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ARTICLE

Reconsidering political and popular understandings of the digital divide

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Abstract

This article presents a theoretical examination of the digital divide, tracing its origins in the centre–Left social inclusion policy agenda of the 1980s and 1990s to its current status of political 'hot topic'. It then moves on to outline four conceptual limitations to conventional dichotomous notions of the digital divide and individuals' 'access' to information and communications technology (ICT): what is meant by ICT; what is meant by 'access'; the relationship between 'access to ICT' and 'use of ICT'; and a lack of consideration of the consequences of engagement with ICT. The article outlines a more sophisticated, hierarchical model of the digital divide based around these conceptual 'stages' while recognizing the mediating role of economic, cultural and social forms of capital in shaping individuals' engagements with ICT. It concludes by developing a set of research themes and questions for future examination of inequalities in individuals' use of ICT.

Key words

access • cultural capital • digital divide • ICT • inequalities • social capital

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INTRODUCTION

> The information age does not have to be the age of stepped-up inequality, polarisation and social exclusion. But for the moment it is. (Castells, 1999: 403)

The use of information and communications technology (ICT) is seen by many commentators as underpinning the social and economic progression of nation-states throughout the first stages of the 21st century. A whole host of analysts have presented convincing arguments over the past two decades as to how new computer and telecommunications technologies will transform countries into 'knowledge economies' and 'network societies' (Castells, 1996, 1997, 1998; Reich, 1991). This often evangelical zeal has been taken up with equal determination by governments of (over)developed countries around the world. The ability to use ICT has been heralded by politicians to be 'the indispensable grammar of modern life' and a fundamental aspect of citizenship in the prevailing information age (Wills, 1999: 10). Indeed, many governments in industrialized countries have been spurred on by the apparent inevitability of the information society and have initiated ICT-based programmes which aim to ensure that their citizens do not get 'left behind' and are able to 'win' in the new global era (Central Office of Information, 1998; Information Infrastructure Task Force, 1993).

In the usually less hyperbolic confines of academe, the transformative nature of ICT has been welcomed also as offering an unprecedented opportunity to overcome existing social divisions and inequalities. It is assumed by many academic commentators that ICT can 'empower' individuals (D'Allesandro and Dosa, 2001), increase levels of social interaction and civic involvement (Katz et al., 2001) as well as facilitate easy and widespread access to education and other public and government services. As Servon and Nelson (2001: 279) surmise: '[A]ccess to information technology and the ability to use it increasingly [have] become part of the toolkit necessary to participate and prosper in an information-based society.'

However such 'techno-enthusiasm' has been tempered of late by concerns over the potentially divisive aspects of the information age. In particular, issues of inequalities of access to both technology and information have begun to prompt concern about emerging 'digital divides' between social groups. It is argued that if individuals or groups of individuals are excluded from using ICT, they will be excluded from many of the benefits that ICT can bring. As the then UK Minister for Learning and Technology, Michael Wills, reasoned:

> The very technology that has the power to empower us all also has the potential to increase the problems of social exclusion unless we act to bridge

the digital divide . . . The Government is determined to help bring us all into the information age. (DfEE, 2000)

Therefore, general concerns about 'information inequalities' have come to the fore in public and political debate over the last decade (e.g. Hansard, 1997; Thomas, 1996). Questions concerning *who* is 'connected' to information and technology have grown in prominence and now form an important element to the information age policy agenda in industrialized, 'technologically advanced' countries such as the US and UK. As such, the notion of the digital divide has been promoted furiously by an unusual alliance of academics, IT industry executives, politicians and social welfare organizations, all pursuing the ideal of widespread use of ICT – albeit for very different reasons (Strover, 2003). Yet, while substantial policies are being put into place to combat the digital divide, much of the surrounding debate remains conceptually oversimplified and theoretically underdeveloped. As Ba (2001: 4) concluded: '[L]ittle has been done . . . to develop comprehensive theoretical frameworks and to research evaluation agendas aimed at understanding the nature of quality access [to ICT].'

From this background, this article presents a theoretical examination of the digital divide, tracing its origins in the centre–Left social inclusion policy agenda of the 1980s and 1990s to its current status of political hot topic. It then moves on to consider four theoretical and conceptual limitations to conventional notions of the digital divide in terms of individuals with and without 'access' to ICT. Having established a more sophisticated hierarchical model of the digital divide, it concludes by developing a set of research themes and questions for the future examination of inequalities in people's access to, and use of, ICT.

POPULAR AND POLITICAL DEFINITIONS OF THE DIGITAL DIVIDE

In many ways the digital divide can be seen as a practical embodiment of the wider theme of social inclusion, which was recently prominent in policy-making throughout centre–Left governments in western nations. Throughout the 1990s, countries such as the UK, France and the Clinton/ Gore-era US witnessed a subtle shift towards a socially-inclusive policy agenda. Indeed, the issue of combating social exclusion and establishing an 'inclusive society' now forms a bedrock of academic and political discourse in many countries. Yet, one of the most intriguing aspects of recent social policy formation in countries such as the UK has been the convergence of the information society and inclusive society discourses into ongoing popular and political debates over the potential of ICTs to either exacerbate or alleviate social exclusion (see Selwyn, 2002).

Thus, in recent years concerns with social exclusion have been augmented by vocal concerns from all sides of the political spectrum over

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'digital exclusion' and the digital divide. Although the notion of digital exclusion first emerged with regard to the technological disparity between developed and developing nations, within western advanced capitalist societies the supranational focus of these debates quickly gravitated towards the issue of technological inequalities *within* individual countries. The 1990s therefore saw the initiation of mainstream political discussion over 'information haves' and 'information have-nots' (Wresch, 1996), 'information and communication poverty' (Balnaves et al., 1991) and, most popularly, the digital divide (BECTa, 2001; Jurich, 2000; Parker, 2000). In so doing, the prevailing political view broadly settled on combating a perceived dichotomous divide between those citizens who are 'connected' and those citizens who remain 'disconnected' from technology, information and, it follows, modern or postmodern society. As the US Department of Commerce (2000) has outlined, these divisions are simple and stark:

> [Some individuals] have the most powerful computers, the best telephone service and fastest Internet service, as well as a wealth of content and training relevant to their lives . . . Another group of people don't have access to the newest and best computers, the most reliable telephone service or the fastest or most convenient Internet services. The difference between these two groups is . . . the Digital Divide.

This dichotomous portrayal of 'haves' and 'have-nots' has been reinforced by a host of official statistics and academic studies over the last decade. Studies inform us, for example, that individual citizens' access to ICT is distributed unevenly both social and spatially (Warf, 2001), with inequalities in terms of access to ICT strongly patterned along the lines of socio-economic status, income, gender, level of education, age, geography and ethnicity (e.g. BRMB, 1999; DTI, 2000; MORI, 1999; National Statistics, 2001, 2002; RSGB, 2001). Although the magnitude of these figures vary, the emerging trends are that even within 'technologically developed' regions such as the US, western Europe and South-East Asia, specific social groups are significantly less likely to have ready access to ICT (e.g. Bonfadelli, 2002; Dickinson and Sciadas, 1999; Jung et al., 2001; Loges and Jung, 2001; NTIA, 1995, 1999, 2000; Reddick, 2000; UCLA, 2000). For example, in terms of socio–economic status, such inequalities of opportunity appear marked and enduring with more 'deprived' individuals who are significantly less likely to have access to a range of technologies. As well as differences in terms of socio–economic status and income, access to technologies such as home computers, the internet and digital television appears to be patterned in terms of gender (with higher proportions of males than female reporting access to ICTs such as the internet), age (with access to all three technologies inversely correlated to age) and composition of household (with two adult and one or two child households most likely to have

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access). Access to ICT also appears to be spatially differentiated within countries towards more economically prosperous regions. It would appear that the digital divide is a marked feature of any information society.

(RE)CONSIDERING THE DIGITAL DIVIDE

This portrayal of the digital divide appears to be a simple premise. Political and popular conceptualizations of the digital divide have tended to be strictly dichotomous – you either have access to ICT or you do not, you are either connected or not connected. From this perspective the digital divide is easily defined and, as a result, easily closed, bridged and overcome, given a political will to provide for those 'without' (Devine, 2001; Edwards-Johnson, 2000). Thus the benefits of the information age that are enjoyed by those segments of the population who have access to ICT and the requisite skills to use it can be augmented by providing public and subsidized access to ICT for those social groups that are otherwise lacking. For example, this logic underpins the UK government's current drive to widen access to ICT which has been constructed around the pledge to achieve both 'universal service' and 'universal access' to the internet by 2005. In practice, the government's Policy Action Team on Information Technology have set the ambitious target that 'by 2004, 75 percent of people living in deprived neighbourhoods will have the capabilities to access electronically delivered public services and skills to do so, if they wish and 100 percent by 2008' (DTI, 2000: 59). This is to be achieved by establishing networks of community ICT centres and points of access in a variety of existing sites such as schools and community centres, thus providing flexible access to new technologies for those without ICT facilities at home or at work. Such initiatives are being complemented by subsidies for the cost of home technology purchases and basic IT skills training for those on low incomes. In this way, countries such as the UK can progress towards becoming information societies, safe in the knowledge that most, if not all, citizens will be on board.

The short-term practical and political allure of this simplified model of the digital divide is obvious. Yet in the longer term, as we shall now outline, to base our conceptualization of inequalities in the information age solely in terms of a polemic set of technologically 'rich' and 'poor' individuals is too limited and rudimentary an analysis. Even from this brief description we can see how concepts such as 'universal access' and the digital divide, grounded as they are in primarily economic judgements, are 'simplistic, formalistic and thus idealistic' (Burgelman, 2000: 56). As Webster continues:

> [T]o distinguish between the 'information rich' and 'information poor' both avoids precise delineation of who these are and fails to consider the range of different positions . . . In short the model lacks sufficient sociological sophistication. (1995: 97)

Therefore, it would seem reasonable that we attempt to move beyond the prevailing notions of a dichotomous digital divide and 'access to ICT', towards a more elaborate and realistic understanding of inequalities in the information age. In doing so, four prominent areas of the digital divide debate need to be reconsidered and, indeed, are beginning to be reconsidered by social scientists:

(1) what is meant by ICT;
(2) what is meant by 'access';
(3) what is the relationship between 'access to ICT' and 'use of ICT'; and
(4) how can we best consider the consequences of engagement with ICT.

These are now discussed in turn in the following sections.

Reconsidering what is meant by ICT

An obvious, but often overlooked, consideration is to what the 'digital' in digital divide actually refers. In particular there is a need to construct an adequate and realistic notion of what we mean by 'information and communications technology' when discussing the digital divide. Much social science research, let alone policy-making, in this area has been limited by the rapid development of new technologies – utilizing either too narrow a definition of ICT in terms of specific technologies, or too broad a definition in terms of ICT as a homogenous concept. A recent example of this latter tendency was evident in the *Economist*'s assertion that 'ICT is spreading faster than any other technology in the whole of human history [and] . . . the poor are catching up' (the *Economist*, 2001: 10).

Even when they are not treating ICT as a homogeneous concept, many politicians and other commentators have been extremely limited in their definition of terms – content to define ICT vaguely in terms of *computer* hardware and software or, latterly, exclusively in terms of access to the internet (e.g. Norris, 2001). However, we know that people's use of technology extends far beyond the realm of the computer through technologies such as digital television, mobile telephony and games consoles, all constituting important but disparate elements of contemporary technoculture (see Choi, 2002; Katz and Aakhus, 2002). Indeed, the term ICT more accurately refers to an updating of the conventional 'information technology' to encompass the rapid convergence of technologies such as computers, telecommunications and broadcasting technologies, as well as stressing the communicative and networking capacity of modern-day information technologies. Thus, the term ICT is best seen as an umbrella term for a range of technological applications such as computer hardware and software, digital broadcast technologies, telecommunications

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technologies such as mobile phones, as well as electronic information resources such as the world wide web and CDRoms. In theory, therefore, any notion of a digital divide must run separately (and even differently) through all these technologies.

This plurality of technologies is complicated further by the use of the term 'digital' to refer to the content that is provided via such technologies – the 'soft'-ware rather than the 'hard'-ware. In other words, the digital divide can be seen also in terms of the information, resources, applications and services that individuals are accessing via new technologies. In one respect, a focus on content rather than technological platform is a more accurate and useful point of reference for the digital divide debate. For example, world wide web resources are accessible through a variety of platforms – from computers to digital television to 3G (third generation) mobile telephones. Yet here as well we are referring to a wide range of 'information' and services. Thus, it is clear that beneath the umbrella term of ICT we are concerned with a heterogeneous range of technologies, types of information and resources – of which all are not necessarily analogous to each other.

Reconsidering what is meant by 'access'

These points lead us to a second area of contention – what is meant by 'access'. As it stands in contemporary debate, access is a woefully ill-defined term in relation to technology and information. As Wise (1997) observes, in policy terms access tends to refer to making ICTs available to all citizens – it is used solely to refer to the provision of physical artefacts. Yet this notion of access in terms of whether technology is 'available' or not obscures more subtle disparities in the *context* of ICT access. For example, accessing online information and resources from a home-based computer or digital television set is not necessarily equitable to accessing the same materials via an open-access workstation in a public library or other community-based ICT centre. Issues of time, cost, quality of the technology and the environment in which it is used, as well as more 'qualitative' concerns of privacy and 'ease of use' are all crucial mediating factors in people's access to ICT (Davis, 1993; Selwyn et al., 2000).

It is important here to acknowledge the importance of an individual's perceived (or effective) access in practice over theoretical (or formal) access to ICT (Wilson, 2000). Indeed, any realistic notion of access to ICT must be defined from the individual's perspective. Although in theory the formal provision of ICT facilities in community sites means that all individuals living locally have physical access to that technology, such access is meaningless unless people actually feel able to make use of such opportunities. The logic of this argument can be seen in the increasing numbers of public payphones in UK towns and cities that are being converted currently to offer email facilities alongside conventional telephony.

Despite this formal provision it would be a nonsense to claim that every individual in these towns and cities now has effective and meaningful access to email or, indeed, equitable access to email when compared to individuals who use email from their home or place of work.

Instead of either 'having' or 'not having' access to these many different technologies in many different contexts, it follows that access to ICT and the digital divide are hierarchical rather than dichotomous concepts. Indeed, as Toulouse (1997) observes, there are two distinct types of access: whether people have access at all and the hierarchy of access amongst those that do. Thus, beyond the simple issue of access/no access to ICT come more complex questions of levels of connectivity in terms of the capability and distribution of the access concerned. For example, on a practical level, access to a personal computer does not guarantee a connection to the internet, any more than 'access' to the internet is a guarantee of effectively accessing every available website and online resource. Similarly, material access to a technology is useless without the requisite skills, knowledge and support to use it effectively (van Dijk, 1999). These issues have led some authors to refer to an 'access rainbow' of physical devices, software tools, content, services, social infrastructure and governance (Clement and Shade, 2000), or 'various shades' of marginality between 'core' access, 'peripheral' access and non–access (Wilhelm, 2000). As we can see already, the digital divide is not solely about purchasing power and physical access.

Reconsidering the relationship between access to, and use of, ICT

It is important, therefore, not to conflate 'access to ICT' with 'use of ICT'. This presumption is at the heart of conventional notions of the digital divide and is reinforced by the determinist belief that access to ICT inevitably leads to use. This can be seen in the popular argument that present ICT-related inequalities are primarily due to the s-curve of expansion of technology use in society from present groups of 'early adopters' through to the majority of the population at a later date. Indeed, academics have identified phases of the diffusion of innovations – pointing to an 'inevitable' progression from 'innovators', 'early adopters', 'early majority', 'late majority' to 'laggards' in terms of individual citizens (Rogers, 1995), and even 'skaters', 'striders', 'sprinters', 'strollers' and 'starters' in terms of countries and regions (Mendoza, 2001). This 'natural' diffusion thesis leads to the view that widespread inequalities in the use of ICT are only a passing phase of technological adoption and that, in the long term, the only people not using ICTs will be 'information *want nots*' – refuseniks who chose not to engage with ICT for ideological reasons, despite being able to in practice (see Selwyn, 2003). From this perspective the digital divide is merely a temporary stage of societal adoption of ICTs, as Tuomi infers:

> If we study available evidence, the digital divide is closing rapidly. During the last decade millions of people have gained access to computers every year. Never in the human history have there been so many people with access to computers, digital networks and electronic communication technologies. (2000: 1)

The danger of this determinist dismissal of the digital divide's significance in the long-term is that it ignores the complex relationship between access to ICT and use of ICT. Yet in making the crucial distinction between access to, and use of, ICT we should recognize that access to ICT does not denote use of ICT. Similarly, use of ICT does not necessarily entail 'meaningful use of ICT' or what could be termed as 'engagement' rather than merely use where the 'user' exerts a degree of control and choice over the technology and its content, thus leading to a meaning, significance and utility for the individual concerned (Bonfadelli, 2002; Silverstone, 1996). Having made these distinctions, we should see that once an individual has gained suitable conditions of access to different technologies, a lack of meaningful use of them is not necessarily due to technological factors (such as a lack of physical access, skills or operational abilities), or even psychological factors (such as a 'reticence' or anxiety about using technology), as is generally claimed by technologists. Instead, as a range of studies have shown, individuals' engagement with ICTs is based around a complex mixture of social, psychological, economic and, above all, pragmatic reasons. Engagement with ICT is therefore less concerned with issues of access and ownership but more about how people develop relationships with ICTs and how they are capable of making use of the social resources which make access useable (Garnham, 1997; Jung et al., 2001). As Heller (1987) argues, at best, technology offers a number of 'options', or 'choices based on particular contingencies', which determine the variable impact of technology on people. Thus individuals' interactions with ICTs are not as simple as the user/non-user dichotomy constructed by much of the previous literature, and certainly they are not determined solely by issues of physical access to technology.

Reconsidering the consequences of engagement with ICT

Notwithstanding these points and caveats, we should consider finally the fundamental yet often unvoiced element of the digital divide debate – the outcome, impact and consequences of accessing and using ICT. Indeed, much contemporary debate over inequalities and ICT concentrates only on the means, rather than the ends, of engagement of ICT use. As Wise acknowledges:

> [T]he problem with questions of access is that they reify whatever it is that we are to have access to as something central to our lives without which we

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would be destitute. They, therefore, redirect debate away from the technologies or services themselves. (1997: 143)

To be of any lasting significance, any conceptualization of the digital divide must combine questions of access and use of technology with the impact and consequences of engagement with ICT for individuals. In this way, we are challenging the policy postulate that the information society necessarily means an informed society for everybody (Bonfadelli, 2002) and, instead, examining to what extent (and why) the consequences of using, and engaging with, ICTs are not automatic for all. For example we know that, by its very nature, some information is specialist and restricted to a few with the requisite intellectual and managerial skills to manipulate and use it (Lyon, 1996). Thus the effects of accessing information, resources and services via ICTs cannot be uniform for all users. As Balnaves and Caputi reason, it follows that where the impact, meaning and consequences of ICT use are limited for individuals, then we cannot accept sustained levels of engagement:

> The concept of the information age, predicated upon technology and the media, deals with the transformation of society. However, without improvements in quality of life there would seem to be little point in adopting online multimedia services. (1997: 92)

In particular, this notion of meaning can be seen as being at the heart of the digital divide debate. For example, a host of authors have pointed towards understanding the *situational relevance* of access to technology and information from the individual's point of view, and, in particular, the relevance of the consequences or potential consequences of engagement with ICT for people (Balnaves and Caputi, 1997; Rogers and Shoemaker, 1971; Rousseau and Rogers, 1998; Wilson, 1973). In this sense, the consequences of engaging meaningfully with ICT could be seen in terms of the effect on individuals' and communities' 'social quality' – i.e. socio-economic security, social inclusion, social cohesion and empowerment (i.e. Berman and Phillips, 2001). Perhaps the most useful framework to utilize here is the various dimensions of participation in society that can be seen as constituting 'inclusion' (e.g. Berghman, 1995; Oppenheim, 1998; Walker, 1997). These can be grouped as:

- production activity – engaging in an economically or socially valued activity, such as paid work, education/training and looking after a family;
- political activity – engaging in some collective effort to improve or protect the social and physical environment;

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- social activity – engaging in significant social interaction with family or friends and identifying with a cultural group or community;
- consumption activity – being able to consume at least a minimum level of the services and goods which are considered normal for the society; and
- savings activity – accumulating savings, pensions entitlements or owning property.

Thus the impact of ICTs could be seen in these terms, which reflect the extent to which technology use enables individuals to participate and be part of society, i.e. the extent to which 'ICTs enhance our abilities to fulfil active roles in society, or being without them constitute[s] a barrier to that end' (Haddon, 2000: 389).

TOWARDS A RECONSIDERATION OF THE DIGITAL DIVIDE

Stages of the digital divide

With all these factors in mind we can now begin to reconstruct the digital divide in more sophisticated terms: as a hierarchy of access to various forms of technology in various contexts, resulting in differing levels of engagement and consequences. On the one hand, we are concerned with inequalities of opportunity to access and use different forms of ICT. On the other hand, we are concerned also with different inequalities of outcome resulting either directly or indirectly from engagement with these technologies. Thus, it makes little sense to talk of a single dichotomous division, as these inequalities of opportunity and outcome run along multiple lines. The different elements that need to be taken into consideration and factors that make up the digital divide are shown in Table 1. Here, the progression from formal/theoretical access to effective/perceived access is followed by basic use of ICT which then may (or may not) lead to meaningful engagement with ICTs, information and services. This process culminates in the potential short-term outcomes and longer-term consequences of this engagement with ICTs.

Factors underlying inequalities in the information age

Having mapped out the different elements of the digital divide, albeit in a crude manner, it is also necessary to begin to develop an understanding of the underlying reasons and shaping forces behind individuals' and groups of individuals' engagement with ICT. Why do some individuals engage successfully with ICTs from the initial stages of physical access through to longer-term consequences, whereas others do not? As we have argued, a whole host of technical *and* non-technical factors, economic *and* non-

• Table 1   Stages in the Digital Divide

Formal/theoretical 'access' to ICTs and content	Formal provision of ICTs in home, community and work settings that is available to individual in theory.
Effective 'access' to ICTs and content **Use of ICTs**	Provision of ICTs in home, community and work settings that individual feels able to access. Contact with ICTs in any form. May or may not be 'meaningful' use. May or may not lead to medium/long term consequences.
Engagement with ICTs and content	'Meaningful' use of ICTs. Use where the user exercises a degree of control and choice over technology and content. Use could be considered to be useful, fruitful, significant and has relevance to the individual.
Outcomes – actual and perceived **Consequences – actual and perceived**	Immediate/short term consequences of ICT use medium/long term consequences of ICT use in terms of participating in society. Could be seen in terms of: *production activity* *political activity* *social activity* *consumption activity* *savings activity*

economic factors are at play. Thus, in attempting to construct a framework in order to understand these mediating factors, perhaps the most comprehensive approach is to distinguish between the different mediating forms of capital that underlie differential access to, and use of, ICTs in society. In adopting this approach, therefore, we are drawing upon Bourdieu's concept of different forms of capital as:

> accumulated labour which, when appropriated on a private, i.e. exclusive basis by agents or groups of agents, enables them to appropriate social energy in the form of reified or living labour . . . It is the principle underlying the immanent regularities of the social world. It is what makes the games of society something other than simple games of chance. (Bourdieu, 1997: 46)

This notion of capital is powerful in that it facilitates a combination of theories of structuration and shaping of social action by social contexts with theories of self-interested individual action (Coleman, 1997), thus allowing the exploration of the achievement of certain ends by individuals and groups from a multilayered approach. Using this approach, we can attempt to identify the effect of the different forms of capital on the ability of individuals and groups to make meaningful use of ICTs.

From this perspective, perhaps the most immediate and obvious form of capital underlying individuals' engagement with ICT is economic. Indeed, in highlighting the other forms of capital inherent in the digital divide we are not trying to underplay the importance of economic capital. On a day-to-day basis, the economics of using ICTs are crucial and ongoing mediating factors (Norris, 2001), with some commentators arguing that the digital divide is primarily about people 'tak[ing] individual responsibility for the economics of getting online' (Haywood, 1998: 23). As Murdock et al. (1996) argue, material resources and economic capacity play a central role in determining whether people use ICTs, and then the nature and subsequent patterns of that use, citing the example of the difficulties of using a wordprocessor without a printer or an adequate monitor. Indeed, as Bourdieu himself asserts, economic capital is 'always at the root in the last analysis' (1993: 33).

Yet economic capital cannot account for all stages and levels of engagement to ICT. As Murdock (2002) contends, it is easy to overemphasise the role of income with regard to ICT and overlook the important social and cultural dynamics that structure participation and exclusion. Therefore, what an individual (or group of individuals) can do with ICT is also intertwined with their corresponding levels of cultural capital. In Bourdieu's original analysis, cultural capital denotes the extent to which individuals have absorbed (often unconsciously) or have been socialized into the dominant culture over time. Therefore, cultural capital can be embodied (in the form of knowledge), objectified (in the form of books, paintings, instruments and other artefacts) and institutionalized (in the form of qualifications). Bourdieu's original work concentrated on the effect of cultural capital that individuals possessed in terms of how successful they would be in the educational system. Yet we can also see that there are specific technological forms of cultural capital that are useful to the information age, such as technological skills, 'know-how' and socialization into the technoculture via family and the household (or, as Jung et al., 2001: 513 put it, 'attitudes, tastes or goals in the specific contexts of technology use'). Such forms of cultural capital can be seen, for example, as the difference between having access or ownership of a technology, and engaging with and making meaningful use of that technology; as Bourdieu explains:

> To possess the machines, he [sic] only needs economic capital; to appropriate them and use them in accordance with their specific purpose he must have access to embodied cultural capital; either in person or in proxy. (1997: 50)

Further, the success of many people's engagement with ICT is also highly influenced by their social capital. This can be seen as social obligations or connections between an individual and networks of other significant

individuals (family members, friends), organizations and institutions that can be called upon for mobilization of their own capital. As Bourdieu continues:

> Social capital is the aggregate of the actual or potential resources which are linked to possession of a durable network of . . . institutionalised relationships of mutual acquaintance and recognition – or in other words to membership of a group – which provides each of its members with the backing of the collectively-owned capital. (1997: 51)

Therefore, social capital has been recognized as an important element of individuals' and organizations' ability to access and effectively engage with ICT (Di Maggio and Hargittai, 2001; Fountain, 1997), with the size and nature of an individual's network of technological connections and relevant social contacts developing and sustaining an individual's use of ICT. For example, ICT use is increasingly about being able to draw upon 'expert' sources of advice to help us use ever-powerful computer systems that the vast majority of users will never fully use, let alone understand. As Kitchin argues:

> [W]e are becoming increasingly reliant on the 'computer experts' that each facility now has to employ to guide us through the rapid developments and sort out our daily problems. (1998: 112)

Whereas such expert sources of advice are being made available increasingly in remote or virtual forms in the shape of helplines, after-sales support and other IT industry services, the development (or not) of localized face-to-face social capital is also important. As Murdock et al.'s (1996) work examining the diffusion of home computing on a UK housing estate has highlighted, people's ability to foster, maintain and draw upon social capital in terms of networks of friends, relatives, neighbours and other significant local sources of technological expertise and material resourcing (in terms of 'borrowing' equipment or 'sharing/copying' software) was a critical factor in people's sustained use of ICT:

> The maintenance of particular forms of computer use will depend in large parts on access to users who can offer advice, encouragement and practical support. Conversely users who are isolated from or marginal to such networks may find it difficult to acquire competencies and sustain interest over time. (Murdock et al., 1996: 273)

These factors have led some authors to point towards the fundamental importance of technological capital as both a subset of, and an addition to, Bourdieu's cultural, economic and social forms of capital in the information age (Hesketh and Selwyn, 1999; Howard, 1992). Indeed, many of the differences that the digital divide pertains towards can be traced back to

• Table 2   Different Forms of Technological Capital

Economic capital	'Material exchanges', material resourcing, domestic space of ICT use Economic Capacity to purchase ICT hardware and software
Cultural capital	*Embodied* Investing time into self improvement of ICT skills, knowledges and competencies in the form of informal learning Participation in ICT education and training – both formal credentialized and informal non-credentialized *Objectified* Socialization into technology use and 'techno-culture' via techno-cultural goods, (e.g. Exposure to ICT via magazines, books and other media), family, peers and other agents of socialization *Institutionalized* Formal credentialized ICT training
Social capital	Networks of 'technological contacts' and support. These can be: *Face-to-face*: family, friends, neighbours, tutors, other 'significant others', membership of groups/organizations *Remote*: online help facilities, commercial helplines

clear differentiation in the technological capital of individuals, organizations and communities – i.e. fundamental differences in the cultural, economic and social resources that individuals and communities can command when engaging with technology and are able to adopt as part of their strategy of reproduction (see Table 2). For example, possession of technological capital enables individuals to become producers and distributors of their own cultural products, rather than active or passive consumers of the products of others (Kenway, 1995). Therefore, it can be seen to be a crucial distinction between the 'information used' as opposed to 'information users' (Dordick et al., 1988) and is reflected also in the 'three Cs' of competence, concepts and connections that some see as underpinning the ability to thrive in the global economy (Kanter, 1995).

Key research questions

The multifaceted and graduated model of ICT use outlined in this article has significant implications for future research in this area. With governments and other policy-orientated funding bodies responsible for the commissioning and funding of digital divide research, there is a danger that the faults of the naive political dichotomous construction are replicated by the empirical research designed to examine it. Yet, as Murdock contends:

> [O]ne has come to expect short-termism from politicians seeking to make a splash in the polls and entrepreneurs looking to make a killing on the exchanges, but scholars have a responsibility to disregard the 'frothy surface'

thrown up by commercial and political hype and to focus on the deeper
dynamics of change and inertia. (2002: 385)

Thus, in seeking to examine the digital divide, researchers should be
interested in a host of 'post–adoption' issues (Jung et al., 2001), such as the
levels and contested nature of individuals' *access* to technology (in particular
their effective access, as opposed to what is formally available to them in
theory), their actual *engagement* with, and use of, this technology and,
importantly, the short-term outcomes and longer-term consequences of this
use. Although this article has attempted to identify the different stages and
elements of the digital divide, there is still a need to explore and clarify
further the relationships between them. Indeed, in attempting to develop a
more sophisticated understanding of the digital divide, this article has
succeeded in raising more questions than answers. From this perspective, and
in light of the recent political efforts to combat the digital divide, the
following questions need to be addressed in detail.

- What types of formal/theoretical access to what technologies do
  people have at home, at work and in community settings?
- What types of effective/practical access to what technologies do
  people have at home, at work and in community settings?
- What is the nature and extent of the use of technologies
  facilitated by this access? Under what circumstances does
  meaningful use/engagement arise? What factors contribute to
  people continuing to be users of ICT and others to revert to
  becoming non–users?
- What types of social, economic, cultural and technological capital
  are people able to draw upon when using technology?
- What are the short-term outcomes of this engagement with
  technology for people and communities?
- What are the longer-term consequences of this engagement with
  technology in terms of individuals' participation in society?
- How are people's ICT access, engagement and outcomes
  patterned according to individual factors such as age, gender, class,
  geography, ethnicity and disability?
- What other mitigating factors and circumstances can be identified
  as having an impact on different social groups' propensity and
  motivations to engage with ICT? E.g. the 'capitalist driven' and
  state-driven development of ICT (Hoar and Hope, 2002), such as
  the development of software and online content by commercial
  and non-commercial interests; the marketing of ICT by corporate
  and public interests; and the content and delivery of ICT
  education and training by public and private bodies.

CONCLUSIONS

In all likelihood, the flawed and oversimplified notion of a dichotomous digital divide of 'haves' and 'have-nots' will continue in its popularity as a means of framing political discussion of social issues in the information age. Despite the recent economic downturns and displacement of centre–Left administrations in countries such as the US which have led some commentators to consign the digital divide to political 'history' (Wilhelm, 2002), the continuing rhetorical appeal of the digital divide lies in its neat packaging of complex social issues in a form of social exclusion that governments can be seen to do something about, unlike more longstanding and fundamental 'non-digital' divides. Moreover, despite its weaknesses the notion of a dichotomous digital divide also has a value in bringing the issue of information inequalities to the fore in contemporary social debate. As Silverstone contends:

> The theoretically unsubtle has its value. It focuses the mind on the dynamics of structural change. It makes us question. But it misses the nuances of agency and meaning, of the human exercise of power and of our resistance. It misses, too, other sources of change: factors that affect the creation of technologies themselves and factors that mediate our responses to them. Society, economy, politics, culture. Technologies, it must be said, are enabling (and disabling) rather than determining. (1999: 21)

But now that the realities of an ICT-based society are becoming more apparent than they were a decade ago, we need to move the debate onwards. There needs to be a political recognition that the crucial issues of the digital divide are not just technological – they are social, economic, cultural and political. The 'cyber-guru' Nicholas Negroponte could not have been more misguided in asserting that in the information age, 'all that is solid melts into bits'. Indeed, to imagine a digital world free from the inequalities of the offline world is again indicative of technological naivety rather than foresight. From this perspective it is of utmost importance that academics, politicians, practitioners and all other stakeholders in the information age adopt a more sophisticated and realistic view of the digital divide and the range of inequalities that currently exist in ICT-based opportunities, uptake, engagement and outcomes.

Yet in proposing this reconceptualization of the digital divide, and therefore eschewing the more 'techno-utopian' positions outlined at the beginning of the article, we must be careful not to fall instead into what Mendoza refers to as the 'fatalist instrumentalist approach' of assuming that it is inevitable that 'social structures will remain unaltered and digital information technologies will be another factor to strengthen the existing structure of social stratification' (Mendoza, 2001: 30). As Golding has argued on many occasions, although the patterns of uptake and use of new technologies do appear to be falling into existing and deep-rooted patterns

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of social and economic inequalities and 'the abiding fault lines of modernity' (Golding, 2000: 179), there is still the potential for change:

> We are now witnessing the 'mediatization' of the new technologies, as they follow past scenarios of commercialisation, differentiated access, exclusion of the poor, privatisation, deregulation and globalisation. None of this is inevitable. We find ourselves staring at the arrival of a tool that could nourish and enhance the public sphere, or could equally provide another vehicle for the incorporation of progressive politics and ideals into the grubby raw maw of market rapacity. (Golding, 1996: 85)

Whether or not such changes *are* taking place, as politicians, technologists and other enthusiastic commentators believe, must now form the basis of carefully conceptualized and executed research. We need to move research away from the current predominance of 'pundit suppositions, travellers tales and laboratory studies' (Wellman, 2001: 2031) towards robust survey-based and in-depth qualitative work which begins to unpack the complexities of the digital divide as set out in this article (DiMaggio et al., 2001). Hopefully it has provided an initial starting point for such work to take place.

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