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Technological Efficacy: A New Identity Category

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Abstract

Debates continue about the relative benefits, costs and risks of the diffusion of computer-based technologies throughout society and schooling. One area that has received considerable attention is gender equity. Early work on gender and computers focused on differences between male and female access and use (e.g. Huff, Fleming & Cooper, 1992; Kirkman, 1993; Morritt, 1997; Nelson & Cooper, 1997; Sofia, 1993), with concerns focused on the potential for girls to be disadvantaged. In some respects, it is arguable that problems of gender equity in schools with respect to computers have been overcome. For example, in a small study I conducted in two New Zealand senior primary classrooms in 2003, I found that both boys and girls were motivated to use computers and appeared to have equal opportunities to access computers in the classroom. The students in my study expressed a belief in the importance of using computers, and this belief can also be discerned from educational policy and media coverage.

In this paper I argue that, although gender by itself no longer appears to be a source of disadvantage in terms of access to and use of computers in schools, many questions about technology, schooling and power relations still remain unanswered. I present two alternative viewpoints on the new digital age. First, I explore Melanie Stewart Millar's (1998) analysis of *digital discourse* as one which reproduces the power of white, middle-class, educated, well-paid males, and excludes anything else it considers 'Other'. Second, I review arguments that the digital age has provided sites for the transcendence of traditional hierarchies and inequalities (e.g. Spender, 1995). I conclude that, despite the discrepancies between these two viewpoints, both concur that technological disadvantage will exacerbate any existing inequality that might result from intersections of identity categories, such as, gender, ethnicity, age, and socio-economic status, and that in this digital age, technological efficacy is arguably a new identity category.

Introduction

In this paper, I discuss issues of gender equity and socio-technological developments associated with the diffusion of digital technologies, with particular attention to implications for social justice in school education. Melanie Stewart Millar (1998), a post-structural feminist, introduced the term *digital discourse*, in her critical analysis of discourses surrounding digital technologies and the role of these discourses in the perpetuation of unequal power relations. In contrast, cyber-feminists see digital technology as providing sites for the transcendence of traditional hierarchies and gendered inequities. In this paper, I discuss the merits and limitations of these two opposing viewpoints. Although these views appear to be contradictory, I argue that both identify the supremacy and power that will be associated with those who, according to dominant digital discourses, are technologically advanced and advantaged, and that a new vigilance is necessary that examines how traditionally conceived identity categories, such as gender, class and ethnicity, intersect with a new identity category that positions individuals in relation to their technological efficacy, such that those without access to and proficiency with the latest digital technology are marginalised.

During the 1990s, numerous studies reported that boys had more computing experiences than did girls, both in terms of quantity and variety (Gaines, Johnson, & King, 1996; Potter, 1995), had

greater access to school computers (Greenhill, 1998; Healy, 1998; Morritt, 1997; Potter, 1995; Spender, 1995), and had more access than girls do and more encouragement to use computers (Gaines et. al 1996; Healy, 1998; Morritt, 1997; Potter, 1995; Spender, 1995; Swanson, 1998). Authors such as these believed that females could become technologically and socially disadvantaged because of their lack of interest in computers, lack of access to computers, and lack of self-efficacy when using computers; if only men are technologically adept, or computer literate, then females may struggle to compete in a world where digital discourses dominate.

Digital Discourse

Previous research found gender differences, anticipated inequities, and social injustice based on gender, particularly in the context of emerging government policy. There are vivid messages given in the current policy environment about the importance of technology to student learning, student citizenship, and to student employment opportunities. Examples are Australian policy on implementing ICT in education which is geared to actualise the role of education in the strengthening of "an equitable, imaginative and economically strong knowledge society" (Bruniges, 2003, np), the Australian National Goals for Schooling in the 21st Century – especially goal 1.6[1] (MCEETYA, 1999), and the U.S. Department of Education's report, "Getting America's Students Ready for the 21st Century: Meeting the Technology Literacy Challenge" (1996). In addition, the Ministry of Education New Zealand's document, "Education Priorities for New Zealand: A Summary" (2003), mandates the increased use of ICT as a teaching and learning tool, and "Interactive Education: An Information and Communication Technologies Strategy for Schools" (Ministry of Education New Zealand, 1998) directly refers to the importance of implementing computer-based technologies into schools. Changes and new direction in policy are of course, reflected and reported by media.

Dominant discourses that construct technological progress still appear to be gendered, supporting a view of white, middle-class, educated, well-paid males as the typical user. However, in a small-scale study I conducted (Johnson, 2004), both girls and boys appeared to value computers, be interested in computers, and gain similar levels of access to computers in the classroom. This has led me to look for more subtle and more complex understandings of identity, equity and social justice in education, specifically in regard to computer-based technologies.

Foucault defined discourses as "historically variable ways of specifying knowledge and truth – what it is possible to speak at a given moment" (cited in Pease, 2000, p. 33). Discourses use language, that is, words, symbols and linguistic structures, to identify the dominant hegemony as the norm. *Digital discourse* is Millar's (1998) term for the representations and power relations surrounding technological progress, which values and emphasises the latest, most progressive technologies, and the material accumulation of them. This progress has been associated with white, middle-class masculinity. Millar's analysis of the magazine *"Wired*" demonstrates how a masculine version of technology is constructed, which reinforces hegemonic power relations, pushing women back into traditional roles through the advertising machinery of the digital world, creating a "superior", hyper-macho, expert male. This magazine is marketed to the most powerful people on the planet today, that is, the Digital Generation (Millar, 1998). This generation

[1] Note: Goal 1.6 of the Australian National Goals for Schooling is to "be confident, creative and productive users of new technologies, particularly information and communication technologies, and understand the impact of those technologies on society" (MCEETYA, 1999, np).

consists of those who are white, Western, middle-class, well educated and male, with an income over $80, 000 (US) per annum. The magazine is written for these men about new developments which will influence them and which in turn will influence new technological advances and continue the digital, masculine hegemony. According to Millar, digital discourse can be viewed as an extension of discourses promoting hegemonic masculinity because it continues the marginalisation of women and subordinates other, non-hegemonic variants of masculinity. Power, consumerism, success and acute individualism are emphasised within digital discourse (Millar, 1998), and these are aligned with hegemonic masculinity. Because the 'masculine' is associated with technological progress, reason, science, culture, and production in the public sphere, the feminine (as its logical opposite) is associated with passion, nature, nurture, and reproduction in the private (or domestic) sphere (Darcy de Oliveira, 1991; Millar, 1998). Millar suggests there is little consideration given to whom technological progress disadvantages and excludes, and that digital discourse concerns itself with progress for progress' sake. For instance, any development is seen as progressive, but yet does not progression only progress those who have been privileged and privilege those that have progressed?

Many authors have demonstrated how mathematics and the sciences are constructed as masculine, logical disciplines, which are appropriate domains for men and inappropriate for women (e.g. Chaika, 1995; Kumar & Helgeson, 2000; Lawrence, 1984; Lynch, Leder, & Forgasz, 2001; Sofia 1993; Spender, 1995; Swanson, 1998; Webster, 1996). According to feminist standpoint theorists, the discoveries of female scientists and mathematicians have been overlooked in the history of scientific and technological development (Harding, 1986, 1991; Lloyd, 1993; Morritt, 1997). Cockburn and Ormrod (1993) give a clear example of the sexual division of labour evidenced in the development of technology:

> Social studies of technology have, in the main, been concerned with the initiatory moment – invention, innovation. The principal actors therefore have been scientists and engineers, and those entrepreneurs and authorities they must draw into an effective alliance if their technological project is to move forward. Such is the sexual division of labour that few if any women are to be found among these actors. The white-coated scientists, the hard-hatted engineers, the grey-suited business executives – these are almost all men. Women are invisible in the mainstream technology studies partly because of their actual absence from the network as there defined (Cockburn & Ormrod, 1993, pg. 9).

The effect of women's exclusion by discourses of rational knowledge and logic branches throughout our Western culture and its effects include the perception of traditional gender roles as female nurse, male doctor, males as school Principals, females as school teachers, etc. Millar (1998) argues that the promotion, by digital discourse, of dominant constructions of masculinity, and the subordination of other variants of masculinity and anything else it considers "Other", will result in harm or disadvantage to those groups that are excluded. Specifically, the hegemony of digital discourse, and the ways of being that it privileges, will lead to discrimination against the "other", where inclusion and success are largely measured by the criteria of computer competency.

Millar offers direction by urging that we develop the tools to engage critically with the digital discourse of advertising, and that we then make choices that resist current hegemonic structures. She maintains that women need to demystify the technology and crack the gender code to

participate equally in the cyber world of the future. However, Millar's view does not allow for individuals to subvert dominant positioning, maintaining all 'others' are part of an unobtrusive minority. This presupposes that all individuals as part of a minority group are unable to advance their perspective/s. Individuals have the ability to challenge hegemonic discourse, and ultimately alter it.

An Alternative View

As a contrast to Millar's negative interpretation of socio-technical developments as an effect of digital discourse, I now examine a feminist perspective that welcomes the new digital culture because of the possibilities inherent within its discourse to challenge traditional gender roles. Recent technological trends can be viewed as providing sites for transcendence of traditional hierarchies and inequalities. *Cyber-feminism*, as founded by Sadie Plant (see Spender, 1995, Millar, 1998 and Wajcman, 2004), embraces digital technology and its influence on Western society. This is largely because cyber-feminists see cyberspace (e.g. the world wide web) as providing an opportunity for women to be on an equal footing with men, and for new kinds of communities to be created (Spender, 1995). Cyber-feminism is based on the premise that there is no hierarchy in cyberspace, therefore class, religion, age, race, and disabilities are ignored, or invisible (see Spender, 1995). This view sees the growing dominance of digital technologies as an opportunity for liberation and empowerment, rather than as a mechanism for control and the reproduction of traditional power relations. Opportunities to create networks, research understandings in different cultures, and launch business ventures are examples of possibilities that are opened up for individuals, regardless of socio-cultural background, and are possibilities that were most likely to be previously unavailable before the world wide web existed. Reasons for this include the immediate contact possible between individuals in cyberspace (i.e. the instantaneity of communication) and the potential to create communities in ways similar to those anticipated by Marshall McLuhan in his writing about the global village (Levinson, 1999). Because all information is public on the internet and all web users have equal access, inequalities between individuals are invisible (Levinson, 1999), which leads to a more inclusive environment than previously experienced.

The Riot Grrrl Phenomenon is one representation of cyber-feminism, where 'grrrls' challenge dominant constructions of the feminine, through websites. These challenges are self-conscious attempts to counter hegemonic forces and open up alternative spaces. Some 'grrrl' feminist activists use websites to promote organised protests for pro-choice campaigns. Other websites consist of reflective journaling, detailing everyday life experiences, including examples of how the author is challenging traditional gender roles in her life. Many authors (e.g. Connell, 1995; Law, Campbell, & Dolan, 1999; Millar, 1998; Sofia, 1993) view the predominance of hegemonic masculinity negatively because it co-constructs femininity as a negative attribute, compliant and subordinate to hegemonic masculinity. Developments such as the 'grrrl' phenomenon challenge these dominant constructions of femininity, and cyber-feminists challenge discourses that position women negatively in respect to technology.

Cyber-feminism, by celebrating in the liberatory potential for computer technology, risks manifesting as an over-generalized answer to sexist issues. The liberal feminist approach of 'add women and stir' is not one that will disturb the foundations of hegemonic masculinity. Being computer literate or knowing how to use the Internet does not require or necessarily lead to an exploration of the discourses and ideology that is at the foundation of the power relations in the

communications industry. How can digital technologies be used as tools of subversion? Much of the literature on cyberfeminism does not cover in ay depth how computers are actually used by women (Wajcman, 2004). In addition, cyber-feminism tends to undertheorise the presence of "difference" online. If females are anonymous and online, how will that help to challenge dominant constructions of digital discourse? Will alternative ways of being continue to be invisible and ignored?

Implications for Education

Both viewpoints discussed in this paper suggest that the orientation of groups and individuals to technology is important, either to challenge existing hegemonic discourses, or to exist within the digital age. Whether one's viewpoint falls on the side of post-structuralists (i.e. digital discourse must be challenged), on the side of cyber-feminists (i.e. digital technologies are tools of subversion), or combines aspects of both views, one must be technologically competent to survive, compete and to make representations in this digital age.

According to dominant digital discourses, supremacy and power will be associated with those who are technologically advanced and advantaged. Those without access to, and/or proficiency with the latest digital technologies will be marginalised with this new identity category of technological efficacy.

The issue of equality in technology may not be gender, as Millar perceives, but rather an issue of technological efficacy, which is about not only having access to computers, but the inclination, skill, and confidence to use computers. This category of technological efficacy comprises whether or not a child has access to computer-based technologies, and whether they have potential and ability (agency) to increase their technological efficacy to match the continual progress and development of technology. Elitist notions of the 'latest' and the 'best' are difficult to keep up with even for those with a fair amount of disposable income. The rate of change in technology is not correlated with the required amount of thought that actually may help to determine whether the implications of a new innovation are in fact desired and able to make a contribution to the greater public good.

Unequal patterns of access can in the most part be explained by intersections of gender, ethnicity, 'race', and socio-economic status, and this unequal access exacerbates individuals' prior marginalisation and exclusion because they do not have access to the discourses of power I have described. In regard to educational policy and schools, those without the same opportunities for computer access and usage, do not have the same opportunities as others do for education, employment, lifelong learning, and as citizens of the new digital world (Polikanov & Abramova, 2003).

The divide is increasing between those with use of technology and the means to access the latest technologies, in contrast with those who have no technology and no means of access. Neither wanting to favour a binary position, nor ignore those along the continuum between no technology and technology saturation, these 'in-between' actors are limited by their attitude to, value of, and confidence with the use of computer-based technology. Therefore, as we head towards the mid 2000's, the identity category of technological efficacy has a defining role in one's construction of identity in Western society.

The ability to determine one's own technological efficacy stems from one's individual habitus (Bourdieu, 1999). If an individual's cultural capital and symbolic capital does not value a) materialistic consumption of the latest and the best, b) the premises underlying the development of the knowledge economy, and c) the notion of quicker is better, then their identity is perceived by the dominant hegemony as lacking. Because progress is occurring for progress' sake, without regard to its implications, these groups are being excluded and marginalized with or without their knowledge which equals a form a symbolic violence (Bourdieu, 1990).

Even though the computer-to-student ratio in schools is decreasing (e.g. Bruniges, 2003), concern should rest with individuals' access to, and efficacy with computers. Cyberspace is not available to those who are not computer users. They are not actors in the digital age; instead, they are positioned by dominant discourses as lacking and are excluded from future developments. Those who are users are privileged. Therefore, those that are unwilling to accept new technologies, those who are poor (unable to afford a computer and/or internet access), and those who do not have access (through position in remote locations, or third world locations) are discriminated against, whether they choose not to be users, or whether they do not have the choice to be a user. Existing inequality (ageism, poverty, socio-economical status) will be exacerbated because of the likelihood that as these identity categories were disadvantaged in the first place, and with the advent of the technological category, these categorical intersections will cause inequality to grow.

The ones that are left behind are those that do not embrace technology and those that cannot embrace technology. The people that come into this category are not actors in this digital age. They have no agency, no position, no voice, and their prior exclusion leads them to further, perpetual exclusion.

The best view of digital discourse may be that it privileges those that "have" the latest technologies while disdaining those that have little or no technologies.

REFERENCES

Bourdieu, P. (1990). *The Logic of Practice.* (R. Nice, Trans.). Cambridge: Polity Press.

Bourdieu, P. (1999). *The Weight of the World: Social Suffering in Contemporary Society* (P. P. Ferguson, S. Emanuel, J. Johnson & S. T. Waryn, Trans.). Cambridge: Polity Press.

Bruniges, M. (2003). Developing performance indicators for ICT use in education: Australia's experience, online document. Available: http://www.unescobkk.org/education/ict/v2/info.asp?id=13249, date accessed: 28/4/04.

Chaika, M. (1995), Ethical Considerations in Gender-Oriented Entertainment Technology, *ACM Crossroads Student Magazine* [online magazine], http://www.acm.org/crossroads/xrds2-2/gender.html, last updated on 18/1/2001, accessed on 17/4/2002.

Cockburn, C. & Ormrod, S. (1993) *Gender and Technology in the Making*. London: Sage.

Connell, R.W. (1995). *Masculinities*. NSW, Allen and Unwin.

Darcy de Oliveira, R. (1991). *In Praise of Difference: The Emergence of a Global Feminism*. New Jersey: Rutgers University Press.

Gaines, C. L., Johnson, W. & King, D. T., (1996). Achieving Technological Equity and Equal Access to the Learning Tools of the 21st Century, *T.H.E. Journal Online (Technological Horizons in Education)*, accessed June, 2003.

Greenhill, A. (1998), Equity and Access to Information Technology – Shifting the Source of the Problem in the 21st Century. Available: http://www.spaceless.com/papers/9.htm

Harding, S. (1986), *The Science Question in Feminism*, New York: Cornell University Press.
Harding, S. (1991). *Whose Science? Whose Knowledge? Thinking from Women's Lives*. New York: Cornell University Press.
Healy, J. M. (1998), *Failure to Connect.* New York: Simon and Schuster.
Huff, C. W., Fleming, J. H., & Cooper, J. (1992). Gender Differences in Human Computer Interaction. In C. D. Martin & E. Murchie-Beyma (Eds.), *In Search of Gender Free Paradigms for Computer Science Education*, (pp. 19 – 32). Oregon: International Society for Technology in Education.
Johnson, N. F. (2004). Computers and Gender in Senior Primary Classrooms [Unpublished Masters Thesis], Deakin University: Geelong.
Kirkman, C. (1993), Computer Experience and Attitudes of 12 Year Old Students: Implications for the UK National Curriculum. *Journal of Computer Assisted Learning*, 9, pp. 51-62.
Kumar, D. & Helgeson, S. (2000), Effect of Gender on Computer-Based Chemistry Problem Solving: Early Findings, *Electronic Journal of Science Education*. 4, (4), n.p., available: http://unr.edu/homepage/crowther/ejse/kumaretal.html accessed on 18/4/2002.
Law, R., Campbell, H., and Dolan, J. (1999). *Masculinities in Aotearoa/New Zealand*. Palmerston North, New Zealand: Dunmore Press.
Lawrence, J. (1984), Girls and Computer Education: Discussion Paper 3. Equal Opportunity Unit of the Victorian Education Department: Melbourne, Australia.
Levinson, P. (1999). *Digital McLuhan: A Guide to the Information Millennium*. London: Routledge.
Lloyd, G. (1993). *The Male of Reason: 'Male' and 'Female' in Western Philosophy*. London: Routledge.
Lynch, J., Leder, G. C. & Forgasz, H. J. (2001), Mathematics: A Dilemma for Feminists, in McNabb, E. L., Cherry, M. J., Popham, S. L. & Prys, R. P. (Eds), *Transforming the Disciplines: A Women's Studies Primer* (pp. 185-192). New York: Hawthorn Press
MCEETYA (1999). Australian National Goals for Schooling in the 21st Century, online document. Available: http://www.mceetya.edu.au/nationalgoals/natgoals.htm, date accessed: 28/4/04.
Millar, M. S. (1998), *Cracking the Gender Code: Who Rules the Wired World?* Toronto, Ontario: Second Story Press.
Ministry of Education New Zealand (1998). Interactive Education: An Information and Communication Technologies Strategy for Schools. Wellington: Learning Media.
Ministry of Education New Zealand (2003). Education Priorities for New Zealand: A Summary. Wellington: Learning Media.
Morritt, H. (1997), *Women and Computer Based Technologies: A Feminist Perspective*. Maryland, USA: University Press of America, Inc.
Nelson, L., & Cooper, J. (1997), Gender Differences in Children's Reactions to Success and Failure with Computers. *Computers in Human Behavior*, 13, pp. 247-267.
Pease, B. (2000), *Recreating Men: Postmodern Masculinity Politics*, London: Sage Publications.
Polikanov, D. & Abramova, I. (2003). Africa and ICT: A chance for breakthrough? *Information, Communication & Society*, 6(1), 42-56.
Potter, R. (1995), The Influence of Gender and Pair Type on Preschool Children's Learning in Computer Context [Master's thesis]. Melbourne: Deakin University.
Sofia, Z. (1993), *Whose Second Self? Gender and (Ir) Rationality in Computer Culture*. Geelong, Australia: Deakin University Press.
Spender, D. (1995), *Nattering on the Net: Women, Power and Cyberspace*. Victoria, Australia: Spinifex.

Swanson, J. (1998), Computers and Technology: Differences in Gender, *GREAT*, 2, (1), 16 March 1998 (excerpt from a doctoral thesis). Available: http://cse.stanford.edu/classes/cs201/Projects/gender-gap-in-education, accessed on 17/4/02.

U.S. Department of Education (1996). Getting America's Students Ready for the 21st Century: Meeting the Technology Literacy Challenge. Washington DC: U.S. Department of Education.

Wacjman, J. (2004). *TechnoFeminism.* Cambridge: Polity Press.

Webster, J. (1996). *Shaping Women's Work: Gender, Employment and Information Technology*. London: Addison Wesley Longman Ltd.