DOCUMENT RESUME

ED 475 475 CE 084 900

AUTHOR	Bush, Sharon; Henle, Toni; Cohen, Shoshana; Jenkins, Davis; Kossy, Judith
TITLE	Recruiting Lower-Income Women Into Information Technology Careers: Building a Foundation for Action.
SPONS AGENCY	Illinois State Dept. of Commerce and Community Affairs, Springfield.
PUB DATE	2002-11-00
NOTE	29p.; Produced by Women Employed Institute.
AVAILABLE FROM	For full text: http://www.womenemployed.org/publications/info_tech_careers.pdf.
PUB TYPE	Reports - Research (143)
EDRS PRICE	EDRS Price MF01/PC02 Plus Postage.
DESCRIPTORS	Access to Education; Blacks; Career Development; *Career Ladders; Demand Occupations; *Employed Women; Employment Opportunities; *Employment Qualifications; Entry Workers; Hispanic Americans; *Information Technology; Interviews; *Low Income; Occupational Information; *Recruitment
IDENTIFIERS	African Americans; Barriers to Participation; *Computer Occupations; Illinois

ABSTRACT

Selected issues related to the lack of women in the information technology (IT) center were examined. Data were collected through literature and Internet research and interviews with female IT professionals and IT educators and trainers. Particular attention was paid to the following issues: qualifications necessary for a career in IT; barriers faced by women entering IT; entry points to IT jobs and careers; career paths in IT; and strategies for recruiting women into IT. The study established that to enter and succeed in higher-wage technology jobs, women need appropriate career information, support, and training. Plans were therefore made to develop an outreach campaign to encourage lower-income women to consider jobs in IT and provide them with the information they need to pursue the education and training to qualify for IT jobs. The following are among the eight outreach strategies identified for use in the campaign: (1) dispel key myths discouraging women from pursuing IT careers; (2) picture women working with and using IT; (3) profile female IT professionals; (4) describe the wide variety of jobs available in IT; (5) highlight IT's financial rewards; (6) highlight the fact that entering IT does not require a four-year degree; and (7) make presentations to community and school groups. (The bibliography lists 22 references. Twenty-four tables/figures are appended.) (MN)

RECRUITING LOWER-INCOME WOMEN INTO INFORMATION TECHNOLOGY CAREERS

BUILDING A FOUNDATION FOR ACTION

Women Employed Institute

Recruiting Lower-Income Women into Information Technology Careers

BUILDING A FOUNDATION FOR ACTION

Women Employed Institute
111 North Wabash Avenue
Suite 1300
Chicago, Illinois 60602
p-312-782-3902
f-312-782-5249
www.womenemployed.org

Acknowledgements

Recruiting Lower-Income Women into Information Technology Careers was prepared by Sharon Bush and Toni Henle of the Women Employed Institute, Shoshana Cohen and Davis Jenkins of the University of Illinois at Chicago's Great Cities Institute, and Judith Kossy.

Women Employed would like to thank the women in technology, representatives of educational institutions, employers, and representatives of efforts to recruit women into the information technology sector who contributed their time and thoughts for the preparation of this report.

This research was funded by the Illinois Department of Commerce and Community Affairs.

Preface

The research conducted to prepare *Recruiting Lower-Income Women into Information Technology Careers* is meant to build a foundation for action. Information technology (IT) careers were chosen because women, particularly women of color, are traditionally underrepresented in IT jobs, and the IT sector is regularly identified as an area of significant job growth, offering jobs with above-average wages and multiple career paths. Our research was designed to assess women's perspectives and knowledge about the IT field to develop a framework for an outreach campaign aimed at promoting opportunities in the IT field to lower-income women.

The Women Employed Institute has a 30-year commitment to expanding employment opportunities and increasing pay for women. This commitment includes two important campaigns: the *Campaign to Increase Access to Education and Training* and the *Raising Women's Pay Campaign*. The Campaigns are comprehensive efforts that highlight the challenges women face and propose solutions that will significantly increase women's access to education and training in Illinois and ensure equitable pay.

The Institute's affiliate, Women Employed, founded in 1973, is a nonprofit organization of women at all employment levels committed to expanding opportunities for women and girls. With the Institute, the organization is the nation's foremost grassroots advocate for effective equal opportunity programs, a leading promoter of state and local workforce development and welfare reform policies leading to self-sufficiency, and an innovator in developing programs to alleviate female poverty.

For more information on the *Campaign to Increase Access to Education and Training* and the *Raising Women's Pay Campaign*, please contact us at www.womenemployed.org.

November 2002

Table of Contents

Executive Summary

Information technology has become the infrastructure for doing business across industries, making IT professionals critical to every business sector. The Information Technology Association of America reports that the IT sector will have to fill 1.1 million jobs over the next year, about half of which will go unfilled due to a lack of qualified workers (ITAA 2002). Meanwhile, many women, particularly minority women, work in low-paying jobs with few opportunities for advancement. Other women have returned to school without sufficient information to make informed decisions about suitable careers. Despite the promising outlook for careers in IT, women comprise only 20 percent of IT professionals (AAUW 2000), and African Americans and Latinos, both male and female, are poorly represented in IT jobs as well.

Between November 2001 and February 2002, Women Employed and the University of Illinois at Chicago's Great Cities Institute investigated several issues related to the lack of women in the IT sector to gain knowledge to develop strategies for recruiting more women into IT careers. The issues examined include: qualifications necessary for a career in IT, barriers faced by women entering IT, entry-points to IT jobs and careers, career paths in IT, and strategies for recruiting women into the field. We accomplished this by conducting literature and Internet research, interviewing female IT professionals, and interviewing IT educators and trainers. We analyzed the latest available data from the Illinois Board of Higher Education (2000) to determine which post-secondary educational institutions are enrolling and graduating women from IT programs.

Key Findings From Our Research

- The lack of peers or role models with similar backgrounds discourages women from entering information technology careers.
- Misconceptions about IT work dissuade women from choosing these jobs.
- Men are more likely to be interested in technology for its own sake, while women are more interested in the uses and benefits of technology to society.
- IT educators disagree about the degree of employability of people who possess limited training in IT, such as industry certifications.
- Previous research suggests that employers require experience in the IT field or other specialized business expertise (in addition to IT certifications) in order to enter the IT sector, especially during weak job markets.
- Women, especially minority women, are underrepresented in most state-approved certificate and degree programs.
- Two private, four-year institutions are among the top producers of female IT graduates for certificate programs, associate's degrees, and bachelor's degrees.
- Many of the women interviewed entered the IT field through "non-traditional" pathways; that is, they entered the field without a formal degree in computers.
- Common entry points for those without extensive education and training in computers are help desk and personal computer (PC) technician.
- On-going participation in education and training is essential to career advancement in IT.

To enter and succeed in higher-wage technology jobs, women need appropriate career information, support, and training. In order to address the vital need for skilled technology workers and increase opportunities for women, we will develop an outreach campaign that encourages more women to consider jobs in IT and provides them with the information they need to pursue education and training that will qualify them for IT jobs.

The Goals of the IT Outreach Campaign

1. To increase awareness of information technology jobs, careers, and pathways among lower-income women
2. To attract targeted segments of lower-income women to information technology and encourage them to consider IT as a career
3. To inform lower-income women about education and training opportunities that enable them to enter IT careers

Campaigns to recruit women into IT are underway across the country. While the majority of them target youth, a few are aimed at women who are already in the workforce. Some of the common strategies used in such campaigns include:

- Dispelling key myths that discourage women from pursuing IT careers
- Picturing women working with and using IT
- Profiling female IT professionals
- Describing the wide variety of jobs available in IT
- Highlighting the financial rewards of IT
- Highlighting the fact that it is not necessary to have a four-year degree to get into IT
- Creating interactive web sites, videos and print materials to convey the above information
- Making presentations to community or school groups to convey the above information

We will use these and other strategies in our outreach efforts. We anticipate opening the possibilities of information technology to women who are unaware of careers in IT and need information to pursue better career opportunities. By doing so, we aim to enhance women's chances for personal and economic advancement. Not only will the women reached by an outreach campaign benefit, but the resulting increase in qualified workers will make the IT industry and the Illinois economy stronger.

Introduction

The Problem

The Information Technology Association of America (ITAA) reports that the information technology (IT) sector is rebounding from the effects of a weak economy by adding new jobs. Over the next year, the IT sector alone will need to fill 1.1 million jobs, about half of which will go unfilled due to a lack of qualified workers (ITAA 2002). However, research also shows that women will not fill many of these positions, especially women of color. Despite the demand for IT workers and the promising prospects for careers in IT, women comprise roughly 20 percent of IT professionals (AAUW 2000). African-Americans and Latinos, both men and women, are also poorly represented in IT (Freeman and Aspray 1999). Meanwhile, many women, particularly minority women, work in low-paying jobs with few opportunities for advancement, and others have returned to school without sufficient information to make a decision on a suitable career.

Information technology has become the infrastructure for doing business across industries, making IT professionals critical to every business sector. Non-IT companies employ 92 percent of IT workers (ITAA 2002). IT jobs will continue to pay higher wages on average and offer better prospects for advancement than other occupations. In the Chicago-area, the fastest growing occupations in the ten years from 1998 to 2008 are all computer-or IT-related (IDES 2000). This creates a tremendous opportunity to broaden the pipeline of workers into the sector by targeting women in low-wage occupations with the interest and enthusiasm to successfully transition into IT jobs. Women Employed is working to involve this segment of the workforce by developing a campaign to encourage women to consider jobs in IT and provide them with information to get the education and training that will qualify them for IT jobs.

Target Audience

Nationally, 60 percent of all year-round, full-time female workers earn less than $35,000 per year (U.S. Census Bureau 2002). Fifty-four percent of Hispanic women, 41 percent of African-American women, and 38 percent of white women work in low-wage jobs[1] (Kim 2000).

Nearly three-quarters (74 percent) of women with less than a high school diploma work in low-wage jobs, while 14 percent of women with college degrees or higher work in low-wage jobs. Women working in low-wage jobs are clustered in particular sectors within the workforce: 54 percent of women in the workforce are in sales (retail), service, and clerical occupations; most of the women in these jobs earn low wages (Kim 2000).

Women Employed's outreach campaign will target women between the ages of 22 and 45 in Chicago and the surrounding Cook County suburbs, with an annual family income of $35,000 and below, and at least a high school diploma or equivalent. We know that many of the women in this target audience will come from the sales, service, and clerical sectors. These women may also be returning learners who are unsure about career possibilities.

[1]Low-wage workers are workers who cannot support a family of four above the federal government's official poverty level ($16,450) while working 52 weeks per year, 40 hours per week, or a total of 2,080 hours annually.

Overview

Between November 2001 and February 2002, Women Employed and the University of Illinois at Chicago's Great Cities Institute interviewed 28 women currently working in IT (including 11 minority women), nine representatives of schools and programs that teach IT, three IT temporary agency placement staff persons, and seven representatives of efforts to recruit people into IT. In all, 47 people were interviewed, primarily by telephone. Respondents were asked to give their opinions on the qualifications and qualities needed to succeed in IT careers, entry-points and career paths in IT for women and minorities, barriers to entry and advancement, and ideas for recruiting women and minorities to the field. The research team also conducted Internet and literature research as well as an analysis of 2000 Illinois Board of Higher Education data on students and graduates in post-secondary IT degree programs in Illinois. The findings are summarized below.

Research Findings

QUALIFICATIONS AND ATTRIBUTES NECESSARY FOR A CAREER IN IT

The requirements for IT jobs vary considerably from job to job, but some non-technical or "soft" skills seem to be important to almost every position in IT. Some skills, like good communication and organizational skills and the ability to work well with others, are required of many jobs both in and outside of the IT field. However, some are more specific to IT. According to the people we interviewed, much IT work involves extensive troubleshooting or problem solving, so it is important for IT professionals to have these skills. IT is a rapidly changing field, and in order to survive and get ahead workers must be willing to constantly update their skills. IT professionals must enjoy learning new things and tackling new challenges. As one woman stated, it is important for IT professionals to "thrive on change."

Many of the women interviewed mentioned the need to be assertive as an essential attribute in determining advancement opportunities and overall success in IT. Women stressed the importance of assertiveness when pursuing the additional training and experience required for advancement into higher positions within the IT sector from entry-level jobs. Along with assertiveness, women need to be resourceful in order to identify training and experience that enhance opportunities to progress into higher level IT jobs.

BARRIERS TO ENTRY FOR WOMEN INTO IT

The fact that there are not many women currently in IT is itself a barrier to women entering the field. Women do not have female role models to inspire or encourage them to enter IT fields (Freeman and Aspray 1999, Roper Starch Worldwide 2001). Three minority respondents stated that the lack of peers or role models with similar backgrounds discourages others from entering the field. When minority women do not see other women of color in the IT field, they are less likely to consider IT as a career choice.

Many of the barriers that exist for women involve misconceptions. These include misconceptions about IT work (AAUW 2000, Fischer et al. 2001, Freeman and Aspray 1999, Hanson 1997, Schott and Selwyn 2000) as well as stereotypes about women and their capabilities (Milne et al.1994, Seymour 1999, Spertus 1991). Several of the women we interviewed confirmed that when many people think of IT workers they think of nerdy, loner types who sit and crunch numbers at their computers all day. This is not an attractive picture for many women. Four of the female respondents said that men still do not associate women with technology. Findings from the literature confirm this view indicating that society still views technology as a man's field (Freeman and Aspray 1999, Hanson 1997, Roper Starch Worldwide 2001). As a result, women are discouraged from entering technical fields like IT at many different points in their lives.

The culture in many IT workplaces is distinctly male-dominated (Spertus 1991, three respondents). This discourages women from entering the field and also makes it difficult for them to advance. Several women indicated that social activities are more likely to revolve around masculine activities, and often these activities are crucial networking opportunities. Women may not be comfortable in these situations and may have a hard time convincing employers to hire them. These are situations in which the aforementioned qualities of self-confidence and initiative are important.

Many women mentioned long hours as a disadvantage of working in IT, but some women did not agree that long hours are always required. The demands of the IT world can interfere with family lives and create another barrier to entering

the sector; however, there are jobs that do not require longer than average workdays, as well as companies offering alternative work arrangements (e.g. telecommuting, flexible schedules). Alternative work arrangements are more commonly found in the IT sector but are usually reserved for individuals in positions well beyond the entry-level.

Several of the women interviewed also stated that women tend to have less exposure to IT than men both in and out of school. This is true, in part, because more men than women tend to be drawn to IT. Men are more likely to be interested in technology for its own sake, while women are more interested in the uses of technology (Hanson 1997, Fischer et al. 2001). Current technology curricula, especially lower-level classes, focus more on technical knowledge and skills and less on applications of technology (Fischer et al. 2001). Male-oriented computer magazines are also mentioned in the literature (Milne et al. 1994, Spertus 1991) and by several interviewees as reasons that males may be more exposed to technology. According to two of the minority women interviewed, this lack of exposure to technology is an even bigger problem for minority women, who are more likely to live in communities with fewer resources.

Since more men than women are more likely to have completed math and science courses, women's deficits in math and science present a barrier to entering IT jobs as adults. In order to obtain a job in IT, women need to obtain more education and training to compensate for their insufficient backgrounds in math and science. However, this may not be true within the African-American community, where girls at the elementary and secondary education levels outscore boys in math and science (AAUW 1998).

ENTRY-POINTS INTO IT

Education and Training

Some people manage to enter IT without formal education in the field, but most will need some level of training. There are many options for IT education and training, including advanced certificates, associate's degrees, bachelor's degrees and graduate degrees as well as non-credit, short-term training certificates (see Figure 1). Women, especially minority women, are underrepresented in most state-approved certificate and degree programs. Appendix A-1 details the enrollment and graduation rates of women in IT programs in Illinois by program level and race. Our analysis of 2000 Illinois Board of Higher Education data on participation of women and minorities in post-secondary degree IT programs in Illinois produced the following findings.

Women represented a progressively smaller share of students and graduates at higher program levels. For example, they represented about half of all 1-4 year certificate[2] graduates, but less than one quarter of bachelor's degree graduates. Women accounted for fewer than one in five advanced degree graduates in IT in Illinois. A relatively small number of institutions accounted for a high proportion of female IT students and graduates at the bachelor's degree level. (See Appendices A-2 through A-6 for lists of the institutions that graduated the greatest numbers of women and minorities at different levels). Robert Morris College is the leading producer of female IT graduates for both 1-4 year certificate programs (226 graduates) and associate's degrees (216 graduates). Over 215 women earned bachelor's degrees from the two Chicago-area campuses of DeVry Institute, compared to 125 from UIC, the next highest producer. DeVry has recently instituted a "Women in IT" initiative because administrators were dissatisfied with the relatively low proportion of women in its IT programs. At most IT program levels, women seem to graduate at a rate similar to that of men.

Latino women were severely underrepresented among Illinois IT students and graduates at all program levels. They were most underrepresented at the bachelor's, master's, and advanced degree levels. Again, a few institutions accounted for the majority of Latina IT students and graduates (see

[2]Continuing education certificates are usually programs that last a year or less. Post-baccalaureate, post-master's, and post-secondary certificates all require the completion of between one year and four years of instruction.

Appendix A-4). At the bachelor's degree level, Latinas made up only two percent of the total IT graduates in Illinois.

African-American women were also severely underrepresented among Illinois IT students and graduates at all program levels. They were most underrepresented at the master's and advanced degree levels. A relatively small number of institutions accounted for a high proportion of African-American female IT students and graduates at the certificate and bachelor's degree levels in particular. Robert Morris College produced more than four times as many African-American female certificate graduates as the second highest producer. Robert Morris College also produced more than half of all African-American female associate's degree graduates in Illinois (see Appendix A-6). Overall, African-American women are six percent of IT enrollments in Illinois but only three percent of graduates from IT bachelor's degree programs.

The IBHE data show that the top producers of both African-American and Latino IT associate's degree graduates are private, four-year institutions, not community colleges. Community colleges are commonly perceived as the primary producers of associate's degree graduates. However, in the case of IT enrollment, community college students usually enroll in one or two specific classes or short-term training for certifications. It appears that these students are already in the IT field and often do not go on to obtain associate's degrees in technology-related fields.

Entry Points by Job Title and Educational Attainment

Entry points into IT are the actual entry-level jobs people obtain within the IT sector. An entry point can be within a technology company or within the IT department of a non-technology company. The entry points into IT jobs vary depending on education attained and practical experience. Figure 1 shows typical entry points into IT fields for those at varying levels of education and experience in computers. Not surprisingly, those with higher-level degrees start higher up the job ladder, although most employers will not hire an IT degree holder if he or she has not had at least some work experience through an internship or summer job.

According to people interviewed for this project, the most common entry points for those without extensive education and training in computers are *help desk* and *personal computer (PC) technician*. Help desk workers generally answer questions about technical systems while PC technicians actually work in the field and help to troubleshoot, repair and maintain computer systems. These jobs are entry points into IT for people with limited training or experience. Help desk workers may only be required to document problems, read from scripts, and try to solve problems. Individuals with strong customer service skills and basic familiarity with computers should be able to readily move into some help desk positions. Similar to the help desk position, entry-level PC technicians need to know how to troubleshoot PCs and maintain systems of computers on local area networks.

Three of the women we interviewed suggested that *production assistant* and *web page assistant* are entry points into IT for those with little formal training. These positions require only a minimal amount of web knowledge because they involve the use of packaged computer software to edit and format content material rather than maintaining or modifying the software itself. However, the environment in which these workers operate provides an opportunity to acquire specialized skills that enable them to advance to more technical positions. Production and web page assistant positions are very similar to help desk and PC technician in that they are entry points for those with a certificate or associate's degree and some work experience.

For individuals entering IT with less than a bachelor's degree and limited training, *software tester* and *quality assurance* jobs are sometimes points of entry into programming work. Some also see *programming* as an entry-level position; however, it should be noted that these jobs typically require a bachelor's degree in a computer field plus some experience.

An Entry-Point Caveat

The Internet age has brought a proliferation of short-term IT training programs, many of them geared to preparing for certification of skills to industry standards. According to a representative

of one of the City Colleges of Chicago, such training programs are extremely popular with students because of the short amount of time it takes to obtain a certification recognized by employers. The most attractive courses are those leading to widely accepted certifications such as Microsoft Certified Systems Engineer (MCSE) and A+ (a hardware-oriented certificate). However, IT educators disagree about the degree of employability that people have with only IT certificates. Robert Morris College, which has a strong track record in placing graduates into IT jobs, is planning to phase out all certificate programs and only offer associate's and bachelor's degree programs in IT. According to staff of the college's placement office, it is difficult to place students who only have the certificate. In extensive interviews with employers on their hiring practices, UIC Great Cities Institute and the Council for Adult and Experiential Learning (CAEL) found no employers who were willing to hire on the basis of industry certifications alone (Jenkins and Kossy 2001). Certification is most useful for people already in the IT field who want to pick up a new skill.

"Non-traditional" Access Points

Many of the women interviewed who are currently in IT positions entered the field through "non-traditional" pathways, that is, they entered the field without a formal degree in a computer-related field. The Computing Research Association estimates that more than half of IT workers do not have degrees in computer fields (Freeman and Aspray 1999). A number of the people interviewed had previously been in administrative or office positions. Three were secretaries or receptionists and one was an office manager. All of them were able to acquire some IT experience simply from troubleshooting computers in their workplaces. Sales, customer service, and artistic occupations were other backgrounds from which the individuals we interviewed had moved into IT. Based on the research, sales, clerical, and service positions can be defined as *access points* to IT jobs because their requirements involve extensive contact with technology via data entry, design, and the troubleshooting of hardware and software problems as they occur on the job. Workers in the above positions are likely to use computers and may have the opportunity to pick up enough skills to move into more technical positions (Figure 2 shows access points to IT careers for career changers).

One of the respondents provided a description of how she gained computer skills as a legal assistant. She got on-the-job training by virtue of becoming known as the "computer troubleshooter" in her office. Today, she heads her own technology company. Several other respondents noted that in smaller organizations or companies it is easier for a person to gain IT experience while in a non-IT or access point position. This is true because in smaller companies there may be fewer employees devoted entirely to IT. Therefore, people in a variety of positions may have opportunities to take on IT functions and gain experience.

CAREER PATHS IN IT

As stated earlier, help desk and PC technician are common entry points to IT for those with limited formal training, but many are unaware of career paths in IT. While the pathways of advancement are rarely clear-cut, Figure 3 shows the next level of advancement for entry-level workers in help desk or PC technician positions. These include technical support specialist (or help desk 2), LAN administrator, computer installation coordinator, and software tester. Thus, the help desk position has some career advancement potential. Individuals can advance to higher levels by learning on the job and with additional formal training. Experience on the job and additional technical training are essential for advancement to higher-level technical positions. Eventually, some people move into technical management level positions, but again this advancement usually requires additional schooling. Women still remain scarce among top technical management positions compared to entry-level IT positions (Igbaria and Saroj 1997).

OCCUPATIONS TO TARGET FOR RECRUITMENT

The respondents suggested targeting occupations that were some of their own entry points into the IT field. These include: secretaries or receptionists,

sales and customer service workers, factory or manufacturing workers, designers/artists, writers, data entry personnel, and workers in the nursing field. These positions all afford experience with computers and most are included in the previously identified low-wage, occupational clusters disproportionately comprised of women.

Several people interviewed suggested that anyone who works with a computer or other sort of technical equipment would make a good target for recruitment. Others suggested that call center and less technically skilled help desk employees would make good targets. These positions require more customer service skill than technical skill, but the workers do become familiar with basic computer functions.

MESSAGES FOR RECRUITMENT

Many of the people we interviewed suggested ways to recruit women to IT that involve dispelling the misconceptions mentioned earlier about the field. They thought women would respond to information that demonstrates IT as a multifaceted field encompassing many different types of positions and clarifies that, while some IT work is relatively solitary in nature, most jobs in the field involve extensive interaction with others.

A majority of those interviewed stated that the benefits of IT should be highlighted. Among the benefits to highlight, women mentioned the chance to be recognized for their achievements regardless of gender. Others described the field as being fun, exciting, and challenging with a vast array of opportunities. IT also provides opportunities to learn new and marketable skills. IT jobs such as web design and those involving problem solving can also involve creativity. Many women we interviewed cited the benefit of financial security, although two stated that this becomes less important as one's career advances.

Because of the lack of women in IT, several respondents and researchers suggest that it is important to try to provide role models (Spertus 1991, Watkins and Milgram 1994). This may include involving prominent and successful women in IT in a campaign to recruit others. These women and their career paths could be profiled so they can provide inspiration to others. It is also important to show that there are many people of different backgrounds involved in IT work. This will help to dispel the IT "geek" image. However, one woman suggested that we should "embrace the geek" by showing that the people society calls geeks are really intelligent, successful, and attractive people.

Other respondents suggested that it is important to use non-technical terms when describing IT and to show how technology relates to women's everyday lives. This can be accomplished by highlighting all of the technologies (e.g. phone, e-mail) that people use every day and demonstrating that learning about technology will benefit people whether they go into a strictly technical field or not. For instance, parents will benefit from learning to use technology by being able to help their children with schoolwork. Skills such as graphic design can allow people to create their own business cards or letterhead. These sorts of skills can be useful in many fields.

Some of the recommendations for marketing to potential recruits included communication via two-year colleges, community organizations, churches, unions, county health facilities, and parent meetings at schools. One of the school representatives said that making presentations is a much more effective way to reach women than simply circulating print materials. Another suggestion was to find ways to give women a "taste of IT," to conquer the fear of technology. Once women see what IT is really all about they may feel encouraged to continue. This could be done through projects or internships for women in schools and colleges.

OTHER EFFORTS TO RECRUIT WOMEN AND MINORITIES INTO IT

The majority of large-scale IT recruitment campaigns are aimed at youth. However, a few initiatives have sought to recruit women and minorities who are already in the workforce. The WomenTech Project is one such effort. The Institute for Women in Trades, Technology and Science (IWITTS) is organizing WomenTech in conjunction with three U.S. community colleges. The goal of the project is to recruit more women into science, math, engineering, and technology

(SMET) classes. Among the women they are targeting are those who are unemployed, underemployed, in job training/welfare-to-work programs, or re-entering the workforce (IWITTS 2002).[3] Another recruiting effort is the Women in Information Technology (WinIT) project in Canada, organized by the Women in Trades and Technology National Network in Canada. The campaign is a national initiative designed to encourage both girls and women to explore careers in IT (WinIT 2002). Black Geeks Online is an organization working to connect people of color from around the world to promote computer literacy and educate others about the power and potential of Internet technology. The organization has participated in specific recruitment efforts in the past (Black Geeks Online 2001)[4].

These and other comparable efforts tend to use very similar strategies, which include:

- Dispelling key myths that discourage women from pursuing IT jobs
- Picturing women and minorities working with and using IT
- Profiling female or minority IT professionals
- Describing the many different types of jobs available in IT, including the variance in intensity level and hours required by IT employers
- Highlighting the financial rewards of IT
- Appealing to people who work hard but are not economically independent– e.g. "Are you a woman who is working hard and barely making ends meet?"
- Highlighting women that began IT careers with less than a four-year degree
- Publicizing testimonials from people who enjoy their jobs in IT
- Creating interactive web sites and videos to convey the above information
- Creating print materials such as posters, brochures, etc.
- Making presentations to community or school groups
- Highlighting skill sets and core competencies of successful IT professionals (assertiveness, problem-solving ability, self-confidence, desire for continuous learning)

[3]The Women Employed campaign will target the same subsets of women. Although current information on the project is limited, we will continue to monitor the progress of the WomenTech campaign.

[4]According to its website, Black Geeks Online is a virtual community that shares technology information and resources. It is not clear whether the organization is active based on the information published on the website.

Conclusion

Great potential exists for closing the information technology job gap by increasing the number of women working in IT jobs. A significant number of women are underemployed in jobs that provide the opportunity to interface with technology on a daily basis. These access points can be used to build bridges for women to pursue careers in information technology. Jobs that serve as access points need to be supplemented with the appropriate education and training that links women to entry-level, career path jobs in IT. A campaign needs to contain messages that correct misconceptions and remove barriers, educate women about job and career possibilities in IT, encourage suitable education and training, and present appropriate role models to which women can aspire. Most of the women interviewed believe that there is enormous potential for women of varying backgrounds to enter the IT sector, pursue successful careers, and earn family-supporting wages.

This research is meant to lay the groundwork to encourage action by educators and trainers, employers, workforce development professionals, and by the women themselves, to increase the number of women pursuing information technology careers in the Chicago area. Increasing the number of qualified technology professionals ultimately means enhanced productivity for companies, increased revenues to state and local communities, and the opportunity for low-wage women workers to build their skills and earn wages that support them and their families.

References

American Association of University Women Educational Foundation. 1998. *Gender Gaps: Where Schools Fail Our Children.* Executive Summary retrieved March 27, 2002 from the World Wide Web at http://www.aauw.org/2000/gg.html.

American Association of University Women Educational Foundation. 2000. *Tech-Savvy: Educating Girls in the New Computer Age.* Executive Summary retrieved November 12, 2001 from the World Wide Web at http://www.aauw.org/2000/techsavvybd.html.

Black Geeks Online. Information retrieved December 15, 2001, from the World Wide Web at http://www.blackgeeks.net.

Hanson, K. 1997. *Gender, Discourse, and Technology.* Newton, MA: Center for Equity and Cultural Diversity.

Igbaria, M. and Parasuraman, S. 1997. Status Report on Women and Men in the IT Workplace, *Information Systems Management, 14* (3). pp. 44-54.

Fischer, A., Margolis, J. and Miller, F. 2001. *Geek Mythology.* In progress. Retrieved August 23, 2001, from the World Wide Web at http://www.cs.cmu.edu/ ~gendergap/papers.html.

Fischer, A, Margolis, J. and Miller, F. 2001. *Computing For a Purpose: Gender and Attachment to Computer Science.* In progress. Retrieved August 23, 2001, from the World Wide Web at http://www.cs.cmu.edu/ ~gendergap/papers.html.

Freeman, P. and Aspray, W. 1999. *The Supply of Information Technology Workers in the United States.* Washington, DC: Computing Research Association.

IDES (Illinois Department of Employment Security). 2000. *Occupational Projections 1998-2008.* Springfield, IL: Author.

Institute for Women in Trades, Technology and Science. Information retrieved February 11, 2002, from the World Wide Web at http://www.iwitts.com.

ITAA (Information Technology Association of America). 2002. *Bouncing Back: Jobs, Skills, and the Continuing Demand for IT Workers.* Arlington, VA: Author. Executive Summary retrieved July 26, 2002 from the World Wide Web at http://www.itaa.org/workforce/studies/02execsumm.pdf.

Jenkins, D. and Kossy, J. 2001. *Building a World-Class Information Technology for the Chicago Region: A Framework for Action.* Chicago, IL: Council for Adult and Experiential Learning.

Kim, Marlene. 2000. *Women Paid Low Wages: Who They Are and Where They Work?* Washington, DC: Monthly Labor Review, Bureau of Labor Statistics.

Milgram, D. and Watkins, K. 1994. Ensuring Quality School-to-Work Opportunities for Young Women. *Presentation at the American Vocational Association Convention.* Washington, DC: Wider Opportunities for Women.

Milne, W., Saini, B., and Segal, B. 1994. Computer Games: A Positive Introduction to IT or a Terminal Turn-off? In A. Adam, J. Emms, E. Green, and J. Owen (eds.), *Women, Work and Computerization: Breaking Old Boundaries – Building New Forms* (pp.203-207). Amsterdam: Elsevier.

Roper Starch Worldwide, Inc. 2001. *Women in Technology Leadership,* retrieved August 20, 2001, from the World Wide Web at http://www.roper.com./Newsroom/content/news257.html.

Schott, G. and Selwyn, N. 2000. Examining the "Male, Antisocial" Stereotypes of High Computer Users. *Journal of Educational Computing Research*, 23(3), pp. 291-303.

Seymour, E. 1999. The Role of Socialization in Shaping the Career-Related Choices of Undergraduate Women in Science, Mathematics, and Engineering Majors. *The New York Academy of Sciences*, 869, pp. 118-126.

Sorenson, C. 2002. Women and Profits. *Fast Times* retrieved February 11, 2002 from the World Wide Web at http://www.worldwit.org/fast_timeswomenandprofits_020002.htm.

Spertus, E. 1991. *Why are There so Few Female Computer Scientists?* MIT Artificial Intelligence Laboratory Technical Report 1315.

U.S. Census Bureau. 2002. Money Income in the United States: 2001. Current Population Report. Washington, DC.

Women in Information Technology. Information retrieved February 11, 2002, from the World Wide Web at http://www.wittnn.com/English/Index.htm.

List of Charts

APPENDIX A-1

Female IT Enrollees and Graduates in Illinois by Various Program Levels and Race (2000)[5]

FEMALES

	Female IT Students	Females as % of All IT Students	Female IT Graduates	Females as % of All IT Graduates
1-4 Year Certificates	1,848	39%	1,102	49%
Associate's Degrees	5,452	37%	828	40%
Bachelor's Degrees	5,865	25%	984	24%
Master's Degrees	1,674	29%	504	30%
Other Advanced Degrees	148	17%	22	17%
TOTAL	14,987	30%	3,440	34%

LATINOS

	Latina IT Students	Latinas as % of All IT Students	Latina IT Graduates	Latinas as % of All IT Graduates
1-4 Year Certificates	185	4%	161	7%
Associate's Degrees	485	3%	91	4%
Bachelor's Degrees	557	2%	71	2%
Master's Degrees	33	1%	6	0%
Other Advanced Degrees	1	0.1%	0	0%
TOTAL	1,261	3%	328	3%

AFRICAN-AMERICANS

	African-American Female IT Students	African-American Females as % of All IT Students	African-American Female IT Graduates	African-American Females as % of All IT Graduates
1-4 Year Certificates	394	8%	267	12%
Associate's Degrees	1,121	8%	192	9%
Bachelor's Degrees	1,442	6%	134	3%
Master's Degrees	178	3%	24	1%
Other Advanced Degrees	1	0%	0	0%
TOTAL	3,136	6%	617	6%

[5]Appendices A-1 through A-6 were produced from 2000 data compiled by the Illinois Board of Higher Education.

APPENDIX A-2

Top Five Institutions in Illinois Producing Female IT Graduates at Various Program Levels (2000)

1-4 Year Certificates	Female IT Graduates	All IT Graduates	Females as % of IT Graduates	% of Total Female IT Graduates in IL
Total Female IT Certificates 1,102				
Robert Morris College	226	420	54%	21%
College of DuPage	128	221	58%	12%
CCC-Richard J. Daley College	113	164	69%	10%
College of Lake County	52	95	55%	5%
Morton College	45	57	79%	4%
TOP FIVE TOTALS	564	957	59%	51%

Associate's Degrees	Female IT Graduates	All IT Graduates	Females as % of IT Graduates	% of Total Female IT Graduates in IL
Total Female IT Associate's Degrees 828				
Robert Morris College	219	378	58%	26%
Southwestern Illinois College	37	81	46%	4%
Joliet Junior College	34	62	55%	4%
Illinois Central College	27	70	39%	3%
William Rainey Harper College	24	63	38%	3%
TOP FIVE TOTALS	341	654	52%	41%

Bachelor's Degrees	Female IT Graduates	All IT Graduates	Females as % of IT Graduates	% of Total Female IT Graduates in IL
Total Female IT Bachelor's Degrees 984				
U of I-Chicago	125	425	29%	13%
DeVry Inst. of Tech.-DuPage*	115	454	25%	12%
DeVry Inst. of Tech.-Chicago	102	334	31%	10%
DePaul University	80	206	39%	8%
U of I.-Urbana-Champaign	63	562	11%	6%
TOP FIVE TOTALS	485	1,981	24%	49%

* The two campuses of the former DeVry Institute of Technology totaled 217 female IT graduates in 2000. DeVry Institute of Technology is now DeVry University.

APPENDIX A-3

Top Five Institutions in Illinois Producing Latino IT Graduates at Various Program Levels (2000)

1-4 Year Certificates	Latino IT Graduates	All IT Graduates	Latinos as % of IT Graduates	% of Total Latino IT Graduates in IL
Total Latino IT Certificates 318				
CCC-Richard J. Daley College	94	164	57%	30%
Robert Morris College	90	420	21%	28%
Morton College	27	57	47%	8%
College of Lake County	12	95	13%	4%
Triton College	12	47	26%	4%
TOP FIVE TOTALS	235	783	30%	74%

Associate's Degrees	Latino IT Graduates	All IT Graduates	Latinos as % of IT Graduates	% of Total Latino IT Graduates in IL
Total Latino IT Associate's Degrees 257				
Robert Morris College	78	378	21%	30%
DeVry Inst. of Tech.-Chicago	47	147	32%	18%
ITT Tech. Inst.-Mount Prospect	30	79	38%	12%
DeVry Inst. of Tech.-DuPage	15	144	10%	6%
CCC-Richard J. Daley College	11	29	38%	4%
TOP FIVE TOTALS	181	777	23%	70%

Bachelor's Degrees	Latino IT Graduates	All IT Graduates	Latinos as % of IT Graduates	% of Total Latino IT Graduates in IL
Total Latino IT Bachelor's Degrees 223				
DeVry Inst. of Tech.-Chicago	55	334	16%	25%
U of I-Chicago	33	425	8%	15%
DeVry Inst. of Tech-DuPage	30	454	7%	13%
ITT Tech. Inst.-Mount Prospect	19	75	25%	9%
DePaul University	14	206	7%	6%
TOP FIVE TOTALS	151	1,494	10%	68%

APPENDIX A-6

Top Five Institutions in Illinois Producing African-American Female IT Graduates at Various Program Levels (2000)

1-4 Year Certificates	African-American Female IT Graduates	All IT Graduates	African-American Females as %of IT Graduates	% of Total African-American Female IT Graduates in IL
Total African-American Female IT Certificates 267				
Robert Morris College	109	420	26%	41%
CCC-Kennedy-King College	24	34	71%	9%
Taylor Business Institute	22	59	37%	8%
CCC-Richard J. Daley College	22	164	13%	8%
CCC-Olive-Harvey College	18	32	56%	7%
TOP FIVE TOTALS	195	709	27%	73%

Associate's Degrees	African-American Female IT Graduates	All IT Graduates	African-American Females as %of IT Graduates	% of Total African-American Female IT Graduates in IL
Total African-American Female IT Associate's Degrees 192				
Robert Morris College	101	378	27%	53%
CCC-Kennedy-King College	12	16	75%	6%
ITT Tech. Inst.-Matteson	10	75	13%	5%
DeVry Inst. of Tech.-Chicago	9	147	6%	5%
CCC-Olive-Harvey College	7	20	35%	4%
TOP FIVE TOTALS	139	636	22%	72%

Bachelor's Degrees	African-American Female IT Graduates	All IT Graduates	African-American Females as %of IT Graduates	% of Total African-American Female IT Graduates in IL
Total African-American Female IT Bachelor's Degrees 134				
DeVry Inst. of Tech.-Chicago	29	334	9%	22%
DeVry Inst. of Tech.-DuPage	17	454	4%	13%
S.I.U-Carbondale	11	289	4%	8%
U of I-Chicago	10	425	2%	7%
Governors State University	10	57	18%	7%
TOP FIVE TOTALS	77	1,559	5%	57%

FIGURE 1
Entry Points to IT Careers for IT Degree Grads

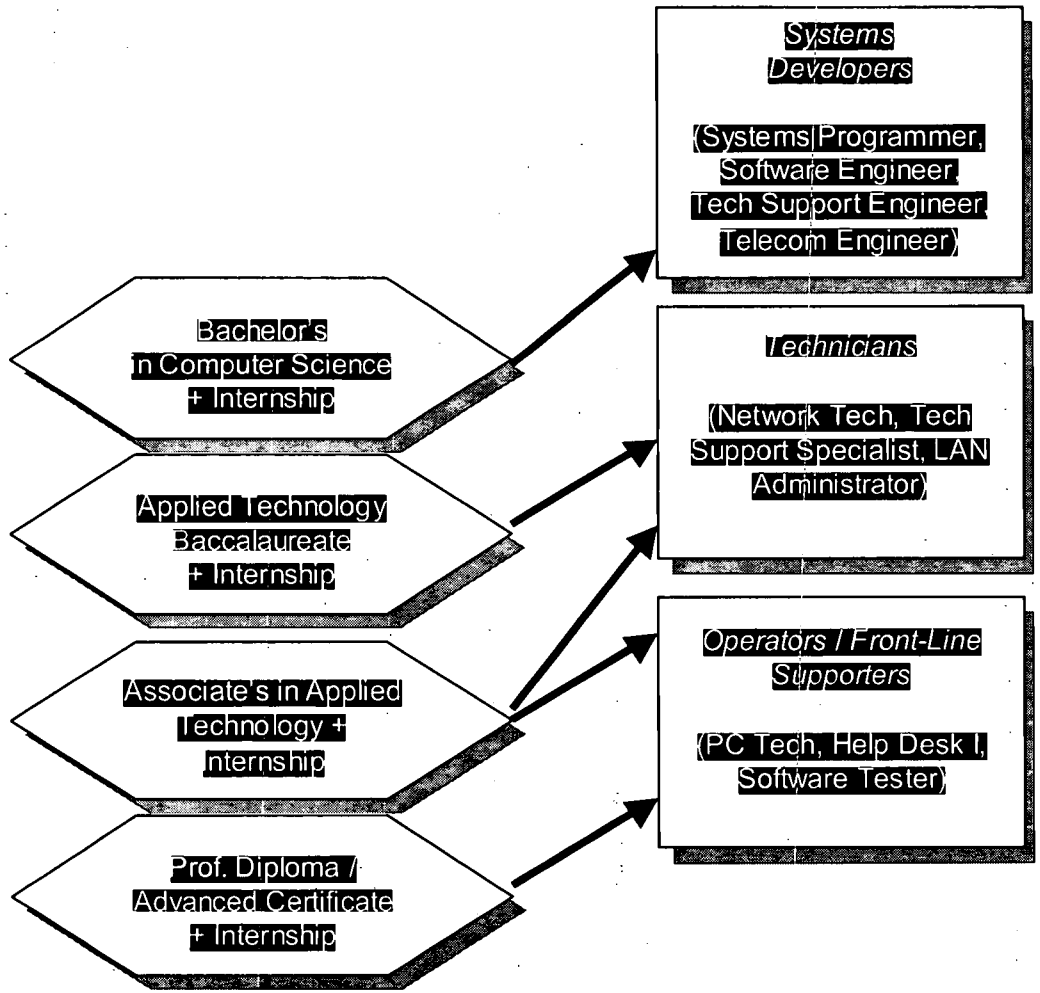

FIGURE 2
Access Points to IT Careers for Career Changers

FIGURE 3
Entry-Level Paths to IT Careers

Women Employed Institute
111 North Wabash Avenue
Suite 1300
Chicago, Illinois 60602
p-312-782-3902
f-312-782-5249
www.womenemployed.org

APPENDIX A-4

Top Five Institutions in Illinois Producing Latina IT Graduates at Various Program Levels (2000)

1-4 Year Certificates	Latina IT Graduates	All IT Graduates	Latinas as % of IT Graduates	% of Total Latina IT Graduates in IL
Total Latina IT Certificates 161				
CCC-Richard J. Daley College	68	164	41%	42%
Robert Morris College	45	226	20%	28%
Morton College	24	57	42%	15%
College of Lake County	6	95	6%	4%
Elgin Community College	3	46	7%	2%
TOP FIVE TOTALS	**146**	**588**	**25%**	**91%**

Associate's Degrees	Latina IT Graduates	All IT Graduates	Latinas as % of IT Graduates	% of Total Latina IT Graduates in IL
Total Latina IT Associate's Degrees 91				
Robert Morris College	46	378	12%	51%
CCC-Richard J. Daley College	11	29	38%	12%
DeVry Inst. of Tech.-Chicago	5	147	3%	5%
The College of Office Tech.	5	8	63%	5%
St. Augustine College	4	10	40%	4%
TOP FIVE TOTALS	**71**	**572**	**12%**	**78%**

Bachelor's Degrees	Latina IT Graduates	All IT Graduates	Latinas as % of IT Graduates	% of Total Latina IT Graduates in IL
Total Latina IT Bachelor's Degrees 71				
DeVry Inst. of Tech.-Chicago	24	334	7%	34%
U of I-Chicago	11	425	3%	15%
DeVry Inst. of Tech.-DuPage	7	454	2%	10%
DePaul University	5	206	2%	7%
Governors State University	3	57	5%	4%
Illinois Institute of Technology	3	108	3%	4%
TOP FIVE TOTALS	**53**	**1,584**	**3%**	**75%**

APPENDIX A-5

Top Five Institutions in Illinois Producing African-American IT Graduates at Various Program Levels (2000)

1-4 Year Certificates	African-American IT Graduates	All IT Graduates	African-Americans as %of IT Graduates	% of Total African-American IT Graduates in IL
Total African-American IT Certificates 497				
Robert Morris College	155	420	37%	31%
Taylor Business Institute	48	59	81%	10%
Lake Land College	33	75	44%	7%
CCC-Kennedy-King College	33	34	97%	7%
CCC-Olive-Harvey College	30	32	94%	6%
TOP FIVE TOTALS	299	620	48%	60%

Associate's Degrees	African-American IT Graduates	All IT Graduates	African-Americans as %of IT Graduates	% of Total African-American IT Graduates in IL
Total African-American IT Associate's Degrees 344				
Robert Morris College	135	378	36%	39%
DeVry Inst. of Tech.-Chicago	41	147	28%	12%
ITT Tech. Inst.-Matteson	33	75	44%	10%
CCC-Olive-Harvey College	18	20	90%	5%
CCC-Kennedy-King College	16	16	100%	5%
TOP FIVE TOTALS	243	636	38%	71%

Bachelor's Degrees	African-American IT Graduates	All IT Graduates	African-Americans as %of IT Graduates	% of Total African-American IT Graduates in IL
Total African-American IT Bachelor's Degrees 327				
DeVry Inst. of Tech.-Chicago	74	334	22%	23%
DeVry Inst. of Tech.-DuPage	38	454	8%	12%
S.I.U-Carbondale	38	289	13%	12%
U of I-Chicago	25	425	6%	8%
Governors State University	15	57	26%	5%
U of I-Urbana-Champaign	15	562	3%	5%
Chicago State University	15	17	88%	5%
TOP FIVE TOTALS	220	2,138	10%	67%

CE0849 00

0

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

ERIC Educational Resources Information Center

REPRODUCTION RELEASE

(Specific Document)

I. DOCUMENT IDENTIFICATION:

Title: Recruiting Lower-Income Women into Information Technology Careers	
Author(s): Women Employed Institute	
Corporate Source: Same	Publication Date: 11/2002

II. REPRODUCTION RELEASE:

In order to disseminate as widely as possible timely and significant materials of interest to the educational community, documents announced in the monthly abstract journal of the ERIC system, *Resources in Education* (RIE), are usually made available to users in microfiche, reproduced paper copy, and electronic media, and sold through the ERIC Document Reproduction Service (EDRS). Credit is given to the source of each document, and, if reproduction release is granted, one of the following notices is affixed to the document.

If permission is granted to reproduce and disseminate the identified document, please CHECK ONE of the following three options and sign at the bottom of the page.

The sample sticker shown below will be affixed to all Level 1 documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

Level 1 ↑ ☑

Check here for Level 1 release, permitting reproduction and dissemination in microfiche or other ERIC archival media (e.g., electronic) *and* paper copy.

The sample sticker shown below will be affixed to all Level 2A documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE, AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2A

Level 2A ↑ ☐

Check here for Level 2A release, permitting reproduction and dissemination in microfiche and in electronic media for ERIC archival collection subscribers only

The sample sticker shown below will be affixed to all Level 2B documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2B

Level 2B ↑ ☐

Check here for Level 2B release, permitting reproduction and dissemination in microfiche only

Documents will be processed as indicated provided reproduction quality permits.
If permission to reproduce is granted, but no box is checked, documents will be processed at Level 1.

I hereby grant to the Educational Resources Information Center (ERIC) nonexclusive permission to reproduce and disseminate this document as indicated above. Reproduction from the ERIC microfiche or electronic media by persons other than ERIC employees and its system contractors requires permission from the copyright holder. Exception is made for non-profit reproduction by libraries and other service agencies to satisfy information needs of educators in response to discrete inquiries.

Sign here, please

Signature: Jennifer Wittner	Printed Name/Position/Title: Jenny Wittner / Senior Policy Associate	
Organization/Address: Women Employed, 111 N. Wabash, Suite 1300, Chicago IL 60602	Telephone: 312-782-3902	FAX: 312-782-5249
	E-Mail Address: jwittner@womenemployed.org	Date: 4/23/03

(Over)

III. DOCUMENT AVAILABILITY INFORMATION (FROM NON-ERIC SOURCE):

If permission to reproduce is not granted to ERIC, *or*, if you wish ERIC to cite the availability of the document from another source, please provide the following information regarding the availability of the document. (ERIC will not announce a document unless it is publicly available, and a dependable source can be specified. Contributors should also be aware that ERIC selection criteria are significantly more stringent for documents that cannot be made available through EDRS.)

Publisher/Distributor:
Address:
Price:

IV. REFERRAL OF ERIC TO COPYRIGHT/REPRODUCTION RIGHTS HOLDER:

If the right to grant this reproduction release is held by someone other than the addressee, please provide the appropriate name and address:

Name:
Address:

V. WHERE TO SEND THIS FORM:

Send this form to the following ERIC Clearinghouse:

Acquisitions Coordinator
ERIC Clearinghouse on Adult, Career, and Vocational Education
Center on Education and Training for Employment
1900 Kenny Road
Columbus, OH 43210-1090

However, if solicited by the ERIC Facility, or if making an unsolicited contribution to ERIC, return this form (and the document being contributed) to: