

The Gender Dimension of Information and Communication Technology

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I'm delighted to be here at a forum sponsored by the World Bank discussing the gender dimensions of information and communication technologies (ICTs). Here we are at the beginning of the twenty-first century, experiencing dramatic advances in technology, yet facing chronic lack of progress for women in technology. Women are still seriously under-represented in many technical fields all over the world. Feminists have worked hard to explain this but it is now for global institutions like the World Bank to use its influence to speed up the pace of change.

I thought the best thing I could do in the time we have available today is provide a theoretical overview of the gender dimensions of technology. This will provide a context for more specific discussions of cases studies.

For many years I have been involved in building a feminist perspective into social science debates about technology. For example, in my book *Feminism Confronts Technology* (1991), I took an in-depth look at a whole range of technologies, considering the differential impact of technical change on women and men, before turning the focus around to examine their social shaping of technology. I demonstrated that artefacts are themselves shaped by gender relations, meanings and identities - from refrigerators to contraceptives, from houses, cars and cities to word processors and weapons. The book thus explored the way hierarchies of sexual difference profoundly affect the design, development and use of technologies that we often take for granted.

Since then, we have seen ground breaking developments in digitalisation and biotechnologies - that have led many contemporary feminists to surmise that the link between technology and male privilege is finally being severed. Yet, there is a suspicion that some existing societal patterns of inequality are being reproduced in a new technological guise. While cyber gurus assert that

everything in the digital future will be different, how true is this for the social relations of gender?

After all, our view of the woman-machine relationship has long oscillated between pessimistic fatalism and utopian optimism, technophobia and technomania. The same technological innovations have been categorically rejected as oppressive to women and uncritically embraced as inherently liberating. I suggest that what is constant is engagement with the process of technological change as key to the renegotiation of gender power relations.

So what role does technology play in embedding gender power relations? Let's begin with the traditional conception of what we take technology to be. There has been a tendency to think about technology in terms of industrial machinery and cars, for example, overlooking other technologies that affect most aspects of everyday life. The very definition of technology, in other words, had a male bias. This emphasis on machines dominated by men conspired in turn to diminish the significance of women's technologies, such as horticulture, cooking and childcare, and so reproduced the stereotype of women as technologically ignorant and incapable. The enduring force of the identification between technology and manliness was revealed to be the product of the historical and cultural construction of gender, rather than being inherent in biological sex difference.

Indeed, it was only with the formation of engineering as a white, male, middle-class profession during the 19th century that 'male machines rather than female fabrics' became the modern markers of technology (Oldenziel, 1999). Mechanical and civil engineering increasingly came to define what technology is, diminishing the significance of both artefacts and forms of knowledge associated with women. Engineering was represented as the very epitome of cool reason, as a detached, abstract activity, the antithesis of 'feminine' feeling. Many of us have argued that the continuing under-representation of women in engineering, and indeed all scientific and technical institutions, is a legacy of this history.

However, while early feminist writing stressed how embedded masculinity is in technology, we are generally more optimistic now about the possibilities that are opening up for women. Indeed, many see digital technologies as being fundamentally transformative, unlike previous technologies.

Indeed, early concerns about women being left out of the communications revolution, victims of the digital divide, now seem misplaced. A proliferation of mobile phones, the Internet, and cyber cafes are providing new opportunities and outlets for women. While the early adopters of the Internet were overwhelmingly men, recent data from the USA shows no gender difference in Internet use (NTIA 2002). China, a country where Internet take-up is relatively recent, shows how rapidly change can occur. Over an eight-year period from 1997, the proportion of Internet users who were female rose from 12 per cent to 39 per cent (CNNIC 2005). Certainly in the Western world, already there seems to be no gender gap whatsoever in relation to ownership or access to the mobile phone. Especially among younger people, this artefact is not culturally coded as either masculine or feminine. There is no equivalent of the hacker stereotype that has had so much traction in relation to computing.

Cyberfeminism

This has given rise to new feminist and post-modern theories of technoscience, such as cyber-feminism and cyborg-feminism. A common argument in this literature is that the virtuality of cyberspace and the Internet spell the end of the embodied basis for sex difference. According to Sadie Plant (1998), for example, digital technologies blur the boundaries between humans and machines, and male and female, enabling their users 'to choose their disguises and assume alternative identities'. Industrial technology may have had a patriarchal character, but digital technologies, based on brain rather than brawn, on networks rather than hierarchy, herald a new relationship between women and machines. In the wireless world, traditional hierarchies are replaced by horizontal, diffuse, flexible networks, which have more affinity with women's culture and ways of being than men's. Cyberfeminists claim that the Internet provides the technological basis for a new form of society that is potentially liberating for women.

[If you think is far fetched, have a glance at current management literature predicting the rise of post-bureaucratic, network organisations.]

The idea that the Internet can transform conventional gender roles, altering the relationship between the body and the self via a machine, is a popular theme in postmodernism. The message is that young women in

particular are colonizing cyberspace where, like gravity, gender inequality is suspended. In cyberspace, all physical, bodily cues are removed from communication. As a result, our interactions are fundamentally different because they are not subject to judgements based on sex, age, race, voice, accent or appearance.

In *Life on the Screen*, Sherry Turkle (1995) similarly enthuses about the potential for people to 'express multiple and often unexplored aspects of the self, to play with their identity and to try out new ones ... the obese can be slender, the beautiful plain, the "nerdy" sophisticated'. It is the increasingly interactive and creative nature of computing technology that now enables millions of people to live a significant segment of their lives in virtual reality. In this computer-mediated world that people can experience a new sense of self that is decentred, multiple and fluid. In this respect, Turkle argues, the Internet is the material expression of the philosophy of postmodernism.

For feminists then, the collapse of these oppressive binaries - nature/culture, human/machine, subject/object - is liberating. The cyborg creature - a human-machine amalgam - fundamentally redefines what it is to be human and thus can potentially exist in a world without gender categories. Cyberfeminism sees these technologies as dissolving the sex/gender nexus in the hybridisation of the lived body and machines.

Such developments in feminist scholarship have stimulated important insights into the gender relations of technology, and are a refreshing antidote to the technophobia that characterises much earlier feminist thought. But I do worry about the tendency to fetishise the new. A sharp divide is made between cutting-edge technologies and existing technologies. Such a discourse of radical discontinuity has echoes of technological determinism - albeit of a celebratory rather than pessimistic kind.

Technocapitalism

Indeed, such claims about the transformative effects of digital technologies are not confined to postmodern feminist scholarship. They abound in mainstream millennial reflections, whether it be theories of globalisation, risk, or the 'network society'. In many ways, cyberfeminism

closely resembles the more popular cybergurus, but with a feminist inflection.

Take for example, Manuel Castells (1996), who argues that the revolution in information technology is dramatically changing the character of capitalism. In the 'informational mode of development', labour and capital, the central variables of the industrial society, are replaced by information and knowledge. In the resulting 'Network Society', the compression of space and time made possible by the new communication technology alters the speed and scope of decisions. Organisations can decentralise and disperse, with high-level decision-making remaining in 'world cities' while lower level operations, linked to the centre by communication networks, can take place virtually anywhere. Information is the key ingredient of social organisation, and flows of messages and images between networks constitute the basic thread of social structure (1996: 477). For Castells, the information age marks a whole new epoch in the human experience.

This idea, that we are entering a new form of market capitalism rooted in technological invention and innovation, is also referred to as '*Technocapitalism*'. There is an economist, Danny Quah, at the London School of Economics who theorises these changes as the 'weightless economy'— whatever the term used, these theories share an emphasis on intangibles, such as creativity and knowledge, being the core of capitalism, replacing raw materials and factory labour. In the words of Nicholas Negroponte, 'being digital is different ... in the digital world, previously impossible solutions become viable' (1995, p. 231).

All these writers play the card of discontinuity and shower us with promises of freedom, empowerment and wealth. It is an old trick but we still fall for it and it has the effect of rendering pointless our knowledge of the present and past. I am not saying that we have new information technologies but the same old social relations, values, and goals.

The issue of gender and IT is not the same as it was in the late 1970s. Computers are very different from what they used to be when we first began to study gender and computing. Likewise, men and women are changing and entering new relationships with each other and their environment, and we now understand masculinity and

femininity as unstable constructions, dynamic rather than static. So, for example, while the Internet is necessarily producing new forms of connectivity and sociality, it is important to stress that the social arrangements in which they are embedded are also changing. We can only understand the widespread discussion about the possibilities in cyberspace of experiencing multiple, fluid, innovative, gender-bending subjectivities, in the context of the transformation in women's lives, and in gender relations, over the 20th century. In other words, I think it is important to credit feminism with many of the social and political transformations that are usually attributed to technoscience.

The Social Shaping of Technology

Now, the social studies of science and technology have been challenging this type of 'technological determinism' since at least the 1970s (see, for example, MacKenzie and Wajcman 1999). Social scientists increasingly recognise that technological innovation is itself shaped by the social circumstances within which it takes place. The idea that technological artefacts are socially shaped, not just in their usage, but also with respect to their design and technical content is no longer controversial. My own approach fuses the insights of new streams of gender theory with a thoroughgoing materialist approach to the social studies of technology.

This approach treats technology as a socio-technical product, enabling us to conceive of a mutual shaping relationship between gender and technology. Technology is then understood as both a source and a consequence of gender relations. In the cultural process of defining what IT is, how it should be used, what IT skills are, and what 'counts' as valuable knowledge and expertise, gender functions as a cultural category in 'sorting things out' (Lie 2003 p.20). In this process of negotiating boundaries, gender is a marker that still functions to sort out high-tech from low-tech or no-tech. In other words, gender is constitutive for what is recognised as technology, and gendered identities and discourses are produced simultaneously with technologies. I think we would all agree that the fact that technology, culture and gender relations are so interwoven helps to explain why this link has proved so durable.

Work/Life Balance

The embeddedness of masculinity in technical culture is well illustrated by the statistical reality of women in the IT sector in the UK and Australia. For example, in Australia since the mid-1980s, women's share of professional computing jobs has remained on average at around 20%, even though women now make up around 50% of all employees in Australia (Australian Bureau of Statistics 2005). While the number of women in computing jobs has been relatively static over this period, there has been a marked decline in the female share of IT education cohorts in recent years. Women made up 27% of commencing students in IT tertiary education courses in 2001, and this has now fallen to around 20%. The picture is similar in the UK where information technology work is segregated, with women tending to work in low skilled, lowly paid IT work and men dominating highly skilled and highly paid work (Greenfield 2002). The result is that women are chronically under-represented in precisely the jobs that are key to the creation and design of technical systems in the new economy.

What is striking is the prevalence of long weekly working hours among computing professional in comparison with all professionals and employees. It is very common to work 40-48 hours per week and part-time work is rare. Indeed, fewer than one in ten computing professionals work part-time (defined as fewer than 35 hours per week) compared with around one in four of all professionals and almost one in three of all employees. As part-time work is one of the most common forms of working-time flexibility used by Australian and British parents to balance work and family responsibilities, its rarity in professional computing work is important to note.

I must say that I find it particularly ironic that women are under-represented in the I.T. sector, given that I.T. is widely seen as facilitating flexible work practices and the micro coordination of time, tasks and place. Women's work-family juggle is a major factor in their marginalisation at work, so we might expect them to flourish in an industry that is widely regarded as synonymous with flexibility. Wireless computers, the Internet and mobile phones are certainly blurring the traditional boundaries between public world of work and the private home. The historical separation of these spheres has been seen as key to women's oppression, so increased

permeability should help erode strict sex role demarcation. However, so far ICTs are almost always used to facilitate the transfer of work into the home, rather than the transfer of home concerns into the workplace. This is especially true for managers and professionals, who increasingly work *from* and *at* home and when they are on the move.

For example, they allow employees to be constantly available, interrupting and diminishing the quality of family time. According to a recent Workforce Survey in California, for example, more than a third of all workers use cell phones or pagers on the job (Fligstein and Shin 2004). As many as 88% of managers, who had cell phones, reported that these devices were used to keep them in touch after hours. There is mounting evidence that ICTs are being extensively used to keep workers wired into their offices, not only during working hours, but after hours as well. According to another recent estimate, over eighty per cent of Americans check in to the office via the Internet while on vacation. The idea that some people work 24/7 is not an exaggeration.

The idea that the preoccupations of work can 'spill over' into non-work life is a familiar one, but new technologies are exacerbating this tendency. Increasingly, constant availability is a major signifier of a person's commitment to work. Pure, uninterrupted leisure time, something women have always enjoyed less of than men, could become a thing of the past. The nexus between home and work is a key one for understanding the relationship between gender and technology.

In both the UK and Australia there is currently a lot of discussion about the need for family-friendly policies to help people combine their care commitments with participation in the labour market. Some progress has been made in terms of parental leave provision, flexible hours provision, and childcare assistance. However, when I carried out a major study of men and women managers in five high-technology companies in the UK a few years ago, I found that managers were very reluctant to make use of these provisions. Both men and women felt that any absence from work would be taken as a sign of a lack of commitment to their careers.

It was not surprising then to find that a high proportion of successful women in senior positions are not parents, in sharp contrast to their male counterparts. A much publicised survey (Hewlett 2002) reports that 49% of women over forty who earn more than \$100,000 a year in the USA are childless compared to 19% of men in the same category. The perception that a career and motherhood are not compatible is still powerful. While some of the barriers that impede career opportunities for women in IT are specific to that sector, such as sex-stereotypes about men's technical expertise, others reflect work time arrangements that make certain types of higher level jobs incompatible with family and other commitments.

Conclusion:

So, to conclude, what makes getting more women into ICTs such an important challenge is that it is not only an equal employment opportunity issue, but also an issue of how the world we live in is designed, and for whom. The process of technical change is integral to the renegotiation of gender power relations and therefore an important site of feminist research and political practice.

My talk has tried to map out the contours of recent debates on the gender dimensions of ICTs and drawn my own empirical research carried out in the UK and Australia. However, emerging studies on gender and the digital economy in the developing world, such as the study on Vietnam that we will hear shortly, seem to reflect similar patterns in formation and raise many parallel issues.

Feminist scholars have long been conflicted about the impact of technology on women - torn between utopian and dystopian visions of the future. Although empirical research on gender and ICTs is still in many ways in its infancy, we can already see that technology itself is neither the problem nor the solution. Rather, the issue is ensuring that women are involved throughout the processes and practices of shaping technological innovation. Indeed there is increasing recognition that the development of effective ICTs requires detailed knowledge of the sites and practices in which new technologies will literally be made to work. Women must be integral to this.

A Technofeminist approach (Wajcman 2004) stresses that gender relations and ICTs are inextricably linked. It foregrounds the need to understand the way women's lives,

identities and needs are being reconfigured along with digital technologies. Certainly, if we are to realise the promise of the new knowledge-based economy, it is imperative that we avoid reproducing the old gendered divisions of work and technology, and place gender equality at the centre of the project.

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