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ABSTRACT

A growing realization in the African American community is that its biggest challenge will be to survive in the high performance world of the future that will require technological skills and lifelong learning and development. With the recognition that more African Americans are needed in the sciences comes an awareness that African American students who attend predominantly white campuses that house the leading science programs experience considerable adjustment difficulties. The momentum of opportunities for African Americans in math- and science-related fields is increasing now, due to the national goal for the United States to become first in math and science by the year 2000. African Americans can fill the employment slots in science and engineering if they look for high school and college programs designed to support first-generation, low-income, or low-achieving students interested in majoring in science or mathematics. They must become more connected with high school and college counselors and advisors and identify support, enrichment, career exploration, and mentor programs. People interested in vocational training should identify programs that provide futuristic job training, and match participants with jobs. (Examples of sources of college financial aid, an outline of New York Community Trust Fund projects, brief descriptions of areas of interest of other funding sources for community and business enterprise, and 12 references are included.) (YLB)

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From High Technology to Vocational Technology: Preparing African Americans for 2000 and Beyond

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Department

## From High Technology to Vocational Technology: Preparing African Americans for 2000 and Beyond

There is a growing realization within the African American community that its biggest challenge will be to survive in the new, high performance world of the future, a world that will require technological skills, self-confident mastery of knowledge, and life-long development and learning. In such a world, what people know and how they perform will be more important than class and race. Therefore it is imperative to overcome centuries of destructive racist stereotypes that many of us have internalized about how much we can know and how well we can perform. We have to do this for ourselves and for our children of the future.

The Urban League (1993) considered what it would take for our children to develop into outstanding twenty-first century citizens. Their answer, adopted from the model formulated by Dr. Jeff Howard of the Efficacy Institute, focuses on four basic criteria of proficiency that will need to be met by our youth in order for them to face the challenging demands of the future effectively. The criteria is as follows:

- every African American child should graduate from high school with the ability to do calculus
- every African American child should be fluent in a foreign language
- every African American child should be able to research, organize, and write a 25 page essay on a challenging topic
- every African American child should live by strict, high

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ethical standards

Developing children to excel in the 21st century is a tremendous challenge for us. The Urban League report also presents an exemplary community model which has been chronicled by T. Williard Fair in a case study entitled "Coordinated Community Empowerment: Some Experiences of the Urban League of Greater Miami."

They conclude that in the new era, intellectual muscle--i.e.: the ability to think analytically, compute, comprehend instructions, make decisions, communicate clearly, interact effectively in group endeavor, etc.--is the ticket to prosperity.

### African Americans in Math and Science

Some of the relevant statistics from the top down illuminate the big picture such that we can clearly understand why we have not moved forward rapidly enough, in some areas of study, when we have no support behind us nor any role models ahead to follow. The 1990 Annual American Mathematical Society report from the Mathematics Association of America indicated that there were only 401 Ph.D.s in mathematics awarded to U.S. citizens in 1990. (Remember that most often individuals who obtain a Ph.D. in math or science do so in order to teach or do research at the college and university level.) Among these 401 U.S. citizens only 4 (1%) were African Americans. The need to increase the representation of students from underrepresented groups in the natural sciences is also evident in

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the National Research Council (NRC) data (Thurgood & Weinman, 1990). The NRC report shows that of the 828 doctoral degrees awarded to U.S. blacks in 1990, only 23 (2.8%) were awarded in the physical sciences, and only 63 (7.6%) were awarded in the life sciences.

Because of these grim statistics, there is a big emphasis being placed on the message that undergraduate programs in higher education need to assume greater responsibility for assisting first generation college students, low income students, and other underrepresented students who have lower standardized test scores. The realization that more support is needed is reflected in the statements made by Monty Neil indicating that "Blacks and [other minorities] go to underfunded high schools that have poor facilities. [Therefore] their low test scores only represent the poor resources available to them" (Washington, 1991).

These poor resources include not only facilities, materials, and equipment, but also inadequate support staff for guidance, counseling and mentoring, or staff that has inherently low expectations for minority students' academic achievement and career goal attainment. As a result of exposure to **poor educational resources**, many students from low income, first generation and underrepresented groups are not as proficient as they need to be in terms of scientific and technical writing skills, analytical reading skills, problem solving conceptual skills necessary for

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research design, or GRE preparation, and they lack the confidence and skills needed to successfully obtain admission to and financial aid for undergraduate or graduate study, or to obtain post-graduate employment in their area of study.

Along with the recognition that more African-Americans are needed in the sciences there is also an awareness that, since many of the leading science education programs are housed at predominantly white campuses, there is also recognition of the fact that although educational attainment is generally lower for students from underrepresented groups, particularly African-American students, those who attend predominantly white campuses experience considerable **adjustment difficulties**. Allen (1992) identifies causes of adjustment problems as isolation, alienation, and lack of support. Of all causes, these are found most serious (Allen, 1985; Smith and Allen, 1984).

With regard to **choice of major** and the low numbers of minority students who pursue graduate study in math and science, gender and career expectations have been found to be the strongest predictors of college major choice for African-American students attending predominantly White and historically Black colleges. However, even though males with high occupational aspirations were found more likely to major in the biological, technical, and natural sciences, "[African-American] students on [predominantly] White campuses were found significantly less likely to elect these majors, irregardless

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of whether they are male or female (Thomas, 1984). According to Allen, 'academic achievement is highest for students who have high educational aspirations, who are certain that their college choice was correct, and who report positive relationships with faculty.' This tells us what we need to do for our youth . . .

The momentum of opportunities for African Americans in math and science related fields is on now, due to the fact that one of the national goals for the U.S. is to become No. 1 in math and science by the year 2000. There is much literature available now relating to the African merican population of high school students by stating that "minority students who are a part of the pool of potential undergraduate majors in math and science must be supported"; that "the nation can become No.1 in math and science if school curriculum is developed to meet the needs of minorities in the nations urban and underfunded schools," because this population of students will soon constitute a third of the nation's workforce just beyond the year 2000.

Reports of educational achievement up until recently show considerable underpreparedness in math and science among African Americans, but projections for the future show us why there will be so many new support programs along with opportunities for African Americans in these areas. The underpreparedness, until recently, is reflected in a 1990 report of the State Mathematics Achievement from the National Center for Education Statistics indicating that

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the math skills of the nation's primary and secondary students leave them unprepared to cope with either on-the-job demands of problem solving or college expectations. Along with these findings, the College Board reported in 1991 that less than 1% of the high school class of '91 planned to major in math or physical science. This is where we have been.

Where we can go is reflected in the projections that indicate a shortage of science and engineering professionals and faculty in higher education by the year 2010--according to several reports put out between 1989 and 1991. Very specifically, a 1991 report by Rawls indicates that the U.S. could see a shortfall of 560,000 scientists and engineers while, at that same time--just beyond the year 2000, there will be fewer faculty to prepare students for employment in these areas after college.

### Overcoming the Obstacles and Shortages

We can get into these slots that are projected to be empty and our youth can make it into these positions in the future if we look for appropriate support systems and get involved in the right places at the right times. What do we need to do? We need to look for programs at the high school and college level that are comprehensively designed to support first generation, low-income, or low achievement score students that are interested in majoring in math or science. We need to become more connected with



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counselors and advisors at the high school and college level to find out:

- 1) what kinds of assessment instruments they use or can obtain to determine how much aptitude or personality orientation individuals have for being successful in math and science related professions or occupations?
- 2) What kinds of support programs are in place to help the student with strategies for self-management, study skills, and test-taking skills (are there homework-helper programs after-school, are there workshops offered regularly, are tutors available regularly)?
- 3) are there any special enrichment programs after school or during the summer to accelerate students skills and readiness for the required courses in a math or science major (eg: computerfest, college for kids, special summer camp programs for acceleration in a chosen subject, evening courses or short courses on campuses-- call the school for special program calendars or announcements--read the advertisements in the Sunday papers and family oriented magazines)?

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- 4) what kinds of career exploration programs does the school provide to inform students on an ongoing basis about possibilities and requirements for future employment in their chosen major and, at the college level, what is the track record of the career placement service in response to serving African American students? (at the University of Wisconsin and many institutions across the nation there have been special minority support programs for engineering, medicine, and other degree programs)
- 5) what kinds of mentor programs are available where the student can be paired with someone holding a position in the profession or occupation that they are interested in (eg: Partners in Schools, Adopt a School, or mentor programs in college departments or fellowship packages)?
- 6) does the college or university have distance learning satellite programs which can do much to compensate for limited library collections, limited faculty, limited course offerings on campus?
- 7) does the college belong to a consortium/partnership of other colleges and universities through which I or my child can be processed to gain entrance to advanced study

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in a graduate program upon completion of prerequisites?

- 8) and, last but not least, what kind of computer systems can be accessed by students (since computer literacy is important to beginners but information retrieval in advanced levels of study is as critical as whether or not the school has a superior library collection of its own)?

Additional information on strategies for overcoming the obstacles can be obtained from reference books such as the recent publication by Levine and Lidiffer (1995).

### Vocational Education Opportunities

The current trend and future direction of vocational programs that are on the cutting edge is one in which the program is designed to provide futuristic job training (for example in computer operation skills) and provide training that is based on a match between the participants in the training and the jobs available that will value these individuals training.

It is important for people who are interested in vocational training that they compare the programs offered by various schools and institutes to be sure that they are enrolling in a program that has a job placement program with a good track record or one that at least provides placement in internships if there are no permanent jobs offered. Beware of "proprietary schools"--those that

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advertise but do not deliver in terms of job placement.

It is also very important that an investment in a vocational training program is targeted at those programs that will provide some kind of legitimate certification in the chosen area of study. For example, certification can be obtained in food handling, home health caretaking, or cosmetology. these are viable areas of employment and certification that enable the holder of the certificate to have more mobility and marketability--qualifications cannot be denied easily.

For individuals who are currently unemployed, vocational training can provide the necessary boost to a new skills level that will open more opportunities for employment--particularly since many vocational and technical programs do begin with job placement by making a match between the new student and a position available for which they will be specifically trained.

One example is the EDGE program that is provided by the City College of New York (CCNY) and the Borough of Manhattan Community College (BMCC), among other locations. This program is specifically for Women receiving Aid for Depend Children (AFDC). Jobs are identified first and then wimen are trained in the needed skills such as clerical, receptionist, or computer operations. Other jobs identified for women sho will be trained as bank tellers for major banks in the metropolitan area. The BMCC program has a special success story. It helped to train three women on AFDC to

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open a small business of their own in home child care. they became certified day care providers and, after the first year of operation together, the netted \$35,000 each.

We should always remember that, if we are not interested in completing a vocational training program, but fall somewhere between that and pursuing a college degree, there are short courses and evening courses offered in a variety of areas that can improve job marketability. It is a good idea to drop in at college campus offices for continuing education or call and ask to have their course catalogues mailed. Then, study them carefully to determine whether they offer instruction that is interesting and opens ideas about gainful employment. Service areas will be lucrative (eg.: wordprocessing, office janitorial services, temporary placement agencies, housekeeping agencies and travel agencies).

For information on the EDGE program at CCNY call 212-650-7596. To get the phone number for the office of continuing education at the CUNY campus of your choice call the Dean of Academic Affairs Office at 212-794-5429.

### Funding Sources for College

Although there never seem to be enough sources of financial support for all who aspire to obtain advanced degrees or certifications, there are a number of funding sources for those who are resourceful in locating them and who qualify according to the

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particular requirements of each source. The following are a few examples of sources among several for which detailed information can be located in reference volumes on financial aid, scholarships, fellowships, and grants such as the 1995-97 Directory of Financial Aids for Women (Schlachter) or 1995 The Annual Register of Grant Support (Bowker):

### Fellowships

Ron McNair Fellowships (science)

Patricia Roberts Harris Fellowships (varied fields depending on institution)

McKnight Fellowships (science but indigenous to institutions in Florida)

An alternative to gaining financial support from a foundation or agency such as those listed above is taking employment with a company that will pay for your college tuition--even partial payment is better than none.

Another strategy to use in increasing your chances of attending an institution of learning that will provide more opportunities for support in the way of stipends, technical assistance, and internships that will help you to advance in a chosen area of study is to look for profile information on various institution's receipt of financial gifts and their intended purposes. For example, if Spelman College is noted for receiving a \$37 million gift, the intended purposes might include support to

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students pursuing degrees and careers in your chosen field.

### Funding Sources for Community Support and Business Enterprise

Find out where trust funds are making donations to organizations in your community and then take advantage of the services and supports that they provide. For example, in the New York vicinity there are entities such as the New York Community Trust Fund, the North Star Fund, and the Community Service Society of New York that provide support for a variety of purposes. A detailed outline of several New York Community Trust Fund projects is provided, as well as brief descriptions of the areas of interest of the North Star Fund and the Community Service Society of New York follow.

#### New York Community Trust Fund

##### Children, Youth and Families

Non-traditional employment for Women, CUNY'S Hostos  
Community College Center for Women and Immigrants' Rights

##### Hunger and Homelessness

The Forest Hills Community House

The Hudson Guild to deter eviction, apply for public  
housing, and secure vocational and employment services

##### Social Service and Welfare

Montefiore Medical Center Child Protection Program

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### Queens Child Guidance Center

#### Substance Abuse

Narco Freedom's Families Together Program--Mother/Child  
Learning Through an Expanded Arts Program--School  
Districts in Harlem and the Bronx

#### Youth Development

New York City School Volunteer Program  
YMCA of Greater New York

#### Economic Development

Council for Economic Action--new business, more jobs,  
neighborhood redevelopment  
Grand Street Settlement--employment services, job  
training, language/writing skills, job referrals,  
counseling, child care

#### Housing

Urban Homestead Assistance Board--management/support to  
existing cooperatives  
Cooperation for Supportive Housing--housing with onsite  
medical and social services

#### Arts and Culture

The Jewish Museum--"Bridges and Boundaries: African  
Americans and American Jews" exhibit in collaboration  
with The Educational Video Center teaching youngsters  
media skills, investigation of race relations in their



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own community and creating a video package for City Schools

Boys Choir of Harlem

### Education

Ackerman Institute for Family Therapy--Parent Involvement  
United Neighborhood Houses of New York--settlement houses  
in Bronx add a college and career counseling program

North Star Fund--political activism at the grassroots level

Community Service Society of New York--varied types of funding

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