John A. Daly   July 9, 2003

ICT, Gender Equality, and Empowering Women

How can information and communication technologies (ICT) be used to promote gender equality in developing nations and to empower women? This essay seeks to deal with that issue, and with the gender effects of the "information revolution." While obvious linkages will be mentioned, the essay seeks to go beyond the obvious to deal with some of the indirect causal paths of the information revolution on the power of women and equality between the sexes.

This is the third[1] in a series of essays dealing with the Millennium Development Goals (MDGs).[2] As such, it deals specifically with Goal 3: to promote gender equality and to empower women. It is published to coincide with the International Conference on Gender and Science and Technology.[3] The essay will also deal with the specific targets and indicators for Goal 3. They are specified below.

Goal 3 Promote gender equality and empower women

Target	Indicators
Eliminate gender disparity in primary and secondary education preferably by 2005 and in all levels of education no later than 2015	• Ratio of girls to boys in primary, secondary, and tertiary education • Ratio of literate females to males among 15- to 24-year-olds • Share of women in wage employment in the nonagricultural sector • Proportion of seats held by women in national parliament

It is important to avoid falling into the epistemological trap of "technological determinism." Optimistic technological determinists will assume that the potential advantages offered by ICT will inevitably be realized. They will assume that women who have been limited from participation in many forms of economic life will utilize ICT in order to participate in e-commerce (conducting business without personal contact with men), and thus become more economically active. Or that girls will be better educated by applications of e-learning, since it is more affordable and allows girls to be educated in the home. Pessimistic technological determinists may see ICT as necessarily exacerbating gender inequities.

In contrast, others may totally deny technological influences. Among this group, pessimists may assume that the cultural barriers that have limited education for girls and economic participation for women will also limit their access to ICT and the benefits that

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[1] The first two were "ICT, Economic Growth and Poverty Reduction," March 2003 http://www.developmentgateway.org/node/133831/sdm/docview?docid=495495 and "ICT and Ensuring Environmental Sustainability" June 2003. (both published on the Development Gateway Portal,) http://www.developmentgateway.org/node/133831/sdm/docview?docid=569545

[2] http://www.developmentgoals.org/

[3] http://www.gasat-canada.org/conference/c1.html

girls and women see from the information revolution. Optimists among this group may hold that progress for women will occur even in countries that fail to adopt ICT.

This paper is based on the assumption that cultural, political, economic, and other factors will influence the degree to which ICT are used by women and the degree to which women benefit from the information revolution. However, the essay recognizes that the technology opens new possibilities, and in that respect not only serves to facilitate the implementation of policies but also serves to allow new approaches to often intractable problems.

General Discussion

Gender and the Information Revolution

The social and economic repercussions of the advances in ICT will be so great that the term "information revolution" is probably justified. On the one hand, technological progress is so fast that *basic* ICT services may well become universally pervasive even in poor societies. On the other hand, developed countries are spending many times as much per capita on ICT as are poor countries and will consequently retain a lead in high-tech ICT. Thus, while ICT offer unparalleled opportunities to meet basic human needs in poor countries, aspects of the digital divide continue to widen, creating new risks for those same poor countries.

Most countries may well maintain the policies and build the institutions needed to utilize the technology to promote social and economic development, and improvement of the status of women may well be part and parcel of the resulting modernization and development. As shown in Figure 1, women appear to be better off and more equal in developed nations than in poorer countries.
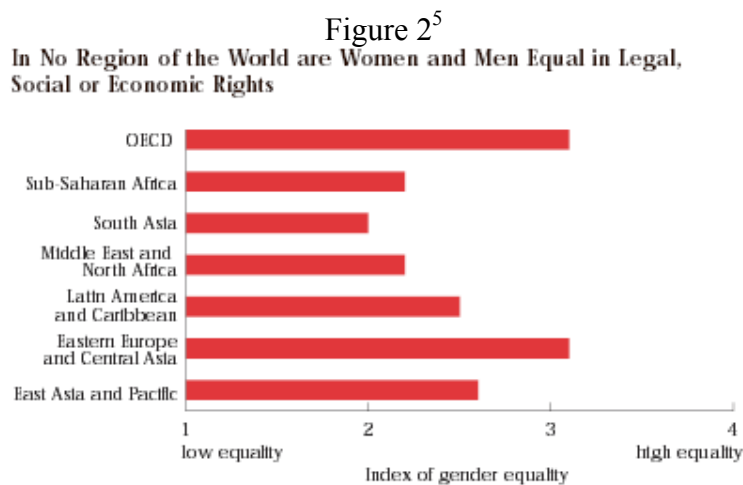
Figure 1. Gender Ratios in Key Indicators by Income Level[4]

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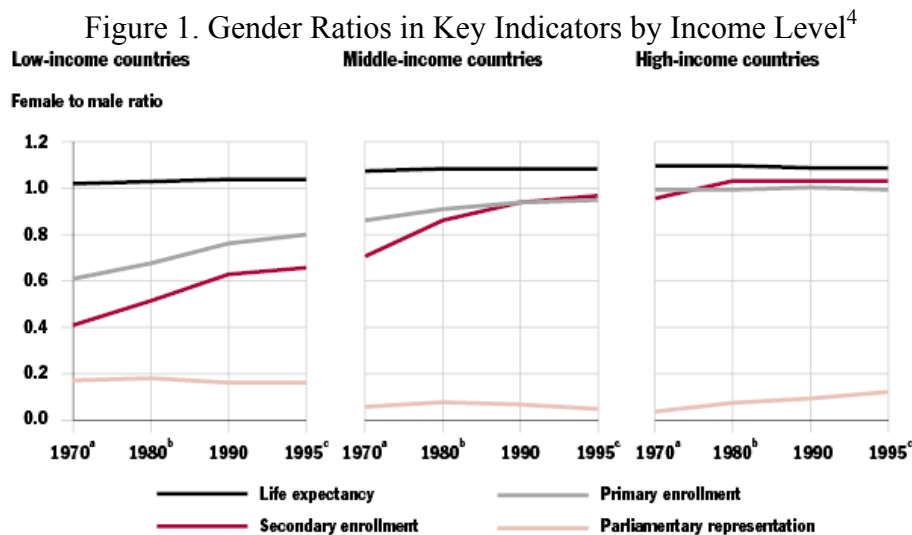
[4] "Engendering Development: Executive Summary," The World Bank, 2001.
http://www.worldbank.org/gender/prr/module7ekam.pdf

It may be, however, that pre-existing gender inequalities will be reflected in the differential abilities of men and women to appropriate the technologies, or that those opposing empowerment of women will be more effective in imposing their views, and that the information revolution will see a continuation or a worsening of gender inequality. Indeed, in some countries a reaction to modernization and to the threats to the status quo posed by the information revolution appears to have succeeded politically, with a significant worsening of the status of women.

Will ICT Promote Gender Equality?

As Figure 2 shows, gender inequality exists everywhere:

Figure 2[5]

In No Region of the World are Women and Men Equal in Legal, Social or Economic Rights

Even in countries where both males and females benefit from ICT, the overall effect might not be to promote gender equality. Thus one might see average household income in a country increase due to successful application of the technology without seeing a relative improvement in the economic status of women relative to men.

An interesting study[6] in virtual economics suggests the magnitude of the problem. There is now a market in which avatars used in playing Internet games can be bought and sold. The avatars are gendered, although the software does not take gender into account in determining the success of the avatars' actions in the games. Both males and females play these games, and many players use avatars of the opposite gender. Yet male avatars sell for a 10 to 15 percent premium over females with exactly comparable skills and powers. Thus, even in an Internet game, people may assign greater value to virtual males than to functionally equivalent virtual females!

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[5] "Gender Equality and the Millennium Development Goals," The World Bank, April 2003. http://www.worldbank.org/gender/gendermdg.pdf
[6] Castonove, Edward, "The Price of 'Man' and 'Woman': A Hedonic Pricing Model of Avatar Attributes in a Synthethic World," June 2003. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=415043

In countries that fail to grasp the opportunities presented by ICT, the technology cannot be expected to promote equality.

Information technology allows information processes to be accomplished much more efficiently, and thus can be used to raise the productivity of information workers, and indeed of most work. As with any technological innovation, there will be winners and losers. Jobs will be created for computer programmers, but lost for typists and draftsmen. Social institutions will determine the gender distribution of the gains and losses. In some societies ICT will empower women in the workforce, but in others they will surely benefit men more than women.

Relatively few applications of the technology are likely be planned to achieve gender goals, but the technology may nonetheless have profound effects on gender roles, gender equality, and the empowerment of women.

Will ICT Empower Women?

There are two aspects to this issue:
1. will ICT directly empower women; and
2. will ICT indirectly empower women.

Certainly there will be a rollout of basic ICT infrastructure and services. Mobile and fixed line telephone service will surely expand in developing nations and probably become affordable. Computer hardware will also become more affordable, especially as low-priced devices are developed for markets in developing nations. Software will become more affordable as markets are expanded for commercial products and as more open-source software becomes available. Telecenter and other approaches to providing community access are being invented, promising business plans for shared access services are improving, and helpful telecommunications policies are being promulgated more widely. Together these trends will also encourage the continued expansion of the Internet. Community radio offers new local radio service, and television will reach a larger audience in rural areas. It seems inescapable that these trends will empower women with more information services, with more information, and indeed with more voice in public affairs.

While ICT infrastructure will be more available and affordable, women's access to that infrastructure is a different matter. Thus a study[7] indicated that "women are 22 percent of all Internet users in Asia, 38 percent of those in Latin America, and six percent of Middle Eastern users." Another recent study[8] found that fewer than 20 percent of people cited in the media in Southern Africa were women. In some countries women will have limited physical access to telecenters and other shared facilities, and even where social and cultural practices allow access to the expanding ICT infrastructure, women's access may

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[7] Hafkin, Nancy and Nancy Taggart "Gender, Information Technology, and Developing Countries: An Analytic Study," June 2001. http://www.usaid.gov/wid/pubs/it01.htm
[8] "The Southern African Gender And Media Baseline Study".
http://www.misa.org/sadc_journalists/press_releases/20030307_Gender_Statement.htm#

be limited by preexisting inequalities in income and education. The costs of ICT are often less affordable to women than to men. In some countries women more often remain in rural areas, where ICT infrastructure is sparse or non-existent. Women are more often illiterate than men, more often limited in their use of national or cosmopolitan languages, and thus more limited in their access to text content. A recent review of the World Links program noted that "domestic chores, culturally-imbued feelings of shyness and traditional rules forced many girls to have less access than boys to computer labs."[9]

It should be noted that there are technological approaches that would help overcome some of these limitations. Thus PRODEM in Bolivia is rolling out ATMs for their micro-finance customers that make banking service available 24/7, that allow transactions to take place in Aymara and Quechua as well as Spanish, and that can be used by people who are largely illiterate.[10]

In some cultures women are not permitted to have face-to-face contact with men other than those in their own families, or are expected to stay at home, or indeed to be isolated in restricted living facilities. For such cultures, communication technologies may empower women. Telephone, radio, television, and the Internet allow women to interact with men without being in the same place, and indeed without face-to-face contact. Especially important in this respect may be distance education and e-commerce.

A Brazilian project[11] illustrates a related phenomenon. It was recognized that a large number of Brazilian women spend most of their time within their homes, engaged in child care, food preparation, and other tasks. Such women have little access to information provided formally in schools, or in the workplace. So a women's network has been formed to broadcast information they need via radio. The radio mass medium reaches homes, is affordable, and serves as an effective means of communication with these house-bound listeners. The Internet allows the network to provide programming and content to local programmers and stations.

It is important to recognize that while basic ICT services and infrastructure are being rolled out in developing nations, the digital divide in high-end ICT is increasing between rich and poor nations. Indeed, rich nations tend to spend a greater portion of their GDP on ICT than do poor nations. There may be a difference of 100 to 1 or more in annual *per capita* ICT expenditures between rich and poor nations, and a comparable difference in the value of ICT infrastructure. Since the market in many of the basic ICT services is essentially saturated in developed nations, they are spending their ICT budgets on high-end ICT, even while poor nations are still struggling to provide basic services.

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[9] "Exploring the Gender Impact of the World Links Program," January 2002.
http://www.worldbank.org/gender/digitaldivide/gendimpact.htm
[10] FFP PRODE"Time for Equality at Work: Part 2," International Labor Organization, April, 2003.
http://www.ilo.org/public/english/standards/decl/download/global4/part2.pdf M Case Study Interview;
http://www.digitaldividend.org/pubs/pubs_05_prod_intvw.htm
[11] Strengthening Women's Leadership in Community Development through Radio internet in Brazil.
http://wbln0018.worldbank.org/ict/projects.nsf/20c7f8205b9d190185256b180057ba4f/8dd09eedddc08d968
5256b10005b7ed0?OpenDocument

Are women empowered by jobs in ICT industry? Of course many women do work in the new and expanding ICT industries, but data from developed countries suggests that men dominate these new opportunities (See Figure 3.)

Figure 3. Women Computer Programmers and Systems Analysts: 1990-2000[12]

Country	Latest year	Percentage of women in "new" occupations (latest year)	Representation ratio[a] (latest year)	Change in percentage of women in "new" occupations, 1990-2000[b]
Belarus	1999	50.9	1.00	—
France	1999	19.6	0.43	–2.3
Germany	2000	18.0	0.42	—
Hong Kong, China	2001	23.8	0.54	1.9
Korea, Republic of	2000	23.4	0.65	—
Poland	2001	25.0	0.55	–44.1
Thailand	2000	47.7	0.98	—
United States	2000	28.5	0.60	–5.3
Average (unweighted)		29.6	0.65	–12.5

Moreover, "patterns of gender segregation are being reproduced in the information economy where men hold the majority of high-skilled, high value-added jobs, whereas women are concentrated in the low-skilled, lower value-added jobs."[13]

Are women empowered to utilize high-end technology? Are they the meteorologists producing weather and climate forecasts using supercomputers for the analysis of masses of data from satellite remote sensing and networks of automated weather stations? Are they the economists producing national economic forecasts and evaluating economic policies through computer analysis of national statistics? Are they the engineers using computer-aided design and planning for computer-aided manufacturing? Are they the elite physicians using computer-aided tomography for diagnosis of complex conditions? All too often, again, the effect of a history of discrimination against women restricts their access to the professions and jobs which would provide access to such high-end ICT. And since it is widely believed that people in these high-tech jobs are gaining in pay and economic status as a result of their appropriation of ICT, women are doubly disadvantaged.

More generally, women lag men in ICT skills. Pay inequality exists between those who have ICT skills and those who do not. "The diffusion of the technologies has been skill-biased and thus accompanied by rising wage inequalities."[14] Moreover, pay polarization also exists within ICT users, and "this polarization is often gender-based."[15]

Are women empowered *indirectly* by the technology? Surely to some extent they are. Thus biomedical research has benefited greatly from the application of ICT, and that research is resulting in new diagnostic and therapeutic technologies that reduce health

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[12] Idem.

[13] "The information technology revolution: Widening or bridging gender gaps?", International Labor Organization, January 2001. http://www.ilo.org/public/english/bureau/inf/pkits/wer2001/wer01ch4.htm

[14] Idem.

[15] Idem.

risks for women, thus empowering them. Indeed, biomedical research has increasingly managed to recognize gender-specific problems and etiologies, and as a result to produce some health interventions that are specifically beneficial to women such as treatments for breast cancer or the complications of pregnancy. Thus ICT in biomedical research can even result in benefits that target women and do not benefit men.

ICT as a powerful technology has risks as well as potential benefits. For example, it can and has been appropriated by those who would exploit women. Thus, the rise of Internet pornography has been a notable development in the last decade, and ICT have been harnessed to other applications by those seeking to profit by the sexual exploitation of women.

Culture Affects the Allocation of ICT Benefits

<u>Social Construction of Technology</u>

This essay must consider the interplay of technology and culture. That interplay is of course relevant in discussing ICT and any MDG, but equality for and empowerment of women are fundamentally cultural issues.

ICT are not *general* purpose: it is better to use a hammer than to use a computer or a telephone for hammering. But ICT can be used in very many circumstances and in many ways. In general, disregarding cultural differences, ICT are equally suited to males and females; any such marginal gender differences as might exist[16] seem not to greatly affect the introduction and utilization of ICT.

On the other hand, technology is socially construed. Cultures may construe ICT to be gender-specific. Thus telecommunications and computer engineering might be considered to be "man's work" or computer programming and data entry to be "women's work" in a specific culture. Moreover, such social construction of ICT may link to other gender roles. For example, the role of physician is often culturally construed as masculine, and that of nurse as feminine. The introduction of a new diagnostic or monitoring technology raises the issue of whether it will be the responsibility of doctors or nurses. The allocation of the function may be an increase in responsibilities and empowerment for one or the other profession. If the technology is socially constructed as "men's work", that fact may influence the outcome of the debate. Of course, power relations within the system may determine both the gender construction of the technology and its assignment to one or the other profession.[17]

The PC on which this essay is written has software, a keyboard, and a video display that are designed for literate English speakers (American usage) who can type. For an

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[16] E.g. manual dexterity and data entry, color blindness (more common in men) and perception of visual displays.

[17] Some years ago in Latin America I came across and example of such a controversy, in which it was deemed that weighing well babies was a medical treatment which had to be performed by doctors, and could not be performed by nurses.

illiterate woman who does not speak English, the device would not be very useful. The understanding of the ways in which PCs will be used is socially constructed, and strongly cultural. ICT designed for use by illiterate women could be tailored to their needs and preferences. Transferring American PCs to Africa or Latin America confronts the ultimate user with a device that embodies many (often implicit) cultural assumptions, often assumptions not appropriate to the destination country.

A great deal of work goes into the interface that links the underlying physical infrastructure with its users.[18] The choices embodied in the design of the interface of the devices and users are indeed *choices*. It would be perfectly possible, albeit a slightly more difficult technical matter and perhaps more expensive, to design a PC that accepts verbal inputs and provides verbal outputs in any specific language, and that uses the display terminal primarily for icons and photos. Thus we are left with an issue of whether the social construction of ICT devices is done to make them equally useful for women and men, or to empower women to fully utilize those devices.

There is a famous historical example, in which telephones at the time of their introduction were conceived as business devices rather than household devices. Indeed, they were seen as appropriate for the "serious purposes" of business men, and not for the presumed frivolous purposes to which women would have put household devices. Advertising sought to encourage business connectivity and discourage household connectivity. Such gender-biased social constructions may well reduce the effectiveness of the ICT revolution in promoting Goal 3. It would seem likely that in countries with little gender equality and little empowerment of women, ICT will not be widely construed in ways promoting equality and empowerment for women. Indeed, it seems likely that people in such cultures will construe technology in gender-specific ways, and will tend not to construe ICT in ways that enhance the status of women relative to men.

ICT May Reinforce Gender Divisions

Will men or women use ICT more? Will men or women benefit more from ICT? (It is at least possible to consider that men would use the technology more, but women benefit more; thus, in a society in which doctors and scientists are men, the use of ICT in medical research and maternal care might be done by men for the benefit of women.)

One level of analysis, suggested in paragraphs above, might simply examine how ICT is used in different occupations, and the gender balance within those occupations. It seems likely that ICT is more important for business managers, engineers, and scientists than for chefs, gardeners, and acrobats. That is, the members of the former professions use ICT more, and gain more in economic productivity from using ICT than do chefs and gardeners. It seems likely that those who gain more in productivity from the use of ICT will, at least as long as their skills are in short supply, also gain more in income from that use. No society has men and women in equal numbers in all its professions. If men substantially outnumber women in the professions that are gaining most from the

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[18] It has been suggested that ICT were created by geeks for geeks, and that almost all users need a cultural interface from geek culture to mainstream culture.

technology, then the average status of men will be enhanced over that of women. And indeed, this is likely to be the case. Thus, in African, Caribbean, and Pacific nations, "women are twice as likely to be involved in agriculture-related activity as men."[19]

Figure 4. Women Hold Fewer Administrative Jobs than Do Men[20]

Region	Administrators as a percentage of the total labour force	Percentage of female administrators
Developed countries	8.1	27.6
Transition economies	6.7	32.9
Asia and the Pacific	5.6	15.3
Latin America and the Caribbean	5.0	32.8
Middle East and North Africa	5.9	28.1

There are wide differences in educational level between men and women in many countries (see Figure 1 above), especially poor countries. Not only is the average level of formal education less for women than men, but illiteracy and innumeracy are higher among women. The ability to use the Internet and high-end ICT is therefore limited for many women in these poor societies, as compared with the that of men.

Canadian University Student Survey Gender Differences

"Many female respondents to our survey note that they have no access to adequate computer hardware (female 48 percent versus 37 percent male), and to the Internet (42 percent male versus 34 percent female) at home, and therefore they feel restricted in choosing their courses, if the courses they wish to take are offered only online, and require researching online resources for class assignments. A major barrier most women students (75 percent versus 52 percent male) seem to face is the lack time for learning new technologies. This is particularly significant because half of the women students (54 percent versus 33 percent men) report that they are often constrained by lack of training they need to use academic software and other advanced IT programs. These barriers would seem to create a lower interest in four in ten women students, more than among men, in their learning to use all IT resources, although few report a sense of alienation in using computers." (Indhu Rajagopal and Nis Bojin, "A Gendered World: Students and Instructional Technology," First Monday, Volume 8, Number 1 — January 6th 2003

Similarly, if men hold considerably more social, economic, and political power than women in the existing cultural order, it seems likely that men will exercise that power to assure that they have greater access to and benefit from new ICT than women. Their power to affect the distribution of access and benefits will of course be limited by their understanding of the processes and effects. Thus, in the United States, personal computers were introduced to many businesses as "word processors," and secretaries

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[19] Hafkin, Nancy and Helen Hambly Odame, "Gender, ICTs and Agriculture," August 2002. http://www.agricta.org/observatory2002/background_paper.pdf
[20] "Time for Equality at Work: Part 2," International Labor Organization, April, 2003. http://www.ilo.org/public/english/standards/decl/download/global4/part2.pdf

(who were usually women at the time) were the first people given access. Of course, later word processing was to be returned to the male domain, and the PC was effectively to spell the end of the professional secretary as one who took dictation, typed drafts, and formatted finished textual products in the office.

Does ICT Change Culture?

Radio, television, and indeed ICT-mediated publishing can be used in explicit efforts to change culture. They can be effective in those efforts over time if campaigns are well conceived and implemented. The resulting cultural changes can be conducive to or contrary to the interests of empowering women. Surely family planning communications programs have been effective in empowering women in aspects of sexual behavior. Media and communications technology have been specifically used as a tool to combat violence against women.[21] Alternatively, the Islamic revolution in Iran used tape-recorded messages to encourage political and social change toward a more conservative regime; the effect of that revolution was a reduction in the rights of many Iranian women. In theory, the media might also be used by those interested in preserving the status quo, opposing change in any direction.

The introduction and expansion of the media may also have unplanned effects on gender issues, incidental to their primary purpose. Thus the introduction of *telenovelas* from Mexico and Brazil into television programming of other (more socially conservative) countries may affect peoples' attitudes toward women, as might the proliferation of Indian programming in Pakistani and Afghan television. Of course, the most visible concern for such cultural impacts relates to the increasing impact of U.S. culture in developing countries, via films and other media, but also more broadly by ICT-driven globalization.

While fertility reduction is not a specific MDG, empowering women with effective rights to control their fertility seems fundamental to MDG 3. Moreover, smaller family size seems fundamental to empowering women economically, and ICT clearly demonstrated utility in family planning programs, from enhancing knowledge, changing attitudes, and changing family planning practices, to enhancing the efficiency of delivery of family planning services. In short, media have been demonstrated to be effective in modifying cultural attitudes toward reproduction, and this will have significant effects on the lives of women.

ICT and Donor Projects

There is considerable debate about the role of projects in the diffusion of ICT. It is clear that many if not most ICT projects are judged not to be successful (in achieving their specified goals and objectives), while it is also clear that the diffusion of the technology is occurring at a very fast rate. A view has been advanced that the dissemination and diffusion of ICT is better viewed as analogous to the spread of a viral infection –

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[21] "Women @ Work to End Violence: Voices in Cyberspace", undated.
http://www.unifem.org/www/resources/w@work/index.htm

occurring largely autonomously, and virtually without planning. This view recognizes that pro-ICT policies and institutions can facilitate the spread of the technology and growth of the infrastructure, but de-emphasizes projects. It especially militates against evaluation of ICT projects in terms of achievement of the intentions of the project proponents, and emphasizes instead the unintended consequences of projects.

Thus one might expect some disagreement about the relative importance of projects in understanding the effect of ICT on women's empowerment and the role of women. It may well be that one must understand broader technological, social, economic, and cultural trends to fully appreciate the effects of ICT. Nonetheless, projects are the basis of much of the work of donor organizations, and are the focus of the following paragraphs.

ICT in projects for women: There are many projects in developing nations that are specifically designed to empower women and/or to improve the status of women.[22] Such projects should be effective, efficient in their use of resources, and well managed. Best practices for the application of ICT in project design, project implementation, project management, and monitoring and evaluation should be applied to these as to other projects.

It should be noted that development projects primarily benefiting women may be in any of a number of sectors, such as maternal and child health, teacher training, or agricultural marketing (e.g. in Africa). Indeed, one might suggest that best practices in the applications of ICT and in gender analysis be applied to projects in all development sectors, leading to many synergistic project opportunities to utilize ICT to empower women and enhance their welfare.

Making ICT projects serve women: Gender analysis appears to be needed in ICT projects and programs. Without such analysis projects may well fail to benefit women to the degree desired. Thus a recent study[23] concluded that "a gender analysis of the six projects supports the hypothesis that women do not benefit equitably from (ICT) development projects unless special efforts are made to identify their situation and needs and effective action is taken to incorporate their participation."

Unfortunately, while many countries have ICT strategies, few appear to have included gender considerations in those strategies.[24] Similarly, a recent study of World Bank[25] projects noted that "If you don't ask for gender in a Bank project, you won't get it."[26]

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[22] cf. The Self Employed Women's Association (http://www.worldbank.org/gender/digitaldivide/digitaldivide20.htm) or ICT Training for Women Entrepreneurs. (http://www.worldbank.org/gender/digitaldivide/digitaldivide18.htm)
[23] Hafkin, Nancy, "Are ICTs Gender Neutral?", July 2002. http://www.un-instraw.org/en/research/gender_and_ict/vss_1.html
[24] "Round Table Discussion: Roles of Gender & ICT in Achieving the Millennium Development Goals" Knowledge Fair, 2003. http://www.worldbank.org/gender/digitaldivide/roundtablediscussion.htm
[25] "Engendering ICTs Study," PowerPoint presentation by Robert Schware and Kayoko Shibata, June, 2003. http://www.worldbank.org/gender/digitaldivide/ict.htm
[26] "Engendering ICTs Study". Rob Schware and Kayoko Shibata, 2003. http://www.worldbank.org/gender/digitaldivide/ict.htm

There are ICT projects that specifically target women, such as projects promoting e-commerce in arts and crafts produced by women, or computer and literacy training for women. Such projects fill a real need in many countries that don't have a level playing field for women seeking ICT access.

ICT projects should also be managed and evaluated using gender analysis. The results may be interesting. For example, a recent review of a scholarship program funding attendance at ICT conferences concluded not only that women were under-represented in the fellowships, but that "women (Fellows) were much less likely to disseminate knowledge (obtained at the conferences) than men".[27]

ICT elements of larger sectoral projects may also benefit from gender analysis. (Indeed, large projects of the World Bank may have ICT components that are much larger than the entire projects of non-governmental organizations.) Thus a health project might include a large telemedicine component as well as support for the application of ICT in improving the productivity and efficiency of health service delivery. Gender analysis might well identify issues of the access of women to telemedicine services, or of women in the health services to the technology. Similarly, radio may be useful in agricultural marketing projects, getting information to the poor on prices and local demand; differential gender analysis may not only identify the gender of the most important recipients for such information, but their access to radio, and their preferred programming and times for announcements.

In some cases gender analysis may be neither easy nor straightforward. For example, donor lending for public telecommunications projects has largely been ended, to be replaced by projects which mobilize private financing for telecommunications. It seems likely that gender analysis would help to assure that the infrastructure empowers women and promotes gender equality. However, in the context of projects mobilizing finance for the private sector, gender analysis may be unfamiliar to key stakeholders, and may involve complex and difficult issues of gender-specific access to different kinds of telecommunications facilities.

ICT for Gender analysis: It should be clear that gender analysis depends on the timely collection and analysis of statistical data, and thus can benefit from appropriate use of ICT. Moreover, decision support systems, computer modeling, and other ICT techniques can be usefully applied to the analysis. Media can facilitate the dissemination of gender analysis results.

ICT as a Tool for Meeting the MDG

The specific target and indicators relating to Millennium Development Goal 3 (Promote Gender Equality and Empower Women) deal with education, literacy, jobs, and political participation. For many countries, these goals will be very ambitious. ICT will be an

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[27] "Impact of Support to Participation in ICT Events," by Louise Chamberlain, June 30, 2003. http://www.infodev.org/icsf/evaluationreport.doc

invaluable tool for those striving to meet the target and to improve performance against those indicators.

Certainly, without the application of ICT there will be no adequate measurement or tracking of progress on Goal 3 nor of the status of women relative to men. It is only through modern survey and statistical techniques, heavily dependent on the advances of ICT, that one will be able to track employment, income, and other statistics and disaggregate them by gender in a timely fashion. Moreover, it is only by the application of ICT that there is any hope of adequately unraveling the complex causal patterns in gender discrimination in order to plan effective public gender policies.

The following paragraphs will treat the Targets and Goals sequentially.

<u>Eliminate gender disparity in primary and secondary education, preferably by 2005</u>

Writing in mid-2003, there is little possibility of eliminating this gender disparity by 2005 with or without the use of ICT.

<u>Eliminate gender disparity in all levels of education no later than 2015</u>

Worldwide, the ratio of girls to boys in primary and secondary schools is about 0.9. While gender equity in primary and secondary education has all but been achieved in high-income countries, in South Asia the ratio is about 0.8, and in Sub-Saharan Africa, about 0.85. Thus, for much of the world there is much to be done in expanding primary and secondary educational opportunities for girls. There are still greater challenges in providing educational opportunities for women in universities.

The task of increasing gender equity in education must be seen in the broader context. "Of the 150 million children aged 6–11 not in school, over 90 million are girls,"[28] but schooling should be made available to all the 150 million children. Thus achieving educational gender equality for girls is part of the effort to make sure that *all* children receive a basic education, and part of the effort to increase the average number of years of schooling for *all* children before they leave to enter the workforce. Higher education clearly must also be expanded greatly for nations seeking to participate in the Information Society, and higher education can be much more expensive than primary or secondary education. Thus expansion of higher education will be even more expensive than primary and secondary, and achieving higher-educational parity for women thereby more difficult. Moreover, numerical increases will be a hollow victory if the quality of education is not improved.

Perhaps the greatest challenge facing nations with large school gender gaps will be mobilizing the political will to develop national programs of educational gender equity. For those who seek to meet this challenge, ICT can be invaluable. The media are a powerful tool in molding public opinion. The Internet can be an invaluable networking

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[28] "Gender Equality and the Millennium Development Goals." The World Bank, April 2003. http://www.worldbank.org/gender/gendermdg.pdf

tool for campaign activists. Decision support systems, expert systems, and modeling packages focusing on gender and education can be developed as useful tools for policymakers and program implementers.

The tasks of expanding the school system, training teachers, and providing educational materials can all be facilitated through the use of ICT. The role of ICT in education will be more directly discussed in a later essay in this series, but this educational challenge is so great that all available means will be needed to address it, and ICT will be especially important.

Ratio of literate females to males among 15- to 24-year-olds

While increasing primary school opportunities for girls is the fundamental tool for achieving progress as measured by this indicator, societies can provide opportunities to become literate through other methods. ICT can help in developing literacy programs, and in making printed materials more widely available and more relevant to the poor, and especially to poor women.

Certainly one issue is that people who achieve limited literacy in school must use those skills after leaving school if they are to retain their literacy. ICT can be a valuable tool for allowing poor people to utilize their literacy skills. For example, as e-government services and telecenters are rolled out to the poor, they will have such opportunities. Same language captioning of popular television programs appears to help retain or recapture literacy.[29]

It is difficult to see how literacy levels can be tracked efficiently and accurately without significant applications of ICT.

Share of women in wage employment in the nonagricultural sector

This general topic has been addressed above. In short, ICT can be a powerful tool in the hands of those who would seek to achieve progress as measured by this indicator, helping to mobilize support for that effort, networking its proponents, and providing instruments useful to those planning and implementing programs, and for tracking success.

Proportion of seats held by women in national parliament

As ICT are powerful instruments in support of women seeking elective office, so too are they powerful in support of those who would oppose them. What is clear is that those women who hold seats in parliament will be well advised to appropriate ICT for their legislative and political needs, for such is increasingly necessary to be effective.

Final Comments

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[29] Kothari, Brij, "Same Language Subtitling: Making India Read", http://diac.cpsr.org/cgi-bin/diac02/pattern.cgi/public?pattern_id=4

This essay has suggested that the diffusion of ICT in developing nations will be part of a larger social and economic phenomenon, and that the effects may well be justifiably termed revolutionary. The process will be largely the result of the policies and institutions in place. No country is without gender inequality, and no nation has fully met the challenge of empowering women. Still, some nations and some cultures have moved much less in these directions than the advanced developed nations.

Rich countries have enjoyed relatively high rates of economic and social progress over extended periods of time. Poor countries have not done so, and indeed the people of some countries appear worse off than their recent ancestors. Yet certainly the world community seeks to achieve a situation in which all countries can progress. In general, high-income countries are more successful not only in empowering their women economically, politically, and socially, but have also achieved more equal status for women. It may well be that development efforts, empowered by ICT, will broaden economic growth, and that this will in turn result in social and cultural changes benefiting women.

It has been suggested alternatively both that the cultural and institutional patterns that have disadvantaged women in the past are likely to disadvantage them in appropriating ICT and its benefits, and that the economic and educational disadvantages that have accrued will further disadvantage them. Indeed, the challenges of globalization and cultural change related to the information revolution have stimulated reactionary elements to promote cultural practices and institutions that would further disadvantage women.

The specific target and indicators for MDG 3 will surely be sought be activists in all countries, and ICT is a powerful technology that can be used in the work of these activists. Where there are opponents to the targets and objectives of MDG 3, they too may find ICT a powerful tool to advance their positions. Where programs are created to achieve the gender equality target, ICT will be powerful programmatic tools. A fundamental issue remains as to what degree the efforts to achieve Goal 3 and its target will contribute to or counteract the larger social and economic trends.

At a project level, ICT can improve projects to empower women, and gender analysis can improve the gender effects of ICT projects. Again, one may question whether these projects will add to or counteract the prevailing trends of impacts of ICT resulting from the larger social, economic and cultural situation.