Science, Technology, Engineering and Mathematics programs for minority youth are providing services throughout the United States in an effort to increase the numbers of African Americans, Hispanics and women in these fields in which they are underrepresented. Impressive programming is offered through universities, business partnerships, K-12 institutions and local foundations, but the evaluation of programs and their impact is limited. This paper describes a successful program in Detroit, Michigan for students in grades 8-11 and promotes the discussion of like programs for minority and/or low-income students in other countries.

The objectives of this session are to (1) promote an awareness of program goals, methods, practices, and barriers for STEM programs for minority youth, and (2) invite a dialogue among participants to share experiences and explore opportunities to broaden our scientific and practical knowledge in the face of current challenges. This topic is relevant to the conference theme in that its focus is the provision of high quality and up-to-date programming for minority youth. The proposed presentation is intended to be interactive: a summary of the program will be followed by a discussion of key findings and a discussion of possible solutions to practical issues.

In the United States, technological and scientific advances over the last two decades have created an increasing need for highly skilled workers, engineers, research scientists, and mathematicians (Oden, Kelly, Ma & Weikart, 1992). Despite the increasing minority population, the percentage of minority students and professionals in these fields has actually decreased in recent years. Since 1982 there have been higher attrition rates for minorities in undergraduate education programs, the percentages of minorities in engineering have decreased, and recent legal challenges to affirmative action have
negatively affected undergraduate and graduate enrollment in science and engineering for minority students (NSF, 2000).

Hispanics, African Americans and American Indians have lower high school completion rates than do white students. In 1998, 63% of Hispanics, 88% of African American students aged 25 to 29 were high school graduates as compared to 94% of their white counterparts. More African American than white students drop out of high school and tend to follow a less traditional path, going to college part-time, or picking up college classes over a long period of time (NSF, 2000; Oden, Kelly, Ma & Weikart, 1992). Reasons for lower rates of college enrollment and completion are family factors, poor academic preparation for college, and low motivation (Oden, Kelly, Ma & Weikart, 1992).

Accordingly, African American, Hispanic and American Indian high school graduates are less likely than other racial/ethnic groups to attend college. African American students represent 9% of those enrolled in universities and college, 5% of the bachelor’s degrees awarded and 2% of doctorates in science and engineering (Hrabowski, F. A. & Maton, K. I., 1995; 2000). According to the NSF’s Scientists and Engineers Statistical Data System (SESTAT) surveys, the percentages of African American, Hispanic and American Indians pursuing careers as scientists and engineers remain low. In 1997 African Americans and Hispanics were each about 3%, and American Indians were 0.3% of U.S. scientists and engineers (NSF, 2000).

Intervention programs for minority students in science, technology, engineering and mathematics (STEM) are one strategy for providing better academic preparation and support toward successful career paths. The programs that have been in existence for a number of years have provided evidence of success through the documentation of increasing high school graduation rates, and college enrollments in STEM fields of study (Clewell, Anderson & Thorpe, 1992).
The Information Technology Experiences for Students and Teachers (ITEST) program was established by the National Science Foundation in direct response to concerns about shortages of information technology workers in the United States. The ITEST program funds projects that provide opportunities for students and teachers to foster the development of skills and knowledge needed to advance their studies and to function and contribute in a technologically rich society. The ITEST program also funds a National Learning Resource Center to support, synthesize and disseminate the learning from the program to a wider audience.

The Detroit Area Pre-College Engineering Program (DAPCEP) is engaged in an ITEST project for African American and Hispanic American students in the Detroit area. DAPCEP is a nationally recognized program that provides engineering, technology, mathematics and science enrichment courses for minority students. DAPCEP, in operation for 26 years, serves up to 6000 students per year, offering high quality instruction in small classes in Detroit schools, on Saturdays at participating university and industry sites, and residential summer programs at universities. In addition to classes, DAPCEP offers interaction with professionals in the field, internships and parent workshops and support services.

The goals of the DAPCEP ITEST project are to:

- Increase student access to information technology within the context of engineering
- Increase opportunities for students to explore related college and career paths
- Motivate and prepare students for college
- Improve parents’ understanding of academic requirements, social skills, and study habits necessary for success in college

120 students participated in the program annually, engaging in carefully planned programs designed to expand their knowledge of engineering, and lay the foundation for successful lifelong learning related to a range of information technologies. Students received 136 contact hours per year, and their parents received 18 contact hours per year.
The significance of this paper is to highlight the lessons learned about as an innovative youth program was implemented and evaluated. In addition possibilities for this as a replicable model will be discussed.

References


