DOCUMENT RESUME

ED 263 252 UD 024 534

TITLE	Black Women in a High Tech World. A New Frontier.
INSTITUTION	NOW Legal Defense and Education Fund, Washington, DC. Project on Equal Education Rights.
SPONS AGENCY	Women's Educational Equity Act Program (ED), Washington, DC.
PUB DATE	82
NOTE	5p.
AVAILABLE FROM	PEER, 1413 K Street, NW, 9th Floor, Washington, DC 20005 ($2.00).
PUB TYPE	Reports - General (140) -- Collected Works - Serials (022)
JOURNAL CIT	Peer Report; n3 1982.
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Blacks; *Career Development; Economic Opportunities; Education Work Relationship; *Employment Opportunities; *Females; High Schools; Labor Market; *Mathematics Education; Student Needs; Technological Advancement

ABSTRACT

The work environment of the 1980s is changing rapidly as a result of technological advancement. These developments are eliminating many jobs once held by Black women, and creating new jobs for which many Black women are unprepared. Although Black women are making some inroads into the technical labor market (the percentage of Black women among all female computer specialists increased from 6.5 percent in 1972 to 9.3 percent in 1980), they are still underrepresented among engineers, technicians, and economists. For Black women, lack of mathematics training can be seen as a barricade which prevents access to the new technological jobs. Others issues related to the educational preparation of Black women for the new job market are: (1) the need to provide career counseling to help students understand how much math preparation they need for college and what is available in the job market; (2) the low math and science requirements of the local school systems; (3) the shortage of qualified math teachers; and (4) low high school completion rates, particularly for Black women. To overcome these problems and ensure Black women an active leadership role in the future world, an organized, concerted effort is required. (KH)

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A NEW FRONTIER:

Black Women in a High Tech World

- After dictating a letter, an executive punches a button on a nearby machine and the text appears on a screen. After altering a paragraph, the executive punches several keys, then turns to another task. Minutes later, several hundred copies of the letter, along with the company's current catalogue, are sent on their way to clients.

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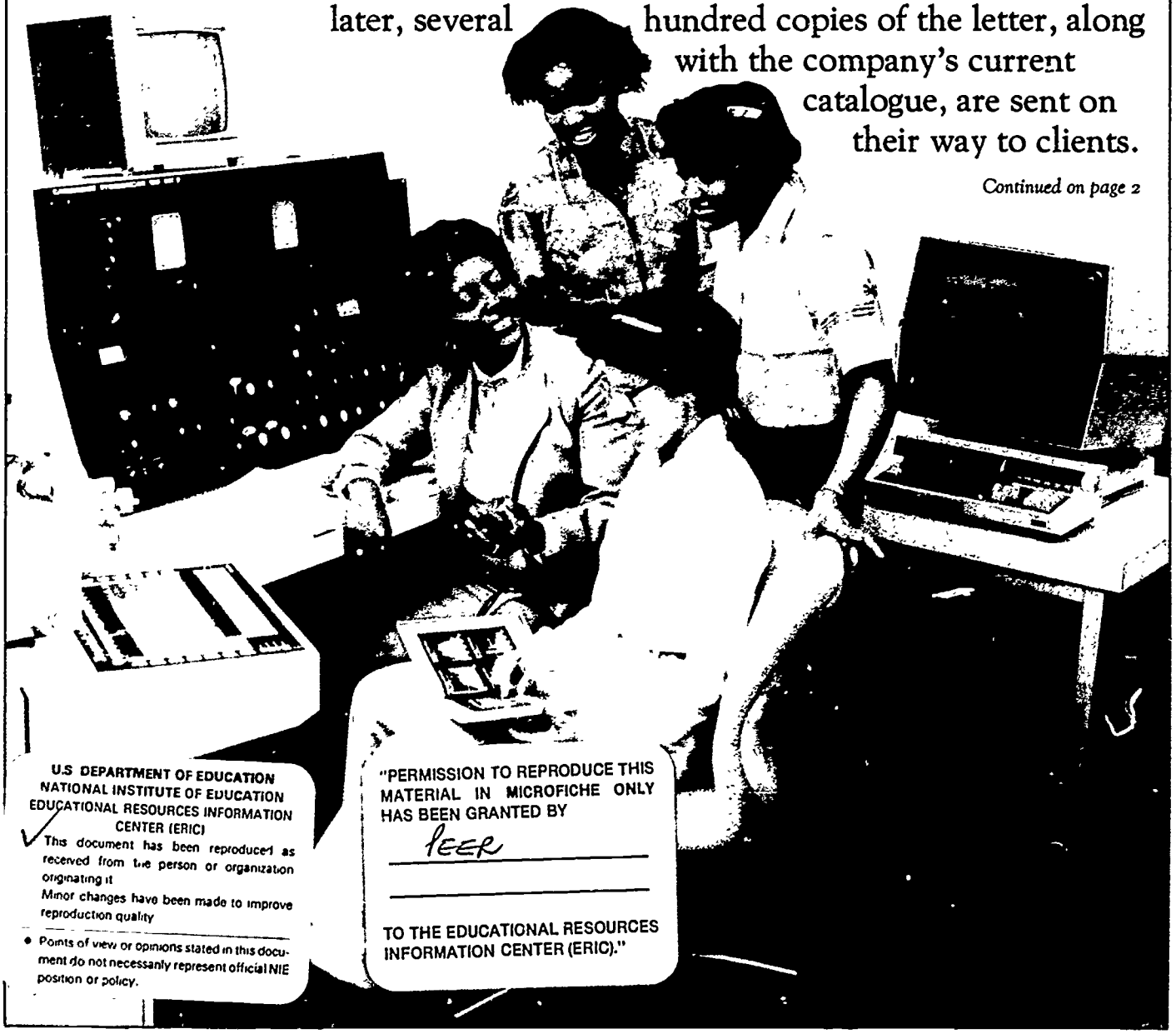

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- In a factory, thousands of micro-computer chips are produced, mounted on boards, assembled into computers, and checked for accuracy. Five technicians operate the entire plant—with the aid of a team of robots.

- A young parent with a toddler at home is alerted by a supervisor that the micro-organisms in Number 13 vat are underproducing insulin. The parent, a bio-technician, punches up a series of numbers on a home computer and alters the composition of the vat, an hour's drive from home.

Science fiction? These work sketches, the science fiction of the 1950s, have become the new realities in the rapidly changing and dynamic high technology work environment of the 1980s. They illustrate a revolution which is transforming the way we live, play and work.

But in these sketches, are the high technology workers likely to be Black women? Will this revolution improve the status of Black women workers? How can Black women prepare to take advantage of the future technological opportunities and protect themselves from obsolescence?

For Black women, entrance into the technological fields can no longer be a matter of "if and when." It must become a matter of "now and how" to gain roles in the work that will dominate the future.

Automation Is Upon Us

The advancements in the high technology fields are coming at such a pace that Alberta Paul, a Black education consultant for the Control Data Corporation, says that in her three years with the company, she has already lived through five generations of technological development. "While some of us have been worrying about computer issues, the field of robotics has snuck up on us."

Robots are here already. They are being utilized in automobile factories and in the production lines of other industries. Some estimates already place the robot population at 5,000 nationwide. One forecast indicates that by 1985, 20 percent of the jobs in industry will be done by robots.[1]

Manufacturing and repairing robots can provide job opportunities for Black women. At the same time, robots can mean disappearance of jobs formerly held by Black women. Whichever the probable future, the vast and rapid changes which are taking place have many implications for Black women.

The Present

Few Black women are currently prepared for the change. Consider that:

- According to the Monthly Labor Review, Black women are employed primarily as food, health, personal and protective service workers, private household workers, and operatives and clerical workers.[2]
- In 1981, the median income of Black women in the U.S. was $4,903, the lowest of any population group.[3]
- In 1980, only 3 percent of Black women workers were employed as managers and administrators, 14 percent were employed in professional and technical positions. These occupational categories are where much of the job growth will occur.[4]
- In 1979, over 40 percent of all Black families were headed by women. Almost half of all Black children lived in female headed households.[5]
- In 1981, more than half of all families headed by Black women lived in poverty.[6]

As these statistics indicate, Black women are working in fields which provide little economic security, low wages and no upward mobility. Yet, they carry tremendous responsibility for economic support of themselves and their families. In this sense, the technological revolution, which will provide new jobs with new career ladders, can be an opportunity for Black women.

Where the Jobs Are

The market for technical graduates is booming. Yet the absolute number of high school graduates in 1985 will be 15 percent lower than a decade earlier. To increase high technology workers, we need to look beyond the traditionally white male constituency.[7]

The Southern Regional Board
1981

Experts tell us that the fastest growing occupations for the next decade are in the technical and scientific fields and they require heavy math and science backgrounds. The rapidly growing demand will be for computer repair technicians with an expected 147 percent growth rate in the next decade.[8]

Other computer-related jobs, such as systems analysts, applications programmers, and operators are expected to experience a 70 percent increase over the same period.[9]

Demand for engineers—especially for mechanical, electrical and electronics and computer engineers—is also expected to increase by 30 percent during the 1980s.

Other areas of job growth during the same period will be among accountants (25 percent); economists (45 percent); life scientists and physical scientists, such as geologists (42 percent); and marine biologists (27 percent), bank and financial managers (41 percent), actuaries (35 percent); and statisticians (23 percent).[10]

Some Small Gains

There are rewards. The pay is good; the people are terrific, you get immediate feedback for your efforts, you see the tangible results of your work.

Sally Richmond
A 26-year veteran of the technical labor market
Director of Flight Dynamics and Control Systems
Computer Science Corporation

Black women are making inroads into the technical labor market. For example, among all female computer specialists, the percentage of Black women increased from 6.5 percent in 1972 to 9.3 percent in 1980.[11] During the same period the percentage of Black female engineering and science technicians rose from 4 to 6.7 percent of all

women in these occupations.[12] While some gains have been made, the numbers of Black women in technical occupations remain small or nearly non-existent in many fields.

Black females account for 6.2 percent of the nation's population.[13] To document their underrepresentation in the technical and scientific fields, a look at Bureau of Labor Statistics' figures collected in 1981 provides the best picture.[14]

- In 1981, there were 1.5 million engineers in the United States, only 5,000 were Black females. This means that less than one in every 300 engineers was a Black female.
- Similarly, among computer specialists for the same year, there were 627,000 computer specialists, only 15,000 were Black females. In this growth field, Black females were about 2 percent of all computer specialists. During the same year, white males who made up 41 percent of the country's population accounted for 67 percent of all computer specialists.
- Among technicians (air traffic controllers, tool programmers, radio operators), there were 164,000 white males, 45,000 white females, 5,000 Black males and 3,000 Black females. Black women accounted for about 1.8 percent of all technicians.
- Among economists, the picture was the same. There were 160,000 economists; only 2,000 were Black females—about one percent of the nation's economists.

Such statistics tell the story. There is currently a very small percentage of Black women in the occupations for which a high demand is projected for the future. And there is little evidence that thousands of young, Black women are standing in the wings, trained to move into the jobs which will be created.

"Statistics tell the story. There is currently a very small percentage of Black women in the occupations for which a high demand is projected for the future."

Math and Science Backgrounds a Must

While there are lower level jobs in the high tech industry that may not require a college degree, they will require math skills. Some of these jobs, such as computer technician, can pay up to $25,000 per year.

Yolanda George
President
National Network of Minority Women in Science

A strong background in mathematics and science, usually grounded in high school math and science courses, is a prerequisite for most high tech jobs. Unfortunately, few Black women and girls acquire the math and science preparation that would make them good candidates for these jobs.

Researchers have found that most Black females are not enrolling in advanced mathematics classes—Algebra II and above—at the high school level.[15] A 1977 study of entering freshmen at the University of Maryland revealed that 63 percent of the white men in the class had 3.5 years of precalculus high school math compared to only 31 percent of white women, 27 percent of Black men, and 19 percent of Black women.[16]

Black female high school students may be using different criteria than their white male counterparts when deciding whether or not to enroll in advanced math courses. A 1980 study on Black females and mathematics discovered that Black female students were more likely to take an advanced math course only if it satisfied college entrance requirements, while white males concentrated on their future career goals when selecting advanced math courses.[17] Math is a "critical filter" which eliminates women from many fields and career options. Dr. Westina Matthews, the study's author, declared that for Black women, math has become a "barricade." "Math is a way of thinking and reasoning logically," she said. "If you've had this kind of training, you can be trained in a technological field."

Yolanda George gives similar advice to young black females who hope to gain access to the new technological jobs. "Stay in those math courses," she says. "Take all you can get. Supplement what you get in the public schools by whatever you can get elsewhere. Participate in science fairs. Actively look for summer programs. Do all of these things to keep your options open."

Other Educational Barriers

Getting students to enroll in the appropriate math courses is only one part of the problem. There are other issues related to the educational preparation of Black women for today's job market that demand attention.

- Career counseling is a critical factor in preparing Black women for technical jobs. Not only is it important that students understand how much math preparation they need for college, but students also need a realistic understanding of what is available in the job market.
- Low math and science requirements by the local school systems is a national problem. In the United States, only one-third of the 17,000 school districts require more than one year of high school math and science.[18] Despite the fact that we are rapidly becoming

a high technology society where good math skills are a necessity, one-half of all high school graduates in the U.S. take *no* mathematics or science beyond the 10th grade.[19]

- There is a critical shortage of qualified math teachers in this country. From 1971 to 1980, student teachers decreased in number—threefold in science and fourfold in mathematics—and only half of these have been entering the teaching profession. In fact, the U.S. is graduating each year fewer than 1,000 individuals trained to teach mathematics.[20]
- Low high school completion rates is a particularly acute issue for Black women who must compete in a job market which demands at least a high school diploma. While Black women have made tremendous strides in this area, their median years of school com pleted still trail those of their white female counterpart—11.9 years for Black women and 12.5 years for white women.[21]

What You Can Do

Unquestionably, the technological revolution and the jobs that are a part of it are where the action is and will be throughout the country. Ensuring Black women a role—and an active, leadership role—requires attention and preparation now. With the rapid changes that are occurring, the science fiction of today becomes tomorrow's fact. To move into the future—even to keep up with the present—will require an organized concerted effort to affect the education of young Black women and to make it relevant for the jobs of tomorrow.

As a parent, student, educator or concerned citizen, here are three simple ways to get started:

1 Share this article with the young people around you. Encourage them to take more math and science—it's their insurance policy for the future, no matter what they decide to do.

2. Talk with other parents, your neighbors and coworkers about the information in this article. Share the article with them.

3 Write to PEER for more information on how you can help create better schooling for the children in your community. PEER offers communities across the country advice, information and in depth training on how to initiate changes in schools. For help, write PEER, 1413 K Street N.W., 9th Floor, Washington, DC 20005.

Footnotes

[1]Emile Milne, The Robots are Coming, *Black Enterprise*, January 1982, p. 28.

[2]Diane Nilsen Westcott, Blacks in the 1970's Did They Scale the Job Ladder? *Monthly Labor Review*, June 1982, p. 32

[3]U.S. Department of Commerce, Bureau of the Census, *Money and Poverty Status of Families and Persons in the United States 1981*, (Advance Data From the March 1982 Current Population Survey), Series P-60, No. 134, p. 14

[4]Westcott, *Monthly Labor Review*, p. 32

[5]U.S. Department of Labor, Bureau of Labor Statistics, *Perspectives on Working Women: A Databook*, Bulletin 2080, October 1980, pp. 78, 82

[6]U.S. Department of Commerce, *Money and Poverty*, p. 28

[7]Eva C. Galambos, *Engineering and High Technology Manpower Shortages. The Connection With Mathematics*, (Atlanta, Southern Regional Education Board, 1980), p. 4.

[8]A New Automation To Bring Vast Changes," *New York Times*, March 18, 1982, sec. 12, p. 1.

[9]Ibid., p. 16.

[10]Milly Daniel, "Where The Action Is—And Will Be," *Business World Women 1980-1981*, pp. 41-47.

[11]*Westcott, Monthly Labor Review*, p. 32.

[12]Ibid., p. 32.

[13]U.S. Department of Commerce, Bureau of the Census, "Census Supplementary Report: Age, Sex, Race and Spanish Origin of the Population by Regions, Divisions, and States," (Washington, D.C., 1980).

[14]U.S. Department of Labor, Bureau of Labor Statistics, "Current Population Survey," (Washington, D.C., 1981).

[15]Westina Matthews, "Black Females and Mathematics," (a postdoctoral study, Wisconsin Center for Education Research, University of Wisconsin, Madison, Wisconsin, 1982), p. 2.

[16]Lucy W. Sells, "Counseling the Young," *Science*, Vol. 203, No. 4377, January 1979, p. 4.

[17]Matthews, "Black Females and Mathematics," pp. 8-9.

[18]Education Commission of the States, "Student Achievement and Participation in Mathematics & Science: An ECS Fact Sheet," (Denver, Colorado, 1982), p. 2.

[19]Education Commission of the States, "Teacher Shortages and Qualification in Science and Mathematics and Engineering. An ECS Fact Sheet," (Denver, Colorado, 1982), p. 1.

[20]Ibid., p. 1.

[21]U.S. Department of Commerce, Bureau of the Census, *Educational Attainment in the United States*, p-20, Report 356, March 1979, p. 910.

PEER, the Project on Equal Education Rights of the NOW Legal Defense and Education Fund, works to end school practices, policies and attitudes that limit children's choices and keep them from learning the skills they will need for tomorrow's world.

Created in 1974, the project has received support from various sources, including the Carnegie Corporation, the Ford Foundation, the Rockefeller Family Fund, the Charles Stewart Mort Foundation, several corporations, and the Women's Educational Equity Act Program, U.S. Department of Education.

A New Frontier: Black Women in a High Tech World

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Design and Production: Art for People, Washington, DC.

This publication was made possible by a grant from the U.S. Department of Education, under the auspices of the Women's Educational Equity Act. Opinions expressed herein do not necessarily reflect the position of the Department, and no official endorsement should be inferred.

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