Junge Menschen und Neue medien: Prozesse der Verbreitung, Aneignung und Nutzung [Young people and the new media: processes of diffusion, appropriation and use]

Book section

Young people and the new media:
Processes of diffusion, appropriation and use

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Introduction

We can no longer imagine living our daily lives – at leisure or at work, with family or friends - without media and communication technologies. Nor would we want to. As we enter the twenty-first century, the home is being transformed into the site of a multimedia culture integrating audiovisual, information and telecommunications services. There is much discussion of the potential benefits of the ever-more significant, ever-more multifunctional electronic screen. Media headlines regularly focus on the possible consequences – e-commerce, the virtual classroom, global consumer culture, cyber-democracy, and so forth. And public anxieties keep pace, reflecting a widespread concern with the kind of society that today's children will grow up to live in as adults. Hence, there is speculation about 'the digital generation', children in the 'information age', 'computer nerds', 'innocents on the net', the 'digital divide' or 'addicted surfers'.

We know from historical studies of past 'new' media that the outcome of ICT diffusion and appropriation is sometimes at odds with popular expectations, is often shaped by those expectations, and may be amenable to intervention if opportunities are recognised in time. Empirical research is essential if we are to understand the balance between the potential and the dangers of today's new media. Yet an exclusive focus on the latest media would be inappropriate. Not only do new media add to and, in the process, transform, existing leisure options, but also existing practices mediate the appropriation of new media into daily life. Consequently, this chapter examines the state of current research on the diffusion, use and significance of new media and information technologies among children and young people by considering 'new' media in the context of older media, media use in the context of leisure, and leisure in the context of the rest of children and young people's lives. The empirical basis of this chapter is a research project that has its origins in the attempt to update, forty years on, Himmelweit, Oppenheim and Vince's *Television and the Child* (1958), a key research project which established our understanding of the place of television, a new medium in the 1950s, in the lives of children.

Himmelweit and her colleagues at the London School of Economics and Political Science took a comprehensive look at a new media technology entering children's lives, examining many of the putative effects of television on children's lives. The main findings of Himmelweit et al's (1958) substantial project can be summarised briefly as follows. (1) Television rapidly became children's main leisure activity, to some extent displacing reading and 'doing nothing,' especially immediately after adoption, and providing functionally equivalent leisure with little detrimental effect on school work. (2) The effects on beliefs and behaviour were few, and in particular no negative effects on levels of aggression were found. Viewers tended to become more ambitious and more middle class in their aspirations having seen middle class, comfortable situations being portrayed on television, while girls became more concerned to adopt feminine roles. (3) Children were found to watch, and to prefer all kinds of programmes, of which many or most were 'intended' for adults (notwithstanding the primary focus of parents, teachers and regulators on specifically children's broadcasting). Looking within the family, parental control and example proved important to mediating and even determining the viewing habits of their children. (4) The uses and impacts of television depended on the child's ability and critical perspective (with less informed or less critical children being most affected by the new medium) as well as their gender, age and personality. In this the findings were broadly in line with a parallel study conducted in America (Schramm et al, 1961).

At the time, almost nothing was known about the likely impact of the new medium of television on children. Consequently, the design and findings of the study were integral in framing the new field of media research both in Britain and elsewhere, and played a key role in informing broadcasting policy for years to come. Hence, Himmelweit at al's *Television and the Child* (1958) was influential in policies which established a highly regulated, paternalistic children's broadcasting culture, with careful scheduling according to idealised notions of children's viewing habits, with the 'toddler's truce' in the early evening, heavily restricted advertising on the new independent channel and reassuring, 'parental' figures presenting the programmes (Himmelweit, 1996; Oswell, 2002).

Contrary to some of the critical attention the project received subsequently, the guiding assumption of that project, which research both then and since has supported, was that television has a diverse range of moderate effects on children, and that these depend on children's age, ability, gender, social class, and personality. However, in designing the *Young People New Media* project, again at the LSE but over four decades later, it was immediately obvious that both childhood and the media environment had changed, making any direct replication of the earlier study inappropriate.[1] To be sure, we once again face what feels like a defining moment, the introduction of significant new media into children and young people's lives. But the questions faced by that project were framed in relatively simple terms, asking what happens when one significant change is made, namely the introduction of one national, terrestrial, public service television channel enters children's lives.[2]

The powerful feature of Himmelweit's design was that the introduction of television in some parts of Britain but not others meant that comparisons between those with and without, or before and after, television were unconfounded by those factors which lead some households to acquire a new medium before others. Today a neat experiment such as Himmelweit et al's comparison of children before and after television is not possible for the computer or the Internet. Not only is the definition of 'new media' far from obvious, but also understanding media access today means mapping complex combinations of diverse media – hence the stress here is not on a particular medium but on the media environment.

Design

In its empirical design, the *Young People New Media* project combined a theoretical commitment to contextualisation with a commitment to a multi-method design triangulating qualitative and quantitative data sources. In the final report of the project, the focus was on access, meanings and use of old and new media for children and young people (Livingstone and Bovill, 1999). The design of the qualitative and quantitative phases of the project was as follows.

Qualitative phase

- Group interviews in 13 schools (6 primary, 7 secondary) with approximately 6 same-sex children in each of 27 groups (some 160 children in total).
- Individual interviews with children, and separately, with their parents, in 32 homes.
- Interviews with Heads of Information Technology (or Information and Communication Techology - ICT - in 13 schools.
- A booster sample of Internet users for qualitative interviews (21 in cybercafés and 15 in boarding schools).

Quantitative phase

- A detailed survey questionnaire administered by BMRB in a face-to-face, in-home interview to a national random location quota sample of young people aged 6 - 17 years across the UK (n=1303).
- A detailed self-completion questionnaire to the parents of those surveyed (achieved sample, n = 978).
- A time budget diary for one week from 334 young people aged 9-10, 12-13 and 15-16.

Children and their changing media environment across Europe

Parallel studies to that in the UK were also conducted by research teams in each of 12 European countries (Belgium, Denmark, Finland, France, Germany, Israel, Italy, the

[1]The theory and background to the project are discussed in the full report, *Young People New Media* (Livingstone and Bovill, 1999); see also Livingstone (1997; 1998; 2002), Livingstone and Gaskell (1997), Livingstone, Gaskell and Bovill (1997) and Livingstone, Bovill and Gaskell (1999).

[2] In fact, during the conduct of the project, a second, commercial channel was introduced (ITV, in 1955) and so some of the research compares this to the BBC channel already available.

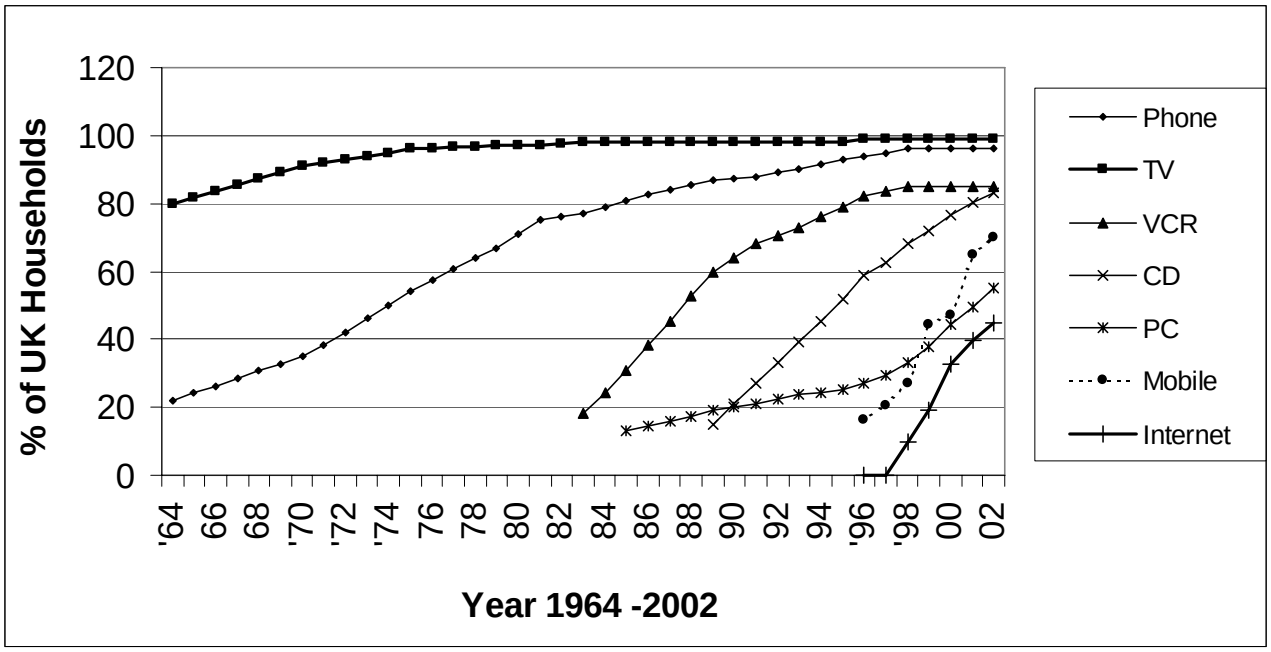
Netherlands, Spain, Sweden, Switzerland and the United Kingdom). Each national study followed a common conceptual framework and methodology, incorporating both qualitative methods and a large-scale survey involving – in total - some 15,000 children and young people aged 6 to 16 (see Livingstone and Bovill, 2001). While most of the findings discussed in this chapter derive from the UK project, some European comparisons, drawing on this larger project, are also included.

The diffusion of ICTs into the home

This section begins to address the question of change by mapping, and interrelating patterns of access and use. Theoretically, questions of access have traditionally been understood in terms of diffusion theory, a theory which offers a model of the typical acquisition path for a new medium from introduction to mass ownership (Rogers, 1995). As historians of once-new technologies have identified, there are strong parallels across the diffusion of different technologies at different times (e.g. Flichy, 1995; Marvin, 1988; Winston, 1998). On this basis, in his now-classic theory of the diffusion of innovation, Rogers (1995) constructed a standard S-shaped diffusion curve by which to classify individuals into five categories: innovators (2.5% of the population), early adopters (14%), early majority (34%), late majority (34%), or laggards (16%).

Each of these groups is defined according to the point in the diffusion curve at which individuals acquire a particular new technology. These diffusion curves can be clearly seen for the UK in Figure 1, making it immediately apparent that the pace of change varies by medium, with the video cassette recorder reaching a critical mass much faster than the telephone, for example. These figures parallel those available for the USA among other countries (Lievrouw, 2000).

Figure 1: Diffusion of domestic media



Notes: This graph draws on data from the General Household Survey up until 1998 (The Stationary Office, London) and its follow up, the Family Expenditure and Expenditure and Food Survey, from 1996/1997 until 2002/2003 (Office for National Statistics). The graph was smoothed to fill in the data missing from data bases for years between measurements.

Acquired initially by the middle classes, television ownership rapidly spread 'down' the social grades so that from 40% of the population with a television in 1955 in Britain (most of whom could only receive BBC1), just a few years later in 1963 more than four in five had a set, and near saturation (93%) was reached by 1969 (by which time half could receive two channels and a little under half, three channels) (MacKay, 1995). Diffusion of the Internet is proving the fastest in the history of ICT. In the USA, the 1990s began with few people even having heard

of the Internet: by 1997, 19 million Americans were using the Internet, by 1999 that number passed 100 million and, having taken only seven years to reach 30% of American households (Cole, 2000), it has stabilised at more or less 71% of Americans during 2003 (Cole, 2003). In 2003, 61% of UK households indicates that they have at one point used the internet and 48% of UK households have home access to the internet, a significant increase from 1998 when only 9% had internet access at home (Office of the e-Envoy, 2003).

However, the relation of access to use is not so straightforward at the social level. Problematically, diffusion theory tends to pose an overly linear process – from the market to the home, from the elite to the mass – which does not always fit the specific conditions under which different media are becoming available to specific groups. Indeed, at its simplest, it can be read as adopting the technologically determinist assumption that social change results from technological innovation, an assumption which many have challenged (MacKenzie and Wajcman, 1999). On this determinist view, an analysis of use becomes, problematically, simply a search for the impacts or effects of the introduction of a technology (Livingstone, 1996).

While not wishing to counter with the equally simple alternative of cultural or social determinism (Neuman, 1991), the argument here is for an in-depth and bottom-up analysis of use-in-context to identify more complex, subtle, and not-necessarily linear processes by which ICT is rendered meaningful and so incorporated into pre-existing and novel domestic routines and practices. Perhaps surprisingly, it is only relatively recently that such questions of use have gained serious attention, stimulated by reference to the literature on mass consumption, or cultural appropriation, of domestic goods more generally (Miller, 1987), local practices of use which develop around a new object (or medium) once in the home, anchoring it within particular temporal, spatial and social relations and thereby rendering it meaningful. For example, Silverstone and Hirsch (1992; see also Livingstone, 1992; Caron et al, 1989) traced the 'biographies' of media goods within the home for 18 families, demonstrating the importance of spatial location in the home. They showed how the public meanings of media goods are transformed when they enter the 'moral economy' of the household according to the operation of four linked processes: appropriation, objectification, incorporation and conversion, arguing that, for example, the aesthetic display of objects within the home reveals the 'classificatory principles that inform a household's sense of itself and its place in the world' (1992: 22).

Media in the homes of children and young people

Central to the *Young People New Media* survey was a series of questions to children and young people (and, to confirm their accounts, their parents) regarding which media are available to them at home.[3] Further, to distinguish between household access and personal ownership of media, we asked them to tell us also which goods they have in their bedroom. Of course, media goods are moved around the home, typically, from communal spaces to bedrooms as newer goods are acquired to replace them, and some may be moved on a more frequent basis. However, mapping the relation between media in the home and media in the child's bedroom is suggestive of the ways in which parents and children view the role of media within the home, and in particular, the balance between locating goods in communal or personal spaces is indicative of the expected patterns of use (placing a computer in the living room suggests shared family uses more than does the computer in the child's bedroom, see Livingstone 2002; chapter 5).

Varieties of domestic media environment

Households do not simply decide to acquire one medium or another, but they make broader decisions about the type of home they want, drawing perhaps on their more general

[3]These data were derived from surveying children and young people aged 6-17. Parents were also surveyed, and where discrepancies arose, parents' responses were used to correct their children's answers just for information about media in the home elsewhere than in the child's bedroom (see methodological appendix).

orientation to technology or to home entertainment or on the priorities they have for their children's education or use of time. Moreover, most are financially constrained in the goods they can acquire. Further, while thus far we have characterised 'the average home' in terms of its combination of media, and this is also the most readily available output of the many surveys, the multiplicity of factors which affect purchase of different goods by different households complicates such an average. Not only do different households differ in media goods but they do so in systematic ways. For example, it may make a difference to the meaning and use of the computer in a household if it is acquired by a home which is already screen-entertainment rich, or a home which is instead bookish and screen-poor.

In the *Young People New Media* project we characterised households by type of media provision, looking first at provision in the house other than in the child's bedroom, and second, by examining provision in the bedroom. For the first typology, bearing in mind that this excluded consideration of children's bedrooms, three broad types of household emerged: Media-rich; Traditional; Media-poor.

'Media-rich' homes, a label which encompasses nearly half of all households with children and young people, contain a wide ranger of old and new media than the 'average' household and so provide the children or, more typically, teenagers who live there with a wide variety of media choices. They have a greater than average likelihood of owning books, personal computer, Internet, telephone, VCR, teletext, cable or satellite television, TV-linked games machine, hi-fi system, camcorder, mobile phone, Gameboy, walkman, and so forth. Predictably, these are most likely to be middle class households, with parents who claim to feel the most comfortable using computers themselves. Thus, the computer (other than those specifically acquired for children and placed in their bedrooms, see Livingstone 2002) is being incorporated into homes which are already media-rich. Consequently, it represents one of several types of screen available to the members of these households.

Around a quarter of households are best described as *'traditional'*, for their ownership of media is average for all media except for the 'newest', of which they have comparatively few (namely the computer, Internet, TV-linked games machines, walkman, camcorder, mobile phone and Gameboy). In short, these households combine television, music and books, providing a familiar media mix, and one that has long been available to children in recent decades. On the other hand, as they are as likely as the average household to contain such relatively new screen media as the VCR and cable or satellite television, they might perhaps be alternately described as 'ICT-poor'. These households tend to contain younger children rather than teenagers suggesting, unsurprisingly, that the presence of teenagers pushes a household into acquiring the latest media. Less obviously, these households span the range of income levels and so may be either middle or working class. The construction of a traditional household, then, appears to reflect less the financial resources of the parents and more their attitudes towards the media. In other words, for those with sufficient financial resources, the construction of a media-rich or a traditional home is a matter of choice. The parents in traditional homes generally feel that television provides children with good programmes, providing viewing is appropriately controlled but they are least likely to describe themselves as comfortable using computers. Perhaps in consequence, although the comparative youth of these children is also a factor, these households are the least likely to provide media-rich bedrooms for their children.

Lastly, in *'media-poor' homes*, the last quarter of the sample in the *Young People New Media* project, every medium we asked about turned out to be less common than in the average home. Such a comparative lack of media is not confined to new media, for these homes are notably less likely to contain books, radios and a telephone as well as newer or more expensive media such as a computer, games machine, hi-fi, etc. Only for television and the VCR does their media ownership approach the average, while the time spent viewing by both parents and children is the highest. As may be anticipated, these are likely to be poorer, working class households, containing children and young people of all ages. Clearly, financial restrictions dictate the provision in these homes. That maintaining a media-poor home is rarely a matter of preference is supported by the finding that while these parents tend to be unable to provide access to a computer for their children, they are particularly keen for their children to know about computers.

Household mediators of ICT access

While some media are prime examples of the trickle down hypothesis – as with the telephone, first acquired by the wealthy in society and, as we saw above, still absent from the homes of one in fourteen children – others are not. The degree to which the diffusion process differs for different media provides a clue to the cultural mediators at work. For example, the different time scales for diffusion, with the proportion of homes still lacking a telephone, for example, exceeding that of households without such newer media as the television or video recorder, point up the importance of a screen entertainment culture both in UK households in general and for certain social strata in particular. Thus, screen entertainment media such as the TV-linked games machine and multichannel television are most acquired by those in the middle-to-lower socio-economic groups, as are television sets and video recorders in their children's bedrooms (which, notably, are already overtaking books in children's bedrooms). In contrast, these same screen entertainment media are not taken up to the same extent by the more educated, primarily for cultural reasons, or by the poor, primarily for financial reasons. If one looks back over the recent history of screen media in the UK, a similar story emerges. Ownership of multiple television sets has spread evenly across all social grades except the lowest, again not supporting the trickle down theory, while both the video recorder and cable/satellite television followed an inverted U-curve rather than a spread from higher down to lower social grades, being initially adopted en masse by blue collar workers and only then spreading both up and down the social grades (MacKay, 1995).

Such diversity in diffusion paths makes generalising from one medium to another hazardous. Particularly, television provides a poor indication of the likely diffusion of newer media. While initially, television followed the classic trickle-down pattern of the telephone, albeit very much faster, multichannel television has instead followed the very different pattern of other screen entertainment media such as the games machines and video recorder. While at the turn of the twenty-first century the domestic personal computer has undoubtedly 'taken off', social class inequalities in acquisition are persisting significantly longer than was the case for television, particularly in Britain (D'Haenens, 2001). European comparative research shows that in the UK the differentials between lower and higher social grade households in access to both multimedia computers and the Internet are much more marked than in the Nordic countries especially (d'Haenens, 2001). As the entertainment potential of the computer increases, with or without convergence with the television, there is a genuine uncertainty in the market as to how acquisition and use will relate to the socio-economic position of the household. One might wonder if the computer will be bought and used differently by those who appropriate it into a context of education, books and work than by those who appropriate it into a context of computer games, television and entertainment. But this is to beg the question of the relation between income and education, for socio-economic classification is itself become more complex, less predictive of household behaviour.

Indeed, if one teases apart the effects of household income and parental education, as we did in the *Young People New Media* project, one finds that the relative importance of these two imperfectly correlated factors can be discerned (see Livingstone and Bovill, 1999). In the main, household income is crucial for determining availability of media in the home, while parental education determines media in the bedroom. Income strongly influences the acquisition of domestic media, with better off parents buying more media goods, and this is as true for the possession of books or music media as it is for the computer or Internet.

However, there are occasions when income may have the opposite effect to parental education, and this is particularly the case for screen entertainment media. In short, domestic acquisition of cable or satellite television, the TV-linked games machine and the camcorder, are all associated with higher income but lower parental education - in Bourdieu's terms (1984), these are households with more economic than cultural capital. By contrast, acquisition of books and the Internet are associated with both higher income and higher educational levels for parents. For the computer, income is the main factor, suggesting that whatever their education, parents are now purchasing computers, provided they have the

financial resources.[4] This variability in levels of education or symbolic resources may have some interesting consequences for competence and expertise in computer use. On the other hand, ICT expertise, often gained at work, is itself proving a stimulus to acquiring access. Turow (1999) found that once a computer has been acquired at home, it is not education and income so much as parental experience with the Internet that determines whether an online connection is acquired at home.

Income is less often a predictor of children's personal ownership of media in their bedroom, for in the main, personal media are acquired according to the age or gender of the child. As we have seen, older children, and boys, have more goods, in general, particularly screen entertainment media. While parental education and income both have a part to play, their effects may be opposed, and it is certainly not simply the more affluent who have more. Rather, those in lower income households are more likely to have a television or TV-linked games machine in their bedroom. Meanwhile, more highly educated parents are less likely to put a television or video recorder in their children's bedrooms, but are more likely to provide them with books or – in the household if not in their bedrooms, a computer. These very different adoption strategies for computers and games machines makes clear that the term, 'computer' – widely used by children to refer to both these technologies, insufficiently defines the potential uses of different machines. Murdock et al (1995) foresee a continued, even a growing stratification or information divide in which the middle classes acquire more expensive, multifunctional computers which support computational, word processing and, increasingly, communication facilities, while the working classes adopt comparatively cheap games machines ('interactivity without power').

Beyond the importance of household income and education, it turns out that family circumstances are associated with differences in domestic media provision. Particularly, while two-parent households (and households with working mothers) are much more likely to provide a media-rich home, reflecting their considerably higher incomes, single parents are just as likely to provide media rich bedrooms for their children. Further, the presence of siblings makes media rich home more likely but a media rich bedroom less likely; in other words, parents with several children tend to provide for household rather than for individual media use.

Cross-cultural mediators of ICT access

If one analyses the diffusion and appropriation of ICT on the level of national or cross-national comparisons, once again the mediating role of cultural context becomes apparent. The comparison explored here is with the present findings for UK access of ICT compared with parallel data for Europe and America. Such a comparison is practical insofar as directly comparable data are available, and is worth pursuing insofar as these countries comprise not only a common research culture but more importantly a common policy context, resting on broad similarities in both media environments and conditions of childhood (Livingstone, d'Haenens and Hasebrink, 2001).

Perhaps not surprisingly, available data from American and from other European countries show that many broad patterns of media access and use are similar across the developed countries compared here. Here I draw particularly on the 12 national comparative project of which the YPNM project comprises the UK component (see Livingstone and Bovill, 2001). For parallel American survey findings, see Annenberg Public Policy Center (1999), Cole (2000) and Roberts et al (1999).

If we consider screen media generally available in the home, it is evident that children and young people at the turn of the century have access to high levels of screen media (Table 1). And as Johnson-Smaragdi (2001) shows, the typology of media-rich, traditional and media-poor households is also replicated across a diversity of European countries, suggesting that

[4]See also Lin (1988), whose American data also suggest that economic rather than cultural capital is increasingly the significant predictor of new media ownership.

this offers a common characterisation of household types in these comparatively wealthy countries.

Table 1: Comparative data on children and young people with access to screen media (%)

	UK	USA	DE	FR	ES	NL	CH	FI	DK	SE
AT HOME										
Television	100	99	96	99	97	99	90	95	98	97
VCR	96	98	87	92	74	92	72	91	92	92
TV-linked games machine	67	82	31	57	54	48	42	43	24	62
Cable/satellite TV	42	74	83	24	21	n/a	50	35	22	64
PC	53	73	50	n/a	54	84	60	70	n/a	66
PC with CD-Rom	31	63	39	19	39	46	43	46	53	47
Internet/modem	7	48	9	8	9	18	17	26	25	31
CHILD'S BEDROOM										
Television	63	65	40	28	31	30	19	38	60	49
VCR	21	36	14	9	9	5	9	15	30	21
TV-linked games machine	34	45	19	25	33	17	19	20	24	34
Cable/satellite TV	5	30	28	3	4	n/a	9	9	22	21
PC	12	21	18	n/a	19	11	19	24	n/a	22
PC with CD-Rom	4	15	13	3	13	3	11	14	16	15
Internet/modem	1	10	2	2	2	1	3	7	5	8

Notes: Abbreviations are as follows: Germany (GE), France (FR), Spain (ES), Netherlands (NL), Switzerland (CH), Finland (FI), Denmark (DK), Sweden (SE). Sources: UK data for 6-17 year olds collected during 1997 (Livingstone and Bovill, 1999);USA data for 8-18 year olds reported in Roberts et al (1999); other European countries' data approximated by collapsing across data reported for boys and girls, and collected for 6-7, 9-10, 12-13 and 15-16 year olds during 1997-8 (d'Haenens, 2001).

There are, however, some cross-national differences of note. Clearly, the USA 'leads' in terms of access to most media, the one exception being that of cable/satellite television where national histories of broadcasting make for very different contexts for the expansion of multiple channels, for reasons of policy, geography and cost (no data on cable/satellite penetration are presented here for the Netherlands, for example, for cabled households are near universal; van der Voort et al, 1998). This applies to both new and older forms of media: significantly, the USA is 'ahead' for diffusion of the computer, CD-Rom and, especially, the Internet, although figures for the EU countries are steadily increasing.

There are grounds for concluding that the USA and the UK have particularly favoured a 'screen entertainment culture' (Livingstone, 2000). While the USA is strong on information technologies also, the comparisons for the UK are particularly stark. Here we see high levels of screen entertainment media - multiset homes, VCRs, TV-linked games machines and so forth – yet rather lower levels of take up for the more 'serious' information technologies than is evident in Nordic (Denmark, Sweden and Finland) and smaller European countries (Netherlands, Switzerland).

By comparison with other European countries, Britain leads in personal provision of screen entertainment media, and Denmark comes very close. The picture is particularly striking for the numbers of 6-7 year olds with a TV set in their bedroom, although figures for other screen entertainment media (e.g. VCR and TV-linked games machine) show a similar pattern. In the UK, 50% have their own set. This may be compared with 25% in Sweden, 21% in Spain, 17% in Germany, 16% in Switzerland and France, and only 12% in the Netherlands (d'Haenens, 2001). A parallel survey shows also that multi-set households are most common in Britain - almost four in ten British teenagers live in homes with 4 or more sets (compared with 8% in Germany), whereas in Germany almost three in ten live in single set homes (compared with 7% in Britain); Italy and France fall somewhere in between (c.f. Livingstone et al, 1999). In such personal media access, however, the UK appears to be following trends set by the USA, where personal provision for children and young people is, and has been for some time, notably higher than in Europe.

Very broadly speaking, usage trends go hand in hand with access. This is shown by the greater amounts of time spent by British and American children and young people with screen media – most notably, for television and computer games - than by children in other European countries, again endorsing the notion of a strong screen entertainment culture in the US and UK.[5] For example, British children watch up to half an hour more television per day than in the Netherlands, Sweden and Spain, and as much as an hour per day more than in Germany, France and Switzerland (Beentjes, et al, 2001). Again, in this respect, UK children are closer to those in the USA, where viewing figures are similar or higher (Roberts et al, 1999).

Clearly, provisioning children's bedrooms is particularly reveals the importance of cultural factors rather than simply those of cost (Bovill and Livingstone, 2001). In the UK, the finding that fewer homes have books than have television sets and that no more children own books (two-thirds in all) than have their own television set, we see the outcome of a longstanding cultural struggle between print and screen media in which these are typically construed as if in competition for people's time and attention. In both the low proportion owning books and the high proportion owning a television, the UK stands out within Europe (d'Haenens, 2001). To put it another way, as screen entertainment media are more expensive than all other media with the exception of computers, yet as television sets are found in the majority, and TV-linked games machines and videos in sizeable minorities, of children's bedrooms – in the UK and elsewhere - this is presumably the result of judgements on the part of both children and parents regarding appropriate uses of leisure time. This screen entertainment culture may be seen to have its roots in adult attitudes to both media (where screen media are seen to challenge the traditional values of an elite print culture) and childhood (where the various threats to innocence are sufficient for entertainment at home to be seen as preferable to leisure outside the home (see Livingstone, 2002).

Meanwhile, households in the Nordic countries and the Netherlands may fairly be termed 'pioneers of new technologies', not only because of their greater domestic provision of computers but also in terms of time spent with interactive media, reflecting a more established culture of domestic and educational ICT (Livingstone and Bovill, 2001). In the British context, it must be of concern that while across Europe, access to ICT at home varies greatly, the UK figures are amongst the poorest (Livingstone and Bovill, 1999). To take a specific comparison, in the UK only 27% of 15-16 year-olds have access to a personal computer with CD-ROM at home. Similar figures are found in France (21%) and Italy (34%). But in many other countries, figures are much higher. In Denmark 63% of 15-16 year-olds have a multimedia computer at home, as do 55% in Sweden, 52% in Switzerland, 51% in Spain, 50% in Germany, 48% in the Netherlands and 47% in Finland. Similarly, in the UK 7% of 15-16 year-olds have Internet connections at home, and similarly small percentages are found in Italy (12%), Spain (11%), Germany (9%), and France (5%). However, access is much more common in Scandinavian countries: Sweden (38%), Finland (30%) and Denmark (26%).

The national policy contexts which give rise to such differences in patterns of ICT adoption are multidimensional, and cannot be simply reduced to such factors as national wealth, being peripheral/central to Europe, size of the language community, etc., although each of these plays its part (Livingstone, d'Haenens and Hasebrink, 2001). The scale of these differences, however, notwithstanding the broad Western trend towards increasingly media-rich homes and leisure, is sufficient to lead Krotz and Hasebrink (2001) to critique the view of diffusion as a neutral or mechanistic and passive process, belying the complacent hope that all groups and societies will 'catch up' eventually, as if there were a single endpoint to the process. Instead, they identify distinct pathways in the diffusion of new media technologies, leading them to view diffusion as a fundamentally cultural and constructive process.

Particularly, while we have here dwelt on ICT in the home, it emerges that in some countries but not in others, this goes hand in hand with ICT diffusion elsewhere in the society and particularly, for children and young people, in schools. For example, our comparative project on young people's media environments suggests that while the Nordic countries and the

[5]For comparative time use data across European countries, see Beentjes et al (2001). For American data, see Roberts et al (1999).

Netherlands 'lead' in both ICT adoption at home and school, and while Germany lags in both, in other countries, however, there is a discrepancy between provision at home and school. The United Kingdom, for example, appears to be 'ahead' in terms of computer use at school, while lagging behind for access to a computer at home, reflecting the screen-entertainment focus of families which contrasts with the apparently advanced policies of business and education. This 'public/institutional' path to ICT diffusion contrasts with the more private path common in other European countries, and exemplified most clearly in Spain, where about half of all Spanish children have access to a computer at home but only one third have access at school, suggesting that here it may be parents who are the more advanced (Krotz and Hasebrink, 2001).

From access to use

In key, but not all, respects today's new media are following a similar path through society, as did previous media, although the cultural factors operating at both national and household levels significantly impact on this process. Thus, broadly speaking, diffusion theory provides a fairly satisfactory theoretical framework for accounting for the patterning of media access across times and places. However, it suffers two significant limitations. First, to the extent that it attempts to fit all new media into the same mould, it oversimplifies, omitting significant cultural considerations. Second, and more important to our developing account of the place of media in young people's lives, the diffusion of media through the market tells only part of the story. In pursuing what we might term the 'career' or trajectory of particular media within the home, rather than simply as far as the front door, we need to consider the context, extent and nature of media use.

Appropriating new media

Murdock et al (1995) identify three categories of resources - the material, social and symbolic - which contextualise media use within the home. Each is differentially available within society, making for different possibilities for social distinction or exclusion. While household income has already been shown as crucial to young people's access to ICTs at home, Murdock et al (1995) suggest that social resources - 'the role of social networks in fostering and sustaining new practices' (p.273) are important in maintaining use. Certainly, in their interviews with users and non-users, Murdock et al identify many whose disillusion with the home computer reflects limitations of social resources which go beyond simple questions of access. Knowing how to buy the appropriate machine, to update software, how to mould initially inflated expectations regarding the computer to realistic aims – these all depend on both social capital (through concrete networks of support) and symbolic or cultural capital (particularly, educational and professional expertise) – and the absence of these may account for those who confound the diffusion hypothesis by acquiring and then dropping out as users (Murdock, et al, 1995). These are, of course, related to economic capital: it is the better off children who not only are more likely to have the latest ICT at home but are also more likely to have friends or relatives able to demonstrate or help with such technologies (Livingstone and Bovill, 1999), and more likely to have parents with the knowledge or expertise to guide and support.

But while finances matter in terms of access for socio-economic groupings, other distinctions become important in relation to use which depend rather on social and symbolic resources. Gender is a primary concern here, for while girls and boys share a common media environment at home, in many respects, they make consistently different use of key media. Consequently, boys' preference for screen media and girls' preference for music and print media primarily reflects differences in social and symbolic resources (Lemish et al, 2001).

Media as domestic infrastructure

This exploration of young people's access and use of media has revealed a variety of ways in which access underdetermines use, taking us beyond simple, causal questions of whether technological change brings about social change, towards a more complex charting of the social and cultural conditions which both shape and are shaped by new media. Since the last decade or two of the twentieth century, 'old' or long-familiar media have been incorporated

into new arrangements of space and time in Western societies as households increasingly come to possess multiple televisions, telephones, video recorders, radios, and so forth.

I will end this chapter, however, by proposing that the diffusion and appropriation of media into the practices of everyday life plays such a key role in defining the home, in spatial terms, and daily life, in temporal ones, that domestic media have become part of the infrastructure of family life. In other words, just as the family is supported by – or regulated in accordance with – a legal infrastructure specifying marital and parental duties and responsibilities, an economic infrastructure which facilitates certain kinds of family structure and undermines others, an educational infrastructure (which is placing increasing responsibility on the family), and a spatial infrastructure (by which certain kinds of living arrangements are supported through an implicit conception of family membership and family life), so too we might see the penetration of media throughout the home as establishing a certain set of expectations, practices and uses and hindering others.

Star and Ruhleder (1996) define the concept of infrastructure in terms of the following characteristics: Embeddedness in other social structures of everyday life; Transparency in use, invisibly supporting daily tasks or practices; Reach or scope beyond a single event or practice; Learned as part of membership of a community of practice; Linked with the conventions of a community of practice; Embodiment of standards, expectations or values; Built on an installed base rather than established from scratch; Becomes visible on breakdown.

If we compare the television and personal computer with each of these characteristics, it is clearly the domestic television set that has acquired the status of infrastructure. It is embedded in the sociality of daily life, invisibly supporting a variety of daily activities including homework, family time, meal times and bedtime, and with a scope which extends to an increasing variety of daily practices. Familiarity with television content and habits is indeed expected by members of the community, for most people and especially perhaps for children and teenagers. This familiarity arises because an engagement with television is integral to the other conventions of those communities, being part of the expectations regarding shared knowledge and humour, and contributing to the construction of social identities, fandom, world views and future ambitions. Television, in both its status as a consumer durable and as a source of mediated content, embodies certain standards or expectations regarding what it means to be a young person today. It has also been argued that the introduction of television – while popularly discussed as a dramatic innovation in daily life – in practice established both its contents and its habits of use on the foundation previously established by radio, film and, to a lesser extent, the press. Visibility on breakdown shows itself on those occasions, always discussed with much fascination by the media themselves, when for whatever reason, one has to spend some time without access to television; suddenly its status as part of the infrastructure of daily life is thrown into sharp relief.

At the same time, we are witnessing a shift in this domestic infrastructure (and, of course, work-related and educational infrastructure also). The newly arriving forms of ICT, currently centred on the computer, have not yet attained this status of domestic infrastructure. On the contrary, the presence in households of computers and the Internet is highly salient, not yet fully ‘domesticated’ (Silverstone, 1994), not yet rendered a transparent part of the temporal and spatial routines of daily life (Scannell, 1988). The computer is, instead, very visible, not only because its breakdowns are more frequent than its successful usage but more importantly because it has not yet become embedded in the social structures of family life. Where to put it, how to update it, how to regulate its use and to realise its potential, all these and other issues are still unresolved. Indeed, the process of learning to use the computer is a significant and somewhat difficult part of domestic life, one which parents and children are still struggling with, such that the conventions of practice which doubtless will, in the near future, serve to embed the computer into daily life are as yet still unclear and problematic. Yet the signs are already there that the computer will become part of the domestic infrastructure, changing the home in the process. Thus, a key moment in the cycle of innovation, diffusion and appropriation is reached when the technology is established as part of the infrastructure of daily life.

While the immediate conditions into which a technology arrives in the home both shape and are shaped by the new arrival, it is only when the technology is sufficiently incorporated as to become part of the infrastructure that its longer term significance becomes apparent. Arguably too, it is only once the domestic infrastructure is altered – where this generally means adjustment more in accordance with the contingencies of daily life than with the specific features of the technology – that we can see the role media play in setting the conditions for the arrival, and potential appropriation, of yet further media. Rather, then, than oppose 'old' and 'new' media, let us instead consider technological innovations as treading a path from the unfamiliar to the infrastructural, from goods understood primarily as rather indigestible technological artefacts to goods understood primarily as transparent mediating devices.

What is gained by labelling the arrival of new media in the home a matter of infrastructure, rather than, say, describing media as part of the changing context, the environment or the ecology of everyday life? While these concepts each have their value, thinking of the media as increasingly crucial to the infrastructure of the home is illuminating. Most obviously, it sensitises us to the easily taken-for-granted ways in which the media – like electricity or town planning – subtly structure the practices of daily life. More significantly, each of the characteristics of infrastructure identified earlier can be seen as mapping out the 'tasks' faced by ICTs if they are to become part of the domestic infrastructure. They must become embedded, transparent, diverse in scope, and so forth. Also important, the infrastructure metaphor invites us to consider how things could have been otherwise. As Star and Bowker (2002:153-4) note, 'a given infrastructure may have become transparent, but a number of significant political, ethical and social choices have without doubt been folded into its development' (see also Winner, 1999). This can be seen partly in the design and marketing of television over recent decades and of computer-based media today, instantiating as they do certain idealised conceptions of family life, of childhood, of pleasure, of value, and so forth, any and all of which can and have been critiqued for their normative, conservative assumptions and their tendency to marginalise alternative lifestyles and lifeworlds. Some of these conceptions remain controversial for television also, insofar as television is itself changing as a medium, with controversy (or in Star and Ruhleder's terms, with a lack of acceptance into the community of practices and standards) centred on its growing commercialism (especially in countries with a strong public service tradition), its globalisation (especially in relation to national identities and cultures) and its facilitation of individualisation through the multiplication of niche channels. For computer-based media the struggle – both cultural and domestic – is more obvious, as people seek to appropriate various ICT forms and services into their lives.

The thrust of such an infrastructure-focused analysis, which stresses the thorough contextualisation of media innovations in the contingencies of everyday life, should guide future research on children and young people's changing media environment. Because we are talking here of a human infrastructure, one consisting of temporal schedules and spatial arrangements (though it also encompasses an arrangement of wires or hardware), the stress is also on gradual change rather than any dramatic effects of technology. For people and, especially, routinised social relations, are slow to change whatever the technological innovation available. Moreover, such change is not simply a quantitative matter – there being more commercialised, globalised or personalised media, but also a qualitative shift from one kind of cultural context for childhood and youth to another. This can be understood, I have suggested, in terms of qualitative changes in the infrastructural arrangements by which relations between public and private, home and community, education and leisure, family and friends are managed.

From access and use to domestic regulation

We are witnessing a historical shift away from the assumption that the home can remain private, outside state regulation. Rather, as learning, work, and public participation are increasingly conducted at home, facilitated by ICT, a detailed understanding of the nature and diversity of domestic practices surrounding the media becomes crucial to policy formation. Given the privacy and individuality accorded to the home and family, this requires, in turn, a shift in the form of regulation, from one primarily based on direct and enforced state

intervention towards the management of a climate of social norms. The scope for regulation depends significantly on the everyday activities and perceived responsibilities of ordinary people. For example, if parents regulated what their children viewed on television as the state might wish, there would be little need for content ratings, legal restrictions on broadcasting and technical means of control. Similarly, if the state did or could take on the full burden of educating children for their future workplace, what need would there be for parents to invest in ICT equipment and know-how at home?

It has been argued that ideas of a proper home, well spent leisure, the supportive parent, traditional values all suggest the increasing – although far from new – inclusion of people's personal or private lives within the disciplinary purview of both commerce and the state. On the other hand, there are limits to the effectiveness of any system of discipline, and it may be that the blurring of work and leisure, education and entertainment, represent an overreaching, a vulnerability to loss of control or a collapse of sustainable classifications and regulatory practices. The efforts of the broadcasting industry to reach ever further into our private and personal lives in order to classify viewing activities may be read both as the effortful, commercially motivated attempt to extend the reach of such disciplinary knowledge but also as the failure of that industry in grasping its goal as ordinary life evades such efforts at measurement. Although this does not necessarily add up to any kind of resistance, the evasion itself is a challenge of sorts, a distinct unmanageability in response to institutional power.

In many ways, particularly in relation to children and young people, media regulation has tended to be restrictive in aim, framed in terms of oppositions between market and pedagogic concerns, needs and wants, freedom and protection and focused on the enforcement of rules, in effect seeking to limit children's mediated exposure to the world. An alternative conception of regulation, centred on social norms, could be framed in the positive terms of seeking to guide and expand children's experience of the world. For example, while parents and teachers are attempting to regulate the learning/fun boundary, this might be perhaps seen as misguided once one recognises a place for learning through fun. Surely a better case can be made for regulating the boundary between public and commercial contents, encouraging participatory as well as receptive engagement, and contents that challenge rather than underestimate children's intelligence. The point is that, unlike the learning/fun and the public/commercial boundaries, worthy of attention though the latter is, the task of developing a case for challenging and participatory contents shifts the regulatory focus from a negative or restrictive orientation to one of positive regulation, defined in terms of goals rather than dangers, part of the current interest in defending public service (and the public good), children's rights to cultural expression, and consumer empowerment.

Arguably, the present state of research suggests that we are currently witnessing a hiatus in the practice of disciplinary power, this being a period of interesting uncertainty regarding the changing media and information environment. Much is made, rightly of the gap between access, use and consequences. But the gap is not simply a gap in practice but rather a systematic and widespread failure of vision. While the policy agenda pushes forward with the apparently straightforward goal of 100% access, supposedly vital for an ICT-literate, internationally competitive workforce, research on use raises more contentious questions reflecting the confused, elusive and ambivalent nature of everyday life. There must also be space in public debate to ask other questions. What are we losing as we rush towards an 'information society'? What counts as good use of a computer? How is literacy changing and what critical literacy skills should be taught? How if at all are ICTs empowering? From what, exactly, are the have-nots excluded? From what, exactly, do children need to be protected? And so forth. Crucial questions are, at present, unresolved. While the debates regarding negative regulation are familiar ones, the debates over positive regulation – identifying the kinds of contents, modes of engagement, skills and literacies, and fora for participation that we as a society wish to encourage and enhance – are as yet underdeveloped. These remain, therefore, as a pressing challenge for all those concerned with the lifeworld and life prospects of today's children and young people.

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