INTRODUCING DIGITAL SOCIOLOGY

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Introduction: the digital age

Digital technologies have become central to the lives of most people living in developed countries and increasing numbers of those in the developing world. Since the introduction of personal computers in the early 1980s and the internet in the early 1990s, those technologies – variously referred to as 'information communication technologies' (ICTs) or 'cyber technologies' and now frequently called 'digital technologies' or 'the new digital media' – have reached into many dimensions of everyday life, affecting family and intimate relationships, leisure activities, paid work, education, commerce and the ways in which mass media are presented and consumed. New digital media technologies have had a profound influence on everyday life and social relations for many people in developed societies, and increasingly in developing societies. People across the globe have becoming linked together by digital media and networks in unprecedented ways, allowing for the fast and efficient flow of information across these networks.

Table 1: Timeline of new digital media technologies since 2000

Year	Technology name	Function
2001	Wikipedia	Online open-edited encyclopedia
	iTunes	Music, podcasts, tv series and film downloading
2003	LinkedIn	Professional networking
	Delicious	Social book marking
2004	Facebook	Social networking
2005	Reddit	Social book marking
	YouTube	Video sharing
	Flickr	Photo sharing and hosting
2006	Twitter	Micro-blogging
2007	Smartphones	Phone calls and connection to the internet, apps
	Tumblr	Micro-blogging
2008	Spotify	Music streaming
2010	tablet computers	Connection to the internet, apps
	Instagram	Photo/video sharing
2011	Google+	Social networking
	Pinterest	Image curation

Table 1 provides a timeline of important digital media technologies that have emerged since the turn of the twenty-first century. This indicates the scale of innovation and rapid adoption of platforms such as Wikipedia, iTunes, Facebook and Twitter and devices such as smartphones and tablet computers over a relatively short space of time.

The evolution of the Web: from Web 1.0 to Web 2.0

It is possible trace an evolution of the web from its first version – Web 1.0 – to the version it is becoming – Web 3.0 (see Figure 1 below). The Web 1.0 technologies of last century were based on websites and devices such as desktop or laptop computers. Users could view information online and use facilities such as online banking and shopping, but had little role to play in creating online content. The internet was difficult to access when away from a landline connection and software applications were loaded onto individual desktops or laptops.

Since the early years of the twenty-first century, the emergence of Web 2.0 sites that were accessible online rather than loaded individually onto one's desktop computer, the development of technologies such as wireless and broadband internet access and related devices have resulted in a proliferation of technologies, including smartphones and tablet computers and social networking sites such as Facebook, Twitter, Instagram and YouTube. Ubiquitous wireless computing technologies allow for users to be connected to the internet in almost any location at any time of the day using their mobile devices that can easily be carried around with them. Some digital devices are not only easily carried around in a pocket or bag (for example, smartphones, MP3 players and tablets) but can be worn by the body, such as self-tracking wristbands or headbands used to collect biometric data (Lupton 2013a). Web 2.0 may now be viewed as a platform supporting other applications rather than simply as 'the internet' or 'the World Wide Web' (Cormode and Krishnamurthy 2008).
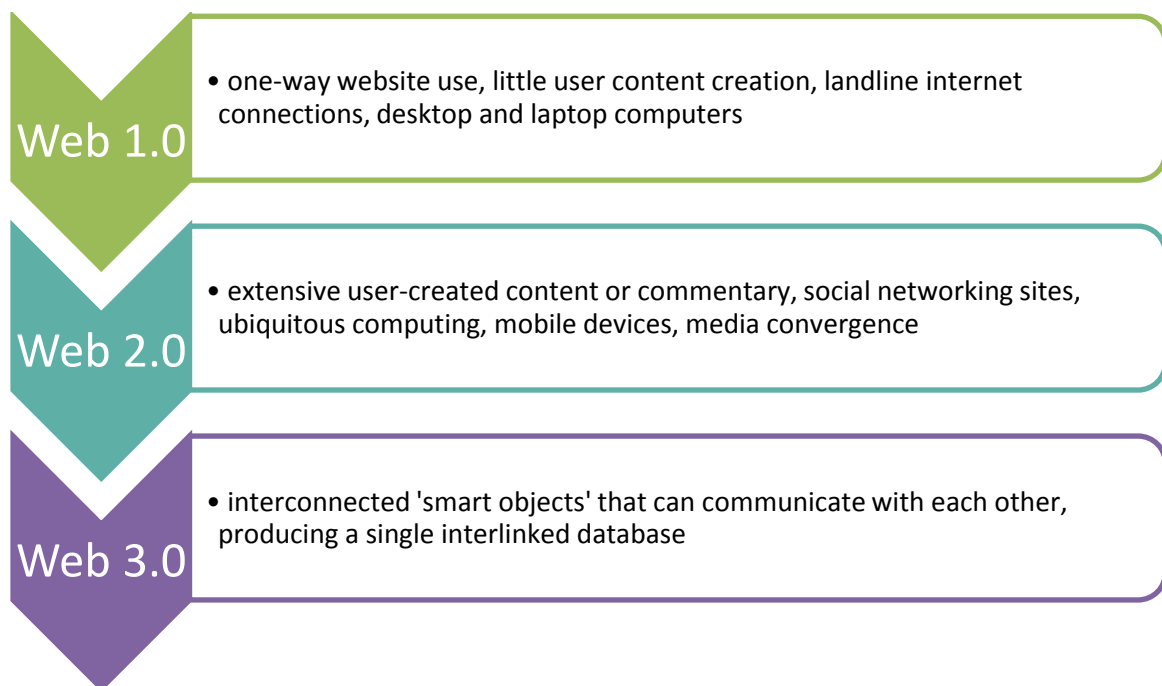
The ways in which we communicate with other people, access news, music and other media, conduct our working lives has changed dramatically. While Web 1.0-style websites are still available and used for some purposes, they have been complemented by a multitude of online platforms that allow and indeed encourage users to contribute content and share it with other users. These acts of both consumption and production have been dubbed 'prosumption' by some internet researchers to convey the dual nature of such interaction with digital technologies (Beer and Burrows 2010, Ritzer *et al.* 2012). They represent a significant shift in how users interact with and make use of digital technologies, conforming to the democratic ideal of citizen participation and sharing (John 2013) that are central features of discourses on contemporary digital media use, particularly social media platforms.

The terms 'media convergence' (Meikle and Young 2012) and 'convergence culture' (Hay and Couldry 2011, Jenkins 2013) are now often used to describe the ways in which digital technologies are able to interact with and communicate with each other and how people often use several different technologies simultaneously. Unlike the older media (landline telephones, video, television, print media, analogue photography,

audio tapes and records) that employed different modes of recording and transmitting data, digital media use the same type of digital encoding. Smartphones not only make telephone calls but connect to the web, take digital photographs and videos, record voice data and play music, television programs and films. Games consoles such as Wiis can now browse the internet and connect to social media platforms. Various devices used each day – smartphones, cameras, MP3 players, desktops, laptops, tablets, wearable computers – can share information between themselves, facilitated by common interfaces and cloud computing.

Some writers propose that we are now moving towards Web 3.0, or what has been dubbed 'The Internet of Things' or the 'Semantic Web' (Halford *et al.* 2013, Miorandi *et al.* 2012). These terms refer to a gradual connection of 'smart objects', or objects that have microprocessors embedded within them that are able to communicate wirelessly with other digitalised objects. Such features as interconnections between digital media platforms and objects, the use of information from one site by another application and technologies communicating directly with each other and establishing relationships without requiring human intervention represent the move towards Web 3.0. It has been predicted that these links will eventually produce 'data entities' with unique identifiers, including places and objects (Halford *et al.* 2013: 176). It has even been contended that with the advent of sensor-based devices that can be embedded into the human body, people will themselves become 'data entities', or one node of 'The Internet of Things' (Brewster 2013).

Figure 1: From Web 1.0 to Web 3.0

Web 1.0
- one-way website use, little user content creation, landline internet connections, desktop and laptop computers

Web 2.0
- extensive user-created content or commentary, social networking sites, ubiquitous computing, mobile devices, media convergence

Web 3.0
- interconnected 'smart objects' that can communicate with each other, producing a single interlinked database

Defining digital sociology

Digital sociology provides a means by which the impact, development and use of digital technologies and their incorporation into social worlds and concepts of selfhood may be investigated, analysed and understood. Sociologists have researched computer technologies since they became widespread in the mid-1980s. They have addressed many varied social issues relating to online communities, cyberspace and cyber-identities. Such research has attracted several different names, dispersed across multiple interests, whether it is entitled 'cybersociology', 'the sociology of the internet', 'the sociology of online communities', 'the sociology of social media', 'the sociology of cyberculture' or something else again.

While the term 'cyber' was in vogue in the 1990s and early 2000s, its use seems to have been largely replaced by the 'digital' now that the internet has become more pervasive and ubiquitous. The term 'digital sociology' encapsulates the concerns previously addressed by 'cybersociology' and extends into this new era of mobile digital computer use. It is a neat descriptive term that also references other disciplines and their use of the term 'digital', such as digital cultural studies, digital humanities and digital anthropology.

As this suggests, the study of digital technologies takes place across a number of disciplines, including media and cultural studies, social computing, social psychology, cultural geography, the humanities and anthropology. Many of these disciplines share methodological and theoretical approaches with digital sociology: this is inevitable in a social research environment in which there are often overlaps in research topics, methods and theoretical approaches between disciplines in the humanities and social sciences. However there are some distinctive differences that can be identified in contemporary sociological scholarship on digital media, particularly in relation to discussion of how digital technologies are affecting academic, and more specifically, sociological practice itself.

I have identified four distinct aspects of digital sociology:

- ***Professional digital practice***: using digital media tools as part of sociological practice: to build networks, construct an online profile, publicise and share research and instruct students;
- ***Sociological analyses of digital media use***: researching the ways in which people's use of digital media technologies configures their sense of selves, their embodiment and their social relations and the role of digital media in the creation or reproduction of social institutions and social structures;
- ***Digital data analysis***: using digital data for social research, either quantitative or qualitative; and
- ***Critical digital sociology***: undertaking reflexive and critical analysis of digital media technologies informed by social and cultural theory.

Each of these is explained in more detail below.

Professional digital practice

Using digital media is integral to sociologists' engagement as public sociologists. An important dimension of public sociology is conveying sociological research findings and ideas to the public. Sociologists should not just be talking to each other, but letting others outside the academy know what they are researching and thinking about. In his well-known address on public sociology, Burawoy (2005: 4) notes that public sociology should be about engaging 'multiple publics in multiple ways' with sociological insights and research findings. What can be more public, and reach more audiences globally, than the use of digital media to convey these insights and findings? Social and other new digital media provide ideal avenues by which such public engagement can be easily carried out. Although Burawoy does refer to the traditional media as a platform for public sociology, he makes no mention of digital media, but he was writing around the time of emergence of Web 2.0 technologies and thus had not yet realised the potential of these media for public sociology.

Table 2: Important digital media for academics

Platform or tool	Purpose
Blogs	Write about research
Twitter	Make connections, promote research, share links
SlideShare	Share PowerPoint or Prezi slides
Facebook	Make topic pages
Wikipedia	Create or edit entries
YouTube	Share video material
Google Scholar	Search other researchers' work, make a research profile
Pinterest	Collect visual material for research and teaching
Storify	Make a narrative using online material
Curating tools for online content (e.g. Bundlr, Scoop.it, Delicious)	Collect and save online material in topics
Online referencing tools (e.g. Mendeley, EndNote Web, Zotero)	Collect and share references
Academia.edu	Make connections, share research
LinkedIn	Make connections, share research
E-repositories	Provide open access to research papers

As shown in Table 2, there are a plethora of digital medial tools and platforms that can be used by sociologists as part of engaging as public sociologists. While they have been lagging well behind such disciplines as science and media studies in using such technologies as part of scholarly practice, a growing number of sociologists both in Australia and other countries are taking up these tools as part of their commitment to public engagement and open access to academic research and in their teaching.

I am one such sociologist, and have written extensively in social media forums about using social and other digital media for sociological research and teaching. I have found that using these tools promotes connections between other academics working in my areas of interest, as well as members of the public and those in professions relevant to my research (Lupton 2012). Research has shown that such engagement has a significant impact on an academic's public and scholarly profile (Eysenbach 2011, Shuai *et al.* 2012), but there are many other reasons why it is important.

I find that following other social researchers' work on digital media is a way to keep up to date with my field. Research findings are often discussed and published much earlier in pieces such as blog posts or articles made available on digital networks such as Twitter, Academia.edu or open-access journals than they are in traditional academic outlets. Accessing these forums, and contributing one's own research, is a way of engaging in and accessing cutting-edge research.

The 'online scholarly ecology' (Shuai *et al.* 2012) that I employ for sociological purposes includes a number of tools and platforms, all of which are interlinked. I have my own blog [This Sociological Life](#) (where I often discuss social media and academia) and am a regular user of Twitter, LinkedIn and Facebook for academic purposes. I also use web curating tools such as Pinterest, Bundlr, Scoop.it, Pinterest and Storify to collect research materials. I use the Academia.edu website to upload my research documents and SlideShare for my PowerPoint presentations, where they are accessible to anyone with a computer and online connection. Many of these tools and platforms are interconnected: when I publish a blog post, for example, I publicise it on Twitter, Facebook, LinkedIn and Academia.edu. My blog posts, in turn, often form part of academic writing that I later publish in traditional academic forums such as journal articles, book chapter and books. I have even written an entry for Wikipedia – on the topic of digital sociology (Digital sociology 2013). (There was a certain degree of reflexive satisfaction to be had by engaging as a digital sociologist by writing about digital sociology in a digital platform.)

Sociological analyses of digital media use

There is a long tradition not only in sociology but also in media and cultural studies, cultural geography and anthropology on researching how users interact with digital media. While some researchers have used quantitative surveys to do so, many employ qualitative, indepth methods, such as ethnographic research, focus groups and semi-structured interviews.

A focus on the influence of digital media in the creation or reproduction of social institutions (for example, the economy, the mass media, the family and the education system) and social structures (age, gender, social class, race/ethnicity) is a characteristic of the type of critical approach that is often adopted by sociologists of the digital. Here again Burawoy's (2005) definition of public sociology is relevant, for he emphasises the importance of sociologists using their research to 'turn private troubles into public issues', an element of sociological writing that has existed since its earliest days.

For example, several sociologists interested in digital media have focused attention on the lack of access to digital technologies experienced by some members of disadvantaged social groups often experience such as the poor, those living in developing countries or remote regions and people with disabilities or chronic illness or poor language skills. However, as Halford and Savage (2010) have pointed out, this term is rather simplistic, as it fails to recognise the complexities involved and also tends to position 'technology' and 'social disadvantage' as two separate and independent phenomena. They contend that understandings of both social inequity and access to digital media technologies need to acknowledge their interlinking and their dynamic nature. Each acts to constitute the other, but this is a fluid, unstable process. Halford and Savage propose instead the concept of 'digital social inequality' to denote the interconnectedness of social disadvantage and lack of access to digital technologies.

Halford and Savage also note that the 'digital divide' literature tends to assume that providing more or better access to digital technologies will in itself solve problems of social disadvantage. Yet access is not the only issue involved in the phenomenon of digital social disadvantage. The practices in which people engage are also important to identify (Hargittai and Hinnant 2008, Robinson 2009). How do people in different social groups use digital technologies when they do have access to them? What capacities and understandings do they need to possess to use them effectively and how does their social positioning affect these? How do pre-established assumptions about gender, age, education, social class, ethnicity/race and people's capacity to use digital media influence their use? To what extent do certain types of digital media use exacerbate or alleviate social disadvantage? Research has shown that people of lower education level may spend more time online in their free time than those of higher education levels, but do so in different ways: engaging in social interaction and gaming more often, for example, rather than for education, seeking information or work-related reasons (van Deursen and van Dijk 2013), or what has been referred to as 'capital enhancing activities' (Hargittai and Hinnant 2008).

So too, it is important to acknowledge that the utopian discourses of democratic participation, community-building, sharing and prosumption that often circulate in mainstream accounts of the possibilities offered by new digital media often fail to recognise the political aspects of these technologies. Not only do people from disadvantaged social groups often experience limitations in their access to and use of digital media, all users are constrained by what these technologies offer them. Digital technologies are not simply neutral artefacts: their affordances (the ways in which they

can be used) are shaped by the decisions of their developers, which are often founded on commercial imperatives and corporate worldviews.

Digital media use takes place as part of a digital economy, in formats that are generated and structured by the developers, not the users (Bird 2011, Hay and Couldry 2011). Indeed users' desire to create and share content on Web 2.0 platforms and the data they upload have increasingly become targeted by corporate companies as sources of wealth creation (Fuchs and Dyer-Witheford 2012, Jenkins 2013, Lupton 2013b). Prosumers are engaging in unpaid digital labour, while many other paid workers who bid for freelance work in online platforms such as Amazon's Mechanical Turk and Freelancer.com are provided with very low recompense for their labour, experience job insecurity and are granted none of the benefits offered by most other workplaces (Scholz 2013). Differential power relations and exploitation, therefore, are reproduced on the internet just as they are in other social sites, challenging taken-for-granted assumptions about the 'democratic' nature of the internet (Fuchs and Dyer-Witheford 2012, Mager 2012).

Digital data analysis

Masses of digital data are produced when users interact with the internet, whether as a by-product of use (the transactional data collected by 'cookies' on websites, for example) or as deliberate contributions by users (blog posts, comments on sites, consumer ratings, tweets, Facebook updates, home-made videos uploaded to YouTube and so on). The advent of 'crowdsourcing', or the contribution of data from many prosumers to serve a particular information need, is also part of this aggregation of data. Algorithms (the codes that direct computers how to operate) are used not only to generate data but also to predict or shape users' consumption habits: for example, the book recommendations that Amazon users receive, based on their previous browsing or purchasing habits, or the automatic search term completions provided by Google.

There has been much emphasis in recent times on the possibilities of the 'big data' that are produced via digital media engagement and archived digitally, and its potential for use in commercial enterprises and social research. A digital data industry has developed, in which 'web scraping' or 'harvesting' techniques are employed to identify, manipulate and analyse digital data. The creation of digital data and social research using these data has now been redistributed among many diverse actors outside of the traditional academic social sciences (Marres 2012).

Many of the tools used to do this involve the quantification of data, but there are also approaches that analyse qualitative data from the web, some of which use natural language processing protocols. These tools can be used for a wide array of social research purposes, including social network analysis, measuring the influence on social media of specific individuals and topics (who and what is 'trending' and why) and the 'sentiment' that is expressed about these people and topics (how others respond emotionally to them) and how this may differ according to geographical location, age, gender, social class and race and ethnicity. Reams of digital data are also generated on

people's consumption patterns: what commodities and services they buy, what music they download, how they use electricity and other utilities, where they prefer to take holidays and how they choose to travel there, what websites they access using search engines and so on.

Sociologists and other social researchers are beginning to see the potential of using these digital data in social research projects. After all, social media were given that title because they involve social relationships, communities and behaviours. As Marres (2012: 142) notes, what is especially interesting for sociologists about digital media and devices is that 'they enable the routine generation of data about social life as part of social life'. This statement echoes Burawoy's (2005: 7) observation of the potentialities of public sociology as bringing sociology into 'a conversation with publics, understood as people who are themselves involved in a conversation'.

Social researchers are able to employ a number of digital tools to harvest data from the web to use in these projects, thus generating new methods for social research. Data from Facebook and Twitter posts, search engine enquiries, text messages, YouTube videos, blogs, online images, audio data and even GPS data may be used for analysis. Researchers may also elicit data for their own concerns, including using web-based surveys. There has been a recent proliferation of social research on Twitter, for example, including analysis of how it has been used for health information and networks (Murthy 2013, Park *et al.* 2013), in disasters (Murthy 2013), the geography of Twitter networks (Graham *et al.* 2013), how language is used to build community on Twitter (Zappavigna 2011), how this medium is used as part of fandom (Highfield *et al.* 2013), celebrity (Page 2012), citizen journalism (Murthy 2013) and news reporting (Arceneaux and Weiss 2010, Hong 2012), how prior online experiences influence Twitter use (Hargittai and Litt 2012) and several studies on the political use of Twitter (Ausserhofer and Maireder 2013, Bruns and Highfield 2013, Christensen 2013, Murthy 2013, Thorson *et al.* 2013).

While some digital data analysis involves expensive software and programing skills or training in how to use the software, several free ('open') web harvesting and visualisation tools have become available that are easy to use. Google has several tools, including Blogsearch Scraper, Image Scraper and News Scraper and its Ngram viewer, a phrase-using graphing tool. Several tools are available to mine social media to make word cloud visuals. As just one example, Figure 2 below reproduces a word cloud I made using Tagxedo from the content of posts on my blog, a way of demonstrating which topics are covered the most (the bigger the word, the most coverage it receives).

Many more complex data analysis tools can be used for digital data analysis, including the latest version of the social data analysis tool NVivo, which now can import material from online sites for qualitative and quantitative analysis.

Figure 2: A word cloud made from the content of entries on my blog

Critical digital sociology

A critical sociological approach to researching digital media draws attention to the nature of such research and its implications. Where sociologists differ from many other social researchers in this enterprise is the awareness on the part of many (if not all) of them of the 'liveliness' of these data: the fact that digital data, like any other type of data, are themselves socially created and have a social life of their own. They are not the neutral products of automatic calculation, but represent deliberate decisions by those who formulate the computer algorithms that collect and manipulate these data (boyd and Crawford 2012, Cheney-Lippold 2011, Ruppert *et al.* 2013).

While there has much written about the democratic possibilities of 'open data', or the digital data that may be available for anyone to use, questions remain about the willingness of corporations or institutions to make the data they collect truly available to the public (Halford *et al.* 2013). The data generated by prosumers is often difficult for them to access once it has been uploaded to a digital platform, and as noted above, may become the basis of commercial enterprises from which they do not benefit financially.

A further topic of digital sociology research is that which directs critical attention at the ways in which sociologists and other academics themselves use digital media. This is a reflexive approach that draws on contemporary social and cultural theory to analyse and interrogate the kinds of subject positions that are configured via digital

technology use as part of professional practice. While such a critical approach does not preclude professional digital use or the analysis of digital data for social research, it opens up a space for reflection upon the implications and unintended consequences of such practices (see Table 3 below for a summary of this).

Table 3: Challenges for sociologists posed by the new digital media

the digital data economy	• sociologists' position as empirical social research experts
digital data and Web 3.0	• sociologists' computational and data analysis expertise
the politics of circulation	• sociologists' control over the products of their research
MOOCS, open access publishing, citation indices	• sociologists' employment conditions
social and other digital media expertise	• sociologists' professional and public profiles

Sociologists have warned that both digital data and the tools used to collect and analyse them are specific ways of shaping research, among many others, and caution must be exercised against uncritically accepting them (Beer 2012, Ruppert *et al.* 2013, Savage 2013, Uprichard 2012). Some sociologists have also interrogated the ways in which sociologists' use of new media affect their employment conditions and their presentation of their professional selves (Burrows 2012, Savage 2013, Savage and Burrows 2007, 2009). What impact do technologies such as Google Scholar metrics, open access publishing, the constant generation of digital data on social activities and the introduction of massive open online courses (MOOCs) have upon sociologists working in universities? Will academics who are able to actively engage with digital media and establish a strong online presence achieve precedence over other academics?

Some sociologists have contended that the masses of data produced by digital media technologies and the potential for these data to be analysed by commercial companies may prove a major challenge to sociological practice. If other social researchers and commercial companies can access and analyse these data, what role can sociologists play (Savage and Burrows 2007)? It has also been contended that the increasingly complexity of the internet as it moves towards Web 3.0 offers challenges to sociologists in terms of researching the social and political aspects of this new

technology, and that they may need to acquire more sophisticated computational expertise to do so or else collaborate with computer scientists (Halford *et al.* 2013).

Others have warned that sociologists need to be aware of the 'politics of circulation' (Beer 2013) of digital media cultures, or the multitude of ways in which the content created by one author or group of authors may be re-used and transmitted via different modes of publishing (reblogged or excerpted on other people's blogs, tweeted in tiny 'grabs', commented upon and so on). As part of using new media technologies, therefore, the product of sociologists' and other academics' labour may be re-appropriated and transformed in ways that are unprecedented and may pose a challenge to traditional concepts of academic research and publication.

Conclusion

The new digital media have had a profound impact upon many aspects of social life, social institutions and social structures, including sociology itself. Many sociologists can see the potential offered by all four aspects of digital sociology outlined above. There is no need to adopt either an uncritical utopian approach or an overly pessimistic perspective on the potential of digital technologies and digital data for sociology (Marres 2012). As Halford and colleagues (Halford *et al.* 2013: 186) have contended, these are 'exciting times' as sociologists investigate new avenues for exploration.

As an academic discipline, sociology has traditionally played an important role in identifying and commenting upon the role played by media and technologies in everyday life, social relations, social inequality, social institutions, selfhood and the body. In this spirit, and also as digital technologies increasingly become part of the academic world as it has in many other spheres, continuing critical and reflexive examination of these technologies and their implications for academic practice and selfhood should be an integral dimension of sociological research, and more specifically, of public sociology.

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