

**Roger Silverstone and [Leslie Haddon](#)**  
**Design and the domestication of  
information and communication  
technologies: technical change and  
everyday life**

**Book section**

**Original citation:**

Originally published in Silverstone, Roger and Haddon, Leslie (1996) *Design and the domestication of information and communication technologies: technical change and everyday life*. In: Mansell, Robin and Silverstone, Roger, (eds.) *Communication by Design: The Politics of Information and Communication Technologies*. Oxford University Press, Oxford, UK, pp. 44-74. ISBN 9780198289418

© 1996 [Oxford University Press](#)

This version available at: <http://eprints.lse.ac.uk/64821/>

Available in LSE Research Online: October 2016

LSE has developed LSE Research Online so that users may access research output of the School. Copyright © and Moral Rights for the papers on this site are retained by the individual authors and/or other copyright owners. Users may download and/or print one copy of any article(s) in LSE Research Online to facilitate their private study or for non-commercial research. You may not engage in further distribution of the material or use it for any profit-making activities or any commercial gain. You may freely distribute the URL (<http://eprints.lse.ac.uk>) of the LSE Research Online website.

This document is the author's submitted version of the book section. There may be differences between this version and the published version. You are advised to consult the publisher's version if you wish to cite from it.

# **Design and the Domestication of ICTs: Technical Change and Everyday Life**

Roger Silverstone and Leslie Haddon

Silverstone, R. and Haddon, L. (1996) 'Design and the Domestication of Information and Communication Technologies: Technical Change and Everyday Life', in Silverstone, R. and Mansell, R (eds) *Communication by Design. The Politics of Information and Communication Technologies*, Oxford University Press, Oxford, pp. 44-74.

It is becoming increasingly evident that technological innovation is not a matter only of production, and that consumption and use are essential components of the innovation process. It is also becoming increasingly evident that technological innovation is not a matter only of engineering, and that both new and old technologies are symbolic and aesthetic as well as material and functional objects. In this chapter we offer an account of the role of information and communication technologies in everyday life which addresses both of these concerns. In the first instance it takes a user's perspective. And in the second instance it focuses on the question of design. We will argue that innovation involves more than merely research and development, or product launch. Innovation requires to be seen as a process which involves both producers and consumers in a complex interweaving of activities, activities which are solely determined neither by the forces of technological change nor by the eccentricities of individual choice.

We will propose a model of what we call the design/domestication interface in an attempt to make some sense of the dynamics of innovation, and in doing so we will privilege the role and perspective of the consumer. In doing so the intention is not that we should simply take a 'user's' perspective on innovation as if this was a magic wand that would resolve all problems of determinacy and indeterminacy in the innovation process. The aim is first of all to insert the particular characteristics of 'use' into that process in such a way as to highlight the activities of consumers who, within their distinctive and perplexing forms of rational and non-rational behaviour, both complete and rekindle the innovation cycle. And the second aim is to focus on the interrelationship of design and domestication in such a way as to identify the particular elements of the careers of information and communication technologies as they move through the spaces and times of innovation.

## **Design**

Design involves three interrelated activities. The first activity, and the most obvious, is that of *creating an artefact*. In this sense of design objects are fashioned functionally and aesthetically. They have to appeal and they are made to work. As Adrian Forty points out (1986, 7) these two aspects of design - the way things look and the conditions of their making - are inseparable though, as we shall point out, the conditions of their making extend beyond the activities of production. The second activity is that of *constructing the user*. In this sense of design images of eventual users are incorporated into the fabric of the object, but at the same time users are designed themselves - as ideal or as necessary to complete both the function and vision embodied in the artefact. And the third activity is that of *catching the consumer*. This places design as a central component of the wider process of

commodification and indicates the importance of recognising, both historically and contemporarily, the significance of technology's presence at the centre of the consuming culture of late capitalism. Indeed, as we shall also argue, information and communication technologies are central to this culture in two interrelated ways. They are objects to be consumed and the means - as media - for the continued stimulation of consumption.

## **Domestication**

Domestication also involves a number of different activities. We shall argue that the link between domestication and design is provided by commodification, the process through which objects and technologies emerge in a public space of exchange values: in a market place of competing images and functional claims and counterclaims. But domestication also involves the consumer in appropriation, in taking technologies and objects home, and in making, or not making, them acceptable and familiar. Indeed the process of appropriation is more than simply a matter of purchase, since, as we shall argue and hopefully also demonstrate, what consumers do with their technologies in their homes, is increasingly important work affecting both present and future technologies. Domestication, finally, involves what we have called conversion, indicating the importance of display. It involves the various things consumers do to signal to others their participation in consumption and innovation.

We shall explore the design/domestication interface as a key to the interrelationship of industrial and social logics in the innovation of information and communication technologies, and as a way of constructing a middle range theory of innovation which can provide a bridge between abstraction and empirical exploration. In doing so we will be drawing principally on research conducted within British households. The focus on the domestic should not be seen as a special case of innovation however, despite its particularity and its importance as the market for domestic ICTs rapidly grows. We would like to suggest that both the structures and the processes which we will be describing have a wider relevance, and that the process of domestication especially should not therefore be seen as something which only takes place in the home.

Design and domestication are the two sides of the coin of innovation. Domestication is anticipated in design and design is completed in domestication. Both depend on a particular balance of structure and agency in which institutional processes - which are together economic, political and cultural - both constrain and enable the capacity of consumers to define their own relationship to the technologies that are offered to, or confront, them. These constraints, which at least as far as the consumer is concerned are largely invisible, are embodied in design and marketing and in the public definitions of 'what these technologies can and should be used for'. Such public definitions are variously defined in the regulatory structures governing standards or services, in the particularities of a technology's appearance and style, as well as in the rhetoric of advertising and the instructions and guidance spelled out in the manual. But equally, again from the point of view of consumption, these constraints are to be found in the domestic itself: in households and in the established patterns of everyday life. These will define in large degree how a particular technology will be used and, at least in part, also the consequences of that use. The emerging character of a new technology, as well as the established character of an old one, will depend on the constantly shifting relationship of actors and structures in both these domains.

## Creating an artefact

It is a truism now to observe that technologies are more than merely machines, and that the history of their emergence is as much a social as a technological history. Indeed it is a social history in so far as the production of a new technology depends upon a politics of adjustment and negotiation between engineers, entrepreneurs, managers, salesmen, experts, laymen, journalists, scientists, showmen and users - as together they stumble their way towards the newly possible. As Carolyn Marvin has argued and convincingly demonstrated in her study of the 'information revolution' of the late nineteenth and early twentieth century institutions take time to form around new machines. The history of technologies, and especially the history of the electric light, the telegraph, the telephone and the phonograph which form the core of her study, is a history of 'the complexes of habits, beliefs and procedures embedded in elaborate cultural codes of communications' (Marvin, 1988, xx). One such cultural code of communication is that of the design of the technology itself (though we should point out that this phrase is itself contradictory - since there is no such thing, as we have just suggested, as the 'technology itself' (cf. Heidegger, 1977)).

One way of illustrating what might be involved in design, in the sense of creating an artefact, would be to trace the design history of a single information technology. Adrian Forty (1986, 200-206; and Forty, 1972) has done this for radio. Forty identifies three stages in the design history of radio. In the first stage, exemplified in the Burndept Wireless Receiver of 1924, the wireless appeared as a technical object, displaying in the visible array of wires, valves and controls (or more specifically diodes, capacitors and resistors) an extremely striking appearance and one that reflected the almost total preoccupation of both manufacturers and public with the technical properties of the apparatus. It was presented as a functional object - and of course in the early 1920s uniquely so. Indeed as Forty points out the radio provided most people with their first experience of owning a piece of 'modern' technology and as such carried a considerable weight as a symbol of scientific and technological progress.

As the rate of technical change slowed, and the radio really became an object of mass consumption, manufacturers could no longer compete with each other in terms of technical advance or advantage. Attention then shifted to the radio's appearance and the balance between functional and symbolic claims shifted towards the symbolic. Radio design entered its second stage. The problem, as Forty elucidates it, for the manufacturers of the time was the production of a unique and powerful technology that combined, and had to reconcile, 'the illusory reality of broadcasting with its actual artificiality' (p.202). The purchase of a radio receiver was not like the purchase of an electric iron (the second most popular electric technology in British homes in the 1920s). Radio was a broadcast technology that linked the purchaser into a network of communications that could be both comforting and disturbing, but in either case brought a distinct and other reality into listeners homes (cf. Frith, 1983; Silverstone, 1994, Ch.4). One solution to this dilemma was to put the radio into a cabinet which harmonised with the domestic furnishings and which 'at least helped to make the monstrous unreality of radio seem part of everyday life' (ibid). However such harmonising also had to take into account radio's symbolic significance as an emblem of future of progress. The resulting designs, paradigmatically in those of Gordon Russell for the manufacturer Murphy, involved radio appearing in the form of modern, if not slightly futuristic furniture. The technology was hidden in a wooden cabinet, but the cabinet was designed in such a way as to indicate its distinctive status and function when it arrived in the living room.

The third stage involved the the wedding of radio design to the image of future progress. The manufacturer Ekco, above all in the designs of the modernist architects Serge Chermayeff and Wells Coates, used the new thermoplastic material bakelite to produce futuristic designs which increasingly became, in their various subsequent transformations, the norm for electronic technologies. Forty points to the efficacy of such a design strategy: that it diverts attention away from the uncomfortable present towards an uncomplicated and appealing future, and in so doing draws a millenarian ideology into the aesthetics of the artefact.

There are a number of points which are raised by this bald history. The first is that there is a symbiotic relationship between technical and aesthetic innovation. The second is that particular technologies - and especially media and information technologies - require design solutions of quite a dramatic kind, precisely because of their distinct significance as media. The third is that (and this a theme to which we shall return on a number of occasions) these technologies, at the point at which they become objects of mass consumption, have to be designed as domestic objects, mediating in their aesthetic the tension between the familiar and the strange, desire and unease, which all new technologies respectively embody and stimulate.

This tension is not of course the exclusive product of the new. Nor is it confined only to the technological object. In the broadest sense all technical artefacts, be they objects or services, have to provide solutions in their design to both functional and aesthetic problems. And they have to provide in their design a resolution of the tension between the familiar and the strange. The solutions adopted by successive generations of radio designers involved an attempt at what we might call pre-domestication: an anticipation in design itself of the artefact's likely place in (in this case) the home, and an attempt to offer a solution *in the design of the object itself* to the contradictions generated within the process of technical innovation. We have seen how, in the case of radio, this has been an evolutionary process. But we have also seen it as one within which a dominant design rhetoric locking technological innovation with images of scientific progress has been firmly established in the culture of the twentieth century.

Forty's account is therefore instructive in a number of ways. It sensitises us to the complex and historically determined dynamics of the design process, alerting us to it as a rhetorical but above all as a social process. As such it offers us a first stage in our attempts to understand the design/domestication interface. But it also provides a cautionary tale for those involved in the present generation of technological change, where for example in the move from voice to video telephony (cf. Kraut, 1994), the issues will not just be those of managing technical solutions (to image or sound resolution or synchronisation) but in providing a design solution which facilitates both the conversion of the telephone from one functional object (voice to voice communication) to another (face-to-face communication as well as video on demand) and at the same which mediates the tension between the familiar and the strange which will inevitably be associated with such a conversion. What Forty's account does not of course do however is to address the more detailed question of how the link between technological design and the user is made. And it is to this problem that we now turn.

### **Constructing the user**

Woolgar (1991) links the notion of design to the construction (configuration in his terms) of the user:

... the design and production of a new entity (a new range of micro-computers) amounts to a process of configuring its user, where 'configuring' includes defining the identity of putative users, and setting constraints upon their likely future actions (1991, 59).

Woolgar's research involves an ethnographic immersion into the organisational culture of a hardware producer. It also involves a conceptual requirement to consider the machine as if it were a text, but a text in the specific sense identified by Dorothy Smith (1978) in her analysis of reports on mental illness. In this specific sense the machine and the machine-text provide instructions for the idealised and eventual user (the two are necessarily interrelated) to 'read' the text in ways that it itself provides for and in a sense legitimates. What Woolgar is trying to identify is a design process through which the user is incorporated into the mechanics of the machine in such a way as to enable the user's relationship to fit both with the intentions of the designer and the embodied possibilities in the functional apparatus of the machine itself (bearing in mind of course that both are disfigured by their very ambiguity). The user is configured because he or she is inscribed in this process in such a way as to be able to find in his or her dealings with the machine an 'adequate puzzle for the solution which the machine offers' (69).

Woolgar's concern is to establish how this design process takes place within a complex organisation and to explore the determinacies and indeterminacies of boundary definition within the organisation as designers negotiate with both imagined and (in usability trials) real users an acceptable set of textual characteristics for the hardware. Clearly this process is a conflictful and uncertain one. It is also the product of, and perhaps even an expression of, the particular characteristics of the organisational culture of the computer manufacturer (cf. Kidder, 1981). Indeed different groups involved in the design of the text-artefact have different perceptions of who the users might, or should, be and those different groups have different power within the organisation to insist on their particular views being taken into account. Woolgar explores, in particular, the relations between those in the technical support and those in the marketing sections of the company.

All this is extremely important. It is clear that technical artefacts are constructed with users in mind (even if that knowledge is often tacit, contradictory and not often tested). It is clear that the particular culture of an organisation will define the particular (in any given case) resolution in the design which, again with greater or lesser degrees of fluency, the user is configured into hardware and software products. It is necessary here to recognise that both these products are not coterminous with the object-machine and much in the way of user configuration takes place within, and can be deciphered through, for example, the manual. It is also clear that the process of configuration is in the broad sense a political one, both in the terms which we have already identified as within the politics of the organisation, but also in the relations between the company and the actual users, who are requested (required) to consult the company if the user is unable to function in the way in which he or she is configured to do within the machine-text (80).

But while these arguments are both suggestive and plausible, they are both contradictory and insufficient. Specifically they fail to clarify the relations of determinacy and indeterminacy that the machine-text is supposed to have with respect to users. The indeterminacy of the configuring process as it plays out within the organisational politics of the manufacturer turns into a kind of pseudo-determinacy when it comes to the actual relationship that the user has with the artefact. Woolgar properly insists on the provisional and arbitrary nature of the

boundary that is socially defined around an artefact or technology, but this begs the precise question he is at pains to address, and to which he assumes 'configuration' provides an answer: namely the effectivity or otherwise of this configurational work.

More serious however is the inadequate notion of the user around which the whole argument is built. It may or may not be the case that in any given organisation the user is seen in exclusively functional, instrumental or cognitive terms. It does appear that in this case the user has just such a status, and that the usability trials, limited as they are in practice, are further constrained by a perception of the user exclusively as being at the interface of screen and keyboard. The inadequacy lies in Woolgar's own apparent acceptance of that definition and in the consequent absence of any consideration of both the machine-text and the user as part of a wider social, cultural and economic environment. Users are not just technical users. The category mistake that the manufacturing company appears to be making may or may not have, or have had, commercial consequences, but the refusal to recognise a much wider definition of the user in the analysis itself has just as plausibly profound intellectual consequences. In both cases the user is misread. In both cases the user is seen as an isolated individual. And in both cases his or her status as a consumer, and therefore as someone who will engage with the technology in altogether other and more diverse ways, is denied.

It is to this wider definition of the user - the user as consumer - that we now turn.

### **Catching the consumer**

Ian Miles and his colleagues, in a recent paper (1994) report research that has as its aim the teasing out of the ways in which firms launch new products, that is new products which do indeed recognisably claim to be offering something quite new technically and technologically. Such products or product areas as home automation, multimedia or messaging systems emerge as the result of a complex organisation politics. But this politics is conducted in relation to a shadowy figure - the consumer - whose presence only intermittently intrudes but yet whose actions individually and collectively will determine the success or failure of new consumer product.

Home automation and multimedia, especially, are being designed for domestic consumption. As such they have to be sold, and they have to be sold within a complex cultural space in which consumers in their various rational or irrational ways make decisions about the appropriateness or inappropriateness of a new product to their own circumstances. As we shall go on to argue, understanding the nature of this complex cultural space requires attention to a number of different factors. Miles and his colleagues are concerned with the questions of how innovators develop their own notions of new consumer products; how they understand the consumption processes which their products are aimed at; how, if at all, this knowledge enters into the shaping of such innovations; and what sort of knowledge, from what sources, is being drawn upon. Together these questions amount to a wider concern, which involves the design of a consumer product - in this case of course a new media or information technology - and the relation of design to future use.

There are a number strategies and tactics to be identified in this process. Innovators will draw on existing product characteristics and product trends in making their forecasts of future demand. The logic of technology - for example in relation to speed or miniaturisation - is often called upon to provide a framework for analysing future demand without any reference

at all to the consumer. Similarly, and once again in the absence of, as well as a result of, any substantial consumer knowledge, the process of product launch involves the building of what Alfonso Molina would call 'a socio-technical constituency'. What is involved here is the mobilisation of significant players across a whole industrial and commercial terrain, in such a way that the new product and the principles that drive the new product get as free a run as possible. Such socio-technical constituencies might include groups within the producing organisation, external sources of finance (both private and governmental), suppliers of complementary products, standards setting bodies, distributors and installers, regulators and lawmakers, organised social actors, such as consumer organisations, and consumers themselves who may be involved in a form of pre-launch testing or market research, and of course the media.

Alongside these activities are those in which the consumer is imagined - constructed, at least as far as the evidence that Miles and his colleagues offer, would be too strong a word. Such imaginings might involve the intuitive stabs of individuals reflecting on their own tastes and preferences, the calling up of diffusion curves on supposedly equivalent earlier technologies, or industry lore in which stories about competitors and other products, created and fanned by the trade press and general media, circulate and recirculate.

What emerges (or should emerge) from this unstable state of affairs is what David Teece (1986) has called a 'design paradigm', a more or less fixed set of characteristics which define an integrity for a particular product in what Cawson et al. (forthcoming) in their turn call a 'product space'. A product space, for example in the case of CD-I, is dependent on the emergence of a number of different product configurations according to intended applications and markets - especially through hardware-software interdependence, and professional and consumer applications. One must be careful not to exaggerate the inevitability, resilience or fixity of both the design paradigm or the product space. Both are hard won and in any given case of course they may remain at best fuzzy, and at worst still born. Indeed as Cawson himself points out the definition of the 'product space' is a continuous process which does not come to an end with the launch of the product. However it is clear that the design and innovation process is one which 'vision and exhortation play as critical a role as the purely technical aspects of design' (Miles et al. 1994, 79). And both vision and exhortation in turn depend on a successful negotiation of the politics of both organisation and market. In this negotiation, what is at issue of course, is the capture of the consumer, the potential purchaser and user, whose desires and behaviour, even for those who conduct product trials or market research, are mostly still a matter for speculation, and whose decisions and actions, both at point of sale, but just as significantly thereafter, will determine the success or otherwise of a given media and information product, and the viability of its product space.

Miles, Cawson and Haddon have begun a process of investigation of the innovation and design process which extends beyond the technical aspects of the user's actual putative relationship to the machine. In so doing they open up the question both of the determinacies and indeterminacies at the heart of the innovation process, but also of design as being an element in a much more complex web of production and consumption relations. In this they extend both Forty's historical analysis and Woolgar's sociological one. But at the same time they have yet to provide a descriptive account of the process as a whole, and especially of the relations of production and consumption of a new media and information technology. And they have yet to offer a conceptual framework or a theoretical perspective which advances understanding much beyond the individual case.

It is to both of these two aspects of the design/domestication interface that we now turn.

### **CD-I: a case study**

In an illustrative case study of the development of multimedia with special reference to the early launch of Philips' CD-i (Silverstone and Haddon, 1993) we sought to show how the innovation process involved a multiplicity of actors across the production-consumption divide. In particular we sought to show how the identity of a new product like CD-i as well as the character of the multimedia product space was subject to competing and continuous definition and redefinition while at the same time the consumer-user was similarly being defined and redefined. The case study was generated as a result of a series of interviews with producers, advertisers, retailers, trade journalists and early users, together with supporting documentary analysis. Without laying too many claims for its significance, the research offered an account of the emergence of a new technology at a precise historical point, indeed at a point at which the future of the product and the speed and character of the acceptance of what multimedia in general was offering was still very much uncertain.

In reviewing the findings of that research here we seek to provide an empirical bridge between the discussions on design and those on domestication that will follow. The case study offers an account of the various elements and players that made up, and make up, the multimedia story. Those players, we argue, include consumers, both imaginary and real. It also offers an account of the innovation process of a media and information technology in all its uncertainty and indeterminacy. At the time of its initial production (and perhaps even still now at the time of publication) the multimedia story is still far from being clearly told or tellable.

Much of the running in the development of a consumer multimedia product has been made by the Dutch multinational, Philips. With the experience of some less than successful product launches behind them (especially Laservision) and with the expectation that multimedia would quickly attract almost all the big electronic hardware and software producers into an increasingly valuable but also competitive market place, Philips' strategy was to establish an early foothold with what they hoped would be a commanding technology. This would in turn be buttressed by a number of industrial alliances (for example with Sony and Matsushita as well as with software developers, for example, at least later, Nintendo). CD-i was to be supported by international agreement on a series of *de facto* standards which would secure Philips' own position in this increasingly intense and competitive market place. It also involved continuing hardware development post-launch, particularly with a view to making Full Motion Video (FMV) available. It also involved the creation and facilitation of a software support industry, bringing together a novel convergence of video and computer technologists with different skills but little experience of collaboration. And it involved, finally and most uncertainly, an attempt to position the new product in the market place. It is this last dimension of the innovation process which provides the focus of what follows.

It is clear that finding its place in the complex and rapidly changing map of consumer electronics was going to be extremely difficult. We identified three dimensions of the problem as they appeared, at least, to the producers. The first was the problem of predicting take-up (the problem of precedence). The second was the problem of defining the product (the problem of identity). And the third was the problem of finding the consumer (the

problem of the market). Together these different concerns involved questions of establishing what kind of technology CD-i was to be: whether it would for example follow the innovation/diffusion curve of CD audio, the VCR, the home computer, or the games console. It could, of course, claim links with all four. These concerns also focused on the problem of interactivity, and the distinctiveness of the new machine from what had preceded and would accompany it in the innovation process. Interactivity, for many the key selling point for CD-i, was seen by others as unsellable, both because it meant so little and/or because it meant so much. Viewers of television, a predominantly passive medium, could be argued to be, by virtue of the remote and in other ways, to be already engaging interactively with the medium. Users of computers would expect a much higher degree of control over their software than CD-I would, at least initially, provide. But the problem of identity was not confined to the status of the hardware, for it was clearly evident that the character of multimedia and its ultimate success would be determined, more than by any other single factor, by the software available. And here the decision to produce education related software (the "worthy option" and one originally favoured by Philips) or more popular or populist software (games, entertainment, feature films and (soft) pornography) was crucial, not just in attempting to claim a market but at the same time defining CD-i within a given product space. Software choice and design, and the design and marketing of the equipment itself, all, therefore, fed into this issue of identity. And the problem of the market was of a piece with this. Early market research, mistakenly as it turned out, pointed to 'self-developers' as early purchasers and lead consumers. But the market would also vary nationally and across class, age and gender. In each case, bar perhaps the perception of the distinct national markets, Philip's strategy suffered a radical post-launch rethink, as different consumers demanding different software emerged from what had originally been incorporated into the product and the product launch.

This uncertain progress was the product of conflicting pressures within and outside the company to *design* CD-i, to design it both literally and symbolically, and to design both hardware and software. Throughout the process, as Miles et al. point out, it is the consumer and his or her willingness to accept both the new machine and the new idea of the machine that is at issue. CD-i had to be defined alongside and differently from earlier generations of plausibly similar technologies, from similarly oriented product packages offered by competitors (Commodore with CDTV were indeed first to launch), and from others such as Sega etc. who were following close behind. But CD-i also had to pass through the hands of advertisers and retailers, as well as across the pages of trade magazines and national newspapers on its way to the consumer. In all these cases there were cross and competing definitions as advertisers sought to define CD-i as an enhanced TV set, its principal high street retailer (at least in the UK) associated it with CD-audio, and the broadsheet journalists trumpeted a whole new dimension in home computing (Silverstone and Haddon, 1993, 27-39).

Through all of this, of course, the consumer-user did not exist. Most of those involved in the marketing of CD-i agreed that there was no demand for, nor understanding of, multimedia. And so if the consumer-user did not exist he or she would have to be invented. And that indeed is precisely what happened and continues to happen. But this invention is not conducted in a vacuum. Feedback from early users came to magazine editors and retailers. Philips indeed conducted their own market research. The process of domestication had begun. And it had begun in design. From the design of the remote control (rather than a joystick or a keyboard) and the packaging of the machine (to look like a video rather than a

computer) to the construction of the image in advertisements and at the point of sale, the public definition of CD-i was being negotiated. And of course beyond this, such definition and redefinition continues, for with early sales came early users and early users were not, as we have already hinted, always quite what Philips had in mind.

If producers, within the terms of the present discussion, have to 'capture' the consumer, the reverse is also true, consumers have to 'find' the technology. These two processes are of course interdependent, but it is the slippage and the contradictions between them which are most instructive. Our research amongst early users of CD-i was far from exhaustive, and can not be used for more than illustration. What it did however was offer an insight into the complexities of the domestication process, complexities informed not just by available resources, but by household priorities; informed not just by gender but also by age and class; and informed above all by a mixture of both high and, for the most part disappointed, expectations, principally with regard to the software; as well as anxieties, principally with regard to whether the new purchasers had backed the 'right' technology. Early adopters are impatient folk, and the lack of what they saw as exciting software as well as the unavailability of FMV were the main reasons for early dissatisfaction (in two of the four cases the new machine had been passed on or abandoned within the six months). But equally early adopters are individuals with clearly defined personal agendas when it comes to new technologies. In all but one case the machine was bought for the individual purchaser to use. It did not become, in the initial household, anything other than a private resource (though in one household it was passed on quite quickly to the grandchildren who would clearly have more of a social relationship with it). Rather than interactivity too, the dominant appeal of CD-i was its integration of previously separate media (especially CD-audio, video and computer games).

Above all what this albeit limited research revealed was the range of domestic circumstances which come into play in the acceptance and appropriation of new technologies. This was much in evidence in the careers of the CD-i machine within each household even within the first few months of ownership. In each case domestication involved locking the machine and its meaning into an existing technological culture of family and household.

Indeed it is the various conjunctions and disjunctions (acceptance and resistance) between the domestication and the design of information and communication technologies which lie at the heart of the innovation process and which provide the focus of the arguments and analysis which follow. In what does follow we present a model for understanding the process of the domestication of media and information technologies and explore some of the implications of the more extensive empirical research that has been associated with its development. But before engaging in some of the detail we need to relate our arguments to a wider set of concerns related to the construction of what Orłowski and Robey (1991) define as a middle range theory of innovation. In doing so we hope to relate our concerns to a wider debate about innovation, and *per contra* draw on the issues raised by this wider debate into the specific domain of the domestic and the everyday.