

CREATING A SUCCESSFUL SUMMER INSTITUTE FOR HIGH SCHOOL GIRLS

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Abstract — The Engineering & Industrial Technologies division at Sinclair Community College has sponsored a summer institute for high school girls for nine consecutive years. The Women In Engineering Technologies (WIET) Institute is designed to provide young women opportunities for exploring careers in engineering technologies. During the WIET Institute, students in grades 10-12 participate in hands-on learning activities and lab experiments. They also have the opportunity to earn two credit hours for the two-week period they are attending the institute. Students from area schools are recruited through high school teachers, counselors and WIET committee members on the Sinclair Community College campus. Community service is one component of the WIET Institute. Students have participated in a “build” for the Dayton chapter of Habitat for Humanity. The WIET Institute is funded through a Sinclair Board Endowment Fund, the Engineering & Industrial Technologies division and the Sinclair Enrichment Center.

THE SINCLAIR COMMUNITY COLLEGE WIET INSTITUTE

The Women In Engineering Technologies (WIET) Institute is a program designed to introduce young women to the different career opportunities available in engineering technologies. Sinclair faculty, staff and guest speakers in engineering fields instruct and give presentations. The two-week summer program is open to area high school students entering grades 10, 11 and 12. In the last two years we have included several middle school students. We do not recruit this age bracket but we will include them if they inquire and show a sincere interest in participating. The majority of the students in the program are African-American (70% over seven years). The 2002 WIET Institute was the ninth year for this highly successful program. The 2002 report is available at www.sinclair.edu/organizations/wiet/institute. Also, see Table I below.

TABLE I
WIET INSTITUTE DEMOGRAPHICS

| Year | #. of students | % minorities | Grade 10 | Grade 11 | Grade 12 |
|------|----------------|--------------|----------|----------|----------|
| 1996 | 39 | 88 | 27 | 7 | 5 |
| 1997 | 32 | 80 | 6 | 11 | 13 |
| 1998 | 39 | 85 | 0 | 17 | 22 |
| 1999 | 25 | 60 | 0 | 7 | 18 |
| 2000 | 36 | 80 | 12 | 9 | 14 |
| 2001 | 40 | 50 | 6 | 19 | 15 |
| 2002 | 48 | 46 | 13 | 17 | 18 |

Demographics

Sinclair Community College (SCC) is in a large metropolitan area with easy access for students. We have a fall enrollment of over 23,000 students. The Engineering & Industrial Technologies division has more than forty labs for engineering technology classes. Public transportation is available and free bus passes are provided for the WIET Institute students. Through exposure to the engineering technology fields (see 2002 Report) the students will be more aware of career choices. According to the American Society for Engineering Education (ASEE), while there are “extensive outreach programs for bright high school students, [they have] not produced more engineers in training.” In fact, more than a million jobs are going unfilled even during the recent economic slowdown.¹ Our efforts to recruit students who may not ordinarily be sought after by traditional outreach efforts that target the top students should ultimately encourage these young women to at least consider the benefits of pursuing a career in engineering.

Currently, 13% of the total number of students enrolled in the Engineering & Industrial Technologies division are female. The WIET program seeks to increase female enrollment in all programs. Since 1994, 311 students have participated in the institute and have been exposed to nontraditional career opportunities for women in engineering. From 1997 to date, 62 past participants have taken classes at SCC and 148 students have taken advantage of the two credit hour option for the course EGR 297. There has not been documentation of past WIET Institute participant enrollment at other institutions.

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The program had 48 students in 2002 and we are planning for an increase of up to 60 students in 2003. We address many engineering and engineering technology careers in our program. Last summer each student designed a PowerPoint presentation to show at the awards luncheon. This culminating activity gave the students a chance to creatively describe what they had learned. The students participating in the WIET Institute are tracked each year as a follow-up to the program. We have documentation that charts which students come to Sinclair and which academic division they enter.

Recruiting

Recruiting starts in September with information packets about the WIET Institute being sent to high schools in the greater Dayton, Ohio area. This region includes Montgomery County, Dayton area high schools and outlying areas. The packets are sent to guidance counselors, math and science teachers and faculty who teach special programs, such as Tech Prep and technology programs. Information is also sent to the Girl Scouts, home school organizations and area youth groups. A WIET committee member from Sinclair contacts the schools and/or groups to see if they need additional information or a personal visit. When a school group is visited, the recruiter uses a PowerPoint presentation and video that highlight past institute activities.

Various media outlets are contacted to publicize the event. Local newspapers, the SCC paper, the engineering division newsletter, WIET Club newsletter and radio spots are all used to inform the public about the WIET Institute. In addition, a table top display with information and photos from past institutes is taken to college career days at local high schools throughout the year. Applications are due by May 1 each year and then we follow up with orientation sessions before the WIET Institute begins. Parents/guardians are required to attend the orientation with the students.

Students are selected on a first come, first served basis. Academic standing and test scores are not considered. The goal of the WIET Institute is to provide experience in engineering technology areas that have not been explored by the high school participants. Awareness of the potential careers for women in engineering is the number one priority.

Early College Credit

WIET students have the option of taking the two-week session for two college credits. This process exposes them to the concept of credit hour costs and potential financial aid sources. They have to meet established requirements for attendance and completion of deliverables, but they do not take tests. During the 2002 Institute, 37 of the girls (77%) exercised this option. The college credit and overall college experience encourages them to consider engineering and Sinclair Community College when planning their future goals.

Institute Funding

Funding for the WIET Institute is provided by the Sinclair Board Designated Endowment Fund, the Engineering & Industrial Technologies division and the Sinclair Enrichment Center. The American Society for Civil Engineers (ASCE) has supported our program through additional grant funds for the last five years. The ASCE funds enable us to provide an enhanced civil engineering experience. In 2002-2003 ASCE awarded Sinclair Community College \$5000 for our institute, and we are using it to involve the students in more construction and surveying experiences.

Civil Construction Emphasis

Since 1999, the WIET Institute has emphasized the civil construction area of our division due in part to the funding of ASCE. We have had sessions in architectural design, planning and construction and we would like to increase our activities in construction materials and land surveying applications now that we have had success in the civil area. In the 2002 Institute the students had a basic surveying class where they learned how to use surveying instruments. They also participated in the preparation of concrete cylinders and compression and destruction testing.

One of the most exciting and interesting activities in the 2002 WIET Institute engaged the students in a Habitat for Humanity home project. This project was already underway and the students participated in work sessions. This was a meaningful day for all of the girls because of the community support and teamwork required for such a project. With the additional ASCE funds, we expect to do another construction project in 2003. According to research, girls are most enthusiastic about learning experiences that are "interactive, collaborative, and team-based [and] offer the opportunity to work on real-world problems."²

In the 2003 Institute we plan to do a workshop called "Build a Bathroom." Several years ago we tried this construction project and it was very successful. Students will learn how to hang and repair drywall, cut and lay ceramic tile, set a toilet and vanity, install plumbing lines and wire an electrical outlet. Students from the Improved Solutions for Urban Solutions (ISUS) construction program will help mentor the WIET participants. Through participation in this workshop, students will learn valuable skills that they can apply whether or not they choose engineering as a career.

Evaluations

Student evaluation forms are filled out on the last day of the WIET Institute. Overall, the opinions expressed are very supportive. As a direct result of the student evaluations, individual workshops are improved or removed from the program. Students often indicate that they consider a career path as a result of attending the institute. The quality of the faculty, staff and laboratories is always given the highest rating. Over the years that the WIET Institute has been at

Sinclair, the student surveys indicated that 99% would recommend the program to friends and relatives. Further information about the student evaluations is available in the 2002 report.

No Cost To Students

Students participating in the WIET Institute do not pay for any of the costs. Students are provided with all lab supplies, lunch tickets, snacks, parking passes, bus passes and other miscellaneous supplies. Also, for the past six years we have provided the students with a scholarship allowing them to earn two credit hours for attending the program. These programs are funded through Sinclair, and are managed and supported in part by the Engineering & Industrial Technologies division.

Underrepresented Groups

Through programs like the WIET Institute we can increase participation of underrepresented groups such as minorities and women of all ethnic backgrounds. The imbalance in gender representation is an issue in engineering technologies. Through hands-on lab experiences and exposure to the myriad possibilities this issue will be addressed and change can follow.

REFERENCES

- [1] Creighton, Linda, "The ABCs of Engineering", *ASEE Prism*, November 2002, p. 24.
- [2] Intel Corporation, "Girls and Engineering", Design and Discovery Online. 2003. http://www.intel.com/education/design/resources/girls_engineering.htm