

Gender and Technology

Looking to the Past

by Denise M. Shortt

Cet article nous parle des aspects qui se rapportent à l'accès aux technologies, aux occasions, à l'intérêt qu'elles suscitent et à leur acceptation par les femmes dans l'histoire et par les femmes modernes.

A ship in port is safe, but that is not what ships are for.
Sail out to sea and do new things.
—Admiral Grace Hopper, computer pioneer.

Charting a course into the world of technology can be rough sailing for women. Today's computer culture is largely dominated by men and many women have yet to navigate these largely uncharted waters. New technologies have become increasingly important and arguably necessary in some spheres of modern life. In light of this sea of change, it becomes imperative for women to heed the words of Admiral Hopper and set sail into new territory (Camp).

With this message in mind, I have decided to explore the relationship of women and technology. My inquiry into this relationship is guided by two fundamental educational questions: what is needed to make good use of new education technologies? and what can we learn from the past about the perils and potential of recent developments in information technology for education? I believe that we can prepare to answer the first question by learning from the lessons of history.

A thorough examination of history with respect to women and technology serves several purposes. First, we gain a better understanding of which technologies women have used or have been prevented from using in the past and how these technologies have been implemented. Further, we can discover the contributions women

have made towards technological progress and why these accomplishments have often been ignored. This information helps us to understand why women are not embracing the current computer culture at the same

there is evidence that women have even lost power with the introduction of new technologies. For example, during the manuscript era of the Middle Ages, women managed to exercise some degree of knowledge



Gail Geltner, "Women and Technologies," 1987

rate as men and why women's voices have largely been left out of the dialogue on the potential future uses of new technologies.

Hence, the purpose of this paper is to explore the issues of access, opportunity, interest, and acceptance of technology in the lives of historical and modern women. My examination of these issues may provide the groundwork for understanding what we as educators need to do in order to close the technological gender gap facing women today.

What can we learn from history?

Women have been excluded from many facets of technology and education throughout history and, in fact,

and power in their roles as nuns. Dale Spender points out that a few women such as St. Radegund of Poitiers, the German scholar Hildegard of Bingen (1098–1178), as well as the English nun Julian of Norwich (1342–c. 1416) managed a respectable degree of status in a time otherwise dominated by men. Yet, immediately after the development of the printing press, women lost their newly won status and instead were for the most part cut off from all forms of printed knowledge.

For the last few hundred years, women have put their energy into reclaiming their voices, experience, and presence in all facets of history. The protests of the 1960s and 1970s were instrumental in helping women

to gain a voice and access to information. The establishment of women's presses, the explosion in women's books, and the introduction of women's studies courses in most universities around the world during the 1980s have helped to remedy the glaring omission of half the experiences of humanity from the repository of human information. Dale Spender reminds us to heed the lessons of the past when she says,

"We cannot afford to permit white male dominance of the new communication technologies. We have learned that history told from the perspective of one group distorts our past. Whether oral, print, or electronic media, the issues are access and equity."

the more women have put in over the past decades as information-makers, the more knowledgeable and wise the society is able to become. And this is why we simply cannot afford to permit white male dominance of the new communication technologies. We have already learned that history told from the perspective of one group distorts our past. Whether it is oral, manuscript, print or electronic media, the issues are access and equity if we want the full story. We need to democratize information-production if we want the best possible basis for making up our minds and arranging our community. (Spender xxvi)

Yet, computer culture was not always a male domain. In fact, some of the first computer researchers, programmers, and experts were women. Augusta Ada Lovelace, a brilliant mathematician introduced a computer binary system and set the groundwork for much of the work of programmers later to come. Similarly, Admiral Grace Hopper was instrumental in the early development of computer assembler language. In addition, in 1945 six young women, Marlyn Meltzer, Ruth Teitelbaum,

Kay Antonelli, Frances Spence, Jean Bartik, and Betty Holberton programmed a machine called the Electronic Numerical Integrator and Computer (ENIAC) and were instrumental in changing the face of computer programming (Petzinger).

However, women often participate in the early stages of new technological fields, but once a field becomes successful and financially viable, women are excluded from decision-making positions. Despite Ada Lovelace's brilliant contributions, she is seldom mentioned in history. In fact, there are still some who claim that Ada did not write the mathematical work that appeared under

her name even though her own letters and notes prove otherwise (Coyle). The exclusion of the ENIAC women's stories from computer education courses is also a great injustice. And women continue to be left out. In Stephen Levy's recent book, *Hackers: Heroes of the Computer Revolution*, the author adheres to the hero myth of computer culture by virtually excluding women from the field of study. Roberta Williams, the woman who authored the first computer adventure games while her husband, Ken, ran their computing shop, is referred to only obliquely in the one-third of the book dedicated to the computer game company she and her husband ran. In Levy's account, Roberta is portrayed as a housewife and mother whose authorship of the popular games was the least important part of the process (Coyle).

Men and computer culture

Gutek and Bikson have suggested that technology has the potential to serve as a catalyst for change or it can rigidly reinforce the status quo. Their study documents that in the modern workplace men have more autonomy in their use of technology, and men's experiences as users will yield greater benefits to their careers. In addition,

"women are clearly in less important positions than men, and their pattern of computer use is strikingly consistent with their subordinate role" (123).

Statistics on Internet use are even more starkly contrasted as girls and women have been virtually invisible. In a recent survey of the World Wide Web, of the 4,700 people that responded to questions, about the use of the Internet, 94 per cent were male (Pitkow and Recker cited in Carli). More recent statistics suggest that women are increasing their participation on the Internet, but their inclusion is halted by dominant male users. Evidence has shown that women who spend time chatting on the net, or those who attempt to enter its subculture have so far met with intimidation if not outright harassment based solely on their gender (Brail).

A look through any edition of popular computer magazines such as *Wired* and *PC* confirms that the media also fails to recognize or acknowledge women as part of the computer culture. Neither magazine represents women in prominent roles as users, or consumers of computers and their accessories, nor are they editorially represented as writers and thinkers about new technologies. The media thus reinforces women's invisibility in the electronic realm.

Furthermore, computer games are notorious for being macho, sexist, and aggressive and marketers eagerly cater to their almost exclusively male audience.

The computer game is a form of virtual virility. The themes are hyper-macho and often revolve around the activities of sports and war. They come with names like *Hardball 4*, *Front Lines*, *Body Count*. The ads for *Doom* 1995's most popular game, read: "Now there's a place more violent than earth"... What would games be like if we designed them with a female audience in mind? Would they be like the Barbie computer game where Barbie gets new outfits and learns to be a fashion model? Or would

we conceive of a game where a clever woman saves the world for all human kind? Unfortunately, even our fantasies for women are based on lowered expectations. (Coyle 48)

Although we are starting to see products geared specifically towards girls—"pink software"—most promote stereotypes. Maria Klawe, an expert on gender and computers at the University of British Columbia claims that girls do not seek the fast-paced conquering adventure games that attract boys and instead "view computers as something to learn with." She adds that what "really appeals to girls is when they feel they're accomplishing something" (*Newsweek*).

Although there are a few products that attempt to create meaningful software for girls, such as the "Babysitter's Club" which helps girls to organize their babysitting schedules, and a program called "Let's Talk About ME!" which is designed as a self-exploration tool complete with a diary, personality quizzes, and honest girlfriend advice on their changing bodies, more effort needs to be put into designing and creating software which meets girls' needs without promoting gender stereotypes.

Why does the gender gap exist?

Sherry Turkle has been a pioneer in exploring why girls are more "reticent" towards computers. She suggests that girls are uncomfortable interacting with a machine, particularly a machine that has so far been considered a kind of male toy. Similarly, "women [are] put off by computer language" that is filled with masculine terminology as users are asked to "command," "control," "execute," or to "escape" and "crash." Turkle adds that "the design of information machines set limits to how much power people have to bring their own meanings, relationships, ways of responding to computers" (41). As girls grow older they also appear to associate computers with

unpopularity and view the computer as an asocial tool (AAUW).

It isn't that they can't do it, and it is not necessarily that they don't like the subject. What they turn away from is the image of the scientist or the computer hacker. It doesn't fit with their notions of themselves as women. (Spender 173)

Carol Gilligan suggests that girls are not attracted to computer programming because it forces them to go against their own values and ways of relating. "The demands of programming, which stress rules and winning, are incompatible with socialized female values, such as relational ethics." AAUW's recent report, *How Schools Shortchange Girls*, finds that to counteract the societal constructs and notions attached to technology-related subjects, non-stressful environments must be created. They reinforce the findings of a 1986 study by Belenky *et al.* which says that, "Successful learning takes place in an atmosphere that enables students to empathetically enter the subject they are studying." Perry and Greber agree that in order to make computer technology more attractive to girls we need to remember that "understanding ... the socially constructed nature of computer use re-

vide untold opportunities for communication, exchange, and keeping in touch (Spender). Segal posits that "technology can be used to better social lives" (41). As technological skills become increasingly important, we must accept the reality of technology as a necessary tool to operate in the modern world. In order to fully participate in this modern vision, women must have a role in shaping the future trends and mapping the direction of cyberspace. Once women have an equal voice in our evolving society, men and women must identify ways that technology can reinforce equity and access.

Computer programming and software need to become less rigid, linear, and task-oriented. To this end, progress has been made in the current trend to create computers that have user-friendly, cooperative formats, icon-driven interfaces, and interactive programming. Similar efforts are required in the development of accessible language, more welcoming terminology, and relational-oriented software.

Many see the Internet as a promising tool to break down the barriers and create a global community. The Internet also has great educational potential for bringing knowledge to learners in remote parts of the country and the world. As well, activists are encouraged by the Internet as an

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veals the origins of technophobic reactions to be in social systems not in machines."

How can technology help?

Cyberspace has the potential to be egalitarian, to bring everyone into a network arrangement. It has the capacity to create community, to pro-

vide an inexpensive resource for information sharing and research.

Equity in technology and education

The current gender imbalance in the workplace and computer subculture also extends to educational forums. At the college and university

levels of education it is clear that although women are gaining ground with respect to science, computer science, and engineering degrees, they are still strikingly behind men's accomplishments at the higher end level.

In the United States in recent years, women earned about half of all associate degrees in computer science, more than one-third of the bachelor's degrees, and 37 per cent and 13 per cent of Masters and PhDs respectively according to *The Chronicle of Higher Education*. Yet, only seven per cent of American universities' computer science and engineering faculty are women. Of that a meagre three per cent are tenured. (Wylie 3)

At the high school level, the statistics on girls' computer use and interest are much less encouraging.

Research has shown that girls' interest and involvement in math, science, and technology decline with each year they remain in school. Unless the situation can be reversed, girls and women will face a technological gender gap which will have serious consequences for their professional futures and for the future of technology. (NCGS 1)

AAUW's findings suggest that gender differences in science and technological achievement are not being addressed by educational systems. Further, their report attempts to invite and inspire action when it claims that we are currently experiencing a "gender gap our nation can no longer afford to ignore."

Educational reform requires sustained reflection and critical conversation about how technology becomes gendered and how we can reform current educational practices to break the cycle. I believe that it is our responsibility as educators to recognize and accept that these inequities exist. As Jansen reminds us, there is an "absence of critical consciousness

about gender in discussions of communications and technology is the reproduction of old patterns of power and privilege in the social distribution of power" (Jansen 196).

Judah Schwartz suggests that society has specific expectations of its educational system, that is, the personal growth and development of its citizens, preparing individuals for the world of work, and finally, transmitting the culture and values of society. Issues of access and equality are inextricably linked to these goals.

If we are to fulfill this educational agenda and create truly successful learning environments, as educators we must encourage students to be thinkers, interpreters, and ethical decision-makers. To promote personal growth in our students we should encourage them to approach each new learning situation from multiple perspectives, facilitating their appreciation of diversity and promoting effective collaboration. As Hawkins reminds us:

Students are awakening to the many histories, not just the one interpretation provided as an immutable set of facts; the many readings of a text as conversations between reader and author ... and different ways of knowing that can separate cultures, current and historical. (39)

This awakening appreciation of complexity and perspective is essential to the understanding of how technology has influenced our society and how girls have been constructed as "computer deficient." Equality and access are not inherent, but rather fought for and won. As educators, we are responsible for including the women's contributions—past and present—to technology in our courses, for educating young people about technology's evolving social impact, and for teaching girls and boys how to use of technology bearing their different needs in mind. There must be a conscious movement to de-construct outdated, patriarchal notions of technology and who uses it and

empower a new vision for the ways both women and men can use technology in the future.

In thinking about computer education we must remember a feminist approach is not one that tries to "beat the boys at their own game" but instead is one that turns the game on its side and changes the rules. (Perry and Greber)

To this end, Peggy McIntosh has suggested a framework that could be implemented within schools in order to incrementally encourage broad revision to current curricula. McIntosh's "Interactive Phases of Curricular Revision," outlines an integrative approach to teaching technology education and acts as a useful conceptual model for teachers. Educators should use this framework to analyze where it is that they currently sit within the context of their own teaching and as a guide for assessing how much work is still needed in order to close the gender gap.

Educational revision requires the efforts of many people, and resources, as well as careful planning, organization, commitment, and patience. The organizational model I work with provides a conceptual plan for how to move beyond the classroom and approach educational reform from different perspectives. Over time, the goal of this outline is to encourage thinking about all of the factors and perspectives that should be involved in a plan to revise the educational system and to meet our evolving needs.

There are specific strategies that can be introduced to reduce the gender imbalance while promoting personal growth. Specifically girls need to be educated about computers and given an opportunity to become familiar with how they work and how they can best be utilized. Teachers could offer after-school clubs, computer camps, and/or enrichment programs specifically targeted for girls. These extracurricular opportunities may provide girls with an chance to

become familiar with computers in a non-stressful environment, as well as to "catch up" to boys experience levels. Furthermore, teachers should refrain from using gender inappropriate software in the classroom, that is, software that is targeted only for boys. As well, teachers could teach the history of computers and programming and include the contributions of women so that boys and girls receive an unbiased understanding of how technologies were developed and by whom. Finally, teachers should allow a greater variety of intellectual styles to flourish in relation to computer

use in the classroom. Girls need to be taught to not only become familiar with the existing uses of the computer but also be encouraged to make their own creative decisions about how computers could be used in relation to their own lives. All of these strategies bring girls closer to technology as well as draw us one step closer to achieving our educational goals. This is an exciting time in the field of technology and education, together we can ensure that women are equal partners in the discovery, planning, and benefits of cyberspace.

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MICHELE LEAR

End of the Affair

What's been lost:
 footsteps after dark,
 soft steps to a bed
 ringed with memories
 more important than itself,
 though
 smaller.

This should not end in
 brass bangs into soft plaster,
 softer for your wear,
 her silence.
 Her, your willing
 accomplice.

Is this possible?
 That time would
 ease
 the walk straight down the
 garden path,
 the blame, the guilt,
 freeing loss of desire.

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