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UNIVERSITY OF WISCONSIN - MILWAUKEE
COLLEGE OF ENGINEERING AND APPLIED SCIENCE

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MULTICULTURAL AND GATEWAY TO ENGINEERING, SCIENCE, AND
TECHNOLOGY PROGRAMS.

BACKGROUND OF PROJECT

The Gateway to Engineering, Science and Technology (GEST) Program began on the UW-M campus in 1974. For over 20 years, each summer has brought a bright and talented group of high school students to share the experience of "college." The program grew out of the national and local need to increase the numbers of under represented students in the fields of engineering, computer science, and other math/science based careers. The program consists of academic enrichment and reinforcement activities for talented students as well as those interested in seeing what these career paths have to offer.

Our project for this proposal is for two years, serving 40 middle school students and 20 high school students. The students will participate in the 6 week summer program as well as activities during the academic year at the University and at various school sites. Program activities will emphasize hands-on projects, design competitions, and team building.

Teacher workshops will train teachers involved to assist students with their hands-on projects while informing/encouraging them to explore engineering, computer science, and related careers. Mathematics teachers will be the priority group for this training since all high school students should be interfacing with them.

Parent workshops will inform parents of different learning styles, career opportunities and college preparation so that they might better guide their students to/through these areas. Many of these students will be the first generation from their family to attend college.

The support from the Department of energy will supplement other funding sources available to the GEST Program. GEST has served over 1,500 students with these college preparation activities.

PROGRAM OBJECTIVES

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Program activities are designed to:

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1. Assist students to identify an interest in math and science while building student confidence and self-esteem.

Students develop hands-on projects under the supervision of engineering mentors, college faculty and college students.

Science and technology expositions and fairs will enable the students to receive recognition for their accomplishments.

Students are introduced to role models by means of career and cultural workshops.

2. Assist students to prepare for scientific and technical fields of study.

Students will enroll in summer courses in mathematics, engineering/science, computers, and technical communications.

College students and peer study groups will provide tutorial assistance as needed.

Students are informed of college requirements in academic preparedness workshops and counseling sessions.

Student academic progress in high school is monitored, and students receive appropriate counseling to enable them to stay on track.

3. Assist parents to provide academic and motivational support.

Parents are informed of opportunities in science and technology by means of career and cultural awareness workshops.

Parents are informed of college requirements in college preparedness workshops and in campus visits.

Parents and teachers participate in workshops on learning behavior including family math/science seminars.

Parents participate in science, technology, and cultural exhibitions of student projects in celebration of student accomplishments.

PROJECT PARTICIPANTS

One hundred and nine (109) students participated in the 6 week program, 63 middle schoolers entering high school (Level 1) and 46 continuing high school (Level 2). The ethnic diversity was 75% African American, 15% Latino/Hispanic, 7% Other, and 3% American Indian. The students primarily came from Milwaukee Public Schools with a few from a parochial setting, and a few from suburban settings. Schools represented included : Bay View, Custer, Hamilton, Juneau,

Madison, Milwaukee High School of the Arts, Milwaukee Tech, North Division, Riverside,

Rufus King, Vincent, Dominican (parochial), Shorewood and Wauwatosa West (suburban).

Students grade points ranged from below 2.000 to 4.000 (on 4.000 scale). We accepted a wide range of student capabilities to give under achievers a challenge and the stronger students some new competition. The student mix worked out well.

Teachers came from a variety of schools/circumstances as well. Most were active teachers, but we also used University professors, teaching assistants, and retired engineers.

Parents were involved in orientations, meetings, and special workshops.

SUMMER PROGRAM

The students attended classes for 6 weeks from June 19 - July 28. The Level 1 students attended from 8:00 - 11:45 a.m. , and the Level 2 students from 8:30 a.m. - Noon.

Level 1 classes included algebra/geometry, computer programming, an engineering seminar and technical communications. Students had a choice of one from either chemical, electrical, or machine concepts for their engineering seminar. Math, technical communications, and the engineering seminars met 4 days a week, and computer programming was 2 times a week. Fridays were reserved for field trips to companies, fun/informational exposures, and special events like the Aerospace Career Day and People of Color Invention Day.

Level 2 classes included the appropriate math course, technical communications, and the engineering seminar. The choices for engineering seminar were architecture, structural and mechanical engineering. Their classes met every day with the exception of class related/ company field trips. Every one participated in a program fun/picnic day.

Classes were held in the Engineering and Mathematical Sciences Building, Mitchell Hall, Lapham Hall, the Chemistry and Physics Buildings.

SCHOOL YEAR PROGRAM

The academic year program was centered around North Division High School. We recruited heavily from this school because of its high number of African American students but the poor performance of many of these students. We concentrated on bringing them into Level 1 to give them a head start in their math and writing courses. We then went into the school during the school year to form a GEST Club where we worked on academic skills development such as class preparation and test taking. We also worked with the Wisconsin Department of Transportation to put on an Aerospace Career Day. The students worked on projects to demonstrate the math/engineering related concepts they had learned about during the year.

Other students participated in our tutorial services and special events which included career exploration and workshops. Tutoring ran from October to May with the other activities interspersed throughout the year.

EVALUATION

We were successful in executing all of our goals to some degree. Over 85% of the students surveyed indicated they might consider careers related to math/science or engineering. Students participated in our annual Summer Showcase, the North Division Project, and individuals in other local fairs. We did distribute admissions information during the summer and subsequent school year. Some students and parents took advantage of the tutorial and workshop options. At least 50% of the Level 2 students indicated they wanted to come the following summer.

IMPROVEMENTS

We will add a Level 3 next summer per student request. Tutorial will be offered on a request basis. This year we scheduled it each Saturday; not enough students came to make it cost effective. We will begin earlier monitoring student progress. After about the 5th week of school, we will begin calling parents to ask them to request a progress report on their child. If students are having trouble in a math/science related class, we will encourage the parent to seek assistance for the student. We will also try to arrange more opportunities for the students to talk to future and current professionals in these areas. We will work with the various student organizations to encourage more students of color to persevere.

Parents were very helpful with some of their suggestions. We will invite them to more workshops to keep them informed.

One of the introductory engineering seminars will be overhauled to make it more user friendly and interesting in the beginning.

All in all we had a successful program and will continue to strive for excellence in services and programming.

Marilyn Miller, Director