Oakton Community College and the National Science Foundation Project:
Center for Promoting STEM (DUE-0622329)

FINDINGS

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Built and expanded upon previously successful project, the Center for Promoting STEM (CP-STEM) at Oakton Community College was established in 2006 to increase the number of students who pursue studies and receive a degree in Science, Technology, Engineering and Mathematics. The goals of CP-STEM are:

- To encourage and enhance student success in STEM courses;
- To develop STEM activities and programs in a supportive, rewarding environment;
- To partner with professional organizations, businesses, and high schools in an effort to promote and sustain STEM activities;
- Study, investigate, and incorporate innovative STEM teaching techniques;
- To contribute to the literature on teaching and learning through program assessment;
- To distribute the successful results of CP-STEM activities.

CP-STEM offers the following programs: STEM Enrichment Program, Study Sessions, Mentoring Program, STEM Internship Program (Peer Tutor Training program, STEM Lab Assistant Training Program, Worksite Internships), STEM Success Seminars, STEM Faculty Leadership program, Student-Industry-Teacher Simulations. CP-STEM also sponsors student clubs that organize academic, career, and social activities.

The Peer Tutor Training Program won the 2003 Innovation Award of the Illinois Council of Community College Administrators (ICCCA) in November, 2003. The Student-Industry-Teacher Simulations Program won the 2005 ICCCA Innovation Award in November, 2005.

In an article titled *For Achievers, a New Destination*: *Two year colleges you may want to attend-and leave*, by Beth Frerking (Education Life Supplement Late Edition - Final, Section 4A, Page 23, April 22, 2007), New York Times featured Oakton Community College a successful two-year college model. Specifically, Frerking stated that "[Oakton Community College] recently received a continuing grant of nearly $800,000 from the National Science Foundation to bolster learning in science, technology, engineering and mathematics, particularly for underachieving students."

This report covers the project activities between August 1, 2006 and July 31, 2007.

Part One: Findings from External Evaluator

Dr. David Smith, external evaluator of the Project, summarizes the following findings for the project activities in 2006-2007.

Student-Industry-Teacher Simulations (SIT SIMs)

Both teachers and students had overwhelmingly positive ratings and comments regarding their experience of the SIT SIMs and the ITECH program. The item, "I will recommend this event to others" received a high marks from both students (4.2), and teachers (4.67). (1 = Strongly Disagree, 3=neutral, and 5 = Strongly Agree)

Common themes that emerge from teachers include the appreciation for the hands on experience and the organization of the program. Interestingly, teachers indicated a lack of agreement (2.33) with the statement that the CPDU was important to their participation in the program. When asked what teachers expected to gain from participating, the common responses included "a better understanding of Oakton's laboratory", "helpful tips on software", "to learn about experiences for my students", and to "learn interesting info and be able to take something back to my classroom". When asked if their expectations were met, all but one respondent agreed. Additional observations include appreciation for the hands on opportunities and appreciation for creating and coordinating the program.

Students similarly remarked about the "hands on" nature of participation and also noted that the SITSIMs were fun and interesting. Students also mentioned that they learned something new The most common least liked factor was "nothing." However, a few students mentioned that they felt the program was boring and that they did not learn anything new.

In terms of suggestions for improvement, teachers mention a desire to have more assistance in demonstrating the activities and/or concepts in their own classrooms, while students recommend more activities and more complex experiments.

Study Sessions

Study session data were collected for fall 2006, spring 2007, and summer 2007 semesters. Data for summer 2007 is not included in the following analysis since it is still ongoing and will end on July 26, 2007 after this report is submitted. Fall 2006 and spring 2007 data are analyzed below.

Among the 13 classes with study sessions in fall 2006 and spring 2007, 80 students attended study sessions while 123 classmates who served as the control group did not. The treatment group had a more significant success rate than the control group. 85% of treatment group received a grade of A, B, or C, while 14% received D or F. However, 58% of control group received A, B, or C, while 42% received D or F.

Findings for the following programs are yet to be provided:

- ✓ **STEM Enrichment Program (SEP)**
- ✓ **STEM Mentoring Program**
- ✓ **Peer Tutor Training Program:** since this component will complete one cycle on July 26, 2007 after this report is submitted.

Part Two: Challenges ahead of CP-STEM

Internship

Oakton Community College has been working to revising its internship program. Business Institute at Oakton previously supervised the internship coordinator. Starting July 1, 2007, the Office of Academic Affairs took over supervision. CP-STEM has collaborated with the internship coordinator on enhancing the program. CP-STEM invited industry professionals to serve on its Council of Industry and Academic Advisors (CIAA). Attendees at the last CIAA meeting discussed methods to strengthen Oakton's internship program.

We see two obstacles on internship for community college students. One is that internship opportunities are often offered to college juniors and seniors. Freshmen and sophomores often do not have sufficient skills and knowledge. Another obstacle is that some companies are unaware of the knowledge, skills, and potential of community college students. In fact, a former Intel employee wrote to Gloria Liu about his experience with the company as it relates to community colleges:

> *One of the reasons that 50% of people do not include community college is employer bias. Most Intel departments/recruiters reject all resumes showing a community college. Several recruiters from other major employers have told me they are instructed to do the same thing. Another problem is most employers will only recruit from specific universities. I was only allowed to recruit from 5 universities in the US and none outside: University of Washington, University of Arizona, Arizona State University, UCLA and University of Michigan. Of these, the two in Arizona were top priority.*

While this is only one anecdotal statement, it suggests that CP-STEM should be working to educate businesses and industries on the benefits of hiring individuals with community college experience. While Oakton has received some positive press coverage, there is still much work to be done.

Sustainability

To sustain and enhance the management and development of CP-STEM, Gloria Liu, a co-project director, was hired as coordinator of CP-STEM starting January 15, 2007, and has spent her 75% of time on CP-STEM. Beginning July 1, 2007, Gloria Liu will work 100% of her time on CP-STEM. Oakton Community College will fund 50% of her salary while the remainder will come from the grant. Her 100% involvement in CP-STEM is essential for implementing the project.

However, her replacement for her previous position has not been hired yet. Hence, arranging peer tutors and study session facilitators with the Learning Center has been a challenge.

The CP-STEM programs require significant use of space. There are 14 STEM Enrichment program and Study Sessions sections per semester. Project directors and faculty members meet several times per week. CPS could significantly benefit from a designated, visible location. CP-STEM is seeking support for a designated space for long term development and sustainability.

Expand the STEM Enrichment Program to Other Disciplines

Our previous findings have indicated that about 1/3 of degree completers are in liberal arts. Most STEM students need to take general education courses, such as English, psychology, history, and philosophy. In the STEM Enrichment Program, students are exposed to rich STEM contents while they are learn English composition. To increase students' success in STEM, we consider expanding the STEM Enrichment Program into psychology, history, or philosophy.

Training mentors for the Mentoring Program: We found out that although many faculty members are experienced teachers, mentoring is a new area for them. We have gradually paid more attention to training mentors for the mentoring program. Ten Oakton faculty members participated in a two-hour training meeting to understand the procedure, requirements, contents and techniques on mentoring students for the STEM Mentoring Program. We developed a paper based on our experience and will present it at the MAA Mathfest in San Jose, August 3-5, 2007.