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A GENDERED PERSPECTIVE ON ACCESS

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Abstract:

This article provides a gendered perspective on access to the emerging information infrastructure. It examines access issues as they affect women; discusses public policy work on gender equity to national information infrastructure initiatives; and provides recommended reforms towards increasing gender equity to the information infrastructure.

Keywords:

National Information Infrastructure (NII)
information infrastructure
universal access
universal service
gender equity
Internet demographics

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1.INTRODUCTION

Public policy researchers, educators, and activists have noted the importance of ensuring equitable citizen representation for the current and emerging digital infrastructure. Given current initiatives to develop information infrastructure platforms in North America, including those formulated by the United States Advisory Council on the National Information Infrastructure (NII) and the Information Highway Advisory Council (IHAC) in Canada, we are at a crucial juncture in examining and elaborating policies of universal access and service. It is extremely important that all citizens, including women, become cognizant of evolving policy issues surrounding the information infrastructure and become involved in both policy formulation and implementation. [1]

Issues of inclusiveness to the digital environment are crucial because they are issues of fundamental democracy. Universal access to communication and information services must be recognized as an essential human right for maintaining basic democratic values. The premise that communication and public access is an economically justifiable public good, where the most benefit to all accrues when all citizens and interconnections are made, needs to be accentuated. This is especially salient as the debates continue over the encompassing factors of universality in a social environment characterized by rapid technological convergence, competition, commercialization and de-regulation. As Benjamin Barber has asked, "what are the market incentives to protect public interests" amidst an increasingly "monopolistic infotainment sector" (Barber, 1995, 86). [2]

Although those formulating public policy have been slow to focus on gender as a variable, recent debate and discussion is beginning to emerge on the gendered implications of access. This article aims to further this important area of research and debate within the North American context. The second section, Gender Troubles, will focus on the myriad issues of access, including economic and physical access, as well as workplace issues surrounding digital technologies. The many issues surrounding substance and content in the digital landscape will also be covered. These issues run the gamut from user-centered design practices, to the controversial issue of online content and ethics, particularly that of online sexual harassment and digital pornography.

The third section, Proposed Solutions, considers some solutions to amending these gender troubles. It looks at physical access--community access points and domestic access, funding and support mechanisms, and argues for the sustenance of community networks.

The creation of acceptable use policies and the development of a user centered design is also examined briefly; as are public policy statements on gender equity to the information infrastructure.

Looking into the Future, the fourth section, evaluates the proposed solutions, maintaining that as information infrastructure policies and technologies develop, humanistic values should accompany their inception, design, development, and diffusion. Such humanistic goals include ensuring equitable access, a diversity of viewpoints, heterogeneity of content and information, and community and democratic enhancement.

The fifth section of the article concludes by reasserting the importance of a gender perspective and how high the stakes are. Issues surrounding democratic participation and edifying expression must be upheld. The challenge that we face now is in ensuring that in our current rush to privatize, deregulate and commodify the information infrastructure, the social infrastructure encompassing a diverse citizenry is sustained and widened.

II. Gender Troubles

A. Access:

Women's relationship to the computer can be simplistically characterized as problematic, as evidenced by an extensive literature on the gendering of computer technologies.

Research has concentrated on the following issues: what uses have computers been designed for?; what language has grown up around their development?; and, what social practices have been constituted by computers, in workplaces, academia, and in popular culture? [3]

Dale Spender echoes the remarks of many feminists when she writes that "The glass ceiling may be preventing women from getting into the top levels of general management, but it is also preventing them from getting into cyberspace in appreciable numbers. Yet this is where the new communities are being formed; this is where the new human values are being forged" (Spender, 1995, xxiv).

Various demographic studies exploring gender representation on the Internet have been released in the last year alone, with many of them conducted for commercial and market research. Statistics fluctuate, but all of the studies indicate that women's access, although

not on an equal par with men's, is slowly increasing. [4]

Despite these lower figures for female representation, there is an optimism that usage amongst women will increase. For instance, The Rand Corporation, in a study examining universal access to e-mail, determined that "...on the whole, our analysis of sex differences in access to information and communications technology provides evidence that the gender gap among adults has decreased; and we concur with the Times Mirror conclusion that it could disappear entirely in the next generation" (Anderson, et.al., 1995).

Anecdotal evidence, through an incremental proliferation of women's content on the Internet, and an increasing activism on the part of women's groups to get online, suggests that this gender gap will decrease. However, and of major concern, is that economics will strongly influence which individuals and groups are able to afford network services.

For instance, a recent survey of women's organizations across Canada was conducted to assess how they are using the Internet. The survey found that most women's organizations are familiar with the Internet, and recognize that their organizations will need, in the near future, access to e-mail and the implementation of a homepage on the World Wide Web for outreach purposes. Most organizations are excited, rather than daunted, about the possibilities inherent in network communications. However, one of the prime barriers to access to network services for women's organizations is financial. Eliminating barriers towards access primarily involves ameliorating the financial constraints of the organizations so that they may purchase various equipment to get online; provide access for the necessary training; and devote the appropriate time towards the development of online content. In addition, many women's organizations are grappling with funding cutbacks from federal, provincial, and municipal entities; a consequent reduction in staff; and, in many instances, waning memberships (Shade, 1997c).

Statistics Canada data reinforces the alignment between economic and computer/modem ownership. A 1995 study reveals that less than 1/3 of Canadian households had a computer, and little more than one-tenth a modem. Both household income and education were factors in access to Internet tools; not surprisingly, the better educated and higher-income households are predictors of Internet access (Dickinson, Sciadas, 1996).

Although this data has not been disaggregated by gender, another Statistics Canada study

on women in Canada reveals that, although females account for 50.4% of the Canadian population, this equality in numbers does not correspond to socioeconomic equality for women. The female to male earnings ratio was 73% in 1995, and the earnings of women were significantly lower than men in all occupational categories and at all levels of educational attainment. Furthermore, unpaid work, part-time and non-standard work, a lack of upward occupational mobility, and a propensity for concentration in low-wage clerical, sales, and service sectors creates an additional burden on women and can help explain why women access and participate in information technology in lower numbers than men (Statistics Canada, 1995).

In evaluating women's relationship to the information infrastructure, one of the more important factors is women's relationship to paid work. Claims by management gurus and technological pundits that the information infrastructure will create jobs and accelerate the trend towards a 'knowledge economy' replete with life-long learning opportunities need to be investigated. Particular issues to examine include:

*What jobs are being deskilled by the introduction of computerization and networked communications? For instance, if libraries are being wired, how is this affecting a workforce predominately staffed by women?

*How are women using networked technologies in entrepreneurial ways? What women are involved in the commercial end of networking (i.e. as consultants, owners of businesses, content creators)?

*What are the obstacles (educational barriers, lack of affordable childcare) facing women who seek to enter and thrive in the high tech fields?

In particular, the impact of telework on women needs to be explored. Oldfield (1991) writes that the triple workload of women teleworkers (paid work, housework, and childcare) creates added stress, dependance on a spouses' wages, an increased risk of poverty, and isolation. Oldfield suggests that 'narrow-scope' public policy strategies for improving the lives of women teleworkers include ensuring that: homeworkers are guaranteed employee status by union membership; homeworkers are included in a broadening of legislative protection such as through unemployment insurance benefits; and that real-life and virtual networking organizations are created, whose goal would be to

reduce home isolation and disseminate public awareness information for teleworkers.

So far, public policy has not addressed the broader social issues of telework (Borowy, Johnson, 1995). For instance, telework has been promoted as a way for women to work at home while combining childcare responsibilities. This promotional stance does not recognize the added stress that juggling these dual roles can create for both the employer as well as for the teleworker and her family. The creation of flexible childcare arrangements that benefit the teleworker who may need erratic or less than full-time care needs to be addressed. This seems unlikely, however, given the dismal record in North America of investing in quality childcare at the federal level, and the trend towards eliminating support (at state or provincial levels) in favor of privatized or ad hoc arrangements.

Oldfield refers to the "not-so-hidden agenda behind telework: mandatory self-employment" (Oldfield, May/June 1995, 16). Indeed, many telework because this is their only option in a jobless economy littered with contract and part-time work. Telework accords with the pre-Millennium ideal of 'virtual corporations', staffed by 'virtual employees' who can expedite models of electronic commerce.[5] Women who telework could find that the gains they have made in the workplace have been eroded because their virtual presence isn't as important or impacting as their 'real' presence in the office. What will be the obstacles to cracking the Virtual Glass Ceiling?

However, some women find that the benefits of telework, such as flexible work and social arrangements, outweigh the disadvantages. As both governments and corporations downsize, work and workplace are being reconceptualized by technological advances. Given the trend towards the redomestication of many forms of work, from low-level clerical entry jobs, to professional 'symbolic analyst' work, many women find that this flattening of hierarchies is more advantageous for them.

For good or for ill, women are part of the new digital environment. It is important to measure how women are actually using computer networks and online services. What functions and services are they mostly likely to use? What kinds of content do they desire? What are their impediments for use--are they economic, technical, or due to a lack of interest? Resnick's (1995) survey of women online revealed that e-mail is the Internet feature women use most--typically for connecting with co-workers and friends in distant

locales. Access to special interest bulletin boards with topics like feminist issues, socially responsible investing, small business matters, parenting, and legal issues ranked a close second. Surprisingly, for the mavens of video-on-demand and the proponents of interactive cybermalls, shopping was ranked as the least-used online service; two-thirds of the women surveyed had never purchased a single item of online merchandise. This consideration of content leads us to the second aspect of gender troubles.

B. Issues of Substance and Content:

Besides the economic wherewithal, access for women also encompasses issues of substance and content. Recent cases in North America have highlighted how gender has influenced and impacted upon the development and cognizance of emerging social mores surrounding the creation, maintenance, and sustenance of the Internet community. These cases have included issues surrounding interpersonal conduct (or netiquette), sexual harassment, privacy, anonymity, identity, and free speech and pornography. The clash between evolving 'net norms' and new strategies to resolve, police, or regulate behavior and content on the Internet by policymakers, governments, and communities has created tensions and acrimony over the future of the information infrastructure (Shade, 1997b).

In order to encourage more women to get and stay online, the development of online gender information services must be promoted. Identification should be made as to what kinds of information and resources can and should be provided for women, with a plurality of viewpoints respecting the tenets of free speech represented. This can include information that resides in the federal, provincial, municipal and community level.

Identification of 'basic content services' for women and women's groups should be conducted (e.g., access to information on community-wide women's health clinics, birth clinics, abortion clinics; counseling; women-oriented small business services; daycare and childcare providers and centres, etc.). Also, what sorts of information should be deemed to be essential for education, public health, or public safety? (e.g., adult education centres; women's centres; community health clinics; local Planned Parenthoods; women's shelters; information for battered women, etc.)

Issues of sexual harassment and pornographic content online also affect access for women. Bell and de la Rue (1995) characterize online harassment as open hostility and harassment (sexual or not) directed towards women by men: "this rationalization for open

hostility towards women seems to be analogous to the experience of women entering traditionally male-dominated professions and trades". Online harassment usually happens through private e-mail and in IRC (Internet Relay Chat) areas, and the nature of computer-mediated-communication (its slant towards anonymity, lack of personal contact, etc.) tends to encourage more flamboyant, outrageous or nasty behavior (Brail, 1996).

Issues surrounding privacy and harassment related to the Internet is another topical concern. For instance, the recent furor over of a World Wide Web site titled Babes on the Web raised the issue of whether or not linking to the personal and professional Web pages of women, which were then rated on the basis of their personal photographs, constituted harassment, violations of privacy, or plain annoyance (Shade, 1996).

The debates about pornography on the Internet, recently fueled by the Communications Decency Act, [6] tend to reflect the same sentiments as the unabated and impassioned pornography debates between feminists, with anti-pornography feminists contending that pornography is sex discrimination on one side; and 'free speech' feminists, who distrust censorship, on the other side. Catharine MacKinnon, clearly in the former camp, has continued her crusade against pornography on the Internet: "Pornography is a huge amount of activity on the Internet, which aspires to be a universal network to unite the world. When men make new communities, they bring their pornography with them. More than that, they bond through it. Computer networks are only metaphors for society, they track it and happen within it" (MacKinnon, 1995).

Gender troubles can be found, even when there are no malevolent intentions. Although the predominance of masculine values may be largely unconscious, these are the values that are commonly associated as being the norm and, thus, universally human. The mythology of computer culture, as Coyle (1996) writes, subscribes to a powerful heroic and machismo mentality.

J.C. Herz (female) wrote, regarding the presence of women in cyberspace:
"Forget the media ballyhoo about electronic town halls and virtual parlors; the net is more saloon than salon. Not too many women in these here parts, scant discussion of philosophy and impressionist paintings, and no tea sandwiches. Rather, much of the Net exudes a ballistic ambience seldom found outside post-apocalyptic splatterpunk video

games. Someone should nail up a sign: `Now entering the Net. Welcome to Boyland...'"(Herz, 1995, 52-3).

Herz's humorous embellishment on the typical Internet denizen is clearly overstated but it does raise an important issue. Greenbaum (1990) and Bodker and Greenbaum (1993) have analyzed the gender perspectives that underlie the systems development process, which typically ascribes male values (objectivity, impersonality, rationality, power) versus female values (subjectivity, personal feelings, emotions, love) towards `good system design'.

Addressing the problem of getting more women into the information infrastructure includes tackling not only their relationship and accessibility towards the technical (hardware and software) accoutrements, but also to the social infrastructure and relations, including the often complex issues surrounding content, offensive speech, and an often inhospitable environment.

The next section will consider some proposed solutions to amending these gender troubles.

III. Proposed Solutions

Access to the information infrastructure is multifaceted, and encompasses physical, technical, economic, and social factors. Public policy examinations on access mainly consider the technical barriers towards access; for instance, the hardware and software to support communication, resource discovery tools and issues surrounding interoperability. The myriad factors that comprise the social infrastructure need to be considered as a holistic component affecting the access triumvirate of equity, affordability, and ubiquity. These include an ongoing examination of the many facets of network literacy; and of the diverse social variables affecting geographic, linguistic, income, gender, and class-based barriers (Clement, Shade, 1996).

The creation of public access network sites in community centres and public libraries will be a necessary requisite to meet universal service goals (Skrzeszewski, et.al., March 1995). However, true access and ubiquity will not be attained until networked technology is `easily' and economically brought into the home. And, such domestic ubiquity will significantly increase women's access to the information infrastructure.

There are many reasons for this. Despite the rhetorical push in current public policy towards creating public access points at public libraries, schools, hospitals, post offices, and community centres, these access sites are not readily available now. Even if these sites were ubiquitous, many women (particularly those with small children, the elderly, and the disabled) might find it difficult to get out of the house. Because the asynchronous nature of networked communications makes for cost- and time-efficient communication, the argument can be made that networked computers will be at least as efficient to use as other widely used household communications tools, such as the telephone and the videoplayer.

How can these services be supported so as to encompass the goal of universality? What sorts of information 'safety nets' could be designed and established so that all citizens, regardless of their ability to pay, can partake of services? There are a variety of funding options available for support mechanisms, but many questions remain to be answered.

For instance, should telecommunication carriers be required to contribute to a universal access fund? Should tax credits be made available for telecommunication carriers that contribute to a universal access fund? Should the telecommunications and computer industries be encouraged to develop a standard 'information appliance' (akin to a device attached to the television, or a Minitel/videotex box) which would allow low-income users to access the Internet? And, how can non-profit public spaces be created and sustained in an era of increasing commercialization? Sustainance of a public sphere broadens the possibilities for a range of citizens to participate in the benefits of the information infrastructure. This can potentially ameliorate the distinction between the information 'have's and have-not's', and also extend and enhance democratic practices.

This is where community-based computer networks (or 'free-nets') can play a vital role (Schuler, 1996). An excellent example of how women can get involved is illustrated by the efforts of Pat Nelson, Co-Chair of the Edmonton Free-Net Content Committee, to create a support system for women. In addition to rallying local community organizations to develop content of interest to women, she has also conducted free training sessions specifically for women. The first workshop, which played to over 200 participants, not only enlisted a plethora of new subscribers to the free-net, but also generated a host of content providers. As Nelson reported with respect to the women workshop attendees:

"Once you get them to water, they're eager to drink" [7].

But, it is also important that content can not only be `tasted' but created; a broadcasting model of communication (one-way) needs to be converted to interactive and dynamic resources, where users can be creators, collaborators, and contributors to the content.

In the Babes on the Web case, what are the remedies for women if they feel their privacy is breached because of untoward `advances' due to the public nature of their homepages? One solution is to aid and educate Internet service providers (ISPs) in developing policies for friendly and supportive environments, while respecting the tenets of freedom of speech. A suggestion for instituting online harassment guidelines has been advocated by several groups, including the Coalition for Public Information. They recommend online harassment guidelines for everyone who receives an Internet account, and a mechanism for including grievance procedures for complaints of sexual harassment (Skrzeszewski, Cubberley, 1995). Some networks, such as educational and community networks, have instituted AUP's (acceptable use policies) which would be an excellent reference point for determining and administering `netiquette' guidelines for appropriate behavior in electronic forums.

Developing a User-Centered Design:

Several multimedia artists have been experimenting with feminist design aesthetics. Christine Tamblyn argues that "because computers have evolved as tools built by men for men to be used in warfare, the current interfaces tend to have a violent, aggressive character. They are hierarchical, mirroring the militaristic male pyramid with its rigid chain of command" (Tamblyn, 1994). For Tamblyn, "interfaces designed to be operated by women ought to be multi-sensory, personal, affective and dynamic". She suggests that the interface feature "a female persona in cyberspace who serves as a guide to the system. The navigation buttons on each screen appear inside an image of this persona, and her voice gives instructions about how to proceed."

Likewise, Joan Truckenbrod argues that a feminist design aesthetic "involves the development of kinaesthetic, holistic, accessible, interactive computing technologies that advance expressive as well as instrumental values. Such an aesthetic would challenge the existing single-minded, malestream commitment to what Mumford calls 'authoritarian technics, a system created for power and control" (Truckenbrod, 1995).

However, we must be wary of essentialist stances which posit that technologies must be based on universal feminine attributes and values. Forging beyond masculinity and femininity to create technologies that subscribe to new social values and needs is an imperative task, but these new social values and needs can and should be multifaceted. A range, as well as an openness, of aesthetics is important if we wish to maintain a sense of inclusivity. [8]

The gendering of computer systems design and feminist approaches towards computer systems design have been the focus of a body of research and theory. The late Margaret Benston was one of the first to consider how a feminist approach would differ from conventional design processes; and for her this "is the recognition of the need to involve the people who will be using a technology in its design, with the aim of incorporating more humane values in such systems" and also of the need to identify and provide an analysis "of the role of experts and authorities in scientific and technical work that comes out of a feminist analysis of masculinity and control in science" (Benston, 1989, 207).

Suchman and Jordan (1989) have argued that incorporation of the everyday work practices of the users of the technology is imperative in order to design appropriate technologies. In particular, the design of technologies that are sensitive to women's knowledge and concerns and work practices is necessary.

Participatory design (PD) practices, where the users of the technology initiate active participation in the systems design of the computer systems (Schuler and Namioka, 1993), have not explicitly addressed gender as a factor. However, Balka's research into designing computer networks for feminist non-profit organizations has introduced an analysis of gender as a factor in PD projects (Balka and Doucette, 1994; Balka, 1997). Balka suggests that notions of PD must be expanded from considerations of business norms to encompass a wider range of organizational settings, such as organizations that are unstable, poorly capitalized, and that include a wide range of learners. As well, "participatory design within women's organizations is likely to fail unless the gendered nature of expertise is recognized, and specific procedures are introduced into the PD process that reflect the difference in women's and men's learning styles, as well as the gendered nature of expertise" (Balka, 1997).

What would women-centered or 'women-friendly' system design look like? Certainly it is difficult to generalize here, (and such generalizations also run the risk of positing essentialist arguments), but several design issues (both technical and social) could be considered to be women-centered or friendly. These include the development of infrastructure applications that support strong security and privacy.

Many women and women's groups are very concerned about maintaining the privacy and integrity of their networked communications. In particular, many women's groups (including shelters for battered women, hostels for homeless women, telephone crisis lines and rape crisis centres) deal with issues of a very sensitive nature, i.e., woman abuse, sexual assault, incest and child abuse. The need for safe and secure security on computer networks is of paramount concern for the women's sector. Therefore, the development of infrastructure and applications for supporting strong security, and the use of encryption and digital signature technologies to ensure the privacy and authenticity of communication is one technical method to ensure privacy (Dam and Lin, 1996).

Design of the information infrastructure must be easily accessible to the broad population, including people with disabilities, and multiple access methods will be necessary to account for differences in human capacities. Shneiderman recommends that more attention be paid to "identifying appropriate services, designing a consistent user interface, and developing a clearer model of the diverse user communities" (Shneiderman, 1995, 162).

Public Policy Statements on Gender Equity to the Information Infrastructure:

Public policy statements with respect to gender equity for the information infrastructure have emphasized the need for women to become integrally involved as users, creators, and policymakers. For instance, the final *Beijing Declaration and Platform for Action* from the Fourth World Conference on Women reiterated the need for women, especially in developing countries, to enhance their skills, knowledge and access to information technology. [9]

In the United States, gender equity recommendations for the National Information Infrastructure (NII) have not been explicated. For instance, *A Nation of Opportunity*, the final report of the United States Advisory Council on the National Information Infrastructure, does not mention gender as a factor affecting access (U.S. Advisory Council on the National Information Infrastructure, 1996).

Canada has been one of the few countries to consider the issue of gender equity to the information infrastructure in their public policy deliberations. The Information Highway Advisory Council's (IHAC) final report recognized that gender and social barriers need to be removed to ensure equitable and universal access to the information infrastructure: "Women's issues and concerns...must be addressed. Some of these, such as safety, privacy, and security, could be largely addressed by early implementation of related recommendations...women have to be able to use the Information Highway and contribute to the content carried. The government can raise the awareness of content and hardware providers and can also implement public awareness campaigns targeted to women."

With the release of *Building the Information Society*, the federal government's response to the IHAC final report, the government reiterated their commitment to ensuring universal access to all, including an examination of gender as one factor affecting access. [10]

As the public interest group the Coalition for Public Information (CPI) noted, IHAC's recommendations for gender equity are very weak, and do not address many of the gender issues recommendations CPI detailed, including development of online gender issue information services and gender-sensitive educational software and training materials, and online harassment guidelines (Skrzeszewski, Cubberley, December 1995). It is unclear at this time how IHAC will address the issue of gender, although there is considerable pressure for federal entities to apply gender-based analyses to issues surrounding universal access (Shade, 1997a).

IV. Looking Farther Into the Future

Some of the proposed reforms to get women to use and participate in the information infrastructure have included an attention to both the technical and the social infrastructures. Forging beyond the technical requirements of getting online and coupling this with an exploration of the social facets that can affect and influence access is of utmost importance. Although many of these barriers to access are not just gender specific, but encompass a diverse citizenry, they do shed light on the intricacies and nuances of factors such as network literacy, social facilitation, and governance.

So far, we have considered the overall workplace dynamics, including women's

relationship to paid work, telework, and the redomestication of work. Issues of substance and content have focused on the development of online gender information services, the definition of essential services, and the debates surrounding privacy, sexual harassment and pornography. As well, the development of a user centered design from a feminist perspective was considered, taking into account the problematic of essentializing (and often trivializing) design processes.

The issues surrounding universal access are complex and multi-faceted, existing as they do in a rapidly changing and technologically converging and competitive environment. Given the swiftly changing nature of the information infrastructure, policies and reforms that are adopted need to be fluid to meet the demands of a diverse population. Sheer economics--funding and support mechanisms to allow access to basic network services for the citizenry--is a necessary concern to mitigate the distinctions between the information 'have's' and 'have not's'.

Although reforms to make universal access a priority are important, it is also important to critically assess the role of the information infrastructure in our everyday lives. In an era of fiscal and 'deficit reduction', what should the priorities be for educational and social service delivery? Do we fund Internet access in every K-12 school while slashing teachers salaries, increasing class size, and halting physical reconstruction of school buildings? Do we spend millions creating community access points for the Internet while eviscerating publicly-funded services such as healthcare/Medicare, welfare, and daycare? Do we 'streamline' government service delivery by digitizing content while laying off public service workers in the guise of 'efficiency'? Does our workforce need to be 're-engineered' by the creation of 'virtual' corporations and workplaces?

As well as critically analyzing values implicit in our new digital economy and communities, we must also realize that the information infrastructure can be a locus of activism, consciousness-raising, and enhancement. Success stories and examples of community augmentation should be exemplified. Examples of using computer networking as a form of resistance and defiance provide useful case histories. [11]

Another key area is the cognizance of the subtle shift in how women's traditional domestic roles are being redefined due to the ability of networked communications to blur and blend the demarcation between the private and public spheres; the area of telework

and the redomestication of work is only one such example.

It is important to differentiate between the placement of 'informational appliances' in the home sponsored by a cornucopia of information providers, and their attendant visions of 'interactive' home shopping 'on demand'; and the public interest which takes as its focus the citizen and everyday community needs. The business prospects and the managerial implications of the 'information superhighway', the highly touted delivery system of the near future that will bring entertainment and communication services to both the domestic and business sector have been the focus, and public interest issues have been side-swiped in the rush to commercialize and privatize the information infrastructure within a competitive environment. Citizens have been reduced to mere passive 'consumers' of the products that the telephone, cable, and television industries want to propagate.

There is a prevailing social discourse now surrounding the information highway, as reflected in advertising, the media, and in some commercial applications, that situates networking technology within the domestic sphere. A cursory examination of current advertising in popular computing magazines reveals the same theme: white, nuclear families gathered around the new 'electronic highway' hearth. Indeed, the discursive strategies used to debate the new 'interactive' technologies are surprisingly the same as those used to discuss the introduction of television into the post-war economy and new suburban landscape, where television came to be seen as the "window onto the world", and spectatorship became privatized and domesticated. It was also a time for the entrenchment of women within the domestic arena, the proliferation of the nuclear family sensibility amidst cold-war rhetoric, and the burgeoning spread of single-family homes in the new Levittowns (Spigel, 1992).

Whether or not new competitive trials of 'interactive' services will increase women's access to a variety of networked services is unknown at this time. In considering the incursion of various innovative networked technologies into the home, how will the family structure and community life be shaped? In the design of these so-called 'smart' homes, are women considered a relevant social group by the designers, architects, and technologists? (Berg, 1994a-b). Will the coming digitization of the home, like its industrial predecessor that Cowan (1983) so vividly described, create yet again 'more work for mother'?

Interactive trials have been hampered by technical and logistical difficulties, and predictions of market penetration are not as rosy as the telephone and cable firms envisioned, with the technology "unlikely to reach even one-quarter of U.S. households until well after the year 2000" (Cauley, 1995, A1). What is disturbing is how, in the general current discourse of these 'user-centered' trials, the users of the technologies are posited as consumers of the services that will be delivered to their homes, rather than as active and inquisitive citizens who might use the technologies for personal 'empowerment' or edification.

Furthermore, even if the resources conducive to personal edification are available, it takes leisure time to be able to use them. This issue has a gender component. Economist Juliet Schor (1992) has documented an average increase in working hours (the equivalent of an extra month a year, or 163 hours) for most full-time employed people.

Women, because of their prescribed gender roles, generally have even less leisure time than men. This concomitant erosion of leisure is particularly acute for working mothers, with estimates of time spent on domestic responsibilities ranging from 25 to 45 hours per week. Reiterating Schor's observations, and commenting on figures culled from Statistics Canada, Gadd (1995) reports that "even when employed, women perform the lion's share of child care and household chores. Employed women spend about 2.5 hours a day cooking, cleaning and washing clothes, an hour a day more than employed men. Employed married mothers spend an average of 2.2 hours a day on child-care activities, double the time their spouses spend" (Gadd, 1995). We need to ask ourselves whether the new technologies of the information infrastructure will lead to an expansion of everyday tasks, raise standards of work or efficiency, or increase or decrease our leisure time. It could be that computer networking will become yet another example of how women's use and appropriation of a communications technology changes its original trajectory-in this case, the current commercial rhetoric which essentially espouses a one-way flow of information and pitches consumer marketplaces.

The unintended consequences of women's use of technology is vividly illustrated by the social history of the telephone: "...from the first decades of the twentieth century, women used the telephone, and used it often, to pursue what they, rather than men, wanted: conversation" (Fischer, 1992, 233).

Michele Martin's account of the early development of the telephone system in Canada relates how women subscribers were primarily responsible for developing a viable culture of the telephone, thus appropriating its use in ways unforeseen by Bell and changing its public perception as a 'germ collector' and 'nerve-racking' technology (Martin, 1991, 162). Women tended to use the telephone for talking to one another and shopping at home, and the rural party-line system allowed for participation in community life by 'meeting on the lines'. Such uses compelled Bell to change their developmental strategy to encompass domestic use.

Ann Moyal's case study of telephone use by women in Australia affirmed a vigorous and forceful feminine culture of the telephone within a diverse cross-spectrum of women, where the telephone served to fulfill social, familial, economic, volunteer, and community activities (Moyal, 1993). These findings were also affirmed in Lana Rakow's study of rural American women, where the telephone served to link both the public and community life, and the private, domestic sphere (Rakow, 1992). Given the increase in diverse women actively staking out some of that 'electronic frontier' turf in the last few years, it is not inconceivable that the same progression will happen with the emerging information infrastructure.

V. Conclusion

Recent feminist perspectives on technology stress the social context of technology where the importance of the various and heterogeneous social factors in the shaping of technological design, change, and diffusion, and the interrelatedness of the work, lives, and status of the producers and consumers are explored. This research agenda concentrates on the effects of society on technology, rather than just the effects of technology on society. Wajcman, (1991) in demonstrating that political choices are integral in the implementation and design of technologies, urges an analysis at both the design level of specific technologies and at its location in the public and private spheres. How will the information infrastructure effect women's status, and what is its relevance for women? More studies need to be conducted on this, from issues of access in a variety of context--the domestic to the workplace--to issues of content creation, design, public policy and gender equity.

Ursula Franklin has written that women's greatest contribution to the current

technological landscape lies in their potential to change the present structure by "understanding, critiquing, and changing the very parameters that have kept women away from technology" (Franklin, 1990, 104). Focusing on the gendered implications of access not only also allows us to widen the spectrum of social actors that have a role to play, participate and partake in the information infrastructure, but it can also lead us to consider some of the unanticipated consequences of new technologies.

However, as has been mentioned before, essentialist analyses, which assert that there are fixed and unified opposed male and female natures, can often be too limiting. The IDRC Gender and Information Working Group recommends that policy recommendations should account for several factors, including accounting for the information needs of both men and women to "foster an understanding of the mutual benefits to be gained by society" (IDRC, 1995, 279) and that approaches should be participatory, encouraging community-wide participation in the design and management of initiatives.

As our public policies for the information infrastructure develop, it is imperative that a more inclusive decision making process be created. So far, policymaking in North America has engaged an elite: technologists, bureaucrats, industry, and academics. Public interest groups have had a minimal presence, and in most instances, their presence came about after vociferous protests. Therefore, the needs of a diverse citizenry, including women, visible minorities, seniors, the disabled, and those marginally employed, need to be included in these salient debates.

TABLE: ACCESS FACTORS & REFORMS

ACCESS - PHYSICAL AND TECHNICAL

The development of public access sites in public libraries, community centres, and women's centres should be facilitated.

Further discussions of the most appropriate technological and public policy means to provide ubiquitous residential access to the Internet at an affordable rate must also be advanced.

ACCESS - SUBSTANCE AND CONTENT

The development of online gender information services should be encouraged.

Identification should be made as to what kinds of information and resources can and should be provided for women, with a plurality of viewpoints respecting the tenets of free speech represented. This can include information that resides in the federal, provincial, municipal and community level.

Identification of `basic content services' for women and women's groups should be conducted.

The development of online harassment guidelines, in coordination with commercial online services, Internet Service Providers (ISPs), K-12 schools, universities, and the private sector, should be advanced.

The promotion of community-based computer networks and a strategy to encourage more women and women's groups to take an active role in participating in content creation, training, mentoring, and management of community networks should be facilitated.

Funding programs, at municipal, state/provincial and federal levels, should allow for flexibility in allowing communities of interest to design their own training programs. This could allow, for instance, for the diverse needs of the women's community to be met with gender-sensitive and specific training.

ACCESS - WORK AND WORKPLACE ISSUES

The deskilling of work (particularly those in pink-collar ghettos traditionally occupied by women) by information technologies should be explored.

Issues surrounding telework, including childcare, employee benefits, and ergonomics, should be researched more thoroughly.

The obstacles (educational barriers, lack of affordable childcare) for women in entering and thriving in the high tech fields should also be a priority consideration.

ACCESS- MISCELLANEOUS SOCIAL FACTORS

The concept of lifelong learning as it applies to women (from young girls to seniors) should be explored.

ACCESS - POLICY FORMULATION

The consultative process related to access and the information infrastructure needs to be broadened, engaging a wide spectrum of citizens and their organizations. Women and women's groups must be consulted. Various consultations should be conducted in a variety of formats: roundtable discussions, open-ended interviews, small focus groups, public forums, conference workshops, teleconferences and online discussions.

ACCESS - KEY INDICATORS

Future surveys on computer/modem access and ownership (in the home and in the workplace) should disaggregate data by gender, as well as age, disability income, and educational level.

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NOTES

[1] In November, 1996 the Federal Communications Commission (FCC) announced its initiative on universal service. See

URL:http://www.fcc.gov/Bureaus/Common_Carrier/Reports/decision.html. In Canada, the Federal Government response to the Information Highway Advisory Council's final September 1995 report was released in mid-May, 1996. One of the issues identified as needing immediate attention was the development of: a national strategy for access to essential services. See *Building the information society: Moving Canada into the 21st century*. May 1996, URL:http://info.ic.gc.ca/info-highway/society/toc_e.html

[2] See *Developing a Canadian access strategy: Universal access to essential network services, workshop summary*, March 1997. This workshop was held February 6-8, 1997 at the University of Toronto, and brought together representatives from diverse

backgrounds to consider Canadian approaches to defining and achieving universal and affordable access to essential network services, and to help develop recommendation for a comprehensive framework for extending access to the Information Highway. URL: <http://www.fis.utoronto.ca/research/iprp/ua/ua2summ.htm>

[3] One of the ways to make the computer culture more inclusive is to recognize and accept the different learning and stylistic paths men and women take in their computer programming and design-what Papert and Turkle dubbed 'epistemological pluralism' (1990). The move towards object-oriented programming, and a change in computer interface design from archaic and hostile UNIX line commands to WYSIWYG (what you see is what you get) designs, featuring icons fashioned as familiar desktop objects such as trashcans and files (the Apple Macintosh version) to the Microsoft Windows design, is one way the computer industry has tried to reach out to a wider audience. The new trend towards social interfaces for PCs featuring 'real-life' scenarios (living rooms, offices, town centres) is another way the computer industry has attempted to 'humanize' the computer, particularly as the computer becomes more domesticated. See S. Turkle and S.Papert, Autumn 1990, Epistemological pluralism: Styles and voices within the computer culture. *Signs* 16(1):128-157.

[4] Several recent demographic surveys on the Internet reveal that women's participation on the Internet is not as high as their male counterparts, but that their access is slowly increasing.

O'Reilly and Associates, in their 1995 survey *Defining the Internet opportunity*, put the U.S. Internet male to female ratio as 67% male and 33% female. See O'Reilly and Associates. October 1, 1995, URL: <http://www.ora.com/research/users/charts/net-gender.html>

GVU Center's 6th WWW User Survey indicated that the gender ratio in North American is 31.4% female and 68.6% male. European users are still predominantly male (80.2%). URL: http://www.gvu.gatech.edu/gvu/user_surveys/survey-10-1996/

A survey conducted by Matrix Information and Directory Services and Texas Internet Consulting revealed a male to female ratio of 62.7% to 37.3% for the general Internet. See John S. Quarterman and Smoot Carl-Mitchell, May 1995, J. S. Quarterman, February

1996, Ages and genders, *Matrix News* 6(2). URL:
<http://www3.mids.org/ids3/ids3sum.603>.

A 1995 telephone survey by J. Katz and P. Spading revealed that longtime Internet users were more likely to be male (66%); recent Internet users more likely to be male (55%), but that the gender gap was decreasing, as their 1996 survey revealed that female users were 46% of Internet users. See Motives, hurdles and dropouts: Who is on and off the Internet, and why. *Communications of the ACM* 40(4) April 1997:97- 102.

[5] Electronic commerce promises to enable companies to shorten procurement cycles through online catalogs, ordering, and payment; expedite JIT (Just in Time) and QR (Quick Response) systems that reduce inventory and facilitate restocking; shrink product development cycles; and accelerate the market delivery of goods and services that can be individually configured for customers. See R. Kalakota and A. B. Whinston, *Frontiers of electronic commerce*. Reading, MA; Addison-Wesley, 1996. See also *The Information Society* 13(1).

[6] The recent uproar over the Communications Decency Act (CDA) highlights the vociferous debates over Internet content and its First Amendment implications. In the U.S., Democrat Senator Exon's amendment to the telecommunications reform package, The Communications Decency Act was proposed legislation as part of the Joint House/Senate Conference Committee on Telecommunications Reform. The Telecommunications Act of 1996 (47 USC sec 254) was approved by Congress in February 1996. In June, 1996, a Philadelphia panel ruled that the CDA was an unconstitutional abridgement of rights protected by the First and Fifth Amendments. A recent appeal by the Department of Justice with the Supreme Court was held in March 1997, and in June 1997 the CDA was ruled unconstitutional. Plaintiffs included representatives of libraries, book and magazine publishers, public interest groups, newspapers, record and motion picture producers, journalists and advertisers, and the on-line industry. See The Citizens Internet Empowerment Coalition at URL:
<http://www.ciec.org/>

In general, the CDA provisions were intended to restrict the access of minors to indecent and obscene material on the Internet. As it read, the CDA legislation would impose the standard of 'indecent' as used in broadcast media. Some of the proposed provisions of

the CDA contained language that was potentially very chilling for women. Under the CDA, even classic works of literature and art, or medical and educational materials on breast cancer or sexually transmitted diseases could be criminalized. Although this was highly unlikely, when the CDA was initially passed, fears were expressed on the Internet that users could be arrested for discussing abortion on the Internet.

[7] June 1995 Personal e-mail with Pat Nelson.

[8] Feminist standpoint epistemologies, as advocated by Sandra Harding and Hilary Rose (Harding, 1986; Rose, 1983) for instance, claim that women are privileged epistemologically in that their historically under-represented position in society produces more 'accurate' and 'better' accounts of the 'real' world--an integration of "hand, brain, and heart", as Rose puts it. Harding (1986) questions whether there can be a feminist standpoint when there is a multiplicity of women encompassing a variety of races, classes, and ethnicities; and in support of this goal, she would have us embrace a "successor science". In response to this proposal, Haraway suggests that the politics of the partial perspective, a notion of objectivity that "privileges contestation, deconstruction, passionate construction, webbed connections, and hope for transformation of systems of knowledge and ways of seeing", (Haraway, 1991, 191-2) would be an apt maneuver.

See S. Harding, *The science question in feminism* (Ithaca, NY: Cornell University Press, 1986); D. Haraway, Situated knowledges: The science question in feminism and the privilege of partial perspective in *Simians, cyborgs, and women: The reinvention of nature* (London: Routledge, 1991):183-201; H. Rose, Hand, brain, and heart: A feminist epistemology for the natural sciences. *Signs* 9 (Fall 1983):73-90.

[9] *Beijing Declaration and Platform for Action*, 1995. URL: <http://women.usia.gov/usia/beijpg.htm>.

[10] Information Highway Advisory Council, *Connection, community, content: The challenge of the information highway*. Ottawa: Minister of Supply and Services Canada, September 1995. URL: <http://info.ic.gc.ca/info-highway/ih.html>; and *Building the information society: Moving Canada into the 21st century*, May 1996, URL: http://info.ic.gc.ca/info-highway/society/toc_e.html.

[11] K. Turnipseed recounts how women in the former Yugoslavia have been using e-mail to further their goals of social solidarity. The Electronic Witches project, initiated in 1994 "has worked with more than one hundred women from thirty organizations throughout former Yugoslavia. These women come from a wide variety of backgrounds different ethnicities, religions, sexual orientations, education levels, classes, and professions." See K. Turnipseed, *Electronic Witches: Women activists using e-mail in the former Yugoslavia*, *Feminist Collections* 17(2) Winter 1996: 22-23. URL: <http://www.library.wisc.edu/libraries/WomensStudies/fcturnip.htm>

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