

Association for Information Systems AIS Electronic Library (AISeL)

ECIS 2004 Proceedings

European Conference on Information Systems
(ECIS)

2004

At What Price Inclusion? Some Pedagogic Implications of the Digital Divide

Hazel Gillard

London School of Economics and Political Science, h.gillard@lse.ac.uk

Follow this and additional works at: <http://aisel.aisnet.org/ecis2004>

Recommended Citation

Gillard, Hazel, "At What Price Inclusion? Some Pedagogic Implications of the Digital Divide" (2004). *ECIS 2004 Proceedings*. 73.
<http://aisel.aisnet.org/ecis2004/73>

This material is brought to you by the European Conference on Information Systems (ECIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ECIS 2004 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

AT WHAT PRICE INCLUSION? SOME PEDAGOGIC IMPLICATIONS OF THE DIGITAL DIVIDE

Gillard, Hazel, London School of Economics and Political Science, Houghton Street, London
WC2A 2AE, United Kingdom h.gillard@lse.ac.uk

Abstract

Current claims by government, major IT companies and educational institutions in the UK that IT skills offer enhanced inclusion into the new economy, are attracting women to the field of information systems. The needs of one social group – lone women parents – that IT skills initiatives seek to include will be analyzed in the light of another policy trend, the ‘work life balance’. Using narrative data from a research study of the Cisco Academy network engineer training programme, multiple stakeholder perspectives will be examined in relation to these two initiatives. The narratives presented highlight a systemic paradox; that the design of IT skills development scheme, the policy principle of ‘work life balance’, and the inclusion of lone women parents are simultaneously working in opposition to each other. By critically analyzing the assumptions underpinning IT skills training in the UK, this paper considers the implications of the contradictions revealed for government policy formation, the design of IT skills initiatives, and our understanding of the role of IT skills in the development of society.

Keywords: Digital Divide. Gender, Network Engineer Training, Organization and Management of IT resources

1 INTRODUCTION

The concept of the 'digital divide' is often functionally understood as the division between those who have access to the new communication technologies and those who don't; a dualism first coined by the Clinton administration in 1995 (Lu and Wang 2003). The latter are perceived to be at risk of exclusion from the influx of new technological developments, and consequently risk inclusion in the 'new economy' (Castells 2000). The social groups categorized as socially excluded, caught in cycles of poverty, unemployment and low educational achievement, are currently being targeted by government, IT businesses and educational institutions in the UK to acquire the essential IT skills (PAT 2002). Strategies, funding and partnerships in the UK have been devised and are currently being instigated to address this (DTI 2001). One such partnership is between business and education; the once relatively independent boundaries of the two are becoming blurred with the current shortage in IT skills necessitating a trained workforce capable of meeting the demands of the labour market.

This paper presents an analysis of one strategy that is particularly targeted at women - the 'work life balance' initiative (Work and Parents Taskforce 2001). This initiative has evolved in response to the perceived problematic of a 24/7 working culture, and is voiced in the context of the acknowledged low rates of women in the IT arena. It will review this initiative in the light of narrated experiences and perceptions of lone parent women, a subset of the socially excluded, who are being trained as network engineers, and of the staff involved in implementing the training programme. While our primary research question focuses on analyzing assumptions underpinning a particular IT training programme, we go on to consider whether participation in the programme contributes to an increased sense of empowerment and ability to engage in the world. The findings that we present in this paper suggest that it does not necessarily do so.

We suggest that empowerment is not the foregone conclusion of IT inclusion, particularly for women who face the practical, everyday reality of raising children as lone parents. Their voices need to be heard if this drive for inclusion is to adequately address their requirements and take into account their personalized circumstances. Our analysis of the low representation of women on technical network training courses draws upon Wenger's (1998) concept of a 'community of practice' and Star's (Star 1991; Bowker and Star 2000;) sociological perspective of marginalization, a logical extension of western classificatory systems. This paper will analyze the price of inclusion into the IT networking domain – what it entails and at what cost to lone women parents; derive from this some pedagogic implications for IT skills training, and discuss their impact on policy formulation. It thereby seeks to contribute to the growing research literature on gender and technology by presenting stories of lone women parents engaged with IT skills acquisition.

2 RESEARCH METHODOLOGY

A narrative methodology was chosen to give voice to the key players – government representatives, the Cisco Networking Academy Programme (CNAP) students and staff (trainers and managers) involved in the Cisco Certified Network Associate (CCNA) programme, and Cisco personnel. In total, some 44 individuals were interviewed, of which 7 were lone female parents. Research participants were asked to talk about their previous background, their experiences of the programme, and to identify what they regarded as the most critical issues influencing the effectiveness of the IT training course. Over a period of eight months fieldwork between 2002 and 2003, a cross-section of four educational sites were visited in S.E. England and Scotland – Higher Education, Further Education, a Women's Technical College and a Women's Technical and Education Centre. The latter two were more community based establishments and specifically target women from marginalized settings. Prominent themes were drawn from the narratives, participant observation (including industry

conferences) and official documentation in order to connect issues on the ground with broader concerns of policy and pedagogy, and to move beyond the plethora of high level accounts and generalities. This process of analysis contextualised the issues raised by research participants, and these insights are supported by a brief critical review of IS literature on gender related issues. We then used our conceptual scheme to theorise these findings, focusing on their implication for the design of IT skills training and how it relates to policy trends in the UK. Extensive quotes from the empirical data will be used to highlight lone women parents' experiences and perception of the reality of matching their circumstances to the perceived 24/7 culture. Underlined text in the selected narratives indicates an emphasis by the narrator. The paper provides a theoretical framework, and situates the debate within a government, a business and a pedagogic location before presenting the narrated research findings.

3 THEORETICAL FRAMEWORK

The IS literature has an interesting body of research focusing on gender issues, including the challenges experienced by women in the professional field of IT (Wilson and Howcroft 2000; Adam et.al. 2001; Robertson et.al. 2001; Wilson 2001b; Trauth 2002; Wilson 2002). The majority of this scholarship draws on the social construction of technology and gender as culturally and mutually constitutive. This analysis has evolved from sociological perspectives on gender and technology (Cockburn 1983; Wajcman 1991; Henwood 2000;) to open up the scope of research in terms of user resistance and systems failure (Wilson and Howcroft 2000; Wilson 2002); the IS developmental process (Wilson 2001b); the focus on hybrid skills to improve user relations (Woodfield 2002); and the importance of individualized stories in understanding the different experiences of engagement for women with IT (Trauth 2002). The notion of the mutual constitutive relation between gender and technology is useful for this analysis, for it presents neither as the problem, rather it points to cultural perceptions and practices tied with the use of both terms.

Wenger's (1998) concept of 'community of practice', as outlined by Bowker and Star (2000), offers an insight on technological objects and membership criteria within the realm of computer science, and therefore is a particularly helpful extension of this existing literature. Computer science, the backbone of IT, can be regarded as a 'community of practice' (Bowker and Star 2000), a subculture, embodying a set of relations cutting across institutions among people co-using objects (anything from a tool, an artefact, an idea, a technique, a story). Such a community of practice ensures that 'the relationship of the newcomer to the community largely revolves around the nature of the relationship with the objects and not, counter-intuitively directly with the people' (ibid: p299). Learning the informal and formal practices involves a set of encounters with the shared objects that eventually may lead to a 'naturalisation process' where one begins to feel more at home within the community (ibid.). The more naturalized an object becomes, the relation of the community to it increasingly becomes unquestioned. Membership then involves the resolution of the initial outsider status with the naturalized, taken for granted relations to the objects.

Research has shown that computer science is predominantly a male enclave (Panteli et.al.1999; Henwood 2000). To enter an all male culture, as Gherardi (1995) observed, is to have either a friendly or a hostile reception. With a friendly approach, women are perceived as guests unlikely to stay long; with a hostile reception, they are perceived as intruders or troubled outsiders and as such are marginalized (Star 1991; Gherardi 1995; Bowker and Star 2000;). Marginalization is implied in the foundations of western logos; classificatory systems contextualise knowledge as something that is known by what it is not, and leave no middle ground, no recognition of exclusions; 'each category valorizes some point of view and silences another' (Bowker and Star 2000: p4). When joining a social group, individuals need to learn the standards of reference and ideals associated with the culture of that collective. When women attempt to participate in masculine enclaves they are identified as different, the De Beauvoirian 'other' or Irigarayan 'non-presence'. The majority of heroes in the

technological world are male and, as our data highlights, the oxymoron of women and technical competence is commonly referred to in everyday parlance. This deeply embedded cultural perception of women's abilities within technological arenas reinforces their alienation to the artefacts. This was expressed by a female instructor as:

‘...I think it must be something about....actually taking machines apart and the programming that they perceived as actually not being designed particularly in a friendly way for women....once you start getting into the maths and programming and the taking machines apart, no thanks.’

Such fundamental classification and gendered alienation require an array of strategies to shift the cultural barriers.

The drive to recruit women to improve the diversification of the workforce is in full swing, and the key players acknowledge the necessity for strategic partnerships. Government, the international business community and educational establishments are forming partnerships that are needed to ‘crack it’, to facilitate a ‘win win’ situation’, providing the parties concerned ‘walk the talk’, in the parlance of government and business representatives. How then has the partnership between business and education sought to address the above?

4 RESEARCH ARENA

4.1 The Government Setting

At a recent Department of Trade and Industry Women in IT conference (DTI 2003), a high level of concern was expressed by the UK Government and the IT industry in the critical shortage of ‘high tech’, ‘hard’ IT skills that exists within the current computing labour market. The move toward an e-Europe, an e-enabled environment wherein every citizen is Internet enabled with skills to access a global network, calls for an IT literate workforce. Given the expertise is very quickly out of date, the increasingly IT orientated workplace requires a workforce that is constantly re-skillable, articulated by a Cisco executive as a ‘skill, re-skill and up-skill’ approach. In this changing business environment where workers are expected to be agile, flexible and always available, the skills of co-operation, people-orientation, communication, team working, networking, partnership, creativity and lateral thinking are essential. This change represents a shift from a production and manufacturing base to one that is more service and user orientated, is highly dependent on technological infusion, and is often articulated in the concept of the ‘new economy’ (Kvasny and Truex 2001). The hybrid blend of technical, creative, personal and business skills are seen as vital to the success and competitiveness of the UK ‘new economy’, and has resulted in initiatives that are pitched at recruiting more women into the industry, and at retaining those already working in the field (Ackers 2003).

By dint of their stereotypically perceived socialization, women are viewed as possessing the hybrid skills necessary for the future of the IT industry. They possess an ‘innate ability’ (IBM executive) to be better at charming, cajoling and calming clients, to be better communicators and team players, better at delicate bargaining, at being flexible, at smoothing of fractious teams, at offering pragmatic solutions and at paying attention to people problems. DTI conference speakers maintained that these ‘soft skills’ are increasingly becoming important in the changing customer, supplier and partner-facing environments; skills that pay attention to the importance of communication, collaboration and negotiation. Because of this, they suggested, women are viewed as integral to a diversified workforce, and offering women this inclusion, the official argument maintains, is to increase their earning potential and their mobility within the labour market (DTI 2003). The official conference consensus was that it was possible to combine a family life with a working one; indeed women speakers who had families used their personal experiences to emphasize this point.

Acknowledging the difficulties many women experience with the prevailing perception of a 24/7 working culture, 'work life balance' initiatives currently proposed by the UK government (Work and Parents Taskforce 2001) are seen as the way forward to change current working practice and allow for more flexible working arrangements. Changes that are recommended are flexi-time, staggered hours, time-off in lieu, better maternity/paternity leave, avoiding early/late meetings, job sharing term-time working, home/tele-working and other strategies. The benefits are perceived as huge, with employees more motivated, more relaxed and healthier, more confident with improved self-esteem, and hence better able to concentrate and make decisions.

These initiatives have been developed in response to the mismatch between people's caring responsibilities, the demands of inflexible working patterns and changing social aspirations, with the aim of improving the working environment. Emblematic of a shift to a knowledge-based economy in which the workforce is valued for its intellectual and IT skills (Castells 2000), the drive to recruit more women is underpinned by the perception of their possessing a hybridity of skills, and may be seen as part of the 'feminisation' of IT move at policy level. Whilst these initiatives look promising, how realistic are they given the struggle many women encounter when entering a field that is not only predominantly masculine, but where they are culturally perceived as having a problematic relation to the technological objects?

4.2 The Business Setting

The partnership with Cisco Systems Inc. centres on its Networking Academy Programme, an international, web-based modular training programme that trains students to design, build and maintain computer networks. Currently offered in over 152 countries, it is facilitated by on-site instructors in schools, technical colleges, Further and Higher Education establishments in the UK. The first rung in the networking expertise ladder is the CCNA module that offers an industry standard qualification. Through this programme, students learn basic and advanced networking skills, IT fundamentals and basic workforce competency, largely in the form of communication skills.

Cisco is seemingly dedicated to changing its corporate culture, and to addressing the 'digital divide', maintaining that lack of access to the Internet will widen the social gap for people already disenfranchised. It believes that the most valuable contribution it can make is to educate and provide resources to local communities through programmes that 'create, sustain and empower' (Cisco 2003) the members to reach their potential. Its core competency is the Internet infrastructure; an equalizing medium it believes will, in the words of its CEO and president John Chambers, 'help facilitate the spread of the other great equalizer – education' (ibid). The programme it offers is the CNAP and the promise is to bridge this gap. The CNAP is dedicated to achieving digital equality, to helping local people learn the IT skills they need to join the global Internet economy, and is targeted at 'empowerment zones'. These zones are areas of low-income and high unemployment, both within the developed and developing nations; areas of social exclusion which include a high percentage of lone women parents.

Paramount in this drive for digital equality is addressing the gender gap. Cisco is very keen to address the predominant exclusion of women from 'hard' IT, and improve their recruitment into, and retention in, the CNAP. In offering 'cutting-edge' IT skills, the CNAP rhetoric offers provision of a 'knowledge base' that will enable women to contribute to the development of the IT sector, and to their own economic potential. Such corporate philanthropy sounds promising but how do the educational institutions and the students targeted experience the reality? How realistic is it to target lone women parents and expect them to be readily available to service a technology that is renown for its time consuming constant reconfiguration? That is not to say that women should not be network engineers, rather their perceptions and experiences need to be heard if further, more encompassing changes are to be made.

Educational institutions no longer perceive IT as a basic skill, but as a key one. As a way of ensuring a future, they have been investing in information technologies to improve educational and training delivery (Alavi and Leidner 2001). To be better equipped to meet the government's goal of education as a life-long learning process, e-learning platforms and IT programmes are increasingly being offered that promise 'skills of the future' with enhanced job prospects, better pay and promotion, and flexible work arrangements. To finance such programmes, they have to be 'mapped' to existing quality assured provision, and with the additional pressure to perform as viable businesses, educational establishments increasingly need to meet labour market demands, as a head of a business development unit recounted:

'[The] government funding is targeted at outcomes, therefore we need to predict labour market trends and talk to employers - what do you need? Tell us what skills you need....[it's] a business deal....[what] we are trying to do is to make our provision more employer-led and to get employers to identify what the skills are that they are looking for and customise the training programmes to accommodate that.'

In the UK, educational institutions are attracted to the programme for a variety of reasons, ranging from its internationally recognised industry qualification, the emphasis on practical laboratory work, the e-learning platform that potentially opens up distance learning, to the expounded benefits it offers to the socially excluded. It also generates extra revenue by offering the programme to those who are already in work and predominantly subsidized by their company. The business deal is mutual. Whilst Cisco offers the necessary equipment at discounted rates, it regularly updates both the hardware and software; expensive outlays for cash-strapped educational organizations. So Cisco not only gains a wider customer base for its networking infrastructure, it also generates a ready pool of network engineers.

These business benefits are not isolated to Cisco; many major IT industries are engaging in similar training initiatives across the globe. It is therefore paramount that we are clear about some of the issues involved, in particular the active recruitment of one subset of the socially excluded, lone female parents. Addressing the additional learning requirements of people unused to work, the programme incorporates the 'softer' communication and commitment skills that focus on the socially excluded. A head of department expressed this as:

'....the softer outcomes that employers are particularly interested in....attitude, commitment, reliability....'

These communication modules, often called 'Business Communication Skills' were designed to not only help build confidence and motivation, but also how to dress appropriately and have the 'right' attitude. Lone female parents may be entering the workforce for the first time or returning after a long break. They may have low self-esteem and require some sort of childcare arrangements. In only one college did the programme include a holistic approach that encouraged 'life changes'. With the exception of the Higher Education and Further Education sectors, the educational institutions offered free nursery provision for the duration of the programme. The student body involved in the research study varied considerably depending on the institution, however a large percentage of those interviewed were of Asian or African ethnicity (home students, foreign or refugees) for whom English is a second language.

The Further Education and Higher Education establishments embedded the programme within existing courses such as the vocationally oriented BTEC in Computing and the academic BSc. in Networking. These sectors attracted younger people who wished to improve their networking knowledge, and sought further full-time education in computer science related disciplines, or work in the networking industry. Female enrolment in these sectors was particularly low, less than 2%. In the remaining two community based sectors, the programme was a standalone, with 99% of the students women, more mature in age and predominantly with childcare responsibilities. This student body was largely

attracted to the programme because it was free, because they were simply curious and had some spare time, because it offered nursery provision, and because they believed that IT skills were a requisite for employment.

Consensus amongst staff and students is that the programme is good, with the content clear and systematically covering the essential ingredients. Whilst most instructors believe the programme to be easy, students varied in their perceptions of the technical knowledge, ranging from hard - particularly subnet and wildcard masking with its underlying binary logic, and access control lists - to unchallenging. The programme is standardized; the same curriculum runs worldwide with cultural sensitivity reflected only in translation of material for the host countries (rather than sub-groups within those geographical areas). As Star (Star 1991; Bowker and Star 2000;) would say, it's an engineered 'community of practice' where the practices are dictated leaving little room for borderlands. The programme is predominantly self-taught with instructors acting as facilitators, so the learning style is essentially rote, with lots of in-class online reading and regular multi-choice testing. Most students found the online reading to be boring, decontextualised and dry, and a waste of time, feeling such tasks could be better approached at home.

4.4 Narratives from the Field

For lone female students engaged in the programme, the notion of being targeted for an industry that is renowned for its perceived 24/7 working environment was frustrating. As one female lone parent student remarked:

'...they gave you false information because they wanted bums on seats...it's money....a computer conveyor belt....don't throw me in at the deep end [to] drown basically....I need a job that isn't going to take up much time as I don't have the support...they knew my situation, this is what's so frustrating, they knew it was difficult for me...I was naïve.... they're obviously targeting women who haven't got a clue until they get halfway through the course and they realize 'hold on a minute'...if they start investigating on jobs and issues and what's realistically out there....they're setting us up to fail...'

This was expressed by the head of a business development unit as indicative of:

'There's an incongruity of women and the hard reality...[there's a] lack of awareness of the IT world....the reality of the networking environment....women have no concept of what the industry is like. Much of the work is shift based, call-centre, 24 hour cover...[there are problems in] bringing women in raw to IT, [they have] no skills, no IT skills, not much work experience in the industry....we're failing...'

Initially naïve to the perceived 24/7 culture, an induction course outlined the facts, as emphatically expressed by another female student recounting a manager's opinion:

'... [he said] 'if you can't work 24/7 don't waste my time, don't waste your time, you ain't going to be working in the networking industry'...[her reaction was] yes it's tough out there, and yes you have to be able to commit....if you've got childcare arrangements, forget it...'

To a single female student this presented a contradiction:

'...[this is] the whole contradiction...I feel the majority of their funding is based on maybe women getting back, single mothers getting back into work....it's going to be shifts....there you have the wonderful contradiction....I mean I appreciate what the man said because part of it is true....networking is a 24/7 thing....it's not a 9 to 5 and 'oh little Johnny's got a cold today'; tough!'

Another lone parent who worked in the field and whose child did not live at home saw other women leave because of the difficulties and emphatically reinforced the reality of the industry:

‘You cannot do IT to be fair if you have got children...you have to be seven o’clock in the morning to turn up and make sure the backups is run and do the monthly backups. You have to run your child and drop her off at the childminders....you just can’t do that....if your network does go down and somebody needs to come out ten o’clock at night....they’re going to need you to be there and....if you were a single mother with a child, it would be virtually no way you could do that because where where would you leave your child at 10 o’clock at night....’

This was reiterated by a married student with two small children who has previously worked in banking:

‘They [banking] were open to different ways of working, but I don’t feel that has reached the male dominated computer world yet...At the end of the day, my family comes first. I don’t feel I’m available 24/7.’

Should they be lucky enough to get a job interview after the network training course, as a lone parent female student, already working in the field, remarked:

‘...I’m also realistic to know that when it comes to interviews I’m sure thatif there is a man going with the same amount of experiences as me.... they will take a man, so I’m realistic as well to know that it’s not as easy to get a job in IT as a woman....as soon as you go into really technical....and network administration [work], I do think it’s harder for you to get into those types of jobs ...um I’m sure if you have a child I don’t think, I don’t think they would employ you, they won’t say it but I think that is the case...’

These narratives identify common themes that cut across geographical locations, both rural and urban, across educational institutions, across individuals varying in ethnicity, age and experience. For lone women parents, these commonalities include notions of identity, confidence, long-term employment disillusion and childcare priorities which do not necessarily fit in with the discourses underlying the government, business and education initiatives outlined above.

5 DISCUSSION

Taken together, the above narratives suggest that offering networking skills to marginalized lone female parents is insufficient and involves a multitude of knock-on consequences. When deep-set cultural practices hold strong bonds with technical objects, the black boxed institutionalized practices remain hidden and unquestioned. The existing configuration of the computer science community of practice that reinforces women’s exclusion is not reflected in the ‘work life balance’ initiatives. It is still assumed that once women have the prerequisite skills, they will find work. The drive for skill acquisition and the changing of work cultures in the IT industry remains in sharp contrast to the ability of lone parents to attain inclusion. This contrast is reflected in educational strategies that seemingly fail to adequately prepare these women for the personal challenges of working in the network industry, and their eagerness to offer IT skills needs to be followed up with research on the employability of the women. These women are clear that employment does not necessarily follow. Perhaps the hype does not match their reality because, in part, the wider complexities of the ‘work life balance’ programme are not addressed.

Given the financial concern about this programme, realistically only large companies can introduce them, and as Wilson (2001a) remarks, they tend to occur at the discretion of individual companies. Lone female parents’ horizons may extend more to the local, the school or small business down the road, organizations that cannot afford the infrastructure to support them. The importance of nurseries for lone parents in general, is not taken into account; childcare is expensive and the shortage of good, reliable, affordable and safe provision is endemic. Consequently, the ‘work life balance’ initiatives

work only for certain employment groups such as the more skilled and educated, during times of full employment when there is a labour shortage (Wilson 2001a; Kay 2003).

The initiatives tend to be vague and there is growing data indicating that they are not as effective as policy makers hoped they would be (Wilson 2001a; Ackers 2003). A recent Guardian article (2003) noted that the new mantra of flexibility offered little more than part-time working and such working arrangements impact on pay and conditions, with further isolation of the worker. The trade-off is more free time at the expense of less pay, a drop in living standards and benefits such as pension, holiday entitlement and insurance. Most employees would like flexibility on a full-time schedule. In addition, flexi-time, job sharing, compressing the working week into 3 or 4 days, for example, tend to increase stress levels as the reality is that work tends to spill into designated 'non-work' time and space (Pringle et.al. 2003), with portable networked technology seamlessly adding more work into everyday life. With the additional expectation to be more productive in return for such concessions, not only do such initiatives overlook women's active negotiation of work-life choices, they assume that work and life are two distinct, oppositional categories (Pringle et.al. 2003). The dichotomy of work and home is increasingly becoming a false distinction in present day society; the two concepts are shifting and becoming more fluid. The distinction ignores the multiplicity of home use, and the sense of identity people may gain from work (Dutton et.al. 2003; Pringle et.al. 2003).

If, as Dutton et. al. (2003) suggest, a person's self-concept is defined and reinforced by her/his membership of an organization, and if the 'work hard, play hard' tough, macho philosophy (Wilson 2002) is shared by market leaders, then the space for challenging the existing perceived 24/7 culture in the IT networking arena is somewhat limited. In the case of lone female parents, they may be less likely to seek, or even be accepted for, employment in the corporate world, as was expressed by one male assistant CEO of an educational institution:

'...most employers would [employ].... graduates....in preference to a black lone parent from [an inner city borough]....'

This controversial narrative from the field indicates that a powerful process of classification is at work with profound implications for the design of inclusive IT initiatives. Furthermore, it is important to reflect upon how the culture of computer science shapes the organization and management of IT resources. When networks frequently go down at the end of the day, for many women with childcare responsibilities, the ability to engage in such an environment is severely restricted.

The dominant western cultural perception of 'hard' technological objects, reflective of the ontic and epistemic underpinnings of such societies, ensures that any 'attempt to match a woman's essential identity to the computer science' environment is a particularly painful and costly mismatch (Bowker and Star 2000: p306), especially if women feel isolated and their skills are unacknowledged. 'Any mismatch becomes her personal failure since the measurement yardstick remains unchanged although the membership criteria appear to have been stretched' (ibid: p306). The strength of the gender classification boundaries becomes integral to a sense of self and underpins the failure of the 'more women in' approach (Wajcman 1991).

6 CONCLUSION

Lack of access to the new technologies may well widen the social gap for people who are already disenfranchised, yet attempts at inclusion must be thought through. If traditional perceptions of the family and childcare continue to be embedded in initiatives, and if stereotypic cultural perceptions of gender and race continue to flourish in the industry, then those who stand outside the norm will have little chance of employment, regardless of policy formation. Additional mechanisms are required that not only support or prepare women for the frank reality of a perceived 24/7 working environment, but also address the cultural discrimination many have experienced. Mechanisms such as pastoral care for

the high percentage who have experienced violence and abuse; on-going support so they don't feel isolated or overwhelmed; quality nursery provision that is not confined to a 9 to 4 schedule. It is not enough to offer training; the contextualised implications of the industry and the social circumstances of the student body must also be incorporated into the programmes. These implications will have profound consequences for pedagogic practices, business strategies and government policy.

The digital divide is fundamentally not a technical problem; it has far wider socio-economic implications. The panacea of IT skills masks those wider issues. The current interests of business may be better served if education regains its pedagogic centre and focuses less on 'bums on seat' than on quality provision that takes account of the individual as a whole, not purely as a commodity. IS research is uniquely qualified to review these perceptions and the underpinning classificatory systems by being cognizant of the standards embedded in the design, implementation and use of information systems. If IT is a cultural commodity (Kvasny and Truex 2001), then the field of information systems research has an ethical responsibility to also accommodate that individual, to acknowledge gender and its cultural ramifications as a salient issue, and to open up the dominant representations of technology for a more inclusive practice. Through a range of narratives, this research reveals a commonality for lone female parents in their efforts to improve their circumstances, but unless they are heard, the recalcitrant networking industry and inadequate policy formulation may remain blind to their realities.

References

- Ackers, P. (2003). 'The Work-Life Balance from the Perspective of Economic Policy Actors' in *Social Policy and Society* 2(3): 221-229
- Adam, A., D. Howcroft, H. Richardson (2001). 'Absent Friends? The Gender Dimension in Information Systems Research' in IFIP Working Group 8.2 Conference on Realigning Research and Practice in Information Systems Development: The Social and Organisational Perspective. Boise, Idaho, USA.
- Alavi, M. and Leidner D.E. (2001). 'Research Commentary: Technology-Mediated Learning – A Call for Greater Depth and Breadth of Research' in *Information Systems Research* 12(1): 1-10
- Bowker, G. and Star, S.L. (2000). *Sorting Things Out*. The MIT Press, London
- Castells, M. (2000) *The Rise of the Network Society*. Blackwell Publishers, Oxford
- Cisco (2003) <http://cisco.netacad.net/public/index.html> (accessed 9/9/03.)
- http://www.cisco.com/warp/public/779/govtaffs/people/digital_opportunity.html (accessed 7/8/03)
- Cockburn, C. (1983). *Brothers: male dominance and technological change*. Pluto Press, London
- DTI (2001). White paper 'Opportunity for All in a World of Change'. Department of Trade and Industry, London
- DTI (2003). Department of Trade and Industry, and Department of Education and Skills. *Women in IT Conference: Engaging & Retaining for Success*. January 22nd. London
- Dutton, J., J.M. Dukerich, C.V. Harquail (2003). 'Organizational Images and Member Identification' in *Administrative Science Quarterly*. 39(2): 239–263.
- Gherardi, S. (1995). *Gender, Symbolism and Organizational Cultures*. Sage Publications, London
- Grundy, F. (1996). *Women and Computing*. Intellect Books, Exeter
- Guardian, The (2003). 'When garden time has you digging deep'. Phillip Inman. 6th September
- Henwood, F. (2000). 'From the Woman Question in Technology to the Technology Question in Feminism: Rethinking Gender Inequality in IT Education' in *The European Journal of Women's Studies*. 7:209-227
- Kvasny, L. and D. Truex (2001) 'Defining away the Digital Divide: a content analysis of institutional influences on popular representations of technology' in IFIP Working Group 8.2 Conference on Realigning Research and Practice in Information Systems Development: The Social and Organisational Perspective. Boise, Idaho, USA
- Kay, T. (2003). 'The Work-Life Balance in Social Practice' in *Social Policy and Society* 2(3): 231-239
- Lu, Xin-An. and H. Wang (2003). 'Panel on: The Problems and Prospects of Teaching in the Digital Age' in *Informing Science and Information Technology Education Joint Conference*. Finland.

- Panteli, A., J. Stack, M. Atkinson, H. Ramsey. (1999). 'The status of women in the UK IT industry: an empirical study' in *European Journal of Information Systems* **8**: 170-182.
- PAT (2002) [Policy Action Team Audit - PAT 15](#) report [1208025088] Michael Wills MP
Parliamentary Under-Secretary of State, Department for Education and Employment at
http://www.socialexclusionunit.gov.uk/publications/reports/html/pat_audit/15.htm (Nov. 2003)
- Pringle, J., S. Olsson, R. Walker (2003). 'Work/Life Balance For Senior Women Executives: Issues of Inclusion?' in the Third Critical Management Studies Conference on Critique and Inclusivity, Lancaster, England
- Robertson, M., S. Newell, J. Swan, L. Mathiassen, G. Bjerknes (2001). 'The issue of gender within computing: reflections from the UK and Scandinavia' in *Information Systems Journal* **11**:111-126
- Star, S.L. (1991). 'Power, technology and the phenomenology of conventions: on being allergic to onions' in *A Sociology of Monsters: Essays on Power, Technology and Domination* (ed) J. Law. Routledge, London.
- Trauth, E. (2002). 'Odd Girl Out: an individual difference perspective on women in the IT profession' in *Information Technology and People*. **15**(2): 98-117
- Wajcman, J. (1991). *Feminism Confronts Technology*. Polity Press, Cambridge
- Wenger, E (1998). *Communities of Practice: learning, meaning and identity*. Cambridge University Press, Cambridge
- Wilson, M. and Howcroft, D (2000). 'The Role of Gender in User Resistance and Information Systems Failure in IFIP Working Group 8.2 Conference on The Social and Organisational Perspective on Research and Practice in IT. Aalborg, Denmark
- Wilson, E. (2001a). 'Organizational Behaviour and Gender' in *Organizational Behaviour Reassessed: the Impact of Gender*. (ed.) E. Wilson. Sage Publications, London
- Wilson, M. (2001b). 'A New Paradigm for Considering Gender in Information Systems Development Research' in *Realigning Research and Practice in Information Systems Development: The Social Organisational Perspective*. (eds) N. L. Russo, B. Fitzgerald and J. I. DeGross. Kluwer Academic Publishers, London.
- Wilson, M. (2002). 'Making nursing visible? Gender, technology and the care plan as script' in *Information Technology and People* **15**(2): 139-158
- Woodfield, R. (2002). 'Woman and information systems development: not just a pretty (inter)face?' in *Information Technology and People* **15**(2): 119-138
- Work and Parents Taskforce (2001). 'About time: flexible working'.
<http://www.workandparentstaskforce.gov.uk> (Sept. 2003)