The Digital Generation?: Children, ICT and the Everyday Nature of Social Exclusion

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In this paper we explore the potentially inclusionary and exclusionary implications of Information Communication Technologies (ICT) for children through an examination of ICT policies and practices within UK schools. We begin by outlining the rhetoric of inclusion evident in UK government policy and by reflecting on how these discourses are mobilised in three case-study schools. We go on to consider issues of social exclusion, demonstrating that both material and social factors can prevent access to appropriate computer technology. In particular, we emphasise the importance of the way that children negotiate the meanings and use of computers through their everyday practices within the classroom. The paper concludes by arguing that only when we recognise that children's use of computers is about not only the broad-scale distribution of resources but also children's everyday social relations can we hope to institute policies that promote an inclusive "information society".

Introduction

"Social exclusion" has become a key concept in both contemporary academic and political debate. The concept was first developed by French sociologists interested in the breakdown of the relationship between the individual and society (Bhalla and Lapeyre 1997; Martin 1996), but has since been more widely applied in considerations of the role of individuals, institutions and wider social relations in the countries of North, South and Eastern Europe and the former Soviet

Published by Blackwell Publishers, 108 Cowley Road, Oxford OX4 1JF, UK and 350 Main Street, Malden, MA 02148, USA

Union (Burgers and Kloosterman 1996; Clammer 1997; Harwin and Fajth 1998). Rather than review these often disparate uses of the term social exclusion, this paper focuses on questions of social exclusion in the North, and in particular on the British experience.

Social exclusion grew in Britain during the course of the 1980s and 1990s, partly as a result of the neoliberalist agenda of the Conservative government that was in power during this period (Walker and Walker 1997), an agenda that saw the reversal of the postwar trend towards a narrowing of the gap between rich and poor. The increasing importance of social exclusion can be seen in academic work focused on issues as varied as social housing, health, disability, unemployment, probation services (Benzeval 1997; Convery 1997; Evans 1998; Pleace 1998; Smith and Stewart 1997) and notably education, children's play, childcare and youth services (France and Wiles 1997; McKendrick and Bradford 1999; McKendrick, Bradford and Fielding 1998; Smith, Smith and Wright 1997). This breadth of interest is also reflected at a political level by the Labour government elected in Britain in May 1997. In its own words,

> Tackling social exclusion is one of the Government's highest priorities, as demonstrated by its actions since coming to office. For example, the welfare-to-work programme, the emphasis on school improvement and raising standards of literacy and numeracy, the national childcare strategy, the review of pensions and work on poorer pensioners, the setting up of the Low Pay Commission, the release of capital receipts to improve housing stock, the review of tax and benefits and the Task Force to hold a wide-ranging review on how to implement comprehensive and enforceable civil rights for disabled people. In addition, the Prime Minister has now set up the Social Exclusion Unit. (URL 1)

Given this diverse academic and political attention, it is perhaps unsurprising that even within the North "social exclusion" is by no means a transparent term (Barry 1998; Lawless and Martin 1998; Oppenheim 1998). Through the aforementioned Social Exclusion Unit, the Labour government in Britain defines the term as "a shorthand term for what can happen when people or areas suffer from a combination of linked problems such as unemployment, poor skills, low incomes, poor housing, high crime environments, bad health and family breakdown" (Social Exclusion Unit Website). Julian Le Grand, the Director of the Centre for Analysis of Social Exclusion, offers a broader definition. He begins: "A (British) individual is socially excluded if (a) he/she is geographically resident in the United Kingdom but (b) for reasons beyond his or her control, he/she cannot participate in the normal activities of United Kingdom citizens, and (c) he/she would like to participate" (quoted in Barry 1998:4).

The emphasis on "normal" activities is important because, as we enter what has been dubbed the "Information Age", what is understood by "normal" activities is being reimagined. This point is made particularly clearly in *The Net Result* (INSINC 1997), a report published by the National Working Party on Social Inclusion (a group established by IBM in collaboration with the Community Development Foundation):

> Whereas full citizenship hitherto has been associated with having a job and somewhere to live, it may be the case that in the future an additional "badge of citizenship" will be access to the information highway. Just as in today's society, those who do not have homes and jobs are at risk of social and political exclusion, so in the future those who are unable to make effective use of information resources will also risk exclusion unless social, economic and educational policies are introduced to maximise opportunities for participation and contribution. (INSINC 1997:7)

Most notably, Information and Communication Technologies (ICT) are popularly understood to be about to lead to—if it has not already led to—the transformation of work and the production of value (Marshall 1997). In the US, for example, it is estimated that 60% of jobs now require technological skills (Benton Foundation, in Association with the National Urban League 1998). Moreover, the Economic Policy Institute estimates that the gap between wages for skilled workers who can use new technologies and those for unskilled workers increased by 23% between 1979 and 1995 (Benton Foundation, in Association with the National Urban League 1998). As such, Kroker and Weinstein (1994:163) argue that computer literacy will be key to membership of the emerging future "virtual class" because the technologically competent will be able to convert their intellectual capital into both economic and cultural capital.

As the use of ICT becomes more widespread, with more activities such as shopping, banking and even voting available on-line, the disadvantage of lacking technological skills will stretch beyond the labour market. In other words, a lack of access to ICT will promote social exclusion in other areas by inhibiting the ability of the technological have-nots to participate in "normal" activities. As Katz, a researcher at Bellcore, explains:

> [T]he information poor will become more impoverished because government bodies, community organisations and corporations are displacing resources from their ordinary channels of communication onto the Internet … To the extent that any demographic group become excluded from and underrepresented on the Internet it will also be excluded from the economic fruits that such participation promises (Benton Foundation, in Association with the National Urban League 1998).

In other words, the centrality of ICT in "modern" society (Kitchin 1998) is such that if access for all is not provided to this technology, it will emerge as potentially economically, socially and politically divisive. Yet inequality of access is already highly apparent in Britain and other "Northern" nations. A report by Motorola (1998:2), for example, identifies Britain as "a nation of technology Haves and Have-Nots". The "Haves"—whether that be in terms of PC ownership, Internet usage or access to training—are more likely to be men, young, employed and from the upper and middle classes. This social divide is also reflected spatially, the south of the country having more "Haves" and the north more "Have-Nots". This picture is reinforced by the findings of the National Working Party on Social Exclusion:

> The category of people most likely to be marginalised are people on low incomes. Everyone, of course, can be categorised in several ways, and many experience multiple disadvantages. Three social groups in particular have frequently been identified as being "at risk" from exclusion in the Information Society, whether or not they experience poverty: women, ethnic and racial groups [sic], and older people. In addition, people in rural communities may experience particular difficulties which are related to the adequacy of the infrastructure provided. (INSINC 1997:3)

A similar pattern is also evident in the US, where the social groups least likely to be connected to the Internet are the rural poor (earning between $5000–10,000 pa), rural and central city minorities (especially blacks and Hispanics, but also Native Americans and Asian Americans), young households with children, and female-headed lone-parent households (Benton Foundation, in Association with the National Urban League 1998).[1] As Golding (1990:90, quoted in Kitchin 1998:112) points out, "Entrance to the new media playground is relatively cheap for the well-to-do, a small adjustment in existing spending patterns is simply accommodated. For the poor the price is a sharp calculation of opportunity cost, access to communication goods jostling uncomfortably with the mundane arithmetic of food, housing and clothing."

The most visible rhetorical and material manifestation of the British government's concern that unequal access to ICT can promote social exclusion has been targeted at children, in particular through strategies in the field of education. Here, emphasis has been placed on the need to train *all* children in technological skills if they are to be able to play a full role in the future of society. As Prime Minister Tony Blair puts it, "Children cannot be effective in tomorrow's world if they are trained in yesterday's skills" (DfEE 1997:1).

The British government's commitment to providing equal access for all to ICT has taken the form of the "National Grid for Learning" (hereafter NGfL). This was formally launched in November 1998 with

a £700m investment earmarked to help use the Internet to construct a network to which all 30,000 UK schools will be connected, on which every child will have an e-mail address, and which will allow pupils access to remote libraries and museums and enable teachers to share ideas and parents to help children with their homework (all by 2002). The Government's vision, set out in the NGfL consultation document (DfEE 1997) published in 1997, is to lift educational standards in Britain by making the most of technological change and, in training children in new skills, to help business to compete and give opportunities to all.

The parallels with the US are again striking, and hardly coincidental. In his 1995 State of the Union address, then President Bill Clinton declared that "every classroom in America must be connected to the information superhighway with computers and good software and well-trained teachers", while Secretary of Education Richard Riley has stated that computers are "the new basic of American education" with the Internet "the blackboard of the future" (URL 2). Moreover, as in Britain, educationalists in the US context have argued that as "technological competence is a new basic for education, equal access and equal competence must be a basic concern for educators" (Kenway 1996:230).

Our aim in this paper is to further this debate about the potentially inclusionary or exclusionary implications of ICT for children through an examination of ICT policies and practices within UK schools. We begin by examining patterns of access to hardware and software between schools and then go on to reflect on the microgeography of access to ICT within schools. Finally, we focus on social practices within the classroom, examining how children use, think about and relate to ICT.

The empirical study on which this paper draws involved a wide-ranging examination of the ways in which ICT fits into children's everyday lives, focusing on children's access to and use of technology at school and at home. The first stage of the research involved a questionnaire survey about the level of computing provision and Internet access of all secondary schools in two Local Education Authorities (LEAs): one largely urban in character and situated in the north of England, the other largely rural and situated in the south of England. On the basis of the responses to the survey, three schools, each with high levels of ICT provision relative to other schools in their local education authorities but with very different catchment areas and social backgrounds, were selected as case-study schools to enable us to explore children's use of these technologies.

Two of the schools, Highfields and Station Road, are located in a major urban area in Yorkshire; the third, Westport, is in an isolated small town in Cornwall.[2] Highfields is a mixed comprehensive school for pupils aged 11–18 located on a residential edge of a major city. The area is dominated by private housing and is relatively advantaged,

with unemployment being well below local and national averages. The ethnic background of the pupils is mainly "white", though at 7 per cent British Pakistanis form a significant minority of the school population. The school has benefited from some investment since its designation as a technology school, and exam results compare favourably with the national average.

Station Road is a mixed comprehensive for pupils aged 11–16 located in a much less well-off part of the same city, where the percentage of children eligible for school meals is higher than the national average. The school has a significantly greater number of pupils of lower ability than the national average, meaning that at a crude level exam results compare unfavourably to national and local averages; however, given its intake, the school is seen by its inspectors to be performing particularly well. Eight percent of the children are from homes where English is not the first language.

Westport is a mixed comprehensive school for pupils aged 11–18, in a rural coastal town that is one of the most isolated in the UK. The school serves a large, mainly rural catchment area, with some pupils travelling considerable distances to attend. While there is a variation in the pupils' socio-economic backgrounds, the school catchment area as a whole is less disadvantaged than the national average. The number of children with statements of Special Educational Needs is relatively high, though exam results for the school as a whole are close to the national average.

Within the case-study schools, we undertook a questionnaire survey of 753 children aged 11–16 asking about their use of computers and the Internet in both school and home environments. This was followed by observation work in a number of case-study classes and focus group discussions—based mainly on existing friendship groups—that covered children's experiences of IT within the school environment. Semi-structured interviews with the IT and head teachers from these schools were also carried out.

On the basis of this work in schools, thirty children and their families were asked to participate in a further stage of the research. This involved separate in-depth interviews with the parent(s) and the children in the household about purchase of home PCs and Internet connection, use of computers and the Internet by different household members, ownership and control of domestic ICT and whether being on-line had affected household relations.

IT for All? The Provision and Use of Hardware and Software

Since the early 1980s, when the Conservative government, in partnership with the Local Authorities, launched a scheme to provide at least one computer in every school, the amount of investment in

ICT grew from £16 million in 1984 to £200 million in 1994, resulting in a five-fold increase in the number of computers available in British schools. On average, there are 85 computers in each secondary school and 10 in each primary school, and 83% of UK secondary schools have some form of connection to the Internet (McKinsey and Company 1998). These figures compare favourably with those in most other Western nations, including Germany, Japan, France and Italy (McKinsey and Company 1998), suggesting a positive picture in relation to children's access to ICT.

However, despite this positive general outlook there are wide variations between schools. This is because, while the British government has triggered initiatives to install hardware in schools, much of the momentum and decision-making necessary to bring this about must occur at the local level. Some local authorities have placed greater emphasis on ICT than others; likewise, different schools have also taken different decisions about the amount to invest in hardware, reflecting their individual visions of the role of technology in the school curriculum, budgetary positions and educational priorities (Valentine and Holloway 1999).

This in turn is heavily dependent on the competence and commitment of individual teachers to research and bid for the funding that the government makes available on a competitive basis for IT provision, and to develop the resources they have. Bigum (1997) points out that the nature (eg keeping track of changes in software and hardware, installing and testing new equipment, and technical trouble-shooting) and amount of work expected from the designated "computer teacher" often exceeds the amount of time they are allocated in this role. As a result, the computing facilities of schools commonly depend on the enthusiasm and unpaid labour of the teachers concerned.

Thus, a very uneven pattern has been created that reflects the attitudes and priorities of different LEAs and more particularly of the teachers and governors of particular schools. This is evident both in the results of our questionnaire survey of schools and in the everyday experiences of teachers. As Dave Matthews, the Information Technology (IT) Coordinator at Highfields, explains, his school has successfully bid against other schools for IT resources, and this has caused some resentment within the LEA:

> When you look round other schools in [his region] it's just unbelievable the variation of kit … I mean the only people, the only places that have got machines like we have are people who've applied for and made bids [edit]. The Head here applied for this bid and got it. I go to meetings and people [teachers from other schools] are looking at you like it's your fault, so like, yeah you've got all this gear and they haven't.

However, having the equipment is only part of the story. The Government Statistics Service Survey of IT in schools (McKinsey and Company 1998) revealed that while 83% of UK secondary schools are connected to the Internet, this does not necessarily mean that the children in these schools have access to it. Rather, many schools severely restrict access to and use of the Internet: first because of the costs—which include access to an Internet service provider, routers and servers, upgrading, extending or installing a network at school and the need for relatively powerful computers; second, because of parental fears that children might access unsuitable material on-line (Valentine and Holloway 2001).

Furthermore, the extent to which ICT is actually used across curricula rather than merely in IT lessons is less dependent on the number of computers or Internet connections than it is a product of the number of teachers with the training and motivation to utilise these resources in their lessons at a time when there are many other competing demands on their energies. Developing computer competence not only takes time that many teachers just do not have, it also requires quite significant investments in training and funding for appropriate software. This lack of time and training resources means that many teachers do not have the appropriate skills to use ICT in their teaching.

This emphasis on usage, rather than provision, starts to raise important questions about access to ICT within schools. While it might seem unremarkable to say that different schools organise computer provision and their use in different ways, these policies and their microgeographies can have very important impacts—a point clearly demonstrated by our three case-study schools.

At Highfields, there are 120 PCs or Macs, 28 with full Internet access. The computers are concentrated in IT labs, and access to these is largely limited to lesson times. All pupils receive one IT lesson per week in years 7, 9, 10 and 11. Children are allowed access out of school hours, in what is termed "extended study time", but security fears and anxieties that children may use the Internet to access unsuitable material (Valentine and Holloway 2001) despite the school's filter system mean that this occurs only under the supervision of a teacher and that children are usually expected to do schoolwork. However, an IT teacher will allow keen pupils (a small group of boys whom he trusts as technologically competent and enthusiastic) to use the machines in his classroom if they ask. In this way, children who have access to ICT at home and are already technologically competent are able to maximise their access to school machines and spend more time developing their technological skills, while technologically poor or technophobic children who do not have home-based access to ICT are not given opportunities to explore and develop their confidence

with technology independently of formal IT lessons. As such, the fluency gap between children is potentially exacerbated, as Calvin and Sally describe:

> Calvin: I'm not real good at 'em. Those who are really good are the one that have got them at home, 'cos that go on 'em all day and everything … if we have computers at home we'd be as good as the Boffins [a technologically competent group of boys].

> Sally: You can tell in our class who's got a computer at home. 'Cos like when we have to do something, even like typing a letter, Chlöe will be like la, la, la and it's done. And some people are like a, … b, … You have more confidence if you know how to use it. The reason we find it easy is that computers are so slow here compared to the computers we have at home. We sit there going chat and it's done.

In other words, Highfields implicitly has a vision of ICT as a privileged tool that has potentially harmful consequences and so needs to be monitored and controlled, rather than as an everyday object that is part and parcel of the school environment. As such, despite the British government's rhetoric, the way that Highfields implements the use of ICT within the school may actually have the effect of reproducing rather than challenging differences between its pupils in access to and use of ICT. Indeed, the Head Teacher at Highfields does not believe that it is the school's responsibility to counter such inequalities. He explains:

> You, you can't in a school, schools … can't function as er sort of social equalisers … We can't do all of that, we're here fundamentally as educators and that's what our job is to do … I can't make up for the fact that Johnny Bloggs at home has a PC and Christina hasn't. Can't do that. All I can do is to provide what we've got here … We give them a taste of something, and that's about as far as I think schools can go. They can't be social engineers beyond all that.

At Station Road there are 39 PCs or Macs, almost all of which can support the Internet. ICT skills are taught to all pupils on a separate course in years 7 and 10, and used cross-curricula in years 8 and 9. Pupils are allowed to use the computers after school if "someone is around", and there are two weekly computer clubs, one of which is a girls-only club that was established specifically to counter the exclusion of girls from the original, male-dominated club. Internet access at these times is restricted; however, pupils may get permission to use the Internet out of lessons through 4 multimedia PCs that can be booked for use in the library at breaks or lunch time.

Consequently, while Station Road has significantly fewer PCs than does Highfields, its pupils actually have potentially greater access to the technology, as the more formalised system secures more children

better access than the dependence on informal requests and "favours" from the teacher at Highfields. Indeed, Station Road regards ICT as a new life skill, and as such imagines itself as having an important role to play in attempting to challenge existing social inequalities and to prevent new social cleavages from opening up. This is evident not only in terms of the school's attitude to providing access to ICT for all its pupils but also in the way that the Head and ICT teachers envisage using the technology to draw parents back into the education system and to bind the school and local community together. For example, Station Road currently offers nine ICT evening classes each week for parents. The school's future vision of ICT also includes providing distance learning for pupils who are unable to attend because of illness or disability or because they are disaffected or excluded. In contrast to the Head Teacher at Highfields, the Head Teacher at Station Road emphasises the responsibility of the school in addressing inequalities in access to ICT:

> There are no obvious patterns and we work very hard to ensure that youngsters, whatever their gender, whatever their background, whatever their experience, whatever their access prior to coming here to ICT facilities, that all youngsters develop the confidence to use it effectively and efficiently.

Pupils at Westport have significantly more independent access to computers and the Internet than their counterparts at either Highfields or Station Road. There are 79 PCs in the school, all with Internet connections. All pupils in years 7 and 8 are provided with a foundation course in ICT. Learning to use the Internet forms a key part of this course, which ends with the children creating their own web page. Cross-curricula use is also made of the technology in years 10 and 11. At break times and lunch time, the pupils are allowed to use PCs situated in "clusters" within the school, with little restriction. This microgeography contrasts starkly with Highfields' policy of containment.

All the children at Westport have e-mail addresses. Unlike Highfields, and to a lesser extent Station Road, Westport places great emphasis on getting children to use ICT rather than teaching them ICT skills per se. In this way, while there are fewer PCs at Westport than at Highfields, the pupils at Westport— like the pupils at Station Road —actually have more access in terms of quantity and quality (independent use rather than regulated) of time, and this access is also equitable in that each child has the same level of opportunity. The Westport IT teacher explains his philosophy:

> My own philosophy which I think is becoming the school's philosophy … is that the computers are there, use them … We'd started

> our taught course and it was a very formal course … this is a word processor, this is underlining, this is a database, this is a field. And it became obvious the children were bored to tears, just typing stuff in, work wasn't relevant to them … So I rewrote our course, told my colleagues to scrap what they were doing, and gave the children a magazine to do.

The evidence of these three case studies and our survey suggests that, contrary to government rhetoric—which is advancing a policy of universal access to ICT as an antidote to potential future social exclusions—the provision of ICT in UK schools varies widely and, as such, some children have very much better access to computers and the Internet than do others. This disparity between institutions is evident in terms of the different levels of hardware they possess, the diverse ways in which ICT is employed in the curriculum, and the quantity and quality of access time that children are allowed outside the structure of formal lessons. These differences, in turn, are at least partially a reflection of the extent to which individual schools embrace or dismiss the government's vision of using technology to counter social inequalities.

In exploring questions of access to ICT and social exclusion, we have begun to highlight the important of social practices, for example how the use of technology is organised within the school, as well as the provision of appropriate hardware. We develop this focus on the "social" further in the following section, which considers in more detail the importance of social practices in producing and countering social exclusions within the classroom.

Social Exclusion as an Everyday Practice

Much of the public policy discourse outlined above about children and computing emphasises the assumed effects of providing access to hardware and software to pupils within schools. Namely, the assumption is that putting a computer on a child's desk and providing IT teaching will produce a technologically literate adult of tomorrow who will able to adapt to and take advantage of the "information society". While there are disparities in hardware and software and in access to these resources in our three case studies schools, all pupils in each school are nonetheless introduced to ICT in formal lessons and have some degree of access to it independently of these classes. However, this research provides evidence that not all students take up the opportunities that they are offered to use ICT at school, and that some actively resist becoming familiar with it to the extent that they might be labelled technophobic.

The fact that much of the public-policy discourse about children and computers assumes that access to hardware and software alone will

produce a technologically fluent generation, and that it fails to recognise that significant numbers of children do not become so, exposes the extent to which the Government's vision of ICT is implicitly technologically determinist. In other words, it adopts "an artifactual view of such technologies, severing them from the normative contexts of social practice within which they have their uses" (Bryson and de Castell 1994:206). This is not to suggest that questions about the provision of computer hardware and software are unimportant—far from it. However, understandings of "information-rich" and "information-poor" that focus only on provision of equipment in the classroom and ignore wider questions about social practices are, in the words of Knobel and Lankshear (1998:3), "radically incomplete". As Bruce (1998:12) points out, "The more we examine technology, the less we find it useful to focus on its technical attributes per se". Rather, "To understand what technology means, we must examine how it's designed, interpreted, employed, constructed and reconstructed through value-laden daily practices" (Bruce 1998:12).

In this section, therefore, we want to examine why some children effectively exclude themselves from the "information society" by resisting the opportunities which they have to develop ICT skills, through a focus on social practices in a year-11 IT class from one of our case-study schools, Highfields. Here, those with the most symbiotic relationship to ICT are a small group of computer-literate boys. To borrow a phrase from Turkle (1984), these boys are "hard masters" of technology. They draw upon sophisticated repertories of knowledges about programming, hacking and computer games gleaned from beyond the classroom through magazines, the Internet and trial-and-error learning. Talking about and interacting with the technology is central to their relationships with each other, inside the IT classroom, at break times and outside school. In this way, their individual identities and shared narrative of identity as a friendship group are predicated upon their close relationships with technology, as this boy explains:

> Charles: Well one of [my friends], called Jamie, … was in my form all through school. But then a couple of months ago, about the start of this year, we both realised we really liked computer games. And that sort of made us more friends like. Or closer friends. And then most of my other friends I just made through computer games. Or computers [edit] … that's sort of all we normally talk about. The latest computer games or how far we got on a certain game or whatever.

Yet this very relationship with computers causes this group of boys to be socially marginalised by their peers, who label them as "sad", "boffins" and "geeks".

In exploring how boundaries are constructed between different groups to produce everyday social exclusions, Sibley (1995) draws

upon a number of psychoanalytic theories, including Mead's (1934) object relations theory. In this theory, Mead (1934) observes that in the process of developing a sense of self, the child elides both people and objects into what he terms the "generalized other". Sibley (1995) argues that this is a useful approach to understanding the relationship between self and other in contrast to more abstract theories because of the way it both locates and embeds the individual in the social and material world. He (1995:10) writes: "The social positioning of the self means that the boundary between self and other is formed through a series of cultural representations of people and things which frequently elide so that the non-human world also provides a context for selfhood." He illustrates this point by drawing on the example of Csikszentmihalyi and Rochberg-Halton's (1981) work on the home, in which they explore the way people relate to others through material objects and argue that people and things can come to stand in for each other.

A more radical understanding of the relationship between people and things is evident in the work of social studies of technology scholars such as Bruno Latour (1996) and John Law (1994), who argue that we are inextricably entwined with our material surroundings in ways we are only just beginning to realise. For these writers, society is produced in and through patterned networks of heterogeneous materials, in which the properties of both humans and nonhumans are not self-evident but emerge in practice. Thus, objects can define actors, the space in which they move and the ways in which they interact, allocating roles and responsibilities and vesting them with a moral content. Indeed, Ackrich (1992:222) claims that "objects have political strength. They may change social relations, but they also stabilise, naturalise, depoliticise and translate these into other media." At the same time as the technological constructs the social, however, so too the social shapes technology (Bijker and Law 1992; Crang, Crang and May 1999). In other words, the social and the technical codevelop.

In the case of the small group of computer-literate boys in the year-11 IT class at Highfields, the computer defines the properties of its users and the ways in which they interact with their peers. In popular culture, the bodies of techies are commonly represented as a product of their obsession with computers, as physically unattractive, wearing glasses and having bad skin and poor fashion sense (Lupton 1995). Below, Hannah, Lotty and Julie describe how the bodies of the cyber-enthusiasts in their class are inscribed upon and constructed through the computers they use.

> Interviewer: Right, so what, what kind of people are they [referring to people who are good at using ICT]?
> Lotty: Sad people [laughter].

[edit]
Hannah: Well they're not very good-looking.
Julie: No.
Lotty: Not good-looking and they don't care what they look like and they're immature.

In this way, the computer defines these boys as sexually undesirable, aligning them with nonhegemonic performances of masculinity, as "homos" or "freaks" (Holloway, Valentine and Bingham 2000). As such, by marking the boys as "deviant" or "abnormal", the computer contributes to drawing a boundary between this group and other groups of pupils in the class. In turn, the association of the computer with "boffins" and "geeks" "naturalises" it as a work tool and its use as a boring and socially undesirable activity. For example, in the quote below, the girls imagine a stark division between on-line and off-line activities in which on-line activities are regarded as "boring", "nerdy" and "abnormal", in comparison to off-line activities such as going clubbing. In other words, the interaction between technology, bodies, identities and peer group relations is "complex and continuous and all the elements combined are transforming of and transformed by each other" (Ormrod 1994:43).

Julie: [referring to using PCs] … it's just I've got better things to do with my life.
Lotty: Yeah.
[laughter]
Interviewer: I wonder what they are? [laughing]
Hannah: Yeah, I wonder what they are as well [laughs].
Julie: Won't get into that.
Interviewer: What are these better things to do, go on?
Julie: Well, going out.
Lotty: Clubbing. Yeah.
Hannah: Yeah.
Julie: And other things.
Lotty: I mean, I went out last night, I wouldn't have stayed in to use a computer. If I'd got chance to go out, I'd go out.

The way that the meanings of PCs have emerged within this classroom mean that despite the fact that girls such as Hannah, Lotty and Julie are aware of the potential importance of having ICT skills in a future information economy, they are reluctant to show any interest in the technology because of the threat it poses to their identities and social relationships. As Thorne (1987) has pointed out, girls' appearances and relationships with boys often take primacy over all else, given that girls' social position usually derives from their romantic relationship with boys. As such, Hannah, Julie and Lotty are aware that if they show an interest in the technology it might lead to the

contamination of their identities and the recoding of their bodies as undesirable by dominant groups of "cool" boys, such that they too might become excluded from their heterosexual peer group culture.

> Interviewer: So how come you can't be, how come you can't be the type of lass that likes going out and the type.
> [laughs]
> Julie: To use a computer.
> Hannah: You just wouldn't tell anyone that you were using the computer.
> Interviewer: Oh right, you wouldn't tell anyone?
> Hannah: No.
> Interviewer: So why not?
> [edit]
> Hannah: It's a boffins thing to do isn't it.
> Julie: I mean computer boffins, that's what people, well …
> [edit]
> Interviewer: But you wouldn't want anybody to think you were a computer boffin.
> Hannah: No.
> Lotty: No.
> Julie: No.
> Interviewer: No, why not?
> Hannah: 'Cos then don't get, you don't get invited out or anything like that.
> Julie: Yeah.
> Lotty: You don't pull all these people at little school discos and all that kind of, I don't know …

This example of the technoenthusiastic boys and the technophobic girls shows how intimately and complexly everyday objects such as computers are involved in our social relations (Wenger 1998). As such, it demonstrates that in order to understand patterns of social exclusion in the emerging "information society", we cannot focus on the provision of the technology alone. Rather, we need to understand how children and technology come together and how they are transformed by and transforming of each other.

As this section has shown, children appropriate computers and give them their own meanings, while also incorporating them in different ways into their everyday interactions, employing their relationships with these objects (and discussion about them) to produce individual and shared narratives of the self or to define and distance themselves from others. Within the example presented here, those children who are closely associated with computers are socially excluded within the everyday context of the classroom, while those who are socially popular distance themselves as much as possible from these objects

and the development of technological skills because of the threat computers pose to their social identities.

Conclusion

In this paper we have linked several takes on children's use of ICT and the question of social exclusion. We began by demonstrating that in government rhetoric ICT are trumpeted for their potential as inclusionary technologies that will "bring Britain together" through an strategy of "IT for All". At the same time, however, fears are mobilised about the potentially exclusionary consequences (ie that technologically illiterate citizens will be unable to participate in "normal activities"—which, it is argued, might include skilled employment, participation in "normal" channels of communication, access to information resources and so on) if this access for all is not provided.

Moving to an analysis of our survey and case study research, we have shown that the provision of hardware is highly unequal between schools. This is a product of the fact that some local authorities have placed greater emphasis on ICT than others. Likewise, different schools have also taken varying decisions about the amount to invest in hardware, reflecting their individual visions of the role of technology in the school curriculum, budgetary positions and educational priorities. Notably, the government's rhetoric about ICT is given different degrees of emphasis by different schools. While all three of our case-study schools espouse the importance of ICT skills in a future information economy, they do not all embrace the government's concern with social equality. While Station Road promotes IT for All to the extent of trying to draw members of the wider community back into learning, and Westport advances the use of ICT by thinking of it as a life skill, Highfields remains firmly wedded to conceptualising ICT in terms of academic attainment. As a consequence of these different visions of technology, each school makes ICT available to children in different ways. For example, at Highfields, networked PCs are contained within IT labs and access to them is within a framework of formal lessons, while at Westport they are situated in "clusters" around the school. These microgeographies of provision have different outcomes in terms of the quality (independent rather than regulated use) and quantity of time children have to use them and in terms of whether access is equitable or whether different children enjoy differential levels of opportunity.

Yet, while questions of hardware provision and physical access to networked terminals are important in understanding patterns of social inclusion and exclusion in terms of socially differentiated or unequal levels of access to ICT, in order to understand social exclusion in terms of participation it is not enough to focus on issues of access alone. To do so is technologically determinist. Rather, the evidence of the final

section of our paper is that access to ICT alone does not equate with either the use or the development of skills, because ICT is understood, valued and taken up or rejected differently by different groups of children. Thus, while children may have equal access to ICT, they will not all necessarily take up the opportunities offered to them to develop technological fluency. This means that those children who currently have access to ICT in school but resist or reject the opportunities they have to become technologically literate may still be socially excluded in a future "information society" because, without these skills, they may be unable to participate in "normal activities".

In order to challenge such potential patterns, instead of thinking about children and technology in isolation, we need to explore what happens in practice when the two come together. Drawing on situated studies of technologies, we have explored the way that the meanings of ICT emerge in practice within the social context of the classroom. Our example highlights how computers can be used to mark out some children as "abnormal" or "deviant" and thus contribute to their social exclusion from peer-group social relations. In turn, the association of "geeks" with PCs contributes to their naturalisation as boring or work tools. As such, other children distance themselves from the technology through a fear that it might pollute their identities and result in their social exclusion within the classroom too. In doing so, they technologically disenfranchise themselves.

This understanding presents radical policy implications. Namely, it is not enough for governments merely to provide access to computer provision within schools. Rather, there is also a need to explicitly address how ICT is introduced within the school context. Notably, much stress is being placed by the government, teachers and parents upon the need for children to develop technological competence so that they are not socially excluded in a future "information society". Yet many children are more concerned about social exclusion in the present, specifically how to negotiate and manage their identities within their peer group social relationships, than they are with questions of the broader transformation of society and their potential social exclusion in the future. In order to encourage children to take up the opportunities they have to use ICT, we need to promote the use of technology in ways that relate to the social context of children's everyday lives and peer group cultures. For example, by encouraging children to use e-mail and the Internet—on-line activities children understand as connected to their off-line lives and activities—adults can contribute to helping ICT emerge as a "cool tool" in more children's eyes. In this way, the fact that technology, identities and peer-group relations transform and are transformed by each other might be regarded by children as offering a range of positive possibilities, rather than as presenting a threat to their identities.

This multiple understanding of social exclusion—both as about the broad-scale distribution of resources and as something reshaped through everyday practices—rests upon taking a radical leap in thinking about ICT to recognise that technical resources and the social are not separate. Specifically, it requires an appreciation that while ICT are technologies, machines, artefacts, they are also much more than this, and that we can only begin to understand their meanings and use by exploring the relationships formed between these nonhumans and ourselves as human actors.

Acknowledgements

We are grateful to the Economic and Social Research Council for funding the research (award no. L129 25 1055) on which this paper is based.

Endnotes

[1] All of which, of course, is to set aside the question of the immeasurably greater disparities operating at the global scale. See, for example, Holderness (1998) and Kitchin (1998).

[2] The names of the schools and interviewees have been changed to protect their anonymity.

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