent users were almost all drawn from early or midcareer researchers. This might suggest that the frequent users are drawn to the sites to further their career. If so, this point could be used for marketing purposes.

5.3 Impacts on scholarly communications processes

At present these sites only have a minor impact upon scholarly communications processes, probably as a result of the low level of usage.

The graphs in Section 4.4.3 show that most respondents did not expect to change the amount of their use of any of the means of communication in the future. However the next most common response was to expect a small increase in the use of all means, with an increase in the use of social networking sites being the most frequently cited. From this finding we may predict that the use of these sites will increase in the future.

Looking at the publication process for peer-reviewed materials, we found little use of other than paid for journals, with institutional repositories being used at least significantly by only about a quarter of respondents, Open Access journals by about the same number, personal websites and hybrid Open Access journals by about 15%

³ "If you build it, will they come? How researchers perceive and use web 2.0".
<http://www.rin.ac.uk/our-work/communicating-and-disseminating-research/use-and-relevance-web-20-researchers>



each, and social networking sites by only about 3%. The picture for non-reviewed articles was similar.

5.4 Impacts on the scholarly communication system

Academic social networking sites are not being used much at present but, if their use for depositing materials were to increase substantially, there would then be a third type of location for storing articles in addition to journals and repositories. For most researchers, the principal means of searching is Google and, as long as social networking sites are searchable by Google, the material will be findable. However, if full articles are stored in multiple places, the researcher may be confronted with the problem of knowing which might be the authoritative version. Our view is that full articles should not be stored on social networking sites but that pointers to the full article held in a place of safe storage should be used: we discuss this below in Section 5.4.5.

Because we were asked to consider these sites and their evolution against a backdrop of existing and developing academic publishing and communications processes it was decided that the survey should include questions about Open Access publishing, to ascertain the views of this cohort on this second and closely related topic.

A basic question about awareness showed that amongst staff, nearly half knew little or nothing about Open Access and that amongst research students a clear majority were in that category. Awareness was somewhat better in the university groups that are more research led, but was still low. Bearing in mind that most UK higher education institutions have had a repository for several years, we consider this a cause for concern.

Our survey question enquiring about encouragement to publish in particular types of place showed that only a minority (about 25%) experienced any encouragement at all from their institution, their departments or leaders of research groups to publish to their institutional repository, with virtually no encouragement to publish on social network sites being found. We consider this lack of encouragement to use repositories very disappointing. We consider it likely that few researchers know the intended purpose or potential value of repositories, especially their crucial role in a migration towards widespread adoption of Open Access.

Recommendation 1: Institutions should arrange that induction courses for research students cover Open Access and repositories.

Recommendation 2: Researchers should be encouraged to understand the value of Open Access publishing and to publish on institutional repositories.

These results about low Open Access awareness and the low encouragement to use repositories obliged us to consider what the role of repositories is perceived to be at present and also to consider how stakeholders consider they are supposed to be used. Because a variety of stakeholder groups is involved, we look at issues as they affect each in turn.

5.4.1 Researchers

1. The social networking sites are fishing for researchers and their publications. Researchers need encouragement and education in both the use and the worth of Open Access and need to be warned of the possible pitfalls in the use of academic social networking sites.



2. Institutions need to formalise the way they give support to researchers to enable them to produce Open Access versions of everything they publish.
3. Researchers will need to give thought to where copies of their publications end up; if copies exist in more than one place then they would presumably have to take responsibility for version control.

5.4.2 Institutions

1. Institutions need to develop and apply a list of aims and objectives describing what their repository is meant to be used for. For them a repository can be⁴:
 - a. An accumulation of the intellectual output of the institution.
 - b. A powerful marketing feature demonstrating in complete depth the research achievements of every part of the institution.
 - c. A denotation of the institution's contribution to knowledge.
2. These are powerful points that institutions should capitalise upon.
3. Institutions do however need to recognise that on its own, a repository is very little use to a research worker; it is the provision of all the information in all the repositories in searchable form that creates value. Hence, for the common good, it is important that gateways exist to give access to all repositories. It is our view that right now, having created repositories, many institutions think that the job is done, when in reality it is only the enabling stage that has been completed.
4. In this age of increasing transparency, especially when public funds are used, the fact that the results of much work that has been paid for with public funds is only available to other academics and not the general public, does appear anomalous and it is surely only a matter of time before the public media make something of this.

5.4.3 Repositories

1. Repositories are capable of being extremely persistent locations for information. Universities are amongst the most persistent organisations in the world, so the expectation that materials in a repository will be available for a long time is particularly reasonable.
2. Two views can be taken of repositories: a management view and a user view. We noted with approval the blog on the "Enhancing Repository Infrastructure in Scotland" website⁵ which discusses the meaning of the term "institutional repository". The blog suggests that an institutional repository landscape is what is required, one which delivers services and facilities. The blog notes that the usual definition of institutional repository gives four main objectives for having such a service:
 - a. to create global visibility for an institution's scholarly research;
 - b. to collect content in a single location;
 - c. to provide Open Access to institutional research output
 - d. to store and preserve other institutional digital assets, including unpublished or otherwise easily lost ("grey") literature (e.g., theses or technical reports)."

We would suggest that such a set of objectives is based on a management view, and not aimed at delivering a service to researchers, who seek recognition for their research output. If repositories are to be important to them, repositories need to provide researchers with something worth having, only part of which is the permanence of the deposited information.

⁴ See for example Alma Swan http://www.openscholarship.org/upload/docs/application/pdf/2009-01/open_access_institutional_repositories.pdf

⁵ <http://eriscotland.wordpress.com/2010/03/08/institutional-repository/>



Consideration of both management and user views is important if a repository is to be successful.

3. Today, bearing in mind the low level of awareness of Open Access, we consider there is a role for the institutional repository to market itself to the institution internally, to its research staff and students, while ensuring it has a beneficial external visibility.

5.4.4 Research Councils, Funding Councils and their Agencies

1. These have made great moves in recent years to encourage the results of research that they fund to be made available in Open Access form.
2. The institutional repositories of British universities potentially provide an important international shop front for their joint research expertise and it is important that this resource is not allowed to be usurped through researchers publishing on locations such as social networking sites.
3. Today's situation, with multiple academic social networking sites vying for attention, is somewhat similar to that of the search engines before the appearance of Google. This suggests that "what if" scenarios should be worked through to postulate what the academic social networking and personal publishing world would be like if one particular piece of software became dominant in the area. Such a development could negatively impact on the perception and adoption of Open Access, could marginalise repositories and could also have other implications.

Recommendation 3: Impact studies of the appearance of a highly successful academic social networking site should be conducted.

Recommendation 4: A watching brief should be kept on academic social networking sites and their levels of use. In particular, a careful watch should be kept for potential lock-in.

5.4.5 Social networking sites

1. Some sites are very open (e.g. Peer Evaluation) while a majority are difficult if not impossible to see into. At least one is funded by a publisher.
2. We consider that presently the funding models of these sites are probably not in their final forms; at the moment they are free to use, but were they to become major players they would almost certainly need some visible form of funding, such as by subscriptions or by carrying advertisements.
3. Providers of proprietary software generally seek "lock in" of their users. This is the creation of a dependency situation whereby users deem that they cannot make a move to different software because of the difficulty involved. This situation has to be guarded against at all costs. Lock in is quite possible with these academic social networking sites, and it could happen as a consequence of the value of the collections of documents that the users have placed on the site. If a site does not have a transparent funding regime and does not mention use of open standards for its data, metadata and construction, then the possibility of lock-in should be considered.
4. As almost every institution already provides a repository for researchers to make their publications available, it seems very desirable that a way of working should be established whereby publications are always put on institutional repositories, and other sites such as social networking ones should use a reference (as a URL or other URI) to that copy of the document.

Recommendation 5: Researchers should use references to an article's location in the repository rather than deposit additional copies of it in



other locations such as social networking sites.

5. There are nearly two dozen suites of software that can be used to build social networking sites⁶, some of which, such as ELGG, have good respect for open standards. We know that some universities, such as Leeds, have used this type of software to provide in-house services, with mixed success. One of our interviewees had used such software to develop a specialist site for researchers in a particular area. There is scope for examining work already done as well as the potential for new services in this area. There may be a worthwhile opportunity to produce a social networking adjunct to an existing portal. This could have a synergistic effect in promoting the portal.
6. We would rather that the products which hide their identities and backers disappear. A few of the academic social networking sites were found to operate "site representatives" with varying roles but all centred upon promoting a particular site at a particular institution. We can only express reservations about a site that operates in that way.
7. At present these sites are having little impact upon scholarly communications, but they are likely to have more impact in the future. For this reason we consider it worthwhile to follow up our recommendations. At present, with social networking being tried out by a minority, but with no leading product, an opportunity exists to consider what developments are desired by the academic community. Developments could build on the well-formed repository infrastructure that already exists to handle article storage. In particular, we would suggest that advice be developed for researchers on how to use these sites whilst avoiding pitfalls, such as losing control of IPR and lock in.

Recommendation 6: Guides to good practice in research communications should be developed.

5.4.6 Publishers

It is known that in general, publishers are adopting sophisticated policies to maintain their controlling position in the academic publishing process, though some of these are quite subtle. For example, Nature and Science have their top journals operated on a free to publish/fee to access basis while their more modestly ranked titles have a paid-for Open Access option - which some say is designed to engender a second echelon status to Open Access.

5.4.7 Non-sector stakeholders

Developments to date in the area of academic social networks have not considered the needs of the wider public which should be seen as including business and industry. We consider that the needs of these stakeholders, which are recognised by the Open Access community, should be borne in mind when future developments are considered.

5.4.8 Portals

1. Portals giving access to Open Access materials are crucial if the Open Access mission is to succeed.
2. We are aware of two portals in the UK, the OpenDOAR portal and one operated by MIMAS. The former gives access to the full-text of material held in over 1800 Open Access repositories listed in its Directory, while the latter gives access to repositories in the UK.

⁶ http://en.wikipedia.org/wiki/Comparison_of_social_networking_software



3. Our survey asked about the awareness and use of OpenDOAR and we found very low levels of use. Our own use of OpenDOAR did show that some articles (foreign ones) appear to be available only in abstract form, requiring a logon to a foreign university's computer network for the full article. This brought home the point that the Open Access movement still has plenty of work ahead in order to ensure that Open Access materials are available in full text form.
4. Google and Google Scholar are demonstrably the most widely used search engines and provide services of a high standard, which facilitate access to a wide range of materials. However, this lack of selectivity also leads to Open Access full text materials being submerged in a sea of other references.
5. We are unconvinced that a national level portal, covering only UK materials, has much value other than, for example, as a testbed or as an intermediary for international/global searches. This value may be sufficient to justify it temporarily, but research is an international activity and researchers would feel badly constrained if they were in any way directed to use a national portal. Handled badly, such a constraint could even harm researchers' perceptions of Open Access.
6. We consider that a portal service offering Open Access to as many of the world's Open Access full text materials as possible, should be a priority. Such a development could be carried out nationally or internationally. We consider that such a portal could give additional momentum both to the Open Access movement and to the use of repositories as locations for the safe storage of authoritative copies of research materials.

Recommendation 7: UK bodies should contribute to the development of a portal service to international Open Access full text resources.

