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Researching gender and home computers

Book section

Researching Gender and Home Computers

Haddon, L. (1990) 'Researching Gender and Home Computers', Sørensen, K. and Berg, A. (eds) *Technology and Everyday Life: Trajectories and Transformations,* University of Trondheim, Trondheim

It can be clearly demonstrated that there has been more male than female interest in home computers since their appearance in Britain in the early 1980s (Haddon 1988a; Haddon 1990a). That difference has led a number of writers to characterise the microcomputer as a "masculine" technology. This paper, based on my PhD dissertation, examines how this pattern of interest developed by exploring the complex process by which home micros emerged.

The first section deals with the question of how this doctoral project emerged and why particular issues and questions were formulated. Since I had found that there was little academic discussion of the experience of males researching gender issues, it seemed appropriate to say something about how personal background, as well as previous academic interests, shaped my approach to this topic[1].

Emergence of the Project

If there was one single prompt which first drew my attention to the micro it was the popularity of microcomputer magazines. In 1983, while following an MA course in cultural studies, one lecturer mentioned that by some measure the UK computer journals had started to rival sales of women's magazines. It was striking that just one branch of the male specialist press should achieve this. Furthermore, this popularity related to a product which appeared to come from nowhere within a few years. At the time I was looking around for possible doctoral research topics, and here was the chance to examine the history of a relatively discrete product, over a limited period of time - which I was advised helps to make a contained thesis project. It also seemed useful to try to apply some of the cultural studies approaches to technology, since such products has been relatively neglected in previous studies within this discipline[2]. In principle, it should be possible to ask similar questions of technologies as "texts" which are produced and read like any other cultural object, such as media texts. This approach has subsequently been developed in other studies[3].

But more personal motivations were also involved in the decision to investigate this field. I had taken a A-level in computing in the mid-1970s when the subject first appeared in schools. An

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[1] One of the few discussions of males researching gender issues is that by Morgan (1981).

[2] Examples where technology is discussed from perspectives related to cultural studies include Willis (1978); Hebdige (1982); Fry (1982); Goodall (1983); Forty (1986). In particular, I drew upon examples provided in Johnson (1986).

[3] For example, this is discussed in the current work at Brunel University. See Silverstone et al. (1989), (1990), and the paper presented in this volume.

enthusiastic maths teacher had introduced computing into our school - in fact, one of the groups who showed an early interest in computers, which I was latter to document in my research - and through his persuasion, I and others took up the subject. Most of us found the subject fairly boring. Computing was mainly a form of insurance policy, a practical skill which might latter help as a qualification to acquire work posts or student places.

This background familiarity with computing meant that I felt confident about understanding the technical aspects which I might encounter. But more importantly, that experience raised a question for me. Why did this interest in computing exist in the early to mid-1980s, especially amongst schoolboys, whereas this appeal had not existed in the same way in my own school a decade earlier? What had happened in the meantime to change the significance of this computing technology?

Given the pattern of male popularity and questions derived from my personal experience, it was clear that gender was going to be an issue from the start - which tied in with my interest in feminist discussions. But the particular emphasis of my work, which may have been different had I been a female researcher, was to actually explain the basis of greater male interest in micros. Some of the more journalistic accounts at the time seemed to assume this to be somehow "natural" or at least "obvious", whereas from my viewpoint the basis for enthusiasm was far less obvious to me. It had to be explained further.

Besides, I felt that from my own position as a male researcher -especially one who could have become "involved" in home computing had the "boom" taken place 10 years earlier - this was a good dimension which I could best attempt to understand. I expected to have a good deal of empathy for enthusiasts to appreciate their interest, while trying to explain it. This does not mean that there were no women and girls interviewed in the project - I interviewed some women involved in production, some girls at school, and a few women who were interested in micros. But the bulk of the work was on males, as reflected, for example in the decision to spend periods observing an evening hobbyist computing club and the club in my old (boys') school.

Production and Consumption

Cockburn in her wider discussion of the relation of males to technology notes that: *"When a computer arrives in school boys and girls are quick to detect its latent masculinity"* (Cockburn 1985). Meanwhile, Zimmermann describes computers as *"built by male engineers in their own image"* (Zimmermann 1986). The implied message of these two early observations about home micros was that it is equally important to pay attention to the production, the shaping of this technological product as to consumption. In contrast, many of the press reports and discussions had usually paid more attention simply to the different attitudes and orientation of men and women when trying to explain differential popularity.

In fact, the research became mainly a study of production. The majority of the original PhD is taken up by an exploration of the origins and subsequent transformations of what turned out to be a family related products, with an eye always to the question of implications for users. This included asking manufacturers and publishers about their conceptions of gendered audiences and their policies based on these assessments. But, and what proved to be more important, the

research also examined the changing nature and identity of the micro in general, and the implications this had for different groups of male and female users.

In some respects, it would have made sense to restrict the research to the "making of a technology", but there were a number of factors which also committed me to paying at least some attention to the consumption of the micro. On my cultural studies course there had been some discussion of following the development of cultural objects across both the production and consumption moments[4]. A second factor was that I simply did not have the confidence to make the kinds of assumptions about male and female interest which some accounts of production texts adopt. For example, commentaries on computer games often made strong claims about the interpretations which males and females would have of these texts. Even though I was committed to the importance of examining production, it seemed difficult to make claims about the "popularity" of a technology without grounding any arguments in some empirical material - and at the time when I started research I was unaware of any such complementary work[5].

Finally, it also became clear that various different groups of "consumers" had played key roles in determining the way micros had evolved: namely, early hobbyists and later the boys whose use of micros helped partially transform its identity to one of "games machine". Hence these users were not just restricted to the limited role of buying a product whose trajectory of development was determined solely by industry forces. It was vital to understand their interest and subsequent consumption histories not just to answer my questions about the "popularity" of the micro but also in order to appreciate on-going developments within the sphere of production.

Some further considerations

The problem with retrospective accounts of research is that the development of the project can appear far too sequential and logical - almost a step-by-step solving of a problem according to good (positivistic) "scientific" method. The reality is more messy, even though the researcher attempts to impose order on the topic. In the case of this doctoral research, a whole range of dimensions, and further puzzles emerged, only some of which were followed up and developed.

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[4] Dave Morley's various contributions on the production and consumption of television texts provided a useful example when planning my research. See Brundson and Morley (1978) and Morley (1980, 1986). Currently, Cynthia Cockburn (at City University, London) plans to conduct a study in relation to the microwave oven which examines both production and consumption

[5] In a well researched area, it would have been easier to focus the project more, but when I started only Sherry Turkle's work had been published (Turkle 1984). During the course of that research, other work on consumption and home micros has been conducted. Murdock et al. (forthcoming) have organised a longitudinal study which involves some qualitative work. Shapiro (1988) has completed her doctoral thesis on early American computer users - employing a symbolic interactionist perspective. Shotton (1989) has carried out work in the UK exploring the issue of computer addiction. Some work on gender and micros was very recently presented by Wheelock (1990). The Brunel work, cited above also deals with the home micro. In addition, there is some ongoing doctoral work being conducted in the UK by David Skinner at Brunel and Susan Bains at CURDS, Newcastle University. For more details, see Haddon (1990b).

But it is worth mentioning some of these early observations because they shaped the overall form of the history.

One point was that computing "interest", a term which I was always attempting to elaborate in the course of the research, clearly went beyond actual sales of machines. I have already indicated that interest was made manifest through magazine sales, but there was also a "boom" in media coverage when schoolboy games writing success stories and especially Sinclair achieved a high media profile. Some of this was helped along by the BBC's Computer Literacy Campaign, the pronouncements of Government spokespeople and the DTI founding of micros in schools (Haddon and Skinner, forthcoming). In fact, part of the "bubble bursting" was this collapse of visibility rather than too great a drop in computer sales.

In figures and media coverage provided "public" measures of the boom, initial enquires also revealed a concomitant upsurge in people's everyday discussions of micros in the early 1980s. In fact, as a researcher it was very easy to be "on duty" all the time in that simply mentioning my work usually led others (mostly, but not exclusively male) to comment extensively on home computers, or, in later years, to reflect back to the days when it had been a frequent topic of discussion[6]. And further investigations highlighted the significance of a whole range of computer-related activities in terms of exchanging software, visits to show and shops, and computer club involvement. In other words, the "boom" in interest was multidimensional, beyond the diffusion of products (and to some extent patterns of usage) which is examined by the innovation literature. And home computing encompasses activities outside of the home, even though the product was a "domestic" technology. Part of the aim was to chart the contours of this "interest".

But there appeared to be a paradox here. In effect, the above points refer to the collective nature of interest in micros - that it was a social phenomenon, that computer talk had some currency in conversation, that there were meeting places and various forms of exchange. Yet, a key image, indeed a minor moral panic, in the case of computing was that the machines might encourage isolated, anti-social users. Moreover, this was a danger to which males were supposed to be far more liable to succumb, having a tendency to become over involved "with things" rather than people. This is a theme which computer manufacturers have attempted to combat, (and still do), and which other research has indicated can be of concern to parents[7].

This fear of male addiction has a longer history, and can be found in concerns about arcade games-playing. There are also several feminist observations about males' intimate relations with machines. Clearly this whole topic is worthy of being a project in its own right[8]. But apart from noting these concerns, that background representation provided yet another motivation in my own work to bring out the social side of computing, and to emphasise that it is difficult to make

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[6] This theme is developed in David Skinner's work, reported in Haddon and Skinner (forthcoming).

[7] Rogge and Jensen (1988) refer to this when discussing one of their family case studies.

[8] Shotton (1989) really only tackles one dimension of this - attempting to test claims about addiction through examining consumption. How these moral panics are created and promoted is another issue.

sense of the popularity of micros, or of games-playing, if one's conception of computing was limited to the moments of contact with the machine in a home setting.

A final puzzle arose after collecting and examining some of the available statistics on home computer usage regarding such matters as usage knowledges of micros and the desire to possess these products. All these measures show greater male interest, whether comparing adults or children/teenagers. But the figures also show some female interest -and there are women and girls who use home machines very frequently (like males, predominantly for playing games). Further investigation showed interest manifest in other ways such as attending evening classes or watching TV programmes on micros (although this is clearly a little problematic given the issue of who controls what programmes are watched in the home).

On the other hand, other channels of interest show negligible female involvement: for example, there are few female readers of computer magazines, and little attendance at computer clubs. So clearly we have to be sensitive to the issue of what shapes different manifestations of interest. Over and above this, what is striking is that in many sense the public image of micros is *so* male dominated. Many of the producers I spoke to assumed mostly male audiences, even if they would like female ones. In casual conversation a 90% male following for the product was often assumed, even though the figures do not support this picture. So here we have the other side of the coin - while I may be trying to explain greater male interest, it is also important to account for the fact that it is male interest which is so visible.

Stages and puzzles

A point which emerged in the early part of the project, and one which must make us reflect on some of the diffusion of innovations literature, is that the micro's development has been by no means straightforward. Its history can be divided into several distinct stages, and hence there was a number of potential turning points - moments when the product could have developed differently (Haddon 1986b). Each of these transformations generated some surprises for many of those involved in the microcomputing or related industries, and so we could be worthy of coverage in any history of the computer. For my purposes, they were also noteworthy in relation to gender and the identity of the micro.

First, the initial appearance of micros as a hobbyist product in the US in the mid-1970s had not been anticipated. Computers had until that time been seen mainly as tools of large-scale administration and science. Why on earth would people want them in their home? In fact, the picture is slightly more complex on further inspection. The semiconductor industry looked forward to the days when more chips would enter the home by being built into appliances offering some of the control functions which microcomputers later offered. Some visionaries in the computer industry looked forward to the time when homes might hire computer-processing time over the phone. But neither of these potential "revolutions" actually prophesied an artefact called a computer in the home. And certainly they did not envisage a hobbyist one with which enthusiasts would want to play! Computers and chips were about delivering benefits of a far more serious nature than this!

So why were micros taken up by hobbyist communities in what proved to be a very enthusiastic

manner by any standards? There was a good deal of proselytising about the future of this product, while many participants gave up their old interests such as electronics to become immersed in the world of microcomputing. Here we have a question concerning how "early (male) adopters" became such, which is especially significant since this group has been portrayed, rightly in my view, as being very influential in the history of the micro compared to the case of other products. Moreover, this was the first moment when the preponderance of male consumers helped to give the home-based machine its "masculine" image. So rather than addressing the question of male interest in general, the first step is to account for the intense interest of this particular strategic grouping of males.

The second phase was when the micro moved from a restricted hobbyist audience to become a mainstream consumer electronic. In general, marketers would tell us that you cannot sell technology for its own sake - that products have to offer consumer benefits, to offer new functions, be they time- or cost-saving options, whatever. Indeed, some manufacturers felt that the micro had this potential to deliver range of applications to a home market and that one day the home computer could find a place in everyday routines of household, being used on a regular basis by all the members of the family. As a vision of where micros go, I refer to this as the infrastructural machine, since it is so integrated into family practices.

Given discussions along these lines, there was some further surprise when early British machines were sold as mainstream consumer electronics on basis of an essentially hobbyist interest; that there was a change to simply get your hands on and explore a new technology. I tend to refer to this underlying conception of the artefact as the "self-referential" machine, because people bought computers to find out about computers. In other words, the continuity with the early male interest was largely preserved as the machine diffused to a wider audience. We need to ask why and to what extent this representation of the micro occurred. But also now that the product was addressed to women as well as men, what was it about the nature of this micro product which still continued to attract a greater male following.

The third phase in the development of the British home micro occurred when the computer became predominantly, but not exclusively, identified as a "games machine". This led to disappointment on the part of those who prophesied the microcomputer revolution on the home as well as on the part of hardware manufacturers for whom relatively down-market single purpose micros held as less potential for profit. Some claimed that the early mass market in cheap, low-powered machines was the cause - that they offered no real application apart from games. But in practice, games did not rise to prominence by default. Their attraction can be better appreciated by looking outside the history of computers to that of electronic games. Which also means investigating young males and the history of games consumption. Thus in this last section, the males under examination are again different - they are male youth, who are now by far the main users of home micros. And the nature of the explanation of their interest needs to change once more to take into account its origins in products other than micros.

Hobbyist Machines

Although individuals with considerable expertise had constructed small computers in earlier years, 1974 is taken to be the start of microcomputing with the launch of the Altair in the US.

These machines and later brands like the Apple and Commodore PET were not available in the UK until 1977, which meant that there was a period when reports of the growth of American hobbyism reached Britain. In both the US and UK, hobbyists themselves were surprised at the number of people who "suddenly" showed interest in micros via demand for machines and at computer shows. But when we examine the build-up to the micro this is less surprising, with the suddenness of enthusiasm merely representing a form of invisible, pent-up demand.

The first micro products were taken up by a number of overlapping communities. One consisted of teachers, often from a maths/science background, who had campaigned in the 1960s and '70s to introduce computing in general into schools. The smaller micros offered new possibilities compares to the cumbersome process of renting computing time on distant mainframes (as had happened in my own school). A second constituency involved those working with computers, either in programming or through some more specific areas such as computers and telecoms. The computing press covered microcomputer developments, but for many in the industry the problem was that the dominant trajectory appeared to be for ever more powerful mainframes and minicomputers to offer *more* services and facilities whereas micros, in the early years especially, could do far less than their larger relatives. Despite the ridicule of some colleagues, a number of these professionals advocated the possible alternative, decentralised potential of micros, drawing on countercultural themes. For the enthusiasts within the computing industry, here was a chance to have total control over a machine.

But my main focus is on the existing community of electronic hobbyists, who came to make up a core in later microcomputer clubs and who had been preparing themselves for micros for some time. The magazines geared to this group provide some insight into the nature of their prior interest in electronics. The projects suggested and products available in the 1970s hobby electronics press clearly offered use-values - e.g. electronic security devices, car accessories, and peripherals to enhance musical or photographic interests. But it is equally clear that these audiences are assumed to show an interest in such a diverse range of electronics that they must be motivated by something beyond the narrowly conceived benefits of any particular item. Technology is assumed to be pervasive in their lives.

Furthermore, knowing about the "latest" technology and anticipating goods which may some day become available for a wider market is as important as making or buying them. What becomes explicit when talking to these readers is that it was ultimately the technology per se which was interesting and more important than its particular application. And that interest extended beyond do-able projects or available products to keeping abreast of state-of-the-art technology more generally - e.g. solar and wave energy or space exploration. These were knowledges which were the currency of talk when hobbyists came together.

It is in this context that we can appreciate the preparation for micros that took place in these hobbyist texts. Throughout the 1970s, the UK electronics press discussed the general significance of programmability for electronics, together with the changes which microchips were going to bring to electronic hobbyism. This field of innovation was portrayed as amounting to a major transition, greater even than going from valve to transistor technology. This press reconstructed "programming" as the new challenge for electronic specialists. Finding out about microprocessors and microcomputers provided a foothold into that wider technological

revolution which was going to affect society.

Thus, microcomputing technologies were gradually constructed as objects of considerable interest for this community and given the technological identity of being modern "high tech" which was strategic to how electronics and computing would develop. These were frontier technologies, as radio had been for an earlier generation (Douglas 1986). By learning about the working of microtechnology, hobbyists could come to grips with the operation of those more inaccessible devices which shared the same core principles.

In fact, from being the new frontier, the area was so vast that enthusiasts could easily find themselves devoting all their energies to simply understanding the workings of these computer. Which meant that many enthusiasts actually transferred their attentions for electronics in general as microcomputers formed the basis for a separate hobby - with its own specialist press. In addition, even relative to electronics hobby projects, computing enthusiasts approached the micro in what could only be regarded as an extremely non-utilitarian fashion. Often they never got to the stage of producing something that looked like an end-product (Shotton 1989), which made it all the clearer that primarily they were concerned with experimenting with the technology, that micros were a "toy".

Early Home Computers

Earlier, I noted that once hobby and later business micros started to become established, there was talk, first in the US, of developing more multipurpose, useful home machines. To achieve this, the form of micros needed to undergo some changes to make them more accessible. But also, for at least some major players, this transition meant intentionally distancing such a machine from hobbyist products, which implied the chance to break away from an association with mainly male hobbyist users.

In Britain, there was always going to be a problem for quickly developing a really useful infrastructural machine because of more restricted disposable income. Even the hobbyist machines in the UK had tended to be cheaper than their American counterparts. However, on top of this, Sinclair Research, and to some extent Acorn too, actually used hobbyist interest as a springboard for a mass market micro.

Sinclair has been long recognised as the most significant innovator at this stage. His firms had a history of transferring products from hobbyist to mainstream consumer electronics markets - the previous key example being that of the calculator. So when his first "home computer", the ZX80, finally made its appearance in 1980, the linkage with the hobbyist machine, and association with male users, was not broken but instead confirmed.

There were some changes from his previous products - for example, the industrial design was chosen on the basis of having more marketing appeal. And the machine was intended to be more accessible, beyond an electronics elite, to "Everyman" (reflecting the Sinclair Research view that such a machine would diffuse mainly to males). But essentially Sinclair machines invited buyers to explore the world of computing, while advertising stressed the need to keep up with developments in the technology. In design terms that such exploration was virtually the only

"application" feasible with the limited capacity of the first machines. So basically, the first home machines remained "self-referential" ones, and once this proved to be successful other companies retained this dimension in their marketing of micros, even after they had started to offer additional uses to which the micro could be put.

Wider Context

While manufacturers such as Sinclair were important agents in determining the identity of the micro, they were not the only ones. The machines were to receive further respectability through being referred to by Government spokespeople and supported by the Department of Trade and Industry initiative to introduce micros into schools. Arguably, the other most significant influence on the home computer's fortunes came from the BBC's Computer Literacy Campaign, which consisted of a number of television series, plus the commissioning of software and hardware - namely the BBC micro.

The BBC's coverage stressed the role of computers as being strategic to our future, and in this sense enhanced the message that it was important to know about computing in order to "keep up" with developments and not be left behind in the modern world. In other words, this was the same type of symbolism which Sinclair and others used, emphasising that here was a technology to get to grips with, rather than just a mundane technology which delivered some benefits in the home. On the other hand, the programme also introduced some different nuances. For example, they lessened the identification of micros with " technology". Home computers were a new form of product which were concerned with information management, and were at least as much about software as about hardware. Arguably such a shift from hard technology helped to reduce its masculine connotations, combined with the BBC's message that *everyone,* not just *everyman* should know about these developments.

So we have two elements at work in this transition to a consumer electronic. The first is that representations of home micros diffused to a wider audience - not just a predominantly male, hobbyist community. Secondly while the message that it is important to find out about computers per se remains, the BBC in particular self-consciously addressed women as well as men, while toning down the identity of the micros as being "hard" technology with which to tinker.

These transformations appeared to have kindled more interest among women than in the strictly hobbyist period. Women at least start to appear in market research data on usage - albeit in a minority. And closer inspection of computer related activities show more female interest than had been anticipated. Even the BBC were a little surprised to find that nearly half their audience was female. Some demand was also shown in adult education day classes on computing. In other words, women were represented in channels through which it was relatively easy to show interest.

Whereas they were far less represented in the computer clubs, and at events such as shows, often attending as the wives, girlfriends and mothers when husbands, boyfriends and sons were enthusiastic - which also meant that in these channels, which were also the key ones seen by producers, males were far more visible.

Overall, men still appear to have a greater incentive to take an interest in micros. It is difficult to construct an exact figure from diverse statistics, but a guideline of twice as much usage among adult males than females would gives some guidelines. That gap was to become greater among male and female children/teenagers, but this was partly for other reasons, as we shall see presently. Furthermore, once we move away from actual usage figures, some other dimensions of interest were even more male dominated. For example, the readership of specialist magazines is about 90% male. And based on my own and others impressions, computers seemed by the mid 198Os to have joined the list if items such as sport, cars, and DIY as a topic of discussion in adult male circles. This point is elaborated later, particularly in relation to male youth.

In tracing the continuities and changes in representations of the micro, I have noted (a) whether and how women were addressed and (b) the degree to which the "technology" of computers was stressed and in what manner. The existing literature on technology and gender would suggest that such matters were relevance in explaining differential male and female interest. But it is also possible to go a stage beyond this to ask how a specially "self-referential" micro computer might be experienced differently by men and women given the broader constraints on women noted in feminist writing. In other words, how difficult is it for men and women to accept a particular relationship to this machine, to engage in the activities implied by this artefact? This too might have a bearing on enthusiasm for the product. To answer this question, the next section makes reference to empirical work on the "sociology of leisure", draws out the implications for computing in particular, and illustrates these through the actual experiences of a small sample of male and female interviewees.

Gender, Leisure and the Self-Referential Machine

First, it was worthwhile bearing in mind some points made by feminist writers about leisure time in general. These researchers have noted that the category of "leisure is in itself problematic for women since they have very little *"time free from obligation"* in which they can choose leisure activities (e.g. Griffin et al. 1982). Seemingly "free" choices are often made to fit in with a network of demands. And when joint leisure choices are made - as in the case of partners going out together - it is often males who are the definers of the form which this free time should take. Indeed, these writers put the case that one of women's obligations is itself to construct and enable male leisure.

Even official statistics show that men have more leisure time and options, while Deem noting; *"women's leisure does not seem to command the same degree of legitimacy as men's, either in the home or out of it and whether we are talking about time, space, money or resources"* (Deem 1986). It is precisely these constituents of what might be thought of as "personal space" which I now examine in the particular case of computing.

The Nature of Computing as "Leisure"

The invitation to explore the world of computing implied by the self-referential conception of the micro entailed a considerable time commitment. The basic of programming, or other computer

applications, required some time to master. Nor was it just the sheer amount of learning time which needs to be considered but also the fact that it was most productive to spend blocks of time on this activity. In fact, one image of the hobbyist was of someone who could be totally "absorbed" in computing. Yet, the feminist writers have pointed out that the "free time" of many women is often fragmented. Since they are permanently "on call" leisure and pleasure have to be merged with other obligations in order to manage their primary domestic role. So the ability to be absorbed in one discrete activity is actually something that is less of an option for many women.

The type of projects suggested in magazines in the early 1980s meant that going down the path to computing as a hobby was a substantial undertaking. One enthusiast noted:

"(...)At   times I was spending 20 hours a week (on computers). Most likely my wife would say a lot more than that (laughs) (...). Well, I suppose my wife is used to me being a nutter, in that sense."

My own work suggested and that of Margaret Shotton suggests that this was not unusual for early hobbyists - and was such time commitments were still considerable for those joining their ranks in the 1980s. Moreover, in this particular quotation we also glimpse how males such as these were allowed the personal space for this hobby.

We can contrast such male accounts with those of women who showed some interest in micros. For example, one of my sample, a graduate, felt that learning about computing would interest her. Yet, after a few prolonged sessions with a micro she decided that computing was just too self-indulgent for her, and so decided against further involvement. She noted that if other people had somehow benefited from her involvement in computing, she might have continued. But this was not the case. As it was, she was concerned that it would have detracted too much from the, already limited, contact time with her husband.

It was easier to follow up this interest when there were no partners to consider. For example, one secretary now spent quite a few hours on her home machine each week, yet recalled how, when she had been married, there had always been conflicts over her ability to find free time to develop her interests. The same sentiment was confirmed by a journalist who said that she would not have been able to continue spending nearly so much time on her interest if there was someone else to consider. In fact, she could justify her interest by the fact that she wrote occasional articles on computing, as could a teacher for whom computing offered an opportunity to branch out into a new career. Here we seem the theme of "legitimacy" arising again - the time could be justified if there were spin offs - whereas the overwhelming impression from my research was that males needed less of these justifications.

When we turn to the question of space, leisure analysts have noted that:
"it is rare for women who live with others to have a space of their own for leisure, whereas men and frequently children too if they do hot simply leave the house, often have special places to go to remain undisturbed" (Deem 1986).
Certainly, the divorced secretary noted above would have agreed. Although she can spread out

her micros now, when married her following up interests usually had to take place in her only free space: the kitchen.

While the core of a micro may not take up too much room, magazines have always displayed and promoted a range of equipment to extend and improve the original machine. In fact, more committed male hobbyists have often appropriated the spare room as the computer room, or taken over parts of the bedroom. Only when the micro was legitimated could the teacher mentioned above command a similar space.

The general issue of financial resources for leisure is a little more complex, depending on how the family income is managed. But some researchers have noted a tendency for men to keep back some money for personal spending in a way which is less possible for, especially non-earning wives (Deem 1986). Certainly, one of my hobbyists talked of the "slush fund" he used on computing - which his wife did not know about. The lack of equivalent reserve funds can severally limit the leisure choices of some women.

Perhaps it is a measure of just how expensive microcomputing could become that even enthusiasts used to spending money on their hobbies knew of marital conflicts concerning the amount of money some of their peers had lavished on their micros. The sheer expandability of this activity, with extra software, add-ons, upgrades etc. could easily eat up funds, while the initial outlay to "find out what computers were about" was no small amount. For some single women such as the journalist noted above, these machines were affordable. Alternatively, if both partners had an interest in micros the home computer could become a family purchase. However, various studies of leisure suggest that more men would be able to find the money to take up such a fairly expensive interest as a personal hobby (Deem 1986).

Deem notes, *"No wonder then that much of women*'s *household leisure consists of needlework, knitting, cooking, reading, TV watching, writing letters, day dreaming and snatching quick naps. All of these activities can be fitted into a fragmented time schedule, don 't require large blocks of time, are cheap or free, require little space or equipment and can easily be disposed of or stopped when work obligations intervene"* (Deem 1986).

Here, I have tried to demonstrate how the nature of user interaction implied in the concept of self-referential machine did not easily fit in with the demands on women's "leisure".

The greater constraints on personal space thus required a greater justification for pursuing an interest in home computing. To an extent, the legitimation provided via sources such as the BBC Computer Literacy Campaign justified some efforts on the part of women - such as attending classes. Some went even further. But the case studies noted here show how pursuing that interest usually had to be justified in terms additional to any pleasure which the activity might provide. Even where computing was "fun", the micro could not just be a "toy" as could for "the boys".

Gender and the Games Machine

In this last section, I turn to the later history of the micro in Britain when male youth became the predominant users of the micro and largely transformed the identity of the product into one of

"games machine". But first, it is worth nothing that adult hobbyists played a role in this process. Before the establishment of a games software industry the positive reception given to games by enthusiasts was significant in providing early sales and hence stimulating further the initial games market. Moreover, hobbyists were themselves often the first games designers. Hence, although relatively small in number compared to later male youth, hobbyists were of strategic importance in the early days of a new industry. So how did their support for games originate?

Hobbyists and games

Interactive games were intimately connected to the precursors of current microcomputers (Haddon 1986c). The origin of these games lay in efforts during the 1960s to develop facilities on the first "interactive" (i.e. "real time") minicomputers. This was conducted by a particular male culture at MIT. These "hackers" shared in many respects the outlook of later computer hobbyists in that they took pleasure in exploring computers and other systems. It was this setting which shaped the genres of the very first games in terms of scenario and action - for example giving rise to the to fast-action battles later familiar in the arcade world.

Apart from being "fun" to play and design the existence and diffusion of games was legitimated by their other roles. It has consistently been argued that designing games was a useful vehicle for developing new types of computing and for discovering the potential of these machines. Games were also taken up for diagnostic purposes (i.e. as examples of complex programs which could be run to test machines). A final important function of games was to demonstrate the capabilities of machines to potential purchasers of computers. Thus, games achieved some familiarity throughout the computer industry - beyond MIT. Through this route they came to be adopted and reproduced by the early hobbyists in the late 1970s and early 1980s. Constructing and acquiring games came to be an acceptable dimension of male hobbyist activity.

The arcade route

The other lineage through which games developed, and which was to have a greater impact on the use of micros, was through the arcades. In the early 1970s, games were transferred from the computers to the arcade in the form of coin-operation games machines. Essentially, these were a replacement for pinball, which itself meant that the fast action style of games were the ones most promoted. By moving into this milieu, the new games machines were incorporated into the existing social activities of the amusement parks and other public sites where coin-op machines were found. These were mainly young male preserves.

An important point to note is that although games were played individually, the activity remained grounded within the social life of the peer group. In addition, by their flexible, programmable nature, there was more scope for innovation with electronic games than pinball in terms their "content" - i.e. the scenarios and forms of games-play could change. This flexibility enabled the first moves towards making interactive games into a cultural industry with regular new releases - a process which was to be vastly expanded with the arrival of programmable home video games and later computer games. Exchanging knowledges about games, together

with comparing playing skills within a framework of the rules and rituals around the arcade provided a basis for interaction among the young male attending. In this sense, games were social, despite the image of isolated individuals confronting the machine. This collective dimension carried over into the later experience of home computers.

When home micros first appeared, both hardware manufacturers and the hobbyists who were familiar with games were willing to supply computer games amongst other types of software. But during the early 1980s, the extent of demand for games began to be appreciated. While micros were bought partly for educational purposes, for learning about computers the products also provided male youth with the chance to get access to these games at home. And because British machines were based on relatively cheap and available cassette storage technology, those early years of the decade saw the entry into the market of many small software firms. Meanwhile computer magazines began to carry more game-related information, with some starting to specialise in games. These journals were slotted into a male orientated press to become an important part of the marketing mechanism for this new software industry.

I have emphasised the role of male consumption, but, as indicated in the introduction, this is not to say that there was no interest amongst young females (or indeed women). Contrary to the view that girls would not be attracted by games, especially ones with a more macho content, there is a substantial minority of girls who play games intermittently and they play mainly arcade type, fast action genres. However, this female audience is usually not the definer of games purchases within the family, and is generally less visible both to producers and other commentators, being absent from the public sites which boys often appropriate in the pursuit of their games interests - such as the shops selling software, computer clubs and computer fairs (Haddon 1990b). The girls are often to be found playing in the private setting of the family.

Moreover, the boys are far more liable to talk about both computers and games at school and in other settings, to read the magazines and to engage in practices such as exchanging and copying software. In other words, boys have other, collective dimensions to their consumption of games which makes their experience of the micro a different one from girls - an aspect which is not captured by statistics such as those on micro usage.

In sum, we might say that, with the collaboration of some parts of the computer industry, mainly games software producers and some magazines, these male youth partly changed the identity of the micro through their consumption practices - although hardware manufacturers have always tried to contest this development. For different motivations than in the case of adult males, their interest, which stemmed from past experiences of consumption of games, also helped to preserve the male connotations of home computers.

Conclusions

I have argued that the development of the home micro has not been an automatic progression - it could have taken different paths. In fact, some say that we have yet to realise the true home computer. For such observers, the history of micros so far, the self-referential and games machines, have been an aberration. In which case, the pattern of gender interest might have been otherwise.

The account has concentrated on underlying, and contending, conceptions of the micro, rather than on particular practices such as advertising. First, I noted how interest among a pre-existing male hobbyist community was itself constructed. When the micro became a "home" computer in the sense of being a mainstream consumer electronic, the important point was that its earlier self-referential identity was preserved. I charted the continuities and changes in representations which might have had a bearing on interest amongst male and female audiences, and then proceeded to examine the conditions shaping the ability of men and women to relate to the mode of consumption implied by the micro. Lastly, we looked outside computer histories to the intimate interrelationship between micros and another product - interactive games. By appreciating this genealogy and related consumption histories we can understand the basis of young male interest in micros, the dimensions of that interest, and the reasons why the micro became a games machine.

Hardware manufacturers, on the whole, have always remained deeply ambivalent about this later conception of the micro. The infrastructural machine remains the goal of many producers, although they have a variety of strategies concerning how best to achieve this goal. Thus, the longer term identity of the micro must remain unsettled. Clearly the male associations created around the home computer show some inertia, but to the extent that the future of this machine remain unclear, the "masculine micro" must be seen as being open to change.

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