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Workshop 6

Underrepresented Groups

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Underrepresented Groups

Abstract

The problem with the shortage of underrepresented groups in science and engineering is absolutely crucial, especially considering that U.S. will experience a shortage of 560,000 science and engineering personnel by the year 2010. Most studies by the National Science Foundation also concluded that projected shortages cannot be alleviated without significant increases in the involvement of Blacks, Hispanics, Native Americans, handicapped persons, and women.

Introduction

NASA's policies and procedures for administering training grants for the National Space Grant College and Fellowship Program has as objectives: "recruiting and training professionals, especially women and underrepresented minorities for careers in aerospace science, technology, and allied fields; and to promote a strong science, math, and technology education base from elementary through university levels.

Effective recruiting and training of any diverse groups of persons presents serious challenges. Obvious answers to the shortage of underrepresented groups are traditional programs such as summer workshops, tutoring, recruitment, retention, and fellowships. Traditional suggestions of increasing involvement have not had the high level of effectiveness needed to alleviate the problem of underrepresentation. In using more traditional tactics, issues such as race, ethnic origin, sex, and mental and physical disabilities have not been dealt with sensitively enough; therefore, success rates have not had a particularly phenomenal impact. Non-traditional options; however, are increasingly appealing as their success rates become more substantial.

Current Programs

Less traditional suggestions includes the AAAS 2061 Project which was developed in 1985 by the American Association for the Advancement of Science (AAAS); the National Science Foundation; the Carnegie Corporation of New York; and International Business Machines (IBM). The plan is called Project 2061 because that is when Halley's Comet returns, and it was created the year of the comet's last appearance.

The educational reforms of this program are expected to be in wide use by the year 2061. Plans for the program include developing new approaches to teaching with a possible end to teaching traditional subjects and administering standardized tests. Teaching would focus on leading all students through all subjects. Students would begin studying substantial subjects from kindergarten through high school and study them in depth from different perspectives, instead of the standard method which is to teach "piece by piece" a little of each subject. Currently, there are 11 school districts in 5 states involved with project 2061. Twenty teachers, 2 university scholars, and 3 school administrators will develop the curricula.

Other non-traditional approaches include one developed by Philip Uri Treisman, Director of the Charles A. Dana Center at UCLA-Berkley. Treisman questions the premise of most academic support programs for minority students - "Why focus on students' weaknesses rather than on their strengths?" He prefers to "focus on helping minority students excel at the university rather than merely avoid failure," as many minority programs do. Treisman formed a Mathematics Workshop after examining the study habits of Black and Asian students. He found that Black students were self-reliant and carried these habits over to their studying. Asian students studied in groups; consequently, excelling in their classes. Black students were organized into study groups and spent 6 hours per week working on tough problems. Failure rates among Black students in this program dropped from 60% to 4%.

Another program, the Valued Youth Partnership Peer Tutoring Project in San Antonio, enlists Hispanic High School students at risk of dropping out, as tutors for Hispanic elementary students. During the four years since the inception of the program, absenteeism and disciplinary action referrals declined and students' self concept improved. Dropout rates of over 40% declined to an average of 2.5%. In 1989, the dropout rate fell to 0.

The Education for Minorities Project has made 58 recommendations to benefit minorities and the entire education system including:

- Eliminate "tracking" or ability grouping
- Extend the school day and years to minimize summer loss and maximize exposure to mathematics and science.
- Provide more financial aid grants and fewer loans.

A number of non-traditional programs are being utilized or introduced, and each of these programs' successes or failures appear to be based on positive expectations, identifying needs, and recognizing the diversity of underrepresented groups. The report Changing America: The New Face of Science and Technology lists additional exemplary programs designed to increase the participation of underrepresented groups.

Networking

The Space Grant Colleges/Consortia may choose to utilize non-traditional suggestions, or a combination of both. Another suggestion would be to locate organizations on college campuses that have been specifically developed for increasing the participation of underrepresented groups in science and engineering. These already established organizations include the American Indian Science and Engineering Society (AISES); National Consortium for Graduate Minorities Consortium for Minorities in Engineering (SECME); Society of Hispanic Professional Engineers (SHPE); Mathematics, Engineering and Science Achievement (MESA); National Action Council for Minorities in Engineering, Inc. (NACME); Society of Women Engineers and numerous others.

Handicapped individuals are often ignored as an underrepresented group. The final report compiled by the Task Force on Women, Minorities, and the Handicapped in Science and Technology Changing America: The New Face of Science and Engineering states: "Unfortunately no one collects Nationwide statistics on degrees earned by people with disabilities so we cannot present the same analysis as for the other groups. We do note that, at 10.5 percent of the postsecondary education students, people with disabilities represent a large untapped pool of talent for science and engineering." Another report The Education of Students With Disabilities: Where Do We Stand? Was compiled by the National Council on Disability (September 1989) for the President and Congress of the United States. The latter report has comprehensive recommendations for educating disabled individuals.

Obviously the problem of underrepresentation can just be highlighted in a paper such as this. The problem is being addressed in detail by: the National Science Foundation; National Education Association; U.S. Labor Department; and various other government agencies. Several bills in congress (including the Hatfield-Glenn bills S-1950 and S-1951) deal with the problem.

Working Group Discussion

During the workshop session at the First Annual National Space Grant Consortia Conference held at Johns Hopkins University this past January, our group discussed some key issues, but were limited by time constraints and the magnitude of the issue.

Several key issues discussed, relating to Space Grant goals include:

- * Space is an interesting and unknown field, and the appeal to underrepresented groups should be that space is universal.
- * Avoid culturally biased educational materials.
- * Utilize role models for underrepresented groups.
- * Acknowledge cultural diversity and emphasize cultural awareness.
- * Work with other institutions including Historically Black Colleges and Universities.
- * Expose younger children to math and science activities.

Conclusion

Exposure to mathematics and science and high expectations from underrepresented groups are what the Space Grant Colleges/Consortia must aim for. Success will depend upon these expectations and the environment created. The Space Grant Colleges/Consortia must be creative, innovative, and use whatever resources are available for the greatest impact on underrepresented groups.