

## DEVELOPING THE DIGITAL RESEARCHER

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### Abstract

A recent survey by the Research Information Network identified at least ten different types of social media tools that may be used to support research (Caan, Dimitriou, & Hooley, (2011). Together these tools can support key research activities including keeping informed of developments in the area of research interest or the discipline more generally, engaging with the relevant research communities, organising and recording meetings with supervisors, document sharing and storage, developing ideas and sharing them with peers and developing professional networks. This paper examines the UK evidence for the current use of the range of available digital tools to support the academic research process based on recent studies; it discusses the potential use of the range of digital tools available to support the research process and some of the implications of this for the development of a 21<sup>st</sup> century academic identity and the role of the university.

### Introduction

One of the key current projects run by the Joint Information Systems Committee (JISC) in the United Kingdom is Developing Digital Literacies. The JISC website explains that “By digital literacy we mean those capabilities which fit an individual for living, learning and working in a digital society: for example, the skills to use digital tools to undertake academic research, writing and critical thinking”(JISC, 2011). This paper proposes to focus on the first of these – academic research – and in particular what we know about the use of digital tools by PhD and early career researchers. The paper examines the UK evidence for the current use of the range of available digital tools to support the academic research process based on recent studies, it discusses the potential use of the range of tools available to support the research process and what steps universities are taking to develop digital literacies in this area of academic activity.

### The Research Landscape

*Universities provide hubs for research and support, exposure and promotion for researchers. (Bradwell, 2009, p.11)*

The research landscape In UK Higher Education is currently undergoing significant change. Most obviously, the Research Assessment Exercise is being replaced by the Research Excellence Framework (HEFCE, 2012), which will be completed by 2014. This change has been driven in part by recognition that in this era of increasing global competitiveness and economic austerity in research funding, the UK Higher Education sector must strive to maintain its

current position as second only to the United States in research impact and outputs (“China Ousts UK,” 2009). Among the many drivers that have resulted in the change to the research funding models and metrics for measuring the impact of UK research are: the decline in state funding; a recognition that researchers today and in the future will be required to show greater flexibility and mobility; the realisation that researchers will be increasingly required to work across academic, business and public sectors; and an acknowledgement that there should be an increase in “broader based collaborations within and between institutions, individuals and disciplinary boundaries” (CST, p. 38). It is against this background that attention has focused on the ways in which technology, particularly social media tools, can support the research process and the ways in which researchers carry out, organise, collaborate, reference and communicate their work (Glenn, 2008). This paper sets out to explore the affordances of these technologies for the research process--to analyse the evidence about the extent to which researchers are engaging with social media and how this might develop in the near future, and how institutions can support and facilitate the use of such technologies. Additionally, the paper investigates some of the issues that are raised by the use of such tools for the research process and the construction of the identity of the digital researcher. Although this paper has a particular focus on doctoral students, its conclusions will also be of relevance to researchers at every stage of the research process

### **Social Media – What is It?**

Social media has been defined by Kaplan and Haenlein (2010) as “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0 and that allow the creation and exchange of user-generated content.” (p. 61). Franklin and van Harmerlin (2007) offer a useful general definition of Web 2.0, of which social media may be seen as a subset:

Web 2.0 encompasses a variety of different meanings that include an increased emphasis on user-generated content, data and content sharing and collaborative effort, together with the use of various kinds of social software, new ways of interacting with web-based applications, and the use of the web as a platform for generating, re-purposing and consuming content. (p. 6)

Any description of social media tools is necessarily subject to change and revision in the light of the speed with which new software applications are developed. Moreover existing applications are subject to market pressures, which may see some applications move from free to proprietary (and therefore chargeable) for users. Recent examples include Ning (<http://www.ning.com>), a social networking application, and Delicious (<http://www.delicious.com>), a social bookmarking tool.

The emphasis given here on the collaborative and social aspects of these web-based technologies is what distinguishes them from the technologies associated with the Web 1.0 era. The extent to which this range of newer social media technologies is used by current doctoral students to support a variety of research activities will be examined in detail below. What kinds of

tools are these, and what do researchers use them for? This brief survey does not claim to be exhaustive. Such information is available elsewhere. (See, for example, *Social Media: A Guide for Researchers* [Cann et al., 2011]). Instead, what follows is a discussion of a representative sample of these tools and their functions, preceded by a short account of some recent research in this area.

### **Researchers of Tomorrow**

Two recent UK studies that have focused on the use of social media tools for researchers report some interesting similarities and differences in their findings about the take-up of these tools as well as which tools are used and why. The first of these, a longitudinal study (2009-2012) carried out by the British Library and JISC, is called *Researchers of Tomorrow* and focuses on the research behaviour of Generation Y doctoral students. The first two reports from this research are now available (Carpenter, Wetheridge, Smith, Goodman & Struijve, 2010; Carpenter, Tanner, Smith & Goodman, 2011); the final report will be published in June 2012. The second study has a wider focus in terms of the sample base, focusing on the whole age range of research scholars, and is titled *Adoption and Use of Web 2.0 in Scholarly Communications* (Procter, Williams, & Stewart, 2010). These studies will be used to provide data on the extent to which these tools are being used by current and post-doctoral researchers as well as identifying the barriers to their wider adoption.

### **A Brief Survey of Social Media Tools**

A recent survey by the Research Information Network identifies at least ten different types of social media tools that may be used to support research (Caan et al., 2011). These include, blogging and micro-blogging sites; social networking services; social citation, news and social bookmarking tools; presentation sharing tools, audio and video tools; virtual worlds, project management (including mind-mapping), collaboration and meeting, information management tools; and research and writing collaboration tools. Together these tools can support key research activities including keeping informed of developments in the area of research interest or the discipline more generally, engaging with the relevant research communities, organising and recording meetings with supervisors, document sharing and storage, developing ideas and sharing them with peers and developing professional networks. Associated with the use of some of these tools and their functions, the research discussed below reports that researchers have anxieties around copyright, intellectual property rights and the extent to which these tools are supported by institutions. The research also reveals that not all researchers are familiar with the affordances of these tools or what use they may be to their own research, so this paper will first offer some detail on how some of these tools can support core research functions.

### **Keeping Informed and Managing Information**

In terms of keeping researchers informed in their discipline area there is evidence that alerting services such as Google Scholar, Google Reader and iGoogle, Alta Vista, and Bing, together with RSS or Atom feeds, data and text mining tools are among the most valued of social media tools as reported by

Generation Y students surveyed for the *Researchers of Tomorrow* report (Carpenter et al., 2010). This study reported that science students tend to make greater use of these tools than those from arts, humanities or social science disciplines. The same research indicates that over 60% of those surveyed had received no training in the set up and use of these alerting services for keeping up to date in their discipline area. The evidence suggests that whilst almost a third of researchers of all ages value RSS and alerting services (and the majority of these from a science background), nearly two thirds make no use of such services (Carpenter et al., 2010).

In addition to using these tools for information gathering, researchers can access and contribute to iTunes U, YouTube, TED talks as well as a range of subject and discipline specific blogs and wikis. The most recent *Researchers of Tomorrow* report (Carpenter et al., 2011) suggested that there has been a modest increase in the number of Generation Y doctoral students accessing blogs and wikis as part of keeping informed, though they are still less likely to contribute to blogs themselves (23% and 9% respectively). Again, there are significant disciplinary differences in the use of these tools. The trend to increasing usage nevertheless seems established and the Adoption report showed that the heaviest users of Web 2.0 tools overall is in the 35-44 age group (Procter et al., 2010), suggesting Generation Y still has some ground to make up in this regard!

By far the most popular social media tools for Generation Y researchers are social citation and reference management tools, with 58% reporting use of them (Carpenter et al., 2011). However the research also indicates that students rely on their peers for recommendations of which tools to use and for help in learning how to use them. Tools such as Endnote, Zotero and Mendeley as well as RefWorks, though not widely used at present, are growing in popularity. Social bookmarking tools such as Diigo and Delicious also provide features, which facilitate the curation and sharing of web-based resources. The collaborative features of some of these tools can be used to collate, comment on and manage resources through tagging and the development of folksonomies. According to the term's originator, Thomas Vander Wal (2007)

A folksonomy is the result of personal free tagging of information and objects (anything with a URL) for one's own retrieval. The tagging is done in a social environment (shared and open to others). The act of tagging is done by the person consuming the information. (para. 8)

Importantly though, younger researchers are clearly concerned about the legitimacy of these tools if they are not explicitly supported by their institutions. Another concern expressed particularly by younger researchers is how to manage and reference the growing amount of information they access over the web, given the temporary nature of many web-based resources and the propensity of information to move from one web address to another over time. Looking ahead, the importance of developing such digital literacy skills among researchers is recognised in this quotation from P. N. Courant (2008) in his chapter in *The Tower and the Cloud* (Katz (Ed.), 2008):

Within a few years, essentially all of the material in many academic libraries will be available in digital form. Once it is in that form (and relevant rights issues are resolved), we will be able to employ the tools of Web 2.0 in the library in support of scholarship and learning. Students can annotate and can “mashup” pretty much everything. The library becomes the bin for the mashups, with care taken to preserve both the original sources and the annotations along with the replicability and authenticity. (p. 208)

### **Proprietary or Public? The Challenge of Open Access**

Another use made of some social media tools is that they can facilitate engagement with the wider research community and general public (Phillips, 2010). Whether publishing through blogs or wikis, or contributing to the growing number of open access journals, academics at all levels are able to attract new and wider audiences for their work. This may be at the global level, where websites such as Innocentive seek to connect “seekers to internal and external communities of problem solvers to find solutions to their most pressing challenges” (<http://www.innocentive.com/>). A more specific university focused illustration of this approach to sharing research results among the wider community comes from Dr Paul Ayris, head of the University College London library, who, in making all UCL research freely available online through the university’s institutional repository, has argued that the current system puts up too many barriers to access, observing, “This is not good for society if you’re looking for a cure for cancer“ (Turner, 2009).

Although, for reasons discussed below, many researchers are still reluctant to share their work on social media tools, preferring more traditional publishing outlets for their academic work, there is nevertheless a growing number who are willing to share ideas, early drafts of papers, presentations and documents with colleagues in the wider academic community. In addition to wikis, blogs, document sharing facilities such as Google Docs or Scribd (<http://www.scribd.com/>) or presentation sharing tools such as Prezi and Slideshare can help reach a wide audience. Networks can develop at the local, national or global level. Examples of such open collaborations include myExperiment, UsefulChem (a real time virtual network) (<http://usefulchem.wikispaces.com/>) and Wolframmathworld (<http://mathworld.wolfram.com/>). There are many such discipline-focused sites. For doctoral students there is a growing number of blogs that focus on the experience and processes of doctoral research including PhD.net (<http://phdnet.org/>) and thethesiswhisperer (<http://thethesiswhisperer.wordpress.com/>). In terms of accessing information then, there is a growing trend for doctoral students and other researchers to make use of such tools, although currently they are more likely to use these to access additional sources of information rather than to contribute to such resources.

### **Keeping in Touch with Supervisors and Colleagues**

A core task for doctoral students is to develop and record formal meetings with their supervisors and for researchers in general to develop and sustain

contacts with their disciplinary research community. A number of tools are available to facilitate virtual meetings, including Skype, Google chat, Elluminate (free for three or less users) as well as Flash meeting, Second Life and more conventional tools such as email and wikis. The most recent data available on the use of video conferencing indicates that less than 10% make use of such technology even where it is provided by their institution (Carpenter et al., 2011). Of Generation Y students surveyed, 60% did not use Skype at all, compared with 52% of the older age group of doctoral researchers. The reasons for this perhaps become clearer when we learn that 58% of respondents to this survey reported that they received no training or support in the use of institutionally supported technologies. This research indicates that the relationship with the supervisor is the most important source of support, especially for Generation Y PhD students, and that they rely on their supervisors to inform them about which technologies and information sources they should use. This suggests that if such collaborative tools are to be used to arrange and record formal meetings, then the responsibility for initiating this may lie primarily with supervisors. However, as the report noted, “the supervisors of the Generation Y cohort generally tend not to be particularly interested or up-to-date about using technology in research” (Carpenter et al., 2011, p. 14).

### **Building a Digital Identity**

The Facebook phenomenon, together with Twitter and MySpace, connect over a billion users daily. In addition to these popular social media tools there are specific social networking tools for professionals in all areas, such as LinkedIn with over 100 million members, and in terms of the development of these tools for academic researchers specifically - academia.edu - currently has over 150,000 members with the specific aim of helping researchers connect to each other and find material that’s relevant to their field of study. The most recent analysis of the use of these tools (Procter et al., 2010) suggests that

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 year age group and lowest among those under 25, and highest among research assistants and lowest among PhD students. (p. 22)

This report goes on to explain that

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 fewer than 25 age band are more likely to make frequent use of social networking services. (p. 33)

What is it that accounts for this finding that mid career professionals are more likely to make use of these tools? One intriguing suggestion (Carpenter et al., 2011) is that since the use of such social media tools requires a degree of personal and professional disclosure, it may be that PhD students and younger

researchers are more reluctant to submit themselves to this kind of exposure before they have established their professional credibility. Of course there are many other reasons why these groups may choose not to engage with such tools including: the belief that they waste time without delivering any tangible benefit, fear about the threat to intellectual property rights if original ideas are exposed too early in the research process, lack of skill or understanding about the potential professional enhancement potential of some of these tools, uncertainty about which tools to use, and a reluctance by supervisors to engage with them (Carpenter et al., 2011). Nevertheless, it is clear that in some cases time invested in building a digital presence can significantly enhance an academic career (Ewins, 2005). It remains to be seen if a recent case of a PhD student's popular blog and evident digital literacy skills producing an academic career will become common. As Dr Quinell (2011) wrote on her blog:

Five years ago, when I started developing a website to conduct my PhD research I was viewed as being slightly mad and the work was not seen to hold any value. In some areas it was thought unlikely that these methods would deliver a quality PhD. Now, it is becoming obvious that more universities are recognising that digital communication skills are increasingly important across the board, particularly when it comes to research, research communication and institutional marketing. Talking about the application of social media in research and researcher development is not talking about the *future* of research; it is talking about research *now*. (para.5)

### **The Role of Universities in Supporting Researchers**

How far should our Higher Education Institutions actively promote the use of the social media discussed above among PhD students and early career researchers? This question opens up a number of issues about the future of our universities and the role of researchers within them. The new Research Excellence Framework rests upon the traditional metric of citation in ISI journals and it is this that will be used to assess the impact of the research of the individual academic. However in an era where podcast lectures on the moral philosophy of Immanuel Kant can reach the top of iTunes downloads, or the videos which Michael Wesch uploads to Youtube on the use of Web2.0 in the Higher education classroom receive over 11 million hits with over 21,000 ratings and over 8,000 comments (<http://www.youtube.com/user/mwesch>) it is apparent that scholarly reputations and impact on a wider global audience are increasingly derived from the digital rather than the print footprint when it comes to publishing and promoting to results of research. Among social scientists there is a growing trend for uploading draft articles to the Social Science research network (<http://ssrn.com>) for peer review (containing over 317,800 downloadable full text documents), a process that has been longer established among the informal networks, which characterise much research in the natural sciences.

Moreover, there is a growing recognition amongst policy makers that accelerating progress in research collaborations within and across disciplines, as well as in research outputs, requires a degree of openness. As semantic

technology develops and search and linking between texts in their various formats becomes ever more detailed and rich there are clearly technological drivers towards greater openness across research communities. A recent report concluded:

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/NESTA, 2010, p. 48)

Support for the use of social media in research in the UK is developing at the national level, particularly through Vitae (<http://www.vitae.ac.uk/>), supported by the Research Council of the UK. Training and support in social media tools at the local, university level is patchier, with some student-led initiatives ([phdblog.net/tag/research training](http://phdblog.net/tag/research-training)), some led by librarians and other information specialists and some from academic staff development teams. For universities the questions posed by the emergence of these new social media tools are manifold and impact on many areas of university life and work, but for academic research in particular among the more urgent questions are how will they respond to the new challenges presented by the developments in the use of social media tools discussed above, what support mechanisms should or will they develop to support PhD and early career researchers, and how will this feed into processes of recruitment training and career progression for researchers?

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