Digital technologies in the research process: Lessons from the digital research community in the UK

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ABSTRACT

This paper reports on a qualitative study of the employment of digital tools, resources and services by social researchers in the UK and has a twofold aim. First, it presents the employment of digital means of research work from the stage of designing the research through to data collection and dissemination of the research results. Second, it assesses the complexity and multiplicity of digital tools, resources and services used in research as well as the complexity and range of such usage, also providing explanations as to why researchers in different disciplines use in different ways and for different purposes digital technologies of various ranges and degrees of complexity. The paper concludes that there are certain commonalities and differences in researchers' practices with digital technologies and that such practices are largely driven by researchers' expertise combined with associated disciplinary traditions and etiquette.

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1. Introduction

Digital research is a rapidly growing area of development, deliberation and reflection. Digital research, Internet research, on-line research, e-research and e-science are concepts often used interchangeably, and, although they are not identical, they all suggest the fast-developing and highly transformative role that information, communication and networking technologies play in the conduct of scientific study and research.

According to the Association of Internet Researchers, Internet technologies, tools and services comprise a 'social phenomenon, a tool, and also a (field) site for research. Depending on the role the internet plays in the research project or how it is conceptualized by the researcher, different epistemological, logistical and ethical considerations will come into play' (Markham & Buchanan, 2012, p. 3). From this one can infer that digital research, more broadly, involves the use of digital technologies, tools and services as objects of research (e.g., research into blogs, social networking sites, virtual worlds, virtual communities and instant messaging spaces), as tools for the creation of innovative methodological practices (e.g., hardware or software for devising, designing and executing

methods of research) and as the actual sphere wherein research is positioned and from which researchers can draw research material and data (e.g., online datasets and repositories, search engines, data aggregators and automated means of data scraping). Digital technologies can serve as objects, tools and venues of research simultaneously (e.g., research into the affordances, content and users of online social networking sites), influencing research design, data collection and data analysis as well (Buchanan & Zimmer, 2012).

Also, digital research often suggests the collaboration of social, computer and web scientists, with knowledge elements from various disciplines being combined, influencing one another and boosting niche spaces for new knowledge networks and novel fields of study (e.g., artificial intelligence). This has led to new trends in research models (e.g., computational social science) and data (e.g., big data), as well as to new practices of collaboration that involve technology experts, funders, creative practitioners, industry actors and technology users. The multiplicity of actors, the dynamic role of digital technologies in and for research, and the interdisciplinary and often cross-institutional nature of research collaborations portray a complicated and continuously shifting set of power relationships, dynamics, constraints, possibilities and synergies in digital research (Tsatsou, 2014, p. 166).

This paper draws from an EPSRC-funded qualitative study of the employment of digital tools, resources and services by social

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researchers in the UK, from the stage of designing the research through to data collection and the dissemination of results. The study aimed to map out the claimed, actual and potential role of digital technologies and to offer a critical assessment of the existing and potential innovation pathways signalled by the employment of digital technologies in social research in the UK. Specifically, it examined ongoing and prospective patterns of use of digital technologies in research contexts and shed light on associated skills and capacity challenges (Tsatsou, 2015). This paper presents and critically discusses the study's insights into the main patterns of use of digital technologies by social researchers in the UK and has a twofold aim:

- first, to present the stage(s) of the research process at which digital means of work are employed: the emphasis is on whether social researchers in the UK use digital technologies to design research, for data-gathering purposes, to analyse collected data or for dissemination, impact and knowledge transfer activities;
- second, to assess the complexity and multiplicity of digital tools, resources and services used in research as well as the complexity and range of usages accordingly, providing some explanation as to why researchers in different disciplines use in different ways and for different purposes digital technologies of various ranges and degrees of complexity.

In what follows, I offer a critical discussion of debates concerning the broader digital research domain. This is followed by an overview of the methodology of the study that this paper draws upon. This leads to a findings section, which addresses the twofold aim of the paper. The paper closes with some concluding remarks as well as reflections on the lessons to be drawn from this study by digital research scholars and experts both within and outside the UK.

2. Digital research: novelty tied to messiness

Digital research developments are rapid. The unprecedented rate at which digital technologies are both diffusing through society and developing new research capacities seriously challenges the questions, phenomena and objects of research, as well as the ways in which researchers conduct research, thus creating a 'messy research landscape' (Karpf, 2012, p. 645). However, messiness goes hand in hand with novelty in digital research.

2.1. The digital as object of research

Researchers revisit existing research questions and generate new and often novel research questions in order to capture how existing or emerging phenomena take place in complex and rapidly evolving digital contexts. Initial considerations of the Internet as an object of research put forward the premise that the Internet can both expand existing research interests and yield new themes and areas of investigation (Costigan, 1999; Sterne, 2005). Costigan (1999, pp. xviii–xix) remarked that this can be done in two ways: first, through engaging in the search for, retrieval and analysis of vast information databases online; and second, by analysing unique communication and interaction phenomena online. I would add a third pathway, that of the study of the relationship of ordinary digital users with socio-technically founded affordances of digital technologies and the implications for existing and new communication-related phenomena. In the remainder of this Section 1 discuss some examples, discourses and debates that shed light on digital technology as an object of research.

A first example is the study of hyperlinks, namely (hyper)link

studies (Ackland & Gibson, 2013; Chang, Himelboim, & Dong, 2009; De Maeyer, 2013; Park & Thelwall, 2003; Shumate & Lipp, 2008). De Maeyer (2013) suggests that (hyper)link studies are present in various social science disciplines and can be split into two categories: the study of hyperlink networks and their properties so as to understand the web's structure; and the study of links as indicators of existing social phenomena, namely the social significance of hyperlinks. With respect to the latter, the Digital Methods Initiative examined hyperlinks as part of the study of 'how an actor may be characterized by the types of hyperlinks given and received', what types of associations an actor on the Internet can have and the 'everyday politics of association'.[1] Wilkinson, Thelwall, and Xuemei (2003) studied hyperlinks in relation to informal scholarly communication via the web, while Ackland and Gibson (2013) examined how political actors use links as a new form of 'networked communication' to promote themselves, to reinforce their policy messages and to inflate the support they enjoy. Chang et al. (2009) studied the political economy of hyperlinks and found that the flow of news and information through outgoing hyperlinks between countries remains mostly closed.

Websites and their content constitute another important object of research and have given rise to website analysis (Cai & Zhao, 2013; Das & Turkoglu, 2009; Kingston & Stam, 2013; McCluskey, 2013; Ortega, Aguillo, & Prieto, 2006; Schweitzer, 2008). Content analysis is the foremost method of studying websites per se, but it can involve the examination of both website content and aesthetics (e.g., Das & Turkoglu, 2009; McCluskey, 2013; Ortega et al., 2006). At the same time, website analysis can enable researchers to develop a better understanding of web or online phenomena, such as e-democracy, online advertising, online advocacy and others (e.g., Cai & Zhao, 2013; Kingston & Stam, 2013; Schweitzer, 2008). Website analysis is often conducted via webscraping and webmining tools,[2] but it also takes place in the form of 'web archive' research. A web archive is formed by the archiving process and 'embeds particular preferences for how it is used and for the type of research performed with it'.[3] Web archives allow the study of the history and content of the web and enable study to be organized by time as well as by website type. In addition, researchers are often interested in the analysis of one or more websites at a particular moment in time. Some studies look at web archiving per se and at associated processes and issues (e.g., Gresham & Higgins, 2012; Wang, 2007). The Wayback Machine[4] is broadly used for the construction of a narrative around website history, whereas Karpf suggests that 'many publicly available types of content go unsaved and disappear forever. Researchers are limited to whatever the Wayback Machine happens to capture' (2012, p. 648).

Social media and their content constitute another new object of research. Kwon, Park, and Kim (2014) studied the motivational factors for using social networking services and user acceptance of platforms such as Facebook and Twitter. Researchers also study the post demographics of social networking sites, namely user profiling, which allows a more insightful definition of self, tastes, interests, 'likes' and other profile characteristics (e.g., Hagger-Johnson, Egan, & Stillwell, 2011; Krämer & Winter 2008; Lorenzo-Romero, Alarcón-Del-Amo, & Constantinides, 2012; Pfeil, Arjan, & Zaphiris, 2009; Quercia, Kosinski, Stillwell, & Crowcroft, 2011). Whereas social media content frequently comprises a virtual version of pre-existing offline discourses and objects of research,

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[1] For more information, see https://wiki.digitalmethods.net/Dmi/DmiAbout.

[2] A compilation of social media/online scraping tools can be found at http://socialmediadata.wikidot.com/.

[3] See https://www.digitalmethods.net/Digitalmethods/TheWebsite.

[4] The Wayback Machine can be accessed at http://www.archive.org.