

MEAP at IUPUI

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Abstract

The Minority Engineering Advancement Program (MEAP) was established in 1976 in response to the small number of minorities in the engineering profession. MEAP strives to circumvent some of the inhibitors that prevent minorities from selecting engineering and technology as potential careers. MEAP enhances the recruitment and retention of minority students at the Purdue School of Engineering and Technology (PSET) at Indiana University Purdue-University at Indianapolis (IUPUI). The program has developed three main components over the years of its evolution. One component is the summer engineering and technology experience, which will be discussed in this paper. The other two components are the undergraduate student scholarship program and pre-college internship program. The summer component of the program is open to 6th – 12th grade students interested in engineering and technology. Public and private schools are contacted with application information and asked to recommend possible candidates. Once the student has been suggested to the program, a final selection process takes place by the MEAP staff. The Purdue School of Engineering and Technology promotes and supports this program that is a community effort as well as a feeder of minority talent into many academic programs especially Engineering and Technology.

I. Introduction

The Minority Engineering Advancement Program (MEAP) was established in 1976 in response to the small number of minorities in the engineering profession. MEAP strives to circumvent some of the inhibitors that prevent minorities from selecting engineering and technology as potential careers. The summer component of the program is open to 6th – 12th grade students interested in engineering and technology. Public and private schools are contacted with application information and asked to recommend possible candidates. Once the student has been suggested to the program, a final selection process takes place by the MEAP staff.

Participants are exposed to industrial tours, positive role models, computer related workshops and engineering and technology activities in one to two week sessions during the day similar to an engineering day camp. The participants are categorized into 4 groups: workshop 1 is for high school students grades 9th, 10th and 11th, which are new to the program, workshop 2 involves high school students grades 9th, 10th and 11th, which are previous participants in the program workshop 3 works with returning 7th grade and new and returning 8th grade students in the program and workshop 4 is designed for new 6th and 7th grade students in the program. Each workshop has activities and interactions designed to best fit the grade level attending. Dividing students into the 4 categories allow for 25 – 30 students to participate in the program for 1 – 2

weeks during the summer. When one group has completed their workshop, the second group starts and this continues until 4 groups or 100 – 120 students have completed the summer MEAP.

II. MEAP and Its Participants

The Minority Engineering Advancement Program identifies, recruits and selects 6 – 12th grade students by working directly with the local area school and by re-enrolling previous participants of the program. Applications for the program are mailed directly to the math and science teachers and guidance counselors. The teachers and counselors are asked to pass the application on to students with good math and science grades and an interest in technical areas. The program information and application is reviewed and completed by interested student and parents. A recommendation from the school, grade information and the application is returned to MEAP. The application is ranked by MEAP using the following criteria: program availability by grade level, academic grades, recommendation and application information. All previous MEAP participants are also given an opportunity to return each semester until they graduate based on continued positive academic performance.

The Minority Engineering Advancement Program (MEAP) concentrates on the following objectives to achieve its goals:

1. To identify, recruit, and select minority students (grades 6-12) with demonstrated academic potential and to expose them to the fields of engineering and technology.
2. To assist students to become enrolled in college (post-secondary education) and provide assistance in helping them obtain financial aid.
3. To increase the students' awareness of career options available to engineers and technologists.
4. To facilitate students' access to and interaction with positive role models from the fields of education and industry who will serve MEAP as workshop instructors, counselors, and mentors for students.
5. To provide hands-on laboratory experiences and academic instruction similar to that of a typical first year of study in an engineering or technology curriculum.
6. To demonstrate work-place environments by providing students with tours of local industries.
7. To provide MEAP graduates with valuable summer work experience in engineering and technology-related fields within local industries.

Funding for MEAP is provided by two main sources. The Purdue School of Engineering and Technology at IUPUI provides 60 percent of the funding while the remaining 40 percent comes from technical companies and local industry. To solicit funding, MEAP staff visits companies and present a program summary. Community minded companies such as Ford Motor Company, United Technologies Carrier Corporation, Raytheon Technical Services Company and United Parcel Services provide a gift in kind to the school that is earmarked for MEAP.

III. Industrial Tours

As one of the world leading manufacturers in heating and air conditioning units, United Technologies, Carrier Corporation at Indianapolis offered a tour to the workshop 1 MEAP students. A representative from the training department gave the students a warm welcome, followed by a challenging activity. Since many students have negative ideas about engineering, the students were asked to sketch their representation of an engineer before she introduced real engineers from various Carrier Corporation departments. After the sketches were reviewed, students were divided into groups to talk with the engineers and experienced staff. The engineers shared their educational backgrounds and career experiences with the students during a panel discussion. In order to give students a clearer picture of various engineering jobs, students toured the research and design areas of the facility. The Carrier Corporation tour was wrapped up with brainteasers and mind challenging games conducted by the staff and company souvenirs were given as prizes to the winners. The students interacted with positive role models and they were exposed to many types of engineering and technology that existed at a company that could be their future employer.

IV. Computer Related Workshops

The fast development in computer technology enables people to design Web Pages very easily today. These advancements in technology were taught to the workshop 4 or new to the program 6th and 7th grade students. Faculty from the Department of Computer Technology presented some basic knowledge about websites, Web Pages and other Internet interactions to the students. The faculty then guided students in building their own Web Pages by using Netscape Page Composer. Students learned how to use Page Composer to blend graphics and make hyperlinks. Participants downloaded images and added them to their personal sections of their WebPages. The creativity of students was seen as they designed WebPages about themselves, their family, friends and other interests. The WebPages were published and presented to the student's parents, families and friends on the last day of their workshop. The Web Page workshop showed students that the power of the Internet is only keystrokes away. Students were able to make a Web Page using a software tool and present their technology creativeness.

V. Engineering and Technology Projects

Faculty from the Department of Construction Technology exposed the students to bridge building. A video was viewed on the history of bridge building during the first session and the concept of bridge building was introduced using the computer software, Bridge Designer. Students spent two sessions designing an efficient and cost effective bridge by using Bridge Designer before going to the laboratory to gain hands-on experience. The laboratory technician from the Construction Technology Department assisted the students in building their bridges made of popsicle sticks, glue and plenty of ingenuity. Students worked in groups to build the bridges according to their original design on the Bridge Designer Software. While some group members were constructing the bridge parts others were decorating their bridges and preparing for the day of presentation and testing. The bridge testing competition was held on the last day of the workshop 3 and was supervised by the faculty and technician. Students' bridges were first

weighed and then tested by a weight-testing machine, where the weight applied to the bridges was increased manually. The efficiency of the bridge was calculated by using this expression: $\text{Efficiency} = (\text{Weight}/\text{Bridge Weight}) \times 545$. Students gained the experience of working in groups and working on an engineering and technology project that had design, testing and presentation.

VI. Conclusion

MEAP enhances the recruitment and retention of minority students at the Purdue School of Engineering and Technology (PSET) at Indiana University Purdue-University at Indianapolis (IUPUI) by exposing them to engineering and technology related activities in the various forms detailed in this paper. The School of Engineering and Technology has a primary goal of fulfilling its mission to expose students on a pre-college level to higher education, technical fields and areas of engineering and technology through the MEAP program.

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