

Researchers of Tomorrow:

A three year (BL/JISC) study tracking the research behaviour of 'Generation Y' doctoral students

Second Annual Report

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Contents

Executive summary	3	4.2 The 2010 Gen Y sample	29
1 Emerging findings	9	5 Research results	35
1.1 Introduction	9	5.1 Use of technologies including Web 2.0	35
1.2 Findings from the survey and cohort study	9	5.2 Using open access	41
1.3 Areas for further research	16	5.3 Using other academic libraries	46
2 About this research	17	5.4 Training and support and the role of the supervisor	48
2.1 Introduction	17	Annex 1: 2010 context-setting survey	55
2.2 Results from Year One	18	Profile of doctoral student respondents	56
2.3 Year Two research participants	19	Annex 2 Key references	58
3 Recent relevant research	21		
3.1 e-Journal use and impact	21		
3.2 Web 2.0 and research	22		
3.3 Openness in research	24		
4 Setting the Scene	26		
4.1 The Gen Y cohort in 2010-11	26		

Executive summary

About the research

This annual report of the second year of the three-year *Researchers of Tomorrow* study is based upon quantitative and qualitative data gathered between March 2010 and February 2011.

The *Researchers of Tomorrow* study focuses on evidence-gathering from three groups of doctoral students in the UK:

- A cohort of 47 Generation Y doctoral students in the second year of a longitudinal qualitative study;
- responses to the 2010 national context-setting survey returned by over 2000 Generation Y doctoral students;
- responses to the same national context-setting survey returned by over 2000 older doctoral students.

The first year of the research resulted in quantitative data in six broad areas:

- constraints on research;
- ways of searching for research information;
- research resources used;
- using library collections and services;
- using technology in research;
- training and support to research.

This was supported by qualitative evidence gathered from the longitudinal study cohort relating to four areas of research experience:

- the networked research environment;
- using open access and open source;
- using technology applications and tools;
- finding help and support in research.

The second year of the study has gathered some comparative data and further concentrated on:

- Use of technologies (including Web 2.0);
- Using materials from and publishing in open access sources;
- Using sources and resources outside their own institutions;
- Training and support, and the role of the supervisor.

Findings and conclusions

Constraints and barriers to progress

Generation Y students appear to be more relaxed than other age groups about any potential constraints or barriers to their research progress, but all doctoral students in 2010 appear to feel under more pressure than in 2009 – overall they ranked the potential constraints as more significant than the comparable sample did last year.

Use of technologies including Web 2.0

Take-up and use of technologies

72% the Generation Y sample had used at least one kind of technology provided by their institutions to support research during the previous academic year and that was most likely to be citation or reference management tools. 27% had used no institutionally provide technology at all.

More of the Generation Y sample had used at least one kind of open web or Web 2.0 technology (only 8% said they had used none at all). However, passive use of these technologies (i.e. reading wikis only but not creating content, following blogs but not blogging themselves) is much more common than active use. For example, 29% made passive use of internet discussion forums, while 13% made active use of them; 23% followed blogs but only 9% actively blogged themselves.

In comparison to 2009-10 data there are indications that use (active or passive) of some social media and networking tools in research is slightly on the increase among Generation Y doctoral students.

Possible reasons for low take-up and use

The reasons for the relatively low take-up of many of the institutionally provided technologies among Generation Y doctoral students may include:

- the technologies on offer in institutions are inappropriate to the Generation Y doctoral students' needs; or

- the institution's current methods of engaging with Generation Y (and older) doctoral students in order to demonstrate the potential benefits of using technology, and of supporting them to do so, are inadequate or otherwise ineffective. It is clear that Generation Y students rarely elect to take-up training opportunities about using technology; they prefer to turn to their peers for help.

Those in the Generation Y survey sample that did make some use of open web technologies received markedly less help in using them overall, and from any source, than they did with institutionally provided technologies. Institutional engagement with open web and Web 2.0 technologies appears not to be sufficiently evident or proactive to convince Generation Y doctoral students of the credibility of using these applications in a research setting.

For the Generation Y cohort lack of institutional support seems to reinforce their own feeling that actively using these open web technologies and online forums in research lacks legitimacy, or that the value and quality of contributions through such forums may be questionable.

Key influencers, such as supervisors, library and information support staff, may not be providing models of best practice and institutional support may lag behind individual interest.

Using materials from and publishing in open access sources

Openness in research

Many of the technologies supported by institutions, as well as those such as Web 2.0 promoted on the open web, are primarily intended to improve and enhance scholarly communication, collaboration and sharing of research ideas, and low take-up may also be associated with an unwillingness among Generation Y and older doctoral students to engage in these activities.

Evidence in particular from the Generation Y sample responses to using open access channels to source and disseminate research results suggests that their attitudes in these three areas are at best ambivalent and these may not be directions in which they wish to develop during their doctoral studies. As we noted in the first year of the study the Generation Y doctoral students tend to be conservative in their choices, risk averse and unwilling to share their research prematurely.

Open access

Many Generation Y (and older) doctoral student respondents appear to be deeply confused about exactly what 'open access' and 'self-archiving' mean, and uncertain how to go about assessing the appropriateness and authenticity of open access channels of research communication in order to address their own primary concerns and reservations. They appear to need greater clarity, better awareness-raising, more proactive promotion of open access

channels and other technology-based tools, and support in using them if they are to make sensible and informed judgments.

Using sources and resources outside their own institutions

As might be expected, the subject area of PhD study is a strong determinant of whether or not Generation Y doctoral students visit academic libraries other than that in their own institution. Fewer respondents in the Generation Y survey sample had physically visited another academic library during the last academic year than those in the older age group sample (44% and 59% respectively): this correlates with the predominance of science, technology and medicine students in the Generation Y survey sample.

The most common reason for using other libraries, among those respondents in the Generation Y survey sample who had used another academic library in the last academic year, was to access research material not available in their own institution.

Training and support and the role of the supervisor

Methods of training delivery

The Generation Y survey sample appears to be particularly reliant on training opportunities that are delivered by their department or faculty. The Generation Y doctoral students in the cohort have a strong preference for face-to-face support and training (and use their own peers as informal providers regularly and frequently) and

are generally dissatisfied with what they perceive as generic training content not tailored to their own subject area or to their own needs. The implication here seems to be that the 'closer to home' and more 'informal' the training offer from the institution, the more effective it would be from the Generation Y doctoral student's point of view.

This raises the question as to whether there are better models for identifying and responding to training needs among doctoral researchers than the widespread use of pre-scheduled lectures, demonstrations and workshops that sweep up attendees from across a range of subject areas and research stages.

The role of the supervisor

Evidence from the Generation Y cohort suggests that the most important elements in the relationship between Generation Y doctoral students and their supervisors appear to be a good fit in terms of expertise and knowledge of the particular research area; and being able to 'get on' as people.

As they draw closer to the end of their PhD studies their supervisors are no less important to the cohort, though the relationship itself may have changed: for instance, for some it has become more 'professional'.

The supervisors of the Generation Y cohort generally tend not to be particularly interested or up-to-date about using technology in research (though a few are actual technophobes) and this appears to have had some influence on the researchers' choices of how to do their research.

Table 1: Summary of similarities and differences between Generation Y and older doctoral students

Broad areas of research	Similarities between Generation Y and older students	Where Generation Y students may be different
Constraints and barriers to research progress	<p>Generation Y and older students concur on the severity of time pressures as a constraint on their research (ranked 4.00 and 4.69 respectively in the two samples, on a scale of 1 – 5 where 1 is no constraint and 5 is a severe constraint): this was ranked the highest constraint in both samples.</p> <p>This year both samples have attributed much higher rankings overall than the comparable samples did in the 2009 survey: this indicates that all PhD students of whatever age appear to feel under more pressure than last year.</p>	<p>There are considerable differences between Generation Y and the older students in the level of significance they attributed to the potential constraints: Generation Y students consistently attributed much lower significance to all selected constraints and barriers, indicating that they are more relaxed about their research progress than older doctoral students.</p>
Main place of work		<p>The survey results for the second year show a clear preference among Generation Y students in comparison to older students for working principally in their institution. However, social sciences, arts and humanities are dominant among the older age groups survey sample and students of all ages in these disciplines show a clear preference for working at home, rather than in an institution: this could go some way to explaining the very clear difference between age groups.</p>
Using technology	<p>Take-up and use of institutionally provided technology to support their research is relatively low among both Generation Y and older students, with the exception of citation and reference management tools. Within both groups active use of open web technologies in research is also low, although the majority of both groups have made some passive use of at least one kind of social media (e.g. following blogs rather than blogging).</p>	<p>As might be expected more of Generation Y students are active users of consumer social networks in their research; whereas more of the older age groups sample than Generation Y made active use of internet discussion forums, and fewer Generation Y students used Skype.</p> <p>Generation Y students are more likely to be influenced by and to turn to their peers for help in using any kind of technology.</p>

Broad areas of research	Similarities between Generation Y and older students	Where Generation Y students may be different
Using open access	<p>All ages of doctoral students show considerable confusion, uncertainty and lack of understanding about the nature and meaning of 'open access' both in terms of using open access source material in their research and in disseminating and publishing their research results.</p> <p>All age groups share similar concerns about quality control, peer reviewing, impact and status of open access, copyright protection, and costs to the researcher of publishing in open access.</p>	<p>Generation Y students are slightly less likely to have any reservations about both using open access channels to source material and to publish their own work. However, this is accompanied by confusion about open access channels (e.g. as to whether journals are peer-reviewed or not, copyright protected etc).</p>
Benefits of training received		<p>Generation Y students appear to be overall slightly less convinced of the benefits of the recent training they have received; the majority of these training interventions were in areas related to identifying and using specific kinds of research resources and specific information sources</p>

1 Emerging findings

1.1 Introduction

In 2010 the research – discussion questions, tasks and interviews with the Generation Y cohort in the longitudinal study, as well as questions in the national context setting survey of all doctoral students in the UK – was focused on four core areas:

- Use of technologies (in particular Web 2.0) in the research and working lives of the Generation Y PhD students;
- Using open access materials in research and choosing open access as a channel to publish research findings;
- Using sources and resources outside those provided by the Generation Y students' own institutions' libraries;
- The training and support that Generation Y doctoral students receive to facilitate their research, including the role of the supervisor.

In addition to these areas, data were collected on more general aspects of the research and information seeking behaviour both within the cohort and through the national survey, so that some direct comparisons could be drawn with data from the 2009 research, for example;

- Constraints on research progress;
- Publishing or disseminating intermediate research outputs;
- Using cross-disciplinary sources in research.

Here we sum up the findings that have emerged in 2010 (which are presented in detail in Section 5) and note priority areas for research in the final year of the *Researchers of Tomorrow* study.

1.2 Findings from the survey and cohort study

Constraints on research progress

Survey respondents were asked to rank the severity of potential constraints on their research progress (ranking 1-5 with 5 the most significant).

The Generation Y students ranked every potential constraining factor markedly lower than the older age groups, indicating that overall Generation Y students feel less constrained in their research progress than older researchers. It cannot be determined from the data why this year's Generation Y sample are apparently more relaxed about their research progress than older age groups. However, this finding contrasts quite markedly with the results of the 2009 survey in which the Generation Y and wider survey samples generally concurred on the severity of, for instance, time pressures (3.78 and 3.85 respectively) and differed only marginally in their ranking of some other important constraints.

Nonetheless, overall both the Generation Y and the older respondents appear to feel more constrained and under pressure in their research in 2010 than the survey respondents did in 2009: for example, in the 2010 survey all mean rankings indicated by

students older than Generation Y were above 3.00, while in 2009 only two constraints were ranked so high.

Among the Generation Y cohort, most of whom are entering or in their final year, there is evidence of their increasing emphasis on the need for lack of distraction and 'productivity', as they engage in data analysis and writing up their research results and conclusions.

Publishing or disseminating intermediate research outputs

Articles in peer-reviewed journals, conference papers and posters at conferences remain the most frequently cited kinds of intermediate research output already produced or planned as part of their doctoral research by both samples, with more Generation Y students (83%) than older students (77%) citing articles in peer-reviewed journals.

In 2010, slightly more survey respondents overall (32% Generation Y and 31% of older age groups samples) cited open access journal articles as a channel used already or planned for their research outputs than the comparable respondents in the 2009 survey (28% and 27%), indicating perhaps that open access channels for scholarly communication may be gaining ground within the doctoral student community.

Using cross-disciplinary sources in research

37% of the Generation Y survey sample was always or very often required to seek information outside their core discipline. More arts and humanities and social science students than science students say that their research 'always' or 'very often' entails crossing core subject discipline boundaries.

Main place of work

The survey results for the second year show a clear preference among the Generation Y sample in comparison to older students for working principally in their institution. Social sciences, arts and humanities students of all ages show a clear preference for working at home, rather than in an institution, and given that these subjects are dominant within the older age group sample this could go some way to explaining the very clear difference between ages.

Progress through the years of PhD study

All the Generation Y cohort members say they feel they need less support in identifying, finding and accessing relevant research resources than they did in 2009, from either supervisors or from library staff.

The majority (mainly those in their final year) also say they feel more confident about assessing the relevance and quality of the research resources they find; they generally use a narrower range

of resources, and no longer need to range across the literature so widely.

Many among the cohort are now more interested in sharing their research because they now feel they have 'something to go on' or 'more to say' than they did last year.

Use of technologies including Web 2.0

Institutionally supported technology

The survey sample was asked which of a range of institutionally supported technologies they used during the past academic year. Over one quarter of the Generation Y sample (27%) had used none of the technologies listed. However, they were more likely than the other age groups to have used some kind of institutional technology (72% of the Generation Y sample and 64% of all other age groups). The data indicate that more science, technology and medicine students use institutionally provided technology than do those in social sciences, arts and humanities, and since the Generation Y sample is dominated by the sciences, this may go some way to explaining the significant difference between the ages.

Citation and reference management tools were overwhelmingly the most frequently cited technology applications by the Generation Y sample (58%). The importance of these tools are also borne out by most of the Generation Y cohort members, for whom a significant amount of time is devoted to managing their downloaded information resources, through, for instance, using EndNote, setting up filing systems, as well as addressing the problems of managing printed copies.

As in 2009, in the Generation Y sample the students' peers remain the most significant influence in choosing to use technology provided by the institution; half of those using any technology had been influenced to do so by suggestions from their peers, in contrast to only 39% of the users among the older age groups sample. Peers were also the most common source of hands-on help to Generation Y students in using this technology.

Open web technology including Web 2.0

The survey respondents were asked which of a range of technologies available on the open web they used actively or passively during the past academic year. Of the Generation Y sample 8% made no use (either active or passive) of any of the listed technologies, 31% used only one or two, and 26% used three or four types of open web applications.

Overall passive use, i.e. reading wikis only but not creating content, following blogs only but not blogging oneself, is much more common among the **Gen Y sample** than active use. For example, 29% made passive use of internet discussion forums, while 13% made active use of them; 23% followed blogs but only 9% actively blogged themselves.

As might be expected more of the Generation Y survey sample (29%) than older age groups (23%) are active users of consumer social networks; whereas slightly more of the older age groups sample than Generation Y made active use of internet discussion forums (16% and 13% respectively). 60% of the Generation Y sample did not use Skype at all, compared to 52% of the older age group sample.

Although the 2009 data are not fully comparable with 2010, there are indications of modest levels of increased use of open web technology: for example, social media sharing sites were not used by 72% of the Generation Y sample in 2009, whereas this figure had gone down to 53% in the comparable 2010 sample.

Within the Generation Y cohort there are also indications in of a change (across all subject disciplines) since 2009 in their use of and interest in using online forums and Web 2.0 applications to support their research. The majority of the cohort now uses Facebook in their personal lives, although most would still not consider using this for their work as it implies an inappropriate mix of social life and work. However, more members of the cohort than last year are using sites such as academia.edu, Graduate Junction and Mendeley to follow-up contacts made at conferences, or organise a conference, and to share bits of research. This change seems to be associated with their growing confidence in having something to share, since most of them are nearing the end of their studies. Several members of the cohort now use Twitter to follow or to share thoughts relevant to their research.

Once again Generation Y researchers were more likely than all other ages to have been influenced to use open-web technologies by their peers (54% and 46% of the respective samples).

Few members of the Generation Y cohort appear to be supported by their institutions in using these applications, though they do not appear to feel the lack of such support in terms of their own competence.

This lack of institutional support, however, seems to reinforce their own feeling that using these open web technologies and online forums in research lacks legitimacy, or that the value and quality of contributions through such forums may be questionable. They see the potential of Web 2.0 technology in research but have raised the question 'who is using it?' Several cohort members express the view that they 'need better tools if they are to be used in research'.

Using materials from and publishing in open access sources

Understanding open access

The survey respondents were asked to consider the veracity or otherwise of seven statements about the meaning and nature of 'open access' and 'self archiving' as they are generally understood in relation to scholarly communications. The data indicates a great deal of uncertainty and lack of understanding about the nature and meaning of 'open access' and 'self-archiving' among both the Generation Y and older age groups.

Using open access sources in research

The survey respondents were asked to comment on any reservations they might have about using open access or self-archived research resources in their own research work. Slightly more of the Generation Y sample than older ages (55% and 51%) said they had no reservations at all.

The Generation Y sample's reservations included:

- Quality control
- Scholarly value and impact of sources
- Time taken to track down materials that are not proper citations

Publishing in open access journals

The survey also asked respondents to comment on any reservations they might have about using open access or self-archiving to publish their own research work. Around 50% of the Generation Y sample and 45% of the older age group sample stated that they would have no reservations whatsoever.

Generation Y sample reservations about using open access channels to publish their work include:

- Lack of impact factor, status or credibility
- Strong preference for peer-reviewed journals, showing a general assumption that open access journals are not peer-reviewed
- Importance of being cited in other publications
- Cost to the individual
- Concern that copyright is not protected

Using sources and resources outside their own institutions

As might be expected, the subject area of PhD study is a strong determinant of whether or not Generation Y doctoral students visit academic libraries other than that in their own institution. Fewer respondents in the Generation Y survey sample had physically

visited another academic library during the last academic year than those in the older age group sample (44% and 59% respectively): this correlates with the predominance of science, technology and medicine students in the Generation Y survey sample.

The most common reason for using other libraries, among those respondents in the Generation Y survey sample who had used another academic library in the last academic year, was to access research material not available in their own institution.

Training and support and the role of the supervisor

Training and support

35% of the Generation Y sample had received no training of any kind in the previous academic year.

This second year of the study reflects a very similar picture to the first year's data: for the large majority of the Generation Y sample the content of their most recent training covered the same four areas of

- Specific information skills (e.g. finding 'grey literature', using specific e-information services);
- Finding research resources and services in your subject beyond your institution (e.g. inter-library loans, the British Library, accessing other key collections or libraries);
- Finding/using subject-based bibliographic, abstract and journal research resources (print and electronic);

- Using their own institution's portal to access electronic research resources.

Relatively few had had any recent training in the use of any technology applications, or, as in the 2009 survey, in open access publishing or self-archiving. This suggests that these may not be areas that are well-covered by institutional provision of training and support to research students.

The data also indicate that there is still a heavy reliance on face-to-face and 'traditional' modes of training delivery, such as lecture, talks or demonstrations, workshops etc. Online tutorials and learning packages were used by few Generation Y doctoral students.

Training take-up among Generation Y students tails off steadily from year one of their studies onwards. As most training received was in the areas of identification and use of research information and specific resources, this result is unsurprising: most doctoral students acquire these essential skills and knowledge in the first or second year of study.

Relationships with supervisors

The Generation Y cohort show as much variation in what they want from their supervisor(s) – for instance regular meetings, continual input and advice on sources and information, psychological support, structure and pressure – as the supervisors do in their style of doctoral supervision. The most important elements in the relationship appear to be a good fit in terms of expertise and

knowledge of the particular research area; and being able to 'get on' as people.

Evidence from the Generation Y cohort suggests that, as they draw closer to the end of their PhD studies their supervisors are no less important, though the relationship itself may have changed: for instance, for some it has become more 'professional'.

It is clear that supervisors have been influential in directing the Generation Y cohort to literature sources and often titles and articles: but in the case of those students in the later stages of their doctoral studies only where their areas of expertise are specifically aligned with the research topic of the student. Where there is no such close alignment, the researchers appear to feel more on their own after the initial few months of study:

Supervisors and technology

Respondents in the Generation Y survey sample that used some kind of institutionally provided technology were more likely to have been influenced to use the technology by their supervisors than older students (41% and 36% respectively) and to have received hands on help from their supervisors (35% and 29% respectively).

In using open web technologies, however, in contrast to institutionally provided technologies, supervisors are very much less likely to be the main influence on the Gen Y sample or the source of help in using them.

The supervisors of the Generation Y cohort generally tend not to be particularly interested or up-to-date about using technology in research (though a few are actual technophobes) and this appears

to have had some influence on the researchers' choices of how to do their research.

However, for most of the Generation Y cohort technological awareness is not a particular expectation of their supervisors, and any shortfall in this respect is not seen as a problem.

1.3 Areas for further research

On the basis of these emerging findings, we intend to focus in the third and final year of the *Researchers of Tomorrow* study on the following.

Sharing and openness in research

It is clear that Generation Y doctoral students are ambivalent at best about openness in research, despite increasing policy and strategic pressure to maximise the public investment in research through improved communication and sharing of research ideas and findings. The study provides an opportunity to try to identify the degree of openness which provides clear benefits to PhD students, to obtain a clearer understanding of what works for Generation Y students at various stages of their doctoral studies.

Using social media for research

Related to openness in research, and building on indications that use of social media in research is slowly growing among Generation Y students, we will try to test the relevance of strategies and benefits described in the recent RIN publication 'Social media: a guide for researchers' (RIN, 2011a) to Generation Y doctoral students.

Copyright and intellectual property

Related to using open access channels and social media we will pick up on the confusion evident from this year's research about copyright protection etc., to define exactly what the concerns of Generation Y students are and how those concerns might best be addressed.

Best practice in institutional support for doctoral research

The study (particularly through the Generation Y cohort) has revealed some important aspects of research support provided by the students' institutions: among the obvious one could list good communication and relations with a supportive supervisor, a rich collection of print materials in the library, extensive subscriptions to key e-journal and e-information sources, etc. We will try to draw out from evidence gathered to date what makes best practice for Generation Y students across the disciplines, and test these characteristics definitively during the final months of the study.

2 About this research

2.1 Introduction

In 2007 the British Library (BL) and the JISC funded *The Google Generation Information Behaviour of the Researcher of the Future* research (CIBER, 2008), which focused on how researchers of the future, ‘digital natives’ born after 1993, are likely to access and interact with digital resources in five to ten years’ time. The research reported overall that the information literacy of young people has not improved with wider access to technology.

To complement the findings of the *Google Generation* research, the BL and the JISC commissioned this three-year research study *Researchers of Tomorrow* focusing on the information-seeking and research behaviour of doctoral students in ‘Generation Y’.

Generation Y, the children of the Baby Boomers, is defined in this study as those born between 1982 and 1994. Generation Y students are not ‘digital natives’ unlike the Google Generation. They were educated, at least up to their senior secondary years, in schools with limited access to computers and the internet. In a largely technology-free environment, it is assumed that Generation Y acquired information-seeking and enquiry skills without learning “to ‘get by’ with Google” (CIBER, 2008) and that the nature of this

early start may have had an impact on their research behaviour and information-seeking skills as doctoral students.

The *Researchers of Tomorrow* study will establish a benchmark for research behaviour against which subsequent generations of scholars can be measured; it will ultimately provide guidance to the academic institutions, libraries and information specialists on how best to meet the research needs of Generation Y scholars and their immediate successors. The main focus areas of the study are

- mapping emerging research behaviour trends across the main subject disciplines;
- investigating how doctoral scholars, in particular those from Generation Y, seek information both on and offline;
- measuring the relative use of digital resources and physical resources (including research spaces);
- understanding how Generation Y students search for and use digital content for research, and
- if and how they use emergent technologies to do so.

The second year of the study concentrated on

- Use of technologies (including Web 2.0);
- Using materials from and publishing in open access sources;
- Using sources and resources outside their own institutions;
- Training and support, and the role of the supervisor.

2.2 Results from Year One

The research results of the first year of the study show that, in broad approaches to information-seeking and use of research resources, there are no marked differences between Generation Y doctoral students and those in older age groups. Nor are there marked differences in these behaviours between doctoral students of any age in different years of their study. The most significant differences revealed in the data are between subject disciplines of study irrespective of age or year of study.

The context within which doctoral students work has become increasingly homogenised as institutions and individuals respond to policy and funding pressures, and information technology has an increasing impact upon the research environment. It is no surprise therefore that doctoral students' overall experiences, priorities and broad research behaviour would be similarly homogenised.

The research indicated, however, potentially interesting and important divergences between Generation Y and older doctoral students; for example, where students turn for help, advice and support; and attitudes to their research environment.

Some implicit assumptions about Generation Y doctoral students were tested in the survey and through the longitudinal study of the Generation Y cohort. These assumptions included:

- **Generation Y students would have and demonstrate good critical information literacy skills, commensurate with growing up in a non-web world.**

The research seemed to confirm this: Generation Y students are sophisticated information-seekers and users of information networks but they are not dazzled by the technology.

- **Generation Y students would be less inclined to make use of printed materials and always favour the electronic versions if they could get them.**

The research in the first year did not support this: e-journal articles certainly dominate as first choice in the Generation Y survey sample. However, that sample is 65% science students and their responses are generally consistent with those from science students in the wider survey sample. Moreover, the experience of reading in hard copy is preferred by many of the Generation Y cohort, including science students, and the notions of quality and authority still cling to print editions of journals.

- **Generation Y students would be highly competent users of information and communications technology.**

This appeared to be true, but it was also apparent among older doctoral students – the impact of technology on learning and research has evidently been so dramatic that 'we are all the Google generation now'.

- **Generation Y would be early adopters and keen users of the latest technology applications and tools in their research.**

The research in the first year did not support this assumption. On the contrary, it would appear that Generation Y doctoral students, in common with others, are quite risk averse and 'behind the curve' in using digital technology in their research work, not at the forefront.

- **Generation Y doctoral students might take a different view of doing research than their older peers, having started their research career in the midst of an information explosion, with web-based access to hugely increased and increasing research resources.**

They might, for instance, take the pragmatic, 'good enough' view to achieving information-seeking and research results, rather than risk information overload; they might be more ready to share research because of the 'web world' they inhabit.

The research indicated, on the contrary, that Generation Y doctoral students are rigorous in their continuous search for, and absorption of, relevant research resources and set high standards for their comprehensive coverage of their fields, heavily influenced by their supervisors. They are generally unwilling to share their research findings at this stage in their research career.

2.3 Year Two research participants

This second annual report is based upon quantitative and qualitative data gathered between March 2010 and February 2011. *Researchers of Tomorrow* focuses on evidence-gathering from three groups of doctoral students in the UK:

- The Generation Y cohort in a longitudinal qualitative study (hereafter 'the Gen Y cohort')
- The Generation Y survey sample in the national context-setting survey (hereafter 'the Gen Y sample'), and
- The older age group survey sample in the national context-setting survey.

Gen Y cohort

At the heart of *Researchers of Tomorrow* are the attitudes and behaviours of a cohort of 47 Generation Y doctoral students from 34 UK higher education institutions (HEIs) recruited into the project's 2½ year longitudinal study. This cohort keeps us informed about the research and information-seeking challenges and other patterns in their doctoral journeys, so that we may understand from their experiences and use their feedback to shape new questions. The cohort is providing contributions in blog entries, discussion forums, their responses to quizzes, one-to-one interviews and face-to-face meetings. Their contributions between March 2010 and February 2011 inform this second Annual Report.

The Gen Y cohort is profiled fully in the first Annual Report (June 2010) Section 5, which can be found online at

<http://www.efc.co.uk/projects/rot/RoT%20Year%201%20report%20final%20100622.pdf>.

Respondents in the national context-setting survey

In the second national context-setting survey run in July 2010, which allows us to compare the attitudes and behaviour of the Gen Y cohort with the wider community of Generation Y and other doctoral scholars, 4807 fully completed returns were received from doctoral students of all ages. The survey methodology, and profile of the respondents in terms of institutions, location, subject discipline etc., is described in Annex 1.

From this national, annual survey (to be repeated in July 2011) we have derived data on two samples:

Gen Y sample

A total of 2239 completed questionnaires were returned by Generation Y doctoral students. The charts in this report are based on the Gen Y sample. A profile of the 2010 Gen Y sample is provided in Section 4.

Older age groups sample

Completed questionnaires were returned from 2568 older doctoral students in the 2010 survey. Using this older age group sample we can compare the attitudes and behaviour of the Gen Y sample with those of older, UK-based, doctoral students.

Results from the older age group sample have been included in the charts where there are significant or interesting variations between that sample and the Gen Y survey sample.

3 Recent relevant research

During 2010/11 new research has been published focusing on the following areas of relevance to the *Researchers of Tomorrow* study:

- E-journal use within the UK academic and research community;
- The use of Web 2.0 in research;
- Sharing research and data

Here we summarise and highlight particular findings from this new research that provide further context and, sometimes, validation of the findings emerging from the *Researchers of Tomorrow* study.

3.1 e-Journal use and impact

The Research and Information Network (RIN) published the final report of the CIBER two-year study on 'e-Journals, their use, value and impact'. This authoritative study used qualitative research to validate and expand on the deep-log analysis of e-journal usage statistics undertaken in the first phase. The research concludes that "researchers are reading and citing more papers and other literature from a wider range of sources than they were two decades ago" (RIN, 2011b, p 17), reflecting the growth in the

volumes of journal articles, other papers and journal titles, the significant majority of which are increasingly accessible at any time of the day or night as e-journals with a concomitant change in working practices.

There are, however, noticeable differences between subject disciplines in both the number of references cited per article and the number of sources drawn upon. The study presents evidence to suggest, for example, that the average number of sources per article may vary between 3.36 in biological sciences, 9.03 in economics and 23.95 in history (RIN, 2011b, p 16).

Subject differences in e-journal use are also clear from the research. Although the majority of all the researchers surveyed in the study across six disciplines use e-journals most or every working day, life scientists were found to be the most likely (50%) and historians the least likely (16%) to use them every day. "While the life scientists have moved essentially to a wholly digital world...not all journals in history are as yet available electronically" (RIN 2011b, p 20).

The study notes the expectation of researchers to have immediate access to the full-text of a journal article and their frustration when they find that their university does not have the necessary subscription – a strong theme emerging from the first year of the *Researchers of Tomorrow* work with the Gen Y cohort. It appears from CIBER's research that "physicists have the fewest access

problems, which may be because so much literature in physics is available open access....Historians, on the other hand, seem to face the most problems with access, partly in relation to currency (the most recent material in JSTOR – the database of choice for many historians – is around five years old)” (RIN 2011b, p 21).

3.2 Web 2.0 and research

If you build it will they come?

In this study RIN set out to investigate whether or not the potential of the Web 2.0 technologies to transform the way in which researchers work and communicate has been realised. The study focused on a range of generic tools – wikis, blogs and some social networking systems – as well as those designed specifically by and for people within the scholarly community.

The study “indicates that a majority of researchers are making at least occasional use of one or more web 2.0 [sic] tools or services for purposes related to their research: for communicating their work; for developing and sustaining networks and collaborations; or for finding out about what others are doing. But frequent or intensive use is rare, and some researchers regard blogs, wikis and other novel forms of communication as a waste of time or even dangerous.....In deciding if they will make web 2.0 [sic] tools and services part of their everyday practice, the key questions for researchers are the benefits they may secure from doing so, and how it fits with their use of established services” (RIN, 2010a, p 5).

Some of the RIN findings from the study have direct relevance to the *Researchers of Tomorrow* findings that Generation Y PhD students’ are very cautious about losing control of their research results and conservative in the range of research methods they choose to use. RIN found that factors influencing take-up of Web 2.0 applications to support scholarly communications include “cultural, organisational and institutional factors such as:

- ownership and control of research outputs by individuals, institutions and publishers;
- institutional, individual and cultural factors shaping collaboration;
- the quality and provenance of information;
- institutional and technical solutions and resolutions of issues of standardisation, IPR and security (RIN, 2010a, p 14).”

In line with earlier surveys, the study found that respondents, when asked to rate the importance of different channels of communication, focused on conventional peer-reviewed journals.

There are also evident differences in take-up between subject disciplines of Web 2.0 for scholarly communication and sharing: “respondents in computer science and mathematics are disproportionately represented among frequent users; while researchers in the medical and life sciences are relatively under-represented”. Social sciences and arts and humanities researchers are relatively infrequent users of Web 2.0 technology, though it appears that the latter are “prominent among frequent bloggers” (RIN, 2010a, p 22).

Significantly, the study found that different kinds of Web 2.0 applications are used by different groups for different purposes with little overlap. For example, “frequent use of social networking services does not....imply frequent use of other kinds of web 2.0 [sic] tools and services, or innovative attitudes and take-up of new channels for scholarly communication” (RIN, 2010a, p 33).

There is some evidence to suggest that “frequency of use of the kinds of web 2.0 [sic] tools associated with producing, sharing and commenting on scholarly content is positively associated with older age groups, at least up to age 65, and more senior positions. The propensity for frequent use is highest among the 35-44 age group and lowest among those under 25; and highest among research assistants and lowest among PhD students” (RIN, 2010a, p 22). However, “both age and seniority seem to play a significant role in propensity to use social networking services frequently, much more so than in the propensity to use web 2.0 [sic] tools to communicate scholarly content. PhD students and respondents in the under 25 age band are more likely to make frequent use of social networking services” (RIN, 2010a, p 33).

Finally, the RIN study confirms what appears to be emerging from the second year of the *Researchers of Tomorrow* study, that “support from departments, research groups and networks is crucial in identifying relevant tools, in demonstrating their utility, and in reducing learning and start-up costs and other barriers to adoption. Variations in levels of local support and encouragement may play a significant part in the uneven adoption of web 2.0 [sic] services that we have identified” (RIN, 2010a, p 48).

Validating a particular theme emerging from this *Researchers of Tomorrow* study, the importance of colleagues and peers is stressed as “particularly important in making researchers aware not only of the services that are available, but of how they can be, and are being, productively employed to support research: researchers will not take the time to learn about and experiment with new tools and services unless they can see the benefit that might flow” (RIN, 2010a, p 48).

Social media: a guide for researchers

This guide published by RIN bases its advice and ideas on working with ten researchers experienced in using Web 2.0 applications in their work. It divides available ‘social media’ into three groups: for communication, collaboration and multimedia. It addresses the main criticisms of using social media in research, which it summarises as:

Growth of technology – some people feel that the encroachment of technology into every aspect of life has potentially damaging implications.

Privacy – social media are built on a culture of active personal and professional disclosure. There are concerns about how this is changing the interface between public and private spaces, and about misuse of our data. For researchers, putting your professional life online can feel exposing, particularly if you express opinions and ideas that have not been subject to the normal process of peer review.

Banality – many social media tools are based on the exchange of many small bits of information such as status updates or the sharing of links. These short-form individual contributions have led to the charge that social media are trivial in nature and suitable only for entertainment rather than professional research.

Peripherality – many researchers stress that social media are still peripheral in research, and this leads some to argue that it is therefore not worth engaging.

Loss of an authoritative perspective – traditional publishing aims to provide a filter for quality whereas social media allow everyone to publish anything that they have to say. This inevitably means that it is more difficult to identify which contributions are valuable or authoritative.

Information overload – social media have dramatically increased the amount of publicly-available information: 24 hours of video are added to YouTube each minute.

Work/life balance – social media has the potential to extend your working day and blur the distinction between work and other aspects of your life. Researchers may need to think carefully about boundaries, particularly if they are using mobile devices (RIN, 2011a, p 11)

Many of these points have been raised as areas of concern in the *Researchers of Tomorrow* study, particularly in relation to using technology and open access channels to communicate their research.

The social media guide is targeted at post-doctoral and already established researchers, for whom “social media are not presented....as a panacea for either the research community in general or for individual researchers. However, researchers who are active users of social media feel they offer them benefits in their professional life. By speeding up communication, and enabling new forms of collaboration, social media also have the potential to spark exciting new research, and to increase productivity” (RIN, 2011a, p 40). These benefits may not have the same power for young PhD students, and it may be interesting to test some of the guide’s conclusions and ideas with Generation Y PhD students, for most of whom social media are currently personal life facilities but not working life tools.

3.3 Openness in research

Open to all?

The theme of scholarly communication is also taken up in another RIN study on openness in research. The *Researchers of Tomorrow* study has revealed a range of concerns among the Generation Y and older PhD students about sharing their research findings and data at this early stage in their research career, many of which are reflected in the findings of *Open to all?* although the case studies were researching the practices of established researchers and not PhD students.

The report notes “we are currently at some distance from a world in which the processes and outputs of research are fully open to all. A relatively small number of individual researchers and

research groups are active in promoting openness. A much larger number are sympathetic or even enthusiastic, but not always open in all their practices. Many other researchers are cautious, and see many barriers and constraints to overcome if a presumption in favour of openness is to become an everyday element of policy and practice” (RIN, 2010b, p 8).

All the constraints and barriers to openness in research have been raised to some degree by the Generation Y research participants in the *Researchers of Tomorrow* study, namely:

- lack of evidence of benefits and rewards;
- lack of skills, time and other resources;
- cultures of independence and competition;
- concerns about quality;
- ethical, legal and other restrictions on accessibility.

The report concludes that “the key issue for policy-makers is not so much how to maximise openness, but how best to support individuals, groups and communities *to work with the degree of openness which provides clear benefits to them*. That requires a clear understanding of what works for different groups and communities; and better policies and strategies to incentivise openness to the degree that it is appropriate in different contexts” (RIN, 2010b, p 48) (our italics).

Researchers of Tomorrow in its final year may present an opportunity to explore more fully what degree of openness in research is appropriate to Generation Y and other PhD students and what institutional policies and strategies might be indicated to best support that.

4 Setting the Scene

In this section we provide some background information about the profile of the research subjects in 2010-11 (both the Gen Y cohort and the Gen Y sample), their working patterns, behaviour and influences with regard to their research work, their information and resources.

4.1 The Gen Y cohort in 2010-11

Since March 2010, 47 participants from 34 different institutions (compared to 60 from 36 HEIs in 2009-10) have been active on the Moodle site and made contributions to the study, of which 43 have continued to be active in the last six months.

Of the 47, 12 are in science, technology and medicine disciplines; 16 are in social sciences; 18 in arts and humanities; and 1 is interdisciplinary. 30 of the participants are due to complete their PhD this year, with a further 16 due to finish some time in 2012 and one planning to finish in 2013. 29 of the active participants are female and 18 male.

With the majority of the cohort now in their final year, there is a change in behaviour in their research participation. The researchers feel and often are under considerably greater pressure – many of them have significant teaching duties, and their involvement in research dissemination through conferences and

seminar presentations has increased. With less time to spare, they are less inclined to be discursive and are more focused. They continue to contribute to the study, however, with more than 140 blog entries in the last year, and high participation in all other research activities in the Study.

All the cohort say they feel they need less support in identifying, finding and accessing relevant research resources than they did in 2009, from either supervisors or from library staff.

The majority say they feel more confident about assessing the relevance and quality of the research resources they find; they generally use a narrower range of resources, and no longer need to range so widely within the literature.

Many among the cohort are more interested in sharing their research because they now feel they have ‘something to go on’ or ‘more to say’ than they did last year.

Behaviour typologies

In 2010 we began to investigate the four behavioural typologies tentatively identified in the first year of the research, with a view to possibly validating and scaling up these typologies through the national context-setting survey. The four types identified were: support seekers, go-it-aloners, multi-taskers and uni-taskers.

A number of research tasks to investigate these further took place with the Gen Y cohort, including a short behavioural survey,

completion of a standard behaviour test and personality quiz, and analysis of blog and discussion data. We concluded that, though there was some evidence to support our four typologies, this was often ambiguous and it was difficult to draw firm conclusions. Many of the behavioural attributes overlapped, or could be explained by the pressures common to all doctoral students at this stage in their career.

It was therefore decided that there would be little benefit in pursuing this typology exercise or trying to scale up evidence gathering through the national context setting survey.

Managing information

The Gen Y cohort was asked to consider issues of managing the information they found to support their research: the impact of the internet on their research; what did they do with downloaded research resources? Do they suffer from information overload?

Many of the cohort have downloaded and stored documents that they have not read, and significant amounts of time are devoted to managing these resources, through, for instance, setting up filing systems, using EndNote, and the problems of managing printed copies. A strong and enduring preference emerges for printing out important downloaded files: for instance:

I keep printing to a minimum. However, if I find something that is particularly insightful I will print it, as I don't like reading on a screen. After that I usually recycle the paper and keep a backed up digital copy. (Gen Y cohort member)

The temporary nature of information on the web and how to deal with this is also a concern within the cohort:

If, for example, we find web based resources that could disappear (blogs, news stories, message boards etc.) how do you guys go about keeping a copy of them so you can refer back to them and prove that they actually existed at some point? I have been copy[ing] and pasting them into word documents and saving them that way (Gen Y cohort member)

a few weeks ago we had a big scare when an email was sent round and re-circulated by one of my supervisors that [a particular] website was going to be taken down....So I got my boyfriend to effectively download the entire website, so at least we have a copy if they do take the website down. I'm quite unlikely to ever read the majority of the documents we downloaded, but I'm glad to know they are there if I or someone else needs them. (Gen Y cohort member)

Nonetheless, there is overall appreciation of the Internet as both a way of accessing research resources and an immensely valuable resource in itself: researchers cannot live without the internet, and technology makes their research manageable.

Nearly all disagreed with the premise that use of the internet could have a detrimental effect on their ability to read in greater depth or to read books:

When I am in 'book-reading mode', I give it my full concentration and don't think about anything but the book.....(Gen Y cohort member)

The problem with the internet is that it's so easy to drift between websites and to absorb information in short, easy bites that at times you forget to turn off the computer, rest you[r] eyes from screen glare and do some proper in-depth reading. The fragments and thoughts on the internet are compelling, and incredibly useful for breadth, but browsing isn't really so good for depth, and at this level depth is what's required. (Gen Y cohort member)

Main place of work

Among the Gen Y cohort there is now a fairly even split between those who work at their institution, usually in a shared office space with other PhD students, and those who work at home, with a handful who do a mixture of the two.

Reasons given for preferring home include the accessibility of online research resources through institutional portals or the internet rendering physical visits to the institution unnecessary, and discomfort or overcrowding in the institution.

Those who prefer working in their institution, however, cite lack of distractions, availability of resources including human resources in the shape of peers and supervisors, and the need to maintain a distinction between work and personal lives.

Whether the choice is home or institutional space, there is an increasing emphasis on lack of distraction and need for 'productivity' among the Gen Y cohort, all in or approaching the final year of their studies.

*I like the fact that you say "did you complete **any** tasks". It's nice to have people who recognise the huge feeling of [being] unproductive associated with doing a PhD. The last few months of data analysis have felt such a huge burden of unproductivity. Well, the last few days I'vegot two of the major categories done.... You never feel you've done enough. And even what I've done feels like a rough draft. It will be many many more days like this to come and then just a feeling at the end that it's come together – but this feeling will not sufficiently reward the huge amount of days feeling unproductive. (Gen Y cohort member)*

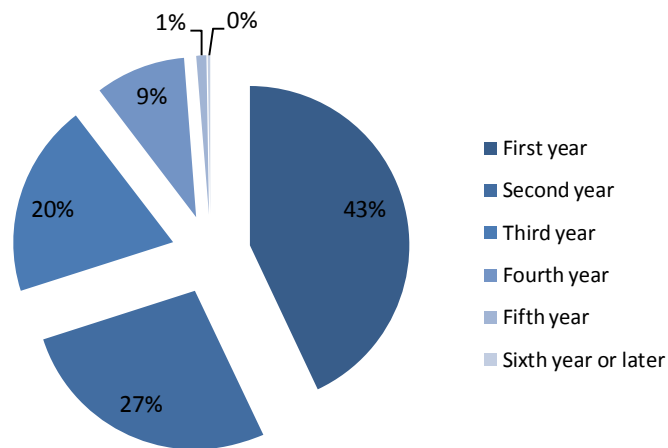
4.2 The 2010 Gen Y sample

Of the 2239 **Gen Y students** who responded to the 2010 national context-setting survey, 93% were studying full-time in 2010. The data show that 41% have some or all their funding from the research councils, 26% from departmental bursaries or other contributions, 27% from other external funding sources (e.g. third sector); and just over 10% are entirely self-funded.

Year of study

Figure 1 shows the sample split between years of study: as might be expected given the age of the Gen Y students, the majority are in their first or second years of study.

Figure 1: Year of study: percentage of total Gen Y sample

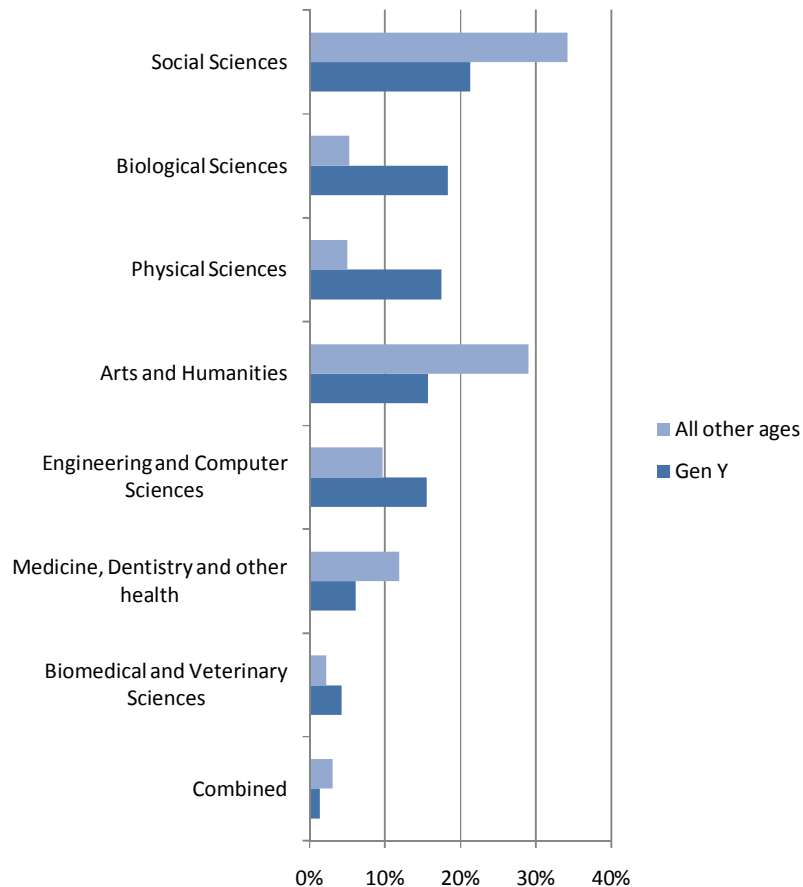


Subject disciplines

As in the 2009 survey, the older age group sample has a significantly different subject profile to the **Gen Y sample** (see Figure 2); 63% of the older age group sample studies arts and humanities and social sciences, in contrast to the **Gen Y sample** among whom 61% studies science, technology and medicine.

This remains consistent with the national trend since 2006 towards strong representation of science, technology and medicine subjects in doctoral research (HEPI, 2009, page 38).

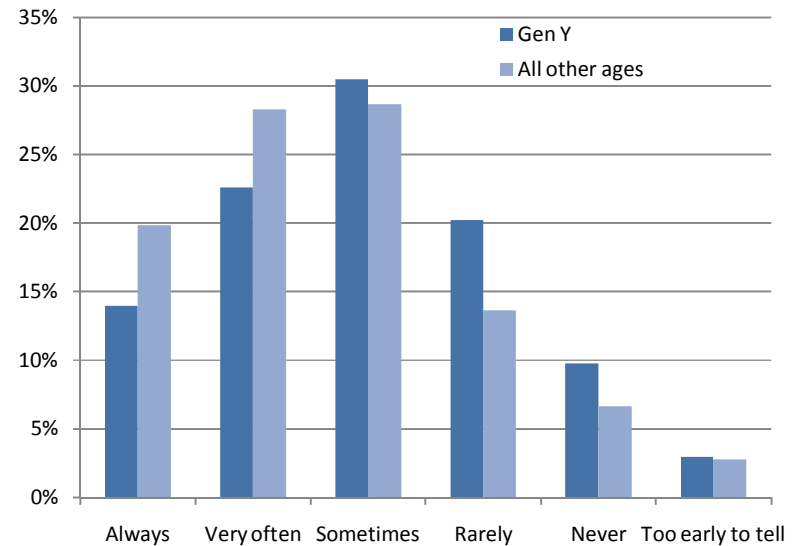
Figure 2: Subject discipline: percentage of Gen Y and other age groups



Cross-disciplinary information-seeking

37% of the **Gen Y sample** is always or very often required to seek information outside their core discipline (Figure 3). More arts and humanities and social science students than science students say that their research ‘always’ or ‘very often’ entails crossing core subject discipline boundaries.

Figure 3: Frequency of information seeking outside of core discipline: percentage of Gen Y and other age groups



The data show more students in older age group sample working this way, which is consistent with the higher proportion of this sample studying arts and humanities and social sciences.

Constraints on research progress

Survey respondents were asked to rank the severity of potential constraints on their research progress (ranking 1-5 with 5 the most significant). As Figure 4 indicates, the **Gen Y sample** ranked every potential constraining factor markedly lower than the older age groups sample, indicating that overall Generation Y students feel less constrained in their research progress than older researchers. The data offer no clues as to why this year's Gen Y sample are apparently more relaxed about their research progress than older age groups.

This finding contrasts quite markedly with the results of the 2009 survey in which the Gen Y and wider survey samples concurred on the severity of time pressures (3.78 and 3.85 respectively) and differed in their ranking of some other constraints much less dramatically than this year: for instance, in 2009 lack of money or the need to raise funds was given a mean ranking of 2.95 by the Gen Y sample and 3.11 by that of the wider survey sample.

Despite this apparently relaxed attitude on the part of the **Gen Y sample** in 2010, comparison of data with 2009 indicates that overall both the Gen Y and the older age group samples feel more constrained in their research than those responding in 2009: for example, in 2010 all mean rankings indicated by the older age group sample were above 3.00, while in 2009 only two constraints were ranked so high.

Analysis of the Gen Y sample by subject discipline show that arts and humanities students are slightly more likely to find the 'time and the opening hours of institution's library' a constraint, and

science, medicine and technology students tend to rank 'licensing restrictions', the 'availability of specific technology' and 'lack of information seeking and research skills' higher than those in other disciplines.

Figure 4: Constraints on research progress ranked 1-5 (by Gen Y)

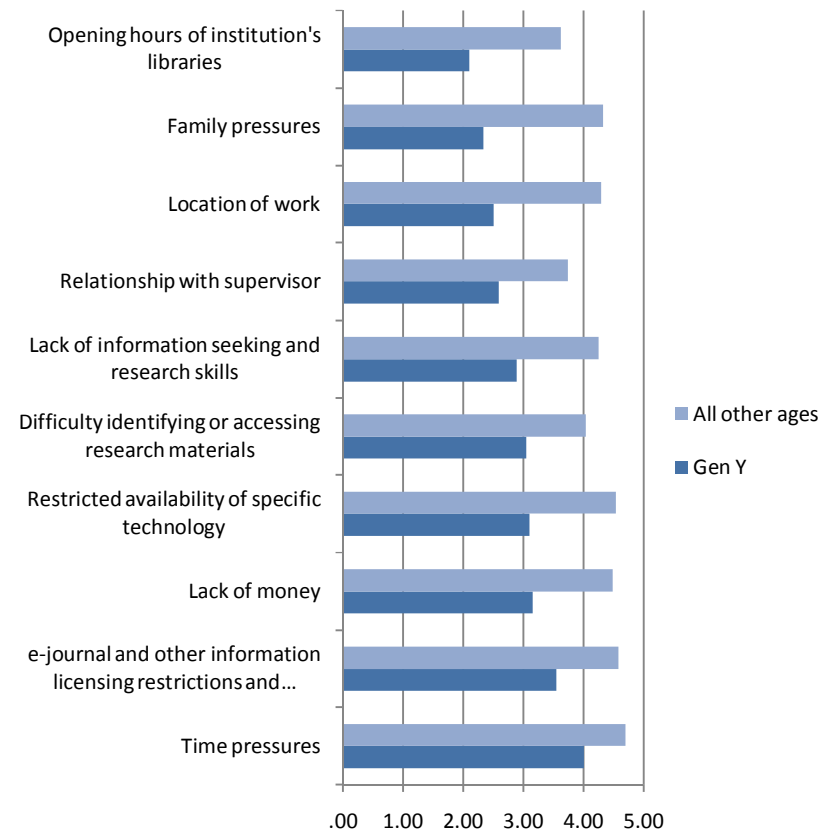
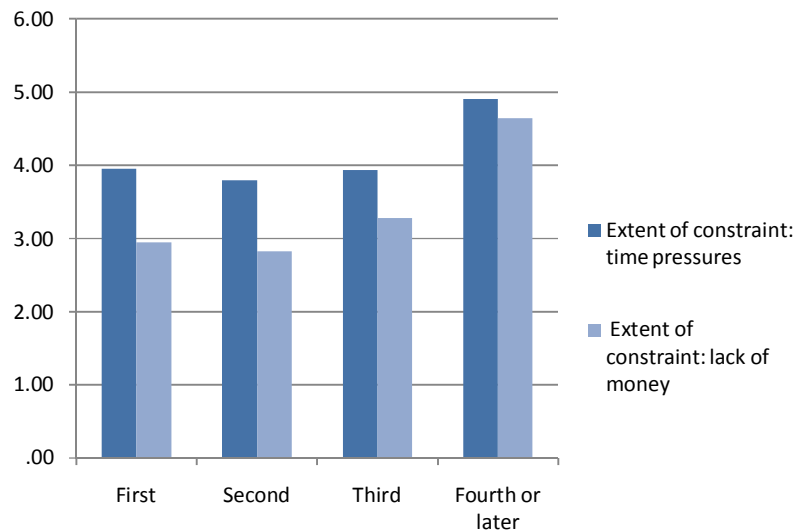


Figure 5 shows the increasing pressure of time and lack of money on the Gen Y sample as students progress through their PhD studies.

Figure 5: Extent of two key constraints on Gen Y students in different years of study



This pressure of time is also apparent among the Gen Y cohort, the members of which report that they have less time to indulge in discursive blogging, and frequently feel under considerable time pressures as they fully engage with writing up their research findings.

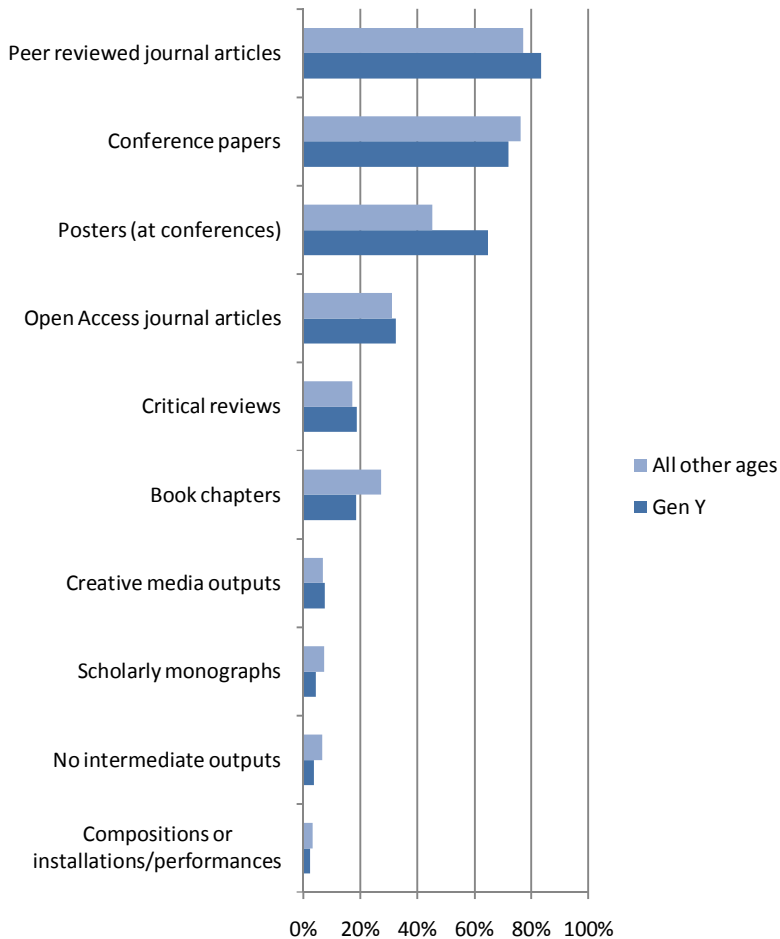
Intermediate research outputs

Articles in peer-reviewed journals remain the most frequently cited kind of intermediate research output, with more of the **Gen Y sample** (83%) than older students (77%) preferring to publish articles in peer-reviewed journals. Conference papers and posters at conferences also dominate as ways of disseminating research findings (see Figure 6).

In both the Gen Y and older age group samples, slightly more survey respondents (32% and 31%) cited open access journal articles than the respondents in the 2009 survey (28% and 27%), indicating perhaps that open access channels for scholarly communication are gaining ground within the PhD community.

However, other survey data suggest that the lack of impact factor, status or credibility of open access journals in the eyes of academic colleagues and potential employers remain factors that constrain choices of publishing output among all doctoral students (see 5.1).

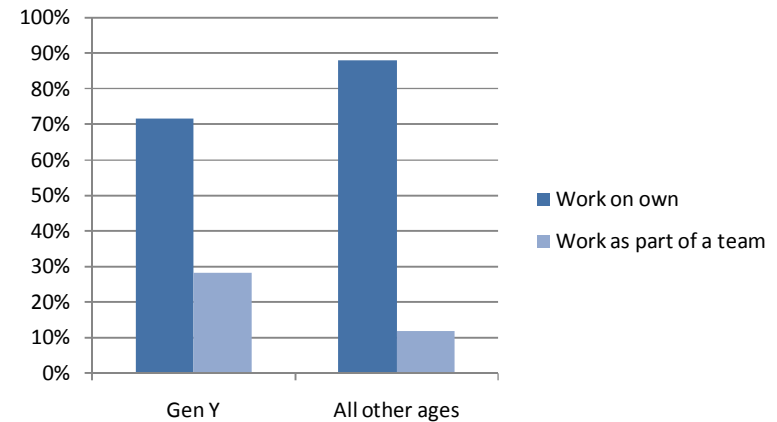
Figure 6: Most frequently cited research outputs: percentage of Gen Y and all other ages



Working in teams or alone

Figure 7 shows that students in the **Gen Y sample** are more likely than older students to work as part of a team (28% and 12%), although the large majority of both samples work alone on their research. Team work is much more prevalent among the physical, biological, biomedical and veterinary sciences, which dominate in the Gen Y sample.

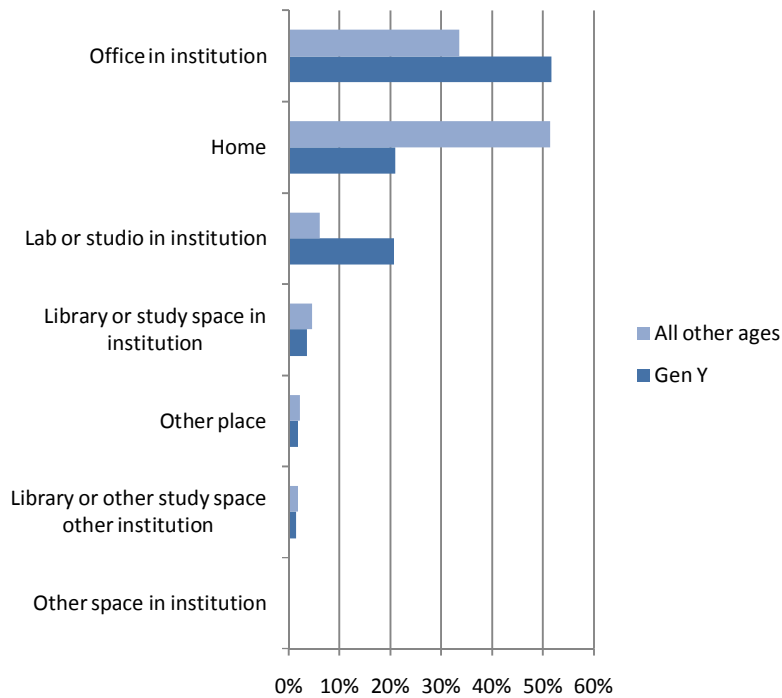
Figure 7: Work alone or in a team: percentage of Gen Y and all other ages



Main place of work

The survey results for the second year show a clear preference within the **Gen Y sample** in comparison to older students for working principally in their institution (either an office or laboratory) (73% and 40% respectively). Only 21% of the **Gen Y sample** prefers to work at home (see Figure 8).

Figure 8: Main place of work: percentage of Gen Y and all other ages



Social sciences, arts and humanities students of all ages show a clear preference for working at home, rather than in an institution, and given that the older age group sample is dominated by these subjects this could go some way to explaining the very clear difference between age groups.

5 Research results

In this section we provide the more detailed findings of the research study in 2010 (from the **Gen Y sample** supported by evidence from the Gen Y cohort where appropriate) in relation to the selected focus areas:

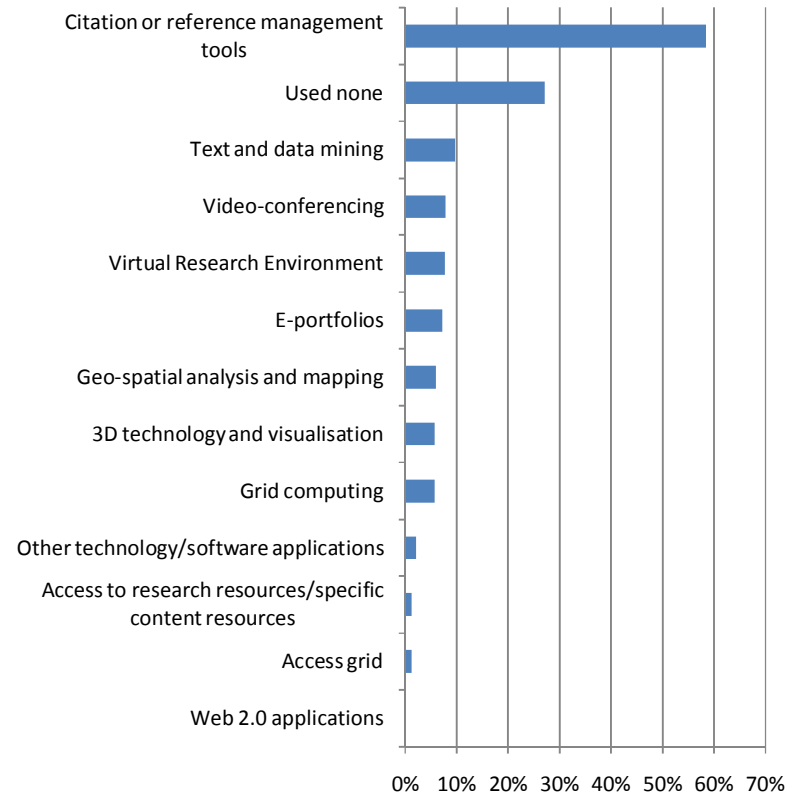
- Use of technologies (in particular Web 2.0);
- Using materials from and publishing in open access sources
- Using sources and resources outside their own institutions
- Training and support; and the role of the supervisor

5.1 Use of technologies including Web 2.0

Institutionally provided or supported technology

The survey respondents were asked which of a range of institutionally supported technologies they used during the past academic year (see Figure 9). Over one quarter of the **Gen Y sample** (27%) used none of the technologies listed. However, the **Gen Y sample** was more likely than the other age group sample to have used some kind of technology provided by their institution (72% of the Gen Y sample and 64% of all other ages).

Figure 9: Use of technologies provided/supported by own institution: percentage of Gen Y sample

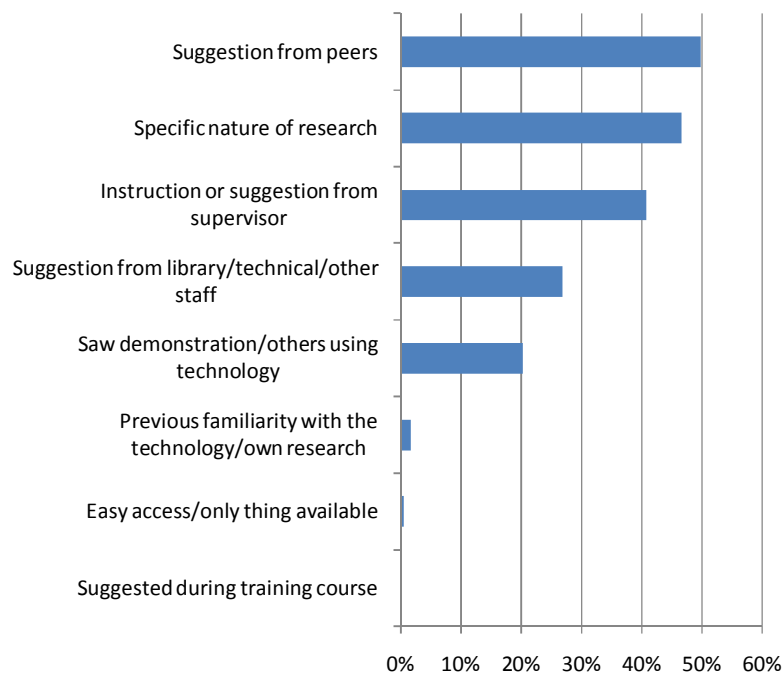


Citation and reference management tools were overwhelmingly the most frequently cited by the **Gen Y sample** (58%). All the other kinds of technologies and applications are cited by only 10% or less.

Influences in using institutional technology

Of those in the **Gen Y sample** who had used some kind of institutionally provided technology, half had been influenced to do so by suggestions from their peers, in contrast to only 39% of the users in the older age groups sample, and more of the Gen Y sample were influenced to use the technology by their supervisors than older students (41% and 36% respectively) (see Figure 10).

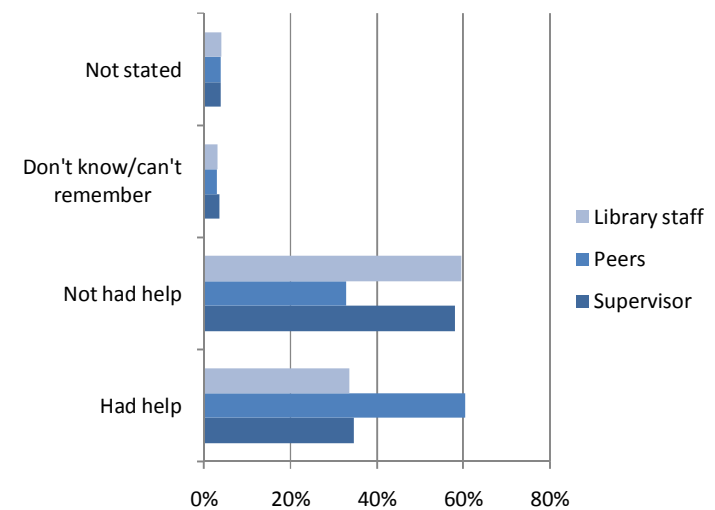
Figure 10: What influenced your decision to use the technology? Percentage of Gen Y sample



Help with using institutional technology

58% of the **Gen Y sample** who used some institutionally provided technology had no hands-on help at all in using it.

Figure 11: Hands-on help with using institutionally provided technology: percentage of Gen Y sample

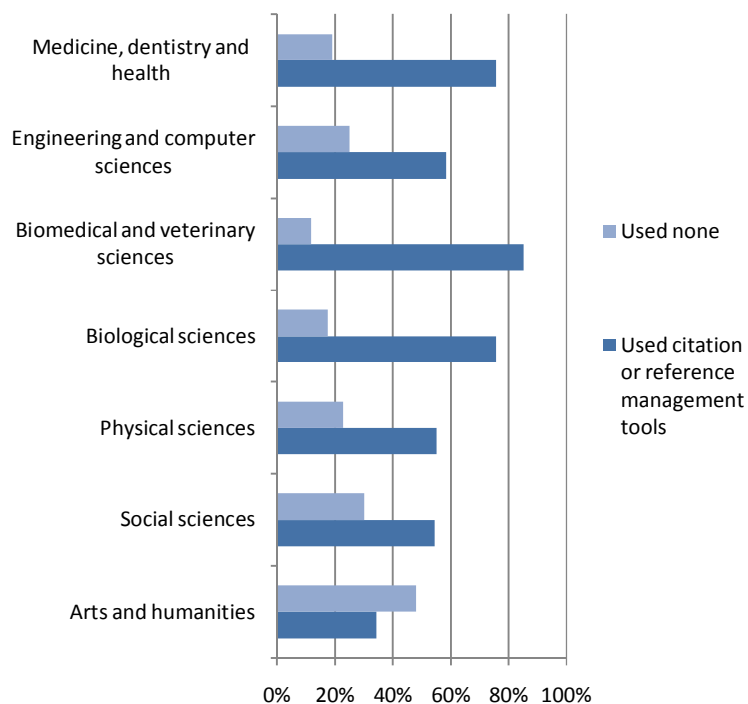


Gen Y sample respondents were more likely to have received hands on help from peers than in the older age group sample (60% and 45% respectively) (Figure 11) and from their supervisor (35% and 29% respectively). However, researchers in the **Gen Y sample** were less likely than the older students to have had help from library staff (34% and 42% respectively), which is in part accounted for by the predominance of arts and humanities and social sciences in the sample of older students.

Discipline differences in using institutionally provided technology

Researchers in the arts and humanities and social sciences were less likely to have used any technology provided by the institution –for example, see Figure 12 showing those in the **Gen Y sample** that used no technology and those using citation and reference management tools.

Figure 12: Using citation or reference management tools or no technology: percentage of Gen Y sample by subject discipline



Technologies available on the open web including Web 2.0

The survey respondents were asked about their passive and active use of technologies available on the open web for their research work during the past academic year (see Figure 13). Overall, passive use, i.e. reading wikis only but not creating content, following blogs only but not blogging oneself, is much more common among the **Gen Y sample** than active use. For example, 29% made passive use of internet discussion forums, while 13% made active use of them; 23% followed blogs but only 9% actively blogged themselves.

Of the **Gen Y sample** 8% made no use at all, either passive or active, of any of the listed technologies, 31% used only one or two and 26% used three or four either passively or actively.

There are a few significant differences between the Gen Y and older age groups samples apparent from the data: as might be expected more of the **Gen Y sample** (29%) than older age groups (23%) are active users of consumer social networks; whereas more of the older age groups sample than the Gen Y (16% and 12% respectively) make active use of internet discussion forums. 60% of the **Gen Y sample** does not use Skype at all, compared to 52% of the older age group sample.

Figure 13: Use of open web technologies: percentage of Gen Y sample

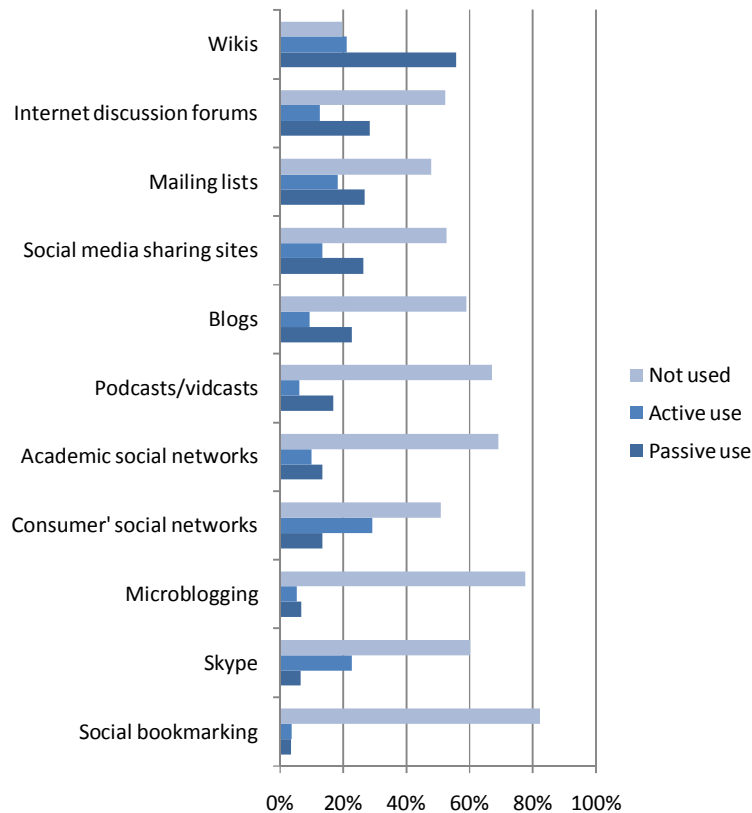
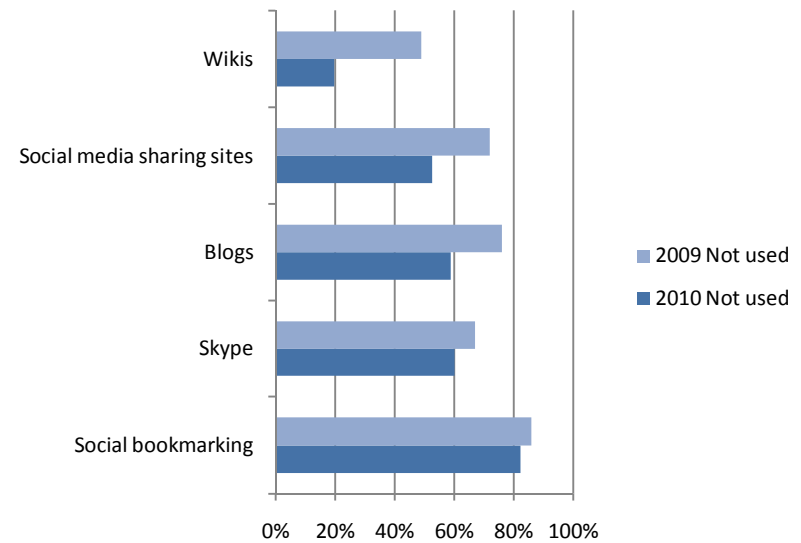


Figure 14: Percentage of Gen Y sample that did not use selected open web technologies in 2009 and 2010 surveys



Although the 2009 data are not fully comparable with 2010, there are indications (see Figure 14) of modest levels of increased use when the levels of ‘not used’ responses are compared for some technologies: for example, social media sharing sites were not used by 72% of the **Gen Y sample** in 2009, whereas this figure had gone down to 53% in 2010.

This apparent modest increase in use of open web technology is also supported by evidence from the Gen Y cohort. There are indications of a change since 2009, within the cohort and across the subject disciplines, in their use of and interest in using online forums and Web 2.0 applications to support their research. The

majority of the cohort now uses Facebook in their personal lives, although most would not consider using this for their work as it implies an inappropriate mix of social life and work.

However, more members of the cohort are using sites such as academia.edu, Graduate Junction and Mendeley to follow-up contacts made at conferences, to make contacts or organise a conference, and to share bits of research. This change seems to be associated with their growing confidence in having something to share, since they are nearing the end of their studies. Several members of the cohort now use Twitter to follow or to share (e.g. one cohort member was following the Housing Minister at DEFRA).

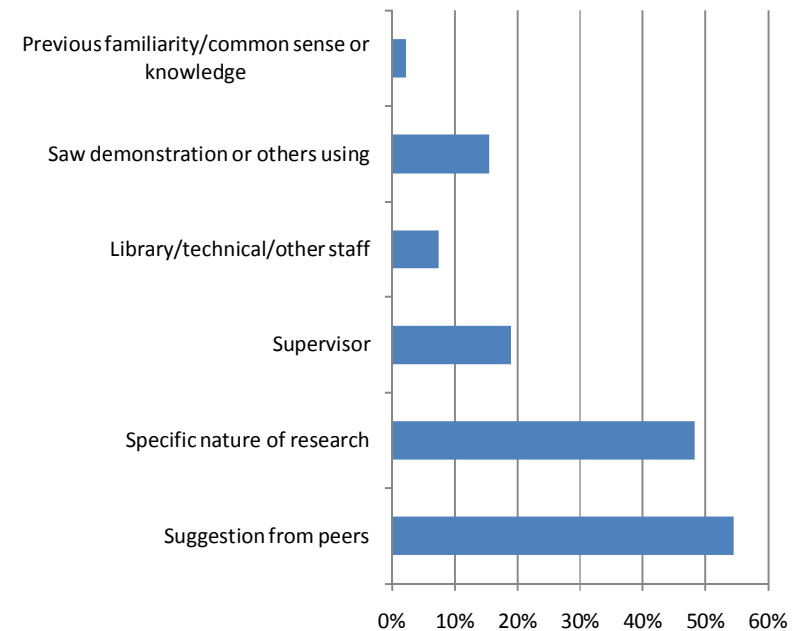
Influences in using open web technology

A range of influences to use these open web technologies was evident within the **Gen Y sample**, most commonly suggestions from peers (50%) and the specific nature of the research (48%). Gen Y researchers were more likely to have been influenced to use open-web technologies by their peers than all other ages (54% and 46% of the respective samples) – see Figure 15.

In using open web technologies, in contrast to institutionally provided technologies (see Figure 11), supervisors and library or technical staff are very much less likely to be the main influence on the Gen Y sample.

The Gen Y cohort confirmed that very few of their supervisors are interested or particularly competent in the latest technology applications (see 5.4).

Figure 15: What/who influenced your decision to use open web technology? Percentage of Gen Y sample



Few members of the Gen Y cohort appear to be supported by their institutions in using these applications, though they do not appear to feel the lack of such support in terms of their own competence.

This lack of institutional support, however, seems to reinforce their own feeling that using these open web technologies and online forums in research lacks legitimacy, or that the value and quality of contributions through such forums may be questionable. They see the potential of Web 2.0 technology in research but have raised

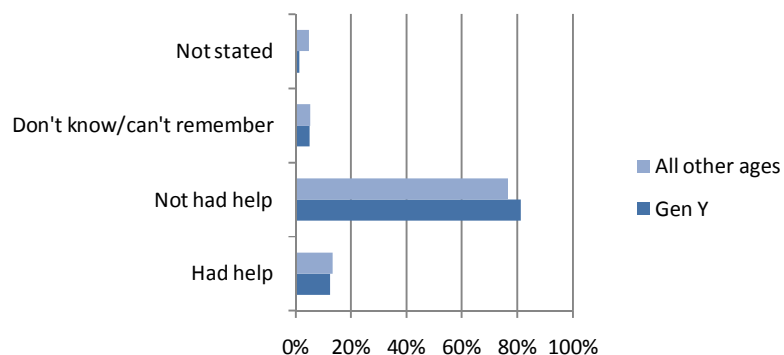
the question ‘who is using it?’ Several cohort members express the view that they ‘need better tools if they are to be used in research’.

Help in using open web technology

The **Gen Y sample** that used open web technologies received markedly less help in using them overall and from any source (see Figure 16) than they did with institutionally provided technologies (see, in contrast, Figure 11).

The large majority of the **Gen Y sample** had no hands on help with using open web technologies in the last year: where help was provided overwhelmingly the most common source was their peers.

Figure 16: Hands-on help in using open web technologies: percentages of Gen Y and older age groups samples that used technologies in last year



Discipline differences in using open web technology

Science, technology and medicine students (with the exception of engineering and computer sciences) overall make use of fewer of these open web technologies than those in arts and humanities and social sciences: see Table 2.

Table 2: Subject disciplines and use of open web technologies: percentage of Gen Y sample

Subject discipline group	Number of Gen Y respondents	Mean number of open web technologies used in the last academic year
Medicine, dentistry and health sciences	137	2.67
Physical sciences	391	3.23
Biological sciences	409	3.27
Biomedical and veterinary sciences	95	3.29
Combined	31	3.55
Social sciences	477	4.19
Engineering and computer sciences	348	4.36
Arts and humanities	351	4.37

5.2 Using open access

Understanding open access

The survey respondents were asked to consider the veracity or otherwise of seven statements about the meaning and nature of 'open access' and 'self archiving' as they are generally understood in relation to scholarly communications in the broadest sense (see Thorin, 2003). Of the seven statements only three were 'not true' or fundamentally inaccurate (see Table 3: statement number 1 – not accurate in context of scholarly publishing; 4 – not true, 5 – not true).

The data from the **Gen Y sample** indicates a great deal of uncertainty and lack of understanding about the nature and meaning of open access and self-archiving (Table 3), with four of the seven statements attracting a majority of 'don't know' replies.

The data also show that this uncertainty is shared with doctoral students of all other ages: there is little or no variation in the responses of the two samples.

Table 3: Responses to statements about open access: percentage of Gen Y survey sample

	Statement	True	False	Don't know/not stated
1	Open access is all works that are openly available on the web, which do not need any payment or permissions to look at, access or use it.	66%	13%	21%
2	Open access is scholarly publishing in an e-journal without any payment requirement to access it and no, or limited restrictions on use	63%	13%	24%
3	Self-archiving refers to authors depositing their work in open access institutional or subject repositories, or making material otherwise available on the web.	40%	7%	53%
4	Open access journals are not peer-reviewed	9%	55%	36%
5	Journal articles in conventional, non-open access journals are not self-archived by their authors	18%	21%	61%
6	Research funders are beginning to expect open access to the research they support: many have already adopted self-archiving mandates	26%	6%	68%
7	Some conventional, non-open access journals provide open access after an embargo period of 6–12 months or longer	33%	6%	61%

Using open access sources in research

The survey respondents were asked to comment on any reservations they might have about using open access or self-archived research resources in their own research work. Slightly more of the **Gen Y sample** than older ages (55% and 51%) said they had no reservations at all.

Around 6% of both the **Gen Y sample** and other age group sample confessed to not knowing anything or not knowing enough about it to comment.

Many others revealed again in their written comments that their understanding of what open access means is uncertain: there is, for instance, considerable confusion between open access and social media: for example

I have to verify the validity of the source. Wikipedia is nice to understand the background and basic concepts. I might use that knowledge to understand my research up to a bit. But I am hesitant to quote it directly in my work. (Older survey respondent engineering and computer science)

Youtube videoblog entries are useful to my research, in the same way that blogs and autobiographies are - but I am aware of the potential for online resources to be removed, and the problems that can cause in referencing my sources. Similarly, while open source wikis might give an initial impression, unless they're peer reviewed I don't feel comfortable basing research on them. (Gen Y survey respondent arts and humanities)

About 20% of the **Gen Y sample** wrote in comments that indicate their reservations about using open access sources: these reservations are primarily concerned with:

- **Quality control, reliability and currency** of the sources, particularly whether or not the journal was peer-reviewed. Respondents particularly queried the use of self-archived sources on the basis that they would not have been peer-reviewed: for example

I've had to look up the term "self archived research resources" to be able to answer this question (not a bad thing I guess)...if quoting from such a source, I would make evident that that was the source. But it is not likely something I would do often, and only if the author was previously known to me. My reservations, when peer-review is not evident, are about the quality or dependability of the research presented. (Gen Y survey respondent arts and humanities)

There is no formal control over the content of open access data, therefore meaning that the data cannot be used with any degree of confidence and would not stand up to any real scrutiny at the end of my studies. (Gen Y survey respondent engineering and computer sciences)

Publishing in open access journals usually requires payment by the authors; I am sometimes concerned that this may lead to publication bias, although the articles I have read from open access

sources have so far been of high quality (Gen Y survey respondent medicine, dentistry and health sciences)

- **Scholarly value, impact or academic ranking** of open access sources: several respondents expressed the view that their supervisors and/or examiners would not approve of citing open access sources: for example

I would want to check on the ranking (or perceived ranking) of each resource before citing it. (Gen Y survey respondent arts and humanities)

There are traditional currents in academia that look down upon use of open access, regarding it as less scholarly than peer-reviewed journals you must pay the earth for (Gen Y survey respondent social sciences)

- **Time required to track down open access sources** and likelihood of obtaining a 'proper' citation for the source: for example

There is still a bit of a stigma attached to them that they do not have the same 'importance' as a conventional, non-open access journal. Also, some are not available through search engines such as Web of Knowledge and may not contribute to citation indices. (Gen Y survey respondent physical sciences)

Publishing through open access channels

The survey also asked respondents to comment on any reservations they might have about using open access or self-archiving as channels to publish or disseminate their own research work.

Around 70% of the **Gen Y sample** and 65% of the older age group sample commented that they would have no reservations whatsoever. At least 5% of the **Gen Y sample** confessed that they did not know anything or enough about open access to comment.

Over 25% of the **Gen Y sample** expressed reservations about publishing their work through open access channels, and these were primarily concerned with:

- **Lack of impact factor, status or credibility** of open access journals in the eyes of academic colleagues and potential employers: for example

Currently the more prestigious journals are not open access journals; this is reflected in research assessment exercise, with more weight given to conventional non-open access publications. As a junior researcher who is yet to establish himself within his field, it is important for me to publish in the more prestigious journals, even if they are not open access and even if on a personal level I disapprove of non-open access journals. (Gen Y survey respondent physical sciences)

I completely support open access but fear that old-fashioned members of my discipline will think that open-access journals are not as good and will rate my work accordingly. (Gen Y survey respondent social sciences)

Reputation of open access journals may be lacking. They may not yet be established. That is what one looks at when seeking where to publish. (Gen Y survey respondent social sciences)

- **Strong preference for peer-reviewed journals**, showing a general assumption that open access journals are not peer-reviewed

Peer-reviewed journals are better respected because of the rigours of the application process. If and when I publish articles, I would prefer to send them to a peer-reviewed journal because this implies my article has passed the journal's quality control. My work will therefore be better respected by my peers. (Gen Y survey respondent arts and humanities)

I want my work peer reviewed. I have no reservations about also self archiving / open access publishing. (Gen Y survey respondent physical sciences)

- **Importance of being cited in other publications** and the assumed impossibility or difficulty of this with open access: for example

If my work has been published already, as in a journal or given as a paper at a conference then I have no problem with providing others with a word copy or pre-proof of my work but otherwise I wouldn't 'publish' anything as it wouldn't be possible to reference for others and so my work could in essence be stolen (at least I wouldn't increase my own or my institutions citations which renders 'publishing' like that pretty useless). (Gen Y Engineering and Computer Science student)

I would wish to ensure I am cited, have a certain prestige and develop a professional reputation-something I do not feel open access would necessarily allow. (Gen Y Social Sciences student)

- **Cost to the individual researcher:** for example:

I think that it costs a significant sum to make your article open access. For this reason, I would be unlikely to go for it. If I couldn't get my work into a peer-reviewed journal, I wouldn't make it available on the internet or by any other source. (Gen Y survey respondent biological sciences)

Would prefer to publish in open access peer reviewed journals - but do not like the payment (Gen Y survey respondent physical sciences)

I pay for 'academic' articles anytime a access so them; so others should pay for mine if there need consult them. (Gen Y survey respondent biomedical and veterinary sciences)

- **Concern that copyright is not protected** in open access journals; that open access and / or self-archiving would allow anyone to access the work and plagiarise it: for example

I would need to make sure it is published with a licence e.g. Creative Commons to try to make sure that other people don't use it without referencing it (Gen Y survey respondent physical sciences)

My concerns relate to the copyright of my work (i.e. if I make my work available on open access do I lose all copyright to my research etc?) (Gen Y Arts and Humanities student)

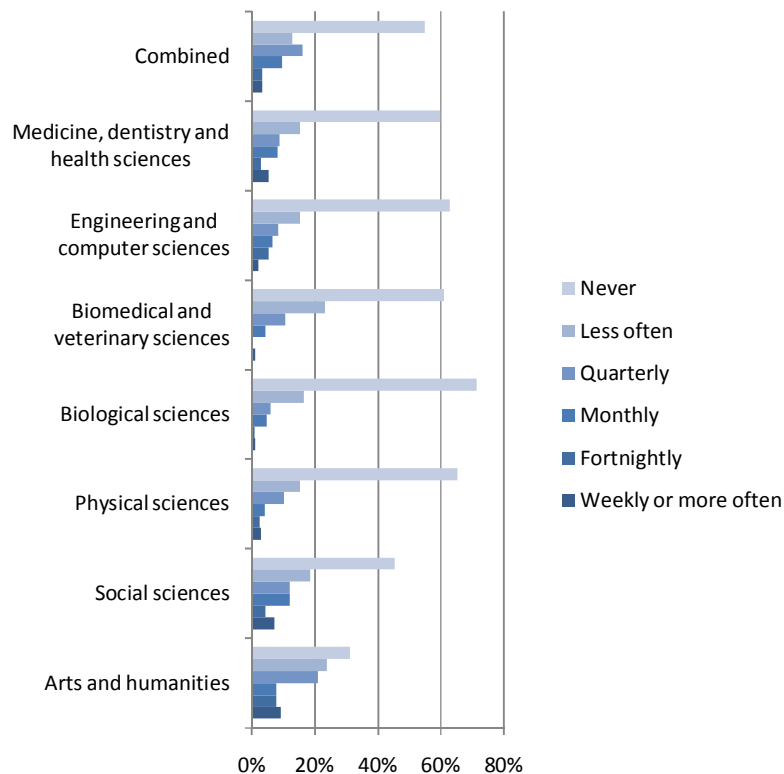
Losing intellectual copyright of something that [might] prove important and/or marketable at some point in the future. (Gen Y survey respondent arts and humanities)

That my original ideas will be 'stolen' by someone more acclaimed and passed off as original. (Gen Y survey respondent arts and humanities)

5.3 Using other academic libraries

Discipline differences in using other libraries

Figure 17: Physical visits to other academic library in last academic year: percentage of Gen Y sample

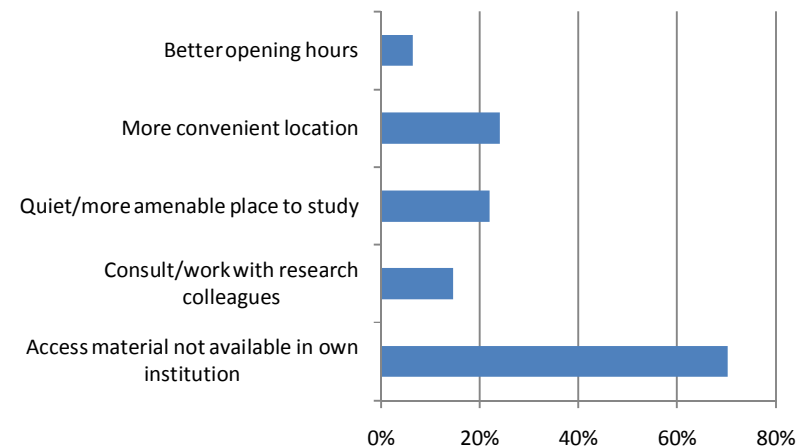


As might be expected, the subject area of PhD study is a strong determinant of whether or not Gen Y doctoral students visit academic libraries other than that in their own institution (Figure 17). Fewer respondents in the **Gen Y sample** had physically visited another academic library during the last academic year than those in the older age group sample (44% and 59% respectively): this correlates with the predominance of science, technology and medicine students in the Gen Y sample.

Reasons for using other libraries

The most common reason for using other libraries, among those respondents in the **Gen Y sample** who had used another academic library in the last academic year, was to access research material not available in their own institution (70%) (Figure 18).

Figure 18: Reasons for using other libraries



A higher percentage of the older age group sample than Gen Y selected 'convenience of location' as a reason for using another library (32% of older respondents using other libraries in contrast to 22% of the Gen Y respondents using other libraries).

Use of resources from other libraries

Most of the **Gen Y sample** that did use another library some time during the last academic year found what they were looking for 'all of the time' (12%) or 'most of the time' (47%).

We conclude that in most cases (because of the predominance of arts and humanities and social science students in this group from the Gen Y sample) this would be material in printed form since the respondents were likely to read the material they found at the library itself (52%) or to photocopy it (50%), while slightly fewer borrowed it (40%).

Only one in four (25%) downloaded an electronic document while in another library.

5.4 Training and support and the role of the supervisor

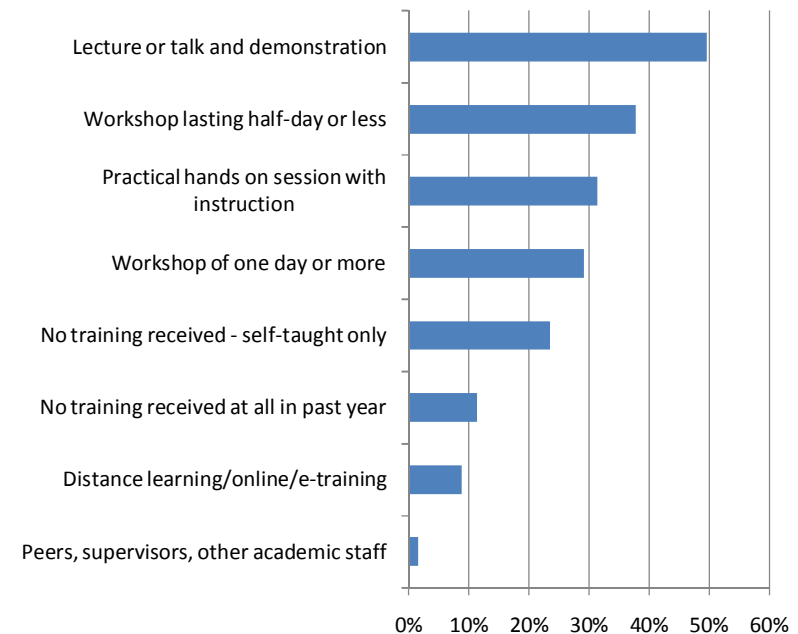
The survey asked respondents a series of questions about the most recent piece of training they had received during the past academic year. 35% of the **Gen Y sample** had received no training of any kind in the previous academic year (see Figure 19).

Type of training received

Respondents were asked to indicate the type or format of their most recent piece of training. The data (see Figure 19: Type of training received during the previous academic year: percentage of Gen Y sample) indicate that there is still a heavy reliance on face-to-face and 'traditional' modes of training delivery, such as lecture, talks or demonstrations, workshops etc. Online tutorials and learning packages were used by very few of the **Gen Y sample**.

The Gen Y cohort confirms that their preference also is for face-to-face training in some form or another, and preferably training that is not 'generic' but tailored to individual students or groups of students in specific fields.

Figure 19: Type of training received during the previous academic year: percentage of Gen Y sample



Content of recent training

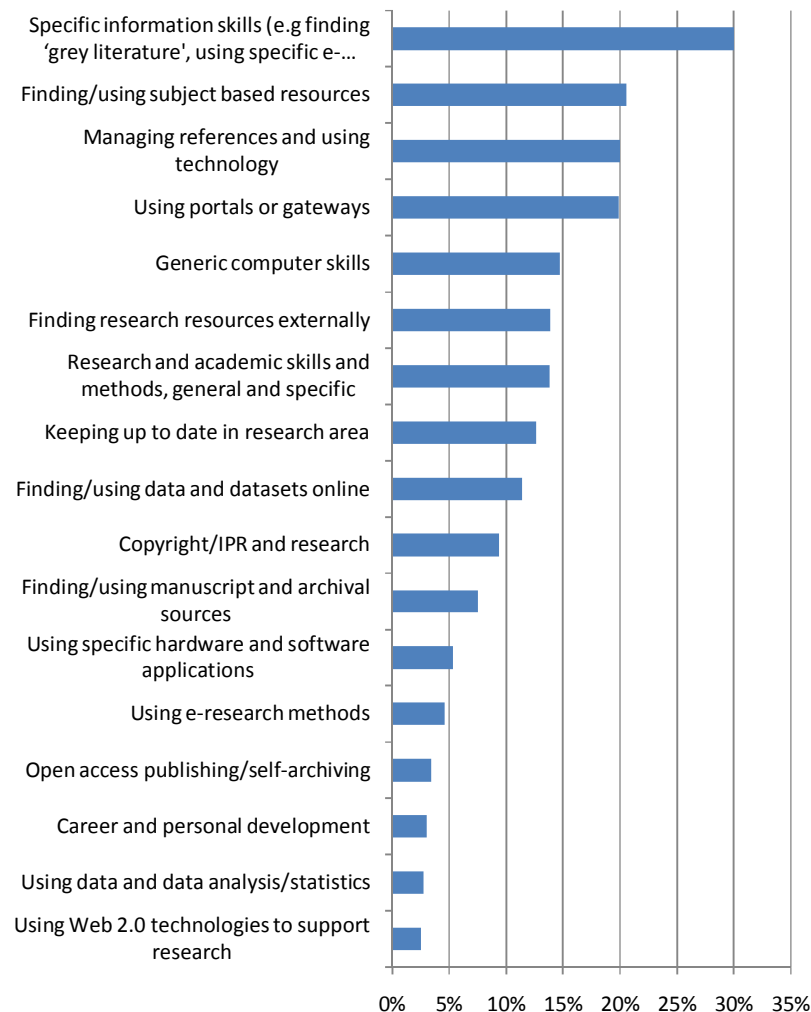
Respondents were asked about the subject or focus of their most recent piece of training related to research information and resources – see Figure 20. The results of this second year survey reflect a very similar picture as those from the 2009 survey: for the large majority of students in the **Gen Y sample** the most recent training they had was in the same four areas as the comparable sample in 2009, namely:

- Specific information skills (e.g. finding 'grey literature', using specific e-information services);
- Finding research resources and services in your subject beyond your institution (e.g. inter-library loans, the British Library, accessing other key collections or libraries);
- Finding/using subject-based bibliographic, abstract and journal research resources (print and electronic);
- Using their own institution's portal to access electronic research resources.

As in 2009 many fewer in the **Gen Y sample** had had recent training in use of any kind of technology applications or software or in using Web 2.0 technologies to support research. The only exception to this is that 20% of the **Gen Y sample** had received training in 'managing references and using technology to do this (e.g. EndNote)'.

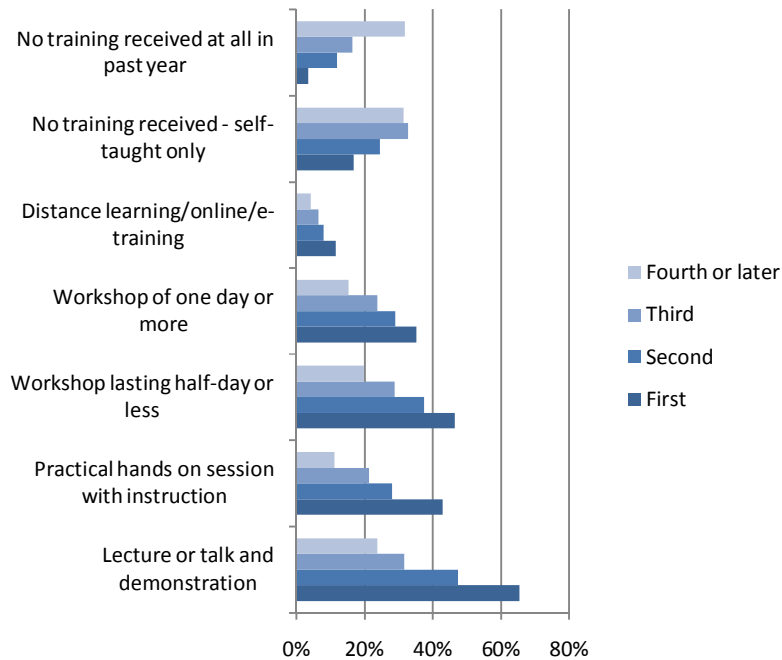
The combined results of the 2009 and 2010 survey suggest that technology support may not be areas that are well or effectively covered by institutional provision of training and support to research students.

Figure 20: Most recent training area: percentage of Gen Y sample



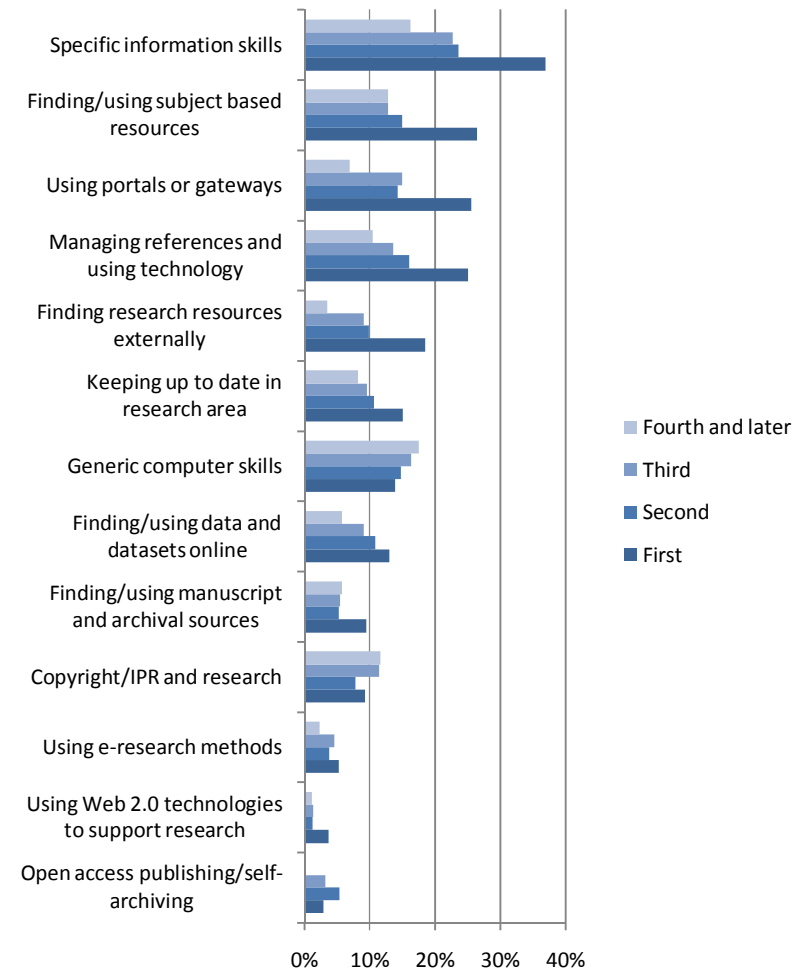
Differences in year of study

Figure 21: Recent training from first year of study onwards: percentage of Gen Y sample



All training take up in the **Gen Y sample** tails off steadily from year one onwards (see Figure 21). Take-up of training in the areas of identification and use of research information and specific resources also reduces from year one onwards (see Figure 22); this is to be expected since most PhD students acquire these skills and knowledge early in their study period.

Figure 22: Content of most recent training by year of study: percentage of Gen Y sample



These data also show that take-up of training in ‘generic computer skills’ remains steady or with a slight increase over the years of study, perhaps indicating a need among a proportion of the **Gen Y sample** to keep up to date; and a slight increase in take up of training about ‘copyright/IPR and research’ between years one and four (9% and 12%), perhaps indicating an increasing interest in copyright issues as publication of final research results draws near.

Discipline differences in training received

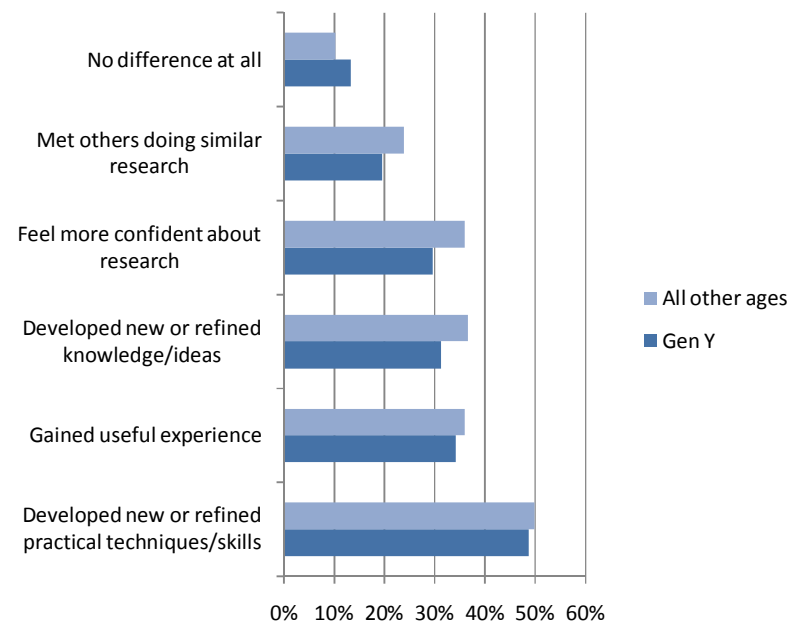
The **Gen Y sample** data show that students in physical and biological sciences and those studying ‘combined’ subjects are more likely than those in other subjects to have received no training at all in the past year (46% of the sample from physical sciences; 38% of biological sciences; 39% of combined; compared to 32% of arts and humanities and 31% of social sciences). This may be indicative of the less diverse and numerous range of research resources and sources required in the pure sciences and their likely electronic formats, in comparison to those available and necessary in the arts and humanities and social sciences (see RIN, 2011b, p 16).

Training providers

The two most common providers of the recent training received by both samples in the survey were the researchers’ own department or faculty (34%) or their Doctoral Training Centre (26%). The **Gen Y sample** was more reliant upon their departments or faculties (38%) compared with 29% in the other age group sample.

Benefits of training received

Figure 23: Benefits of most recent training: percentage of Gen Y and all other ages samples



There was a range of benefits identified from the most recent training (Figure 23): as might be expected about half of both samples felt they had developed new or refined practical techniques and skills. The **Gen Y sample** overall appear to be slightly less convinced of the benefits of the recent training they received: they selected fewer benefits than the other age groups sample (mean 1.64 and 1.83 respectively).

The role of the supervisor

The first year of the study revealed a heavy reliance by the Gen Y cohort on their supervisors, for broad support and guidance in the direction of their research, as well as specific assistance with identifying research resources. This was identified as an area for focus in the second year of the research in terms of how the supervisor provided support with technology, information seeking and research behaviour.

In this second year of research the Gen Y cohort show as much variation in what they want from their supervisor(s) – for instance regular meetings, continual input and advice on sources and information, psychological support, structure and pressure – as the supervisors do in their style of PhD supervision. The most important elements in the relationship appear to be a good fit in terms of expertise and knowledge of the particular research area; and being able to ‘get on’ as people.

My supervisor and I have a great relationship - in some ways, it's more like a peer-relationship.... we share experiences and frustrations. (Gen Y cohort member)

We started off with one 1.5 hour meeting per month and then moved to a meeting every six weeks/two months, even though I could probably do with more support at this (writing up) stage. (Gen Y cohort member)

We get on because my background is in [the same discipline] also, and because I don't always tell him what I'm up to....His role is almost entirely reactive. I submit pieces of work, and he responds to them. (Gen Y cohort member)

Changing relationships

Evidence from the Gen Y cohort shows that, as they draw closer to the end of their PhD studies their supervisors are no less important, though the relationship itself may have changed: for instance, for some it has become more ‘professional’:

When it comes to support generally, when I am disillusioned by the PhD, frustrated or am fed up, it is not my supervisors that I go to talk to. Although I know they would listen, try to be sympathetic and offer advice, I feel that I would rather get that support via other members of staff in the department (such as members of my research group) and other PhD students..(Gen Y cohort member)

Overall, I feel that the supervisor input into my thesis has been quite minimal but that this has given me a taste of what it might be like to be an independent research leaderI don't think my experience is atypical for an academic and so I'm quite happy with the way things are progressing at the moment. (Gen Y cohort member)

A successful supervisor has to go beyond mere subject knowledge and provide assistance for those areas which the student has no prior knowledge: organizing a long-term study; publication, especially of monograph-length pieces; grants and postdoctoral awards; and eventual career goals.Facilitating this transition from student to profession has definitely been the most valuable aspect of my relationship with my supervisor. (Gen Y cohort member)

Supervisors and technology

Data from the **Gen Y sample** indicate that supervisors are quite influential in getting students to adopt institutionally supported technologies relevant to the specific nature of students' research (see Figure 10 above); however, they are very much less influential when it comes to influencing the use of open web technology among students (see Figure 15 above).

The supervisors of the Gen Y cohort members generally tend not to be particularly interested or up-to-date about using technology in research (though a few are actual technophobes) and this appears to have had some influence on the researchers' choices of how to do their research: for example:

I have always excelled using new technologies so I feel he is holding me back a little. I don't use certain pieces of software because he looks bamboozled when I talk about them.....(Gen Y cohort member)

My supervisor is not completely technologically illiterate, but he doesn't know anything about some of the computer-based tools used in some qualitative research - this has helped influence me away from using [certain] programmes..... to support my work. (Gen Y cohort member)

I think that being a younger researcher (he's still under 40), he's quite good with technology. Not as good as me.....but certainly good with emails, online journals etc..... However, he doesn't have a presence on, for example, facebook, academia.edu, or other academic networking sites, as some other professional academics in the department do, so his coverage is patchy. (Gen Y cohort member)

However, for most of the Gen Y cohort technological awareness is not a particular expectation of their supervisors, and any shortfall in this respect is not seen as a problem:

She is not 'tech savvy' but it's a thing we joke about and not a major issue..... I'm not as research or knowledge savvy – it's a generation and experience thing. Being able communicate, work well both professionally and personally and to have a good relationship is more important and can overcome anything. (Gen Y cohort member)

Recommending research resources

It is clear that supervisors have been influential in directing the Gen Y cohort students to literature sources and often titles and articles: but as the PhD studies progress this is true only where

their areas of expertise are specifically aligned with the research topic of the student. Where there is no such close alignment, the researchers appear to feel more on their own after the initial few months of study:

As my project has evolved it has clearly been influenced by my[supervisor] and his wealth of knowledge on my topic and the general theoretical backdrop to my work. He is 'well read' in an almost incomparable sense has therefore been able to direct me to areas of literature that I would have not considered. (Gen Y cohort member)

The best thing about my supervisor is his wide knowledge and contact base, particularly the latter. He is the head of department so while he has a wide knowledge base, he is sometimes lacking in the specifics of my field. (Gen Y cohort member)

He actually isn't an expert on my particular historical period, so has not suggested any readings or lines of inquiry. (Gen Y cohort member)

Annex 1: 2010 context-setting survey

In the 2010 national context-setting survey of doctoral students in the UK, 72 higher education institutions (HEIs) from across the UK collaborated in the distribution of the survey, an increase of four on the number in 2009.

A total of 6100 returned surveys, of which **4807** were useable in that they completed the questionnaire and they had no missing data in respect of the analysis variables. Corresponding numbers in 2009 were 6562 completions and 5410 useable.

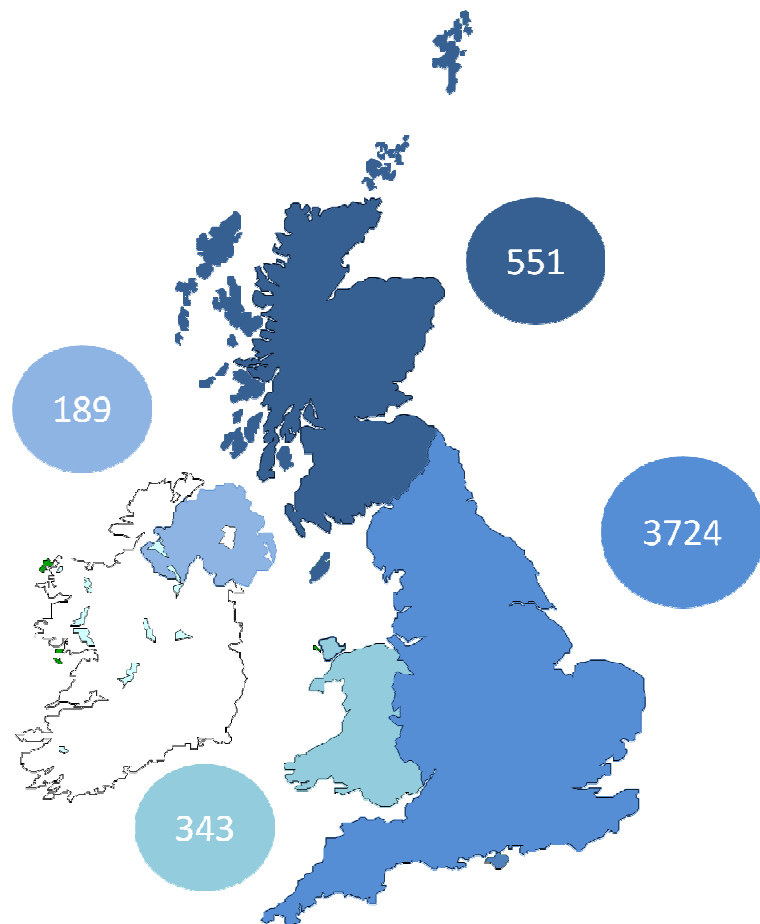
Table 4: Survey response by type of HE institution

HEI type	No. of respondents	Percentage of total
University: old pre-1962	3202	66.6%
University : old 1962-1991	741	15.4%
University: new 1992	616	12.8%
University: new post 1992	239	5.0%
HE College	9	0.2%
Total	4807	100.0%

Table 5: Survey response by UK region

UK Region	No. of respondents	Percentage of total
North East	164	3.4%
North West	172	3.6%
Yorks and Humberside	331	6.9%
East Midlands	216	4.5%
West Midlands	275	5.7%
East of England	416	8.7%
London	1203	25.0%
South East	553	11.5%
South West	389	8.1%
Wales	343	7.1%
Scotland	556	11.6%
Northern Ireland	189	3.9%
Total	4807	100.0%

Figure 24: Number of respondents in England, N. Ireland, Scotland and Wales

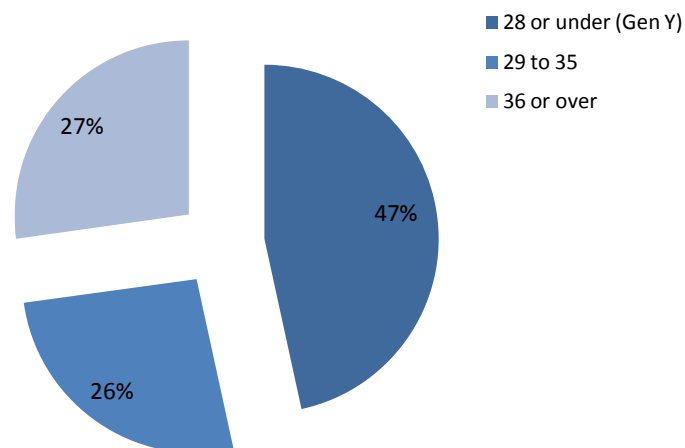


Profile of doctoral student respondents

Age range

The survey once again achieved a reasonable spread across **different age groups** including responses from 2239 (47% of total) Gen Y scholars, which is a higher proportion of the total compared to the 2009 survey sample (38%). Figure 25 shows the range of responses, which is overall slightly younger than the HESA statistics show for the population of PhD scholars as a whole.

Figure 25: Age range of respondents: percentage of total respondents



Gender representation

The gender split in 2010 was identical to that in 2009 (58% female, 42% male), so skewed towards female researchers as indicated by comparison with the HESA data (46% female, 54% male).

Full-time and part-time students

As in the 2009 survey sample only 23% of respondents are studying **part time**, which is considerably lower than the proportion of part-time students recorded by HESA in the total doctoral student population. Only 7% of the Gen Y respondents are studying part-time.

Spread of subject disciplines

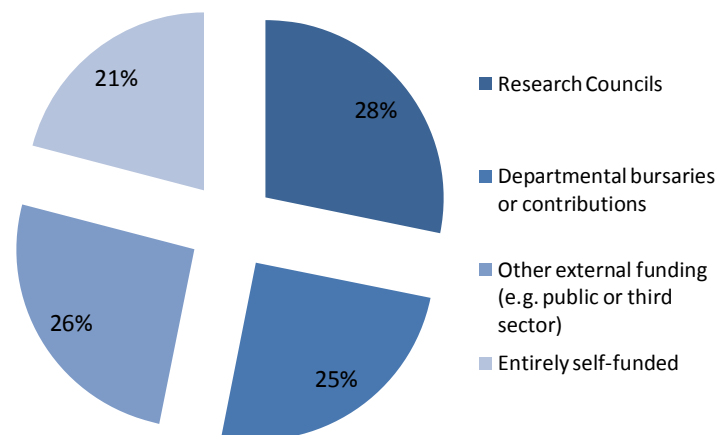
There was a fairly even spread of subject disciplines in the survey, with 51% of respondents in arts and humanities or social science disciplines, 47% science, technology and medicine and 2% in combined discipline subjects.

Generation Y respondents were more likely to be undertaking a science or technology discipline, with far more of the older students in arts and humanities and social sciences (see Figure 2)

Sources of research funding

Over one quarter (28%) of the survey respondents receive all or some funding from the research councils: 21% are entirely self-funded – see Figure 26.

Figure 26: How students are funded: sources of some or all funding: percentage of total respondents



Annex 2 Key references

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