Attracting and retaining females and minority students into Technology.

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Abstract

Diversity was identified as a core value in the 2003-2007 strategic plan of the College of Technology (COT) at Purdue University (School of Technology 2004). While diversity remains a core value, the current draft of the COT's 2007-2011 strategic plan extended the importance of diversity to the college by naming STEM Education as one of its six strategic areas, as evidenced by the following statement (College of Technology 2007):

> Research in STEM education focuses on innovation in what is taught, how it is taught, and increasing the access of underrepresented groups to these innovations. (p. 3)

The college has been committed to multicultural diversity since 1984, but in 2004, the college expanded its diversity focus when it replaced the position of Director of Minority Programs with a Diversity office. This office is led by a Diversity Director who plans and implements a broad range of recruitment and retention programs that target students in the middle school level and continue until they graduate from college. These programs accomplish many goals, including:

- introduce underrepresented students to a wide array of Technology disciplines,
- encourage theses students to apply to a STEM discipline,
- support these students as they matriculate and eventually graduate from Technology.

The Diversity office relies on support from college students, Purdue student organizations, COT faculty, Girl Scouts of America, and corporate sponsors to implement these programs on a continuous basis. Although these programs are relatively new and the students who participated in these programs are just now starting to enter college, the college has already witnessed visible improvements in the gender and minority student enrollments.

This paper will share the evolution of the Diversity office as it relates to the current offerings of these recruitment and retention programs. Through this discussion, the audience will learn what worked and why as well as the roles of various people involved in each program that contributed to its success.

Background

The evolution of the diversity efforts of the College of Technology at Purdue University began in 1984, when it created the position of Coordinator of Technology Minority Programs (Denton and Gillespie 1991). (Prior to the creation of this position, the college used informal efforts to recruit and retain minority students.) A decade later, in 1995, a new person was hired to fill the role of Director of Minority Programs, and he remained in that position for eight years (("New Director…" 2003). As the names of both positions imply, the diversity focus of the college was on multicultural students for nearly thirty years. During the majority of this period, female enrollment in most programs gave little cause for concern, which explains why the diversity focus excluded gender.

A variety of programs were instituted during this thirty year period to reach pre-teens through current college students. All programs introduced the multicultural participants to the breadth of baccalaureate offerings in the College of Technology. Some of these programs are still being offered, while others were terminated to make room for programs to reach females. A summary of these programs follows.

The Vision program brings tenth and eleventh grade multicultural students to campus for a three-day residential program during the spring semester ("Vision…" 2007). Program participants have the opportunity to attend class lectures and participate in lab activities with College of Technology students, meet with the college's faculty and staff, ask questions during break-out sessions with technology students, and spend evenings with fellow Vision participants and chaperones in social activities. This program continues to be offered each spring.

The seventh and eighth grade summer camp was a five-day residential program for multicultural junior high students. Participants engaged in a variety of hands-on activities led by faculty and students in each of the departments in the College of Technology. Other, fun activities were interspersed with the academically-oriented activities to keep the students interested in the camp. This program is still being offered, but was given a more recognizable name in 2004.

The Seniors in Technology program brought multicultural high school seniors to campus for a five-day residential program that was similar to the summer camp for junior high students. This summer program was offered sporadically during the period when the focus was on multicultural students, but has not been offered since gender was added as an equal focus of the Diversity Office.

In addition to the educational programs for pre-college students, the college also has a student organization, Minority Technology Association (MTA), as a resource for current multicultural college students. MTA was established in 1985 and has been dedicated to excellence in academics, personal, and professional growth ("Diversity courses…" 2007). MTA helps run the Vision recruitment program for junior high minority students.

In 2003, the Director of Minority Programs for the College took a new position to lead a university-level program. Around this time, it became apparent that several programs were experiencing a gender gap. This was also the period when the college finalized its strategic plan and diversity was included as a core value. At this time, diversity included both race and gender.

Changing the Face of the Diversity Office

In April 2004, a new Director of Diversity was hired. The College used this as an opportunity to realign mission of the diversity office to include females as a target group while maintaining the successful programs to reach multicultural students. Because no studies about past program offerings were done, only anecdotal data could be used to infer whether these programs made a positive difference in the multicultural population of the college. Therefore, the new director took the initiative to begin tracking data regarding the gender and race profile of the college.

Evaluation of all programs was necessary, and data collection and analysis would be used to demonstrate their success. Program outcomes were to attract and retain diverse students in Technology. There were two student organizations targeting diverse students, the Minority Technology Association and Women in Technology (WIT). The membership of each organization was less than 10 students, so another charge for the Diversity Office was to invigorate both organizations.

In 2004, the college was about 13.25% multicultural and 12.5% females. The freshman classes in fall 2004 were 11.1% multicultural and 10.6 % females. These statistics suggested that recruitment was slightly more important than retention. Therefore, the Diversity Director's goal was to increase the diversity of the freshman class. Once students were recruited, retention programs were needed to keep and graduate the underrepresented groups that matriculated to technology.

Program Administration

All of the educational programs are administered through the Diversity Office under the direction of the Associate Dean of undergraduate studies. The camp participants pay a nominal fee because corporate partners provide grants to run and implement the programs. Some monies are used to provide scholarships to need-based participants. Faculty support is crucial to the success of all programs. Faculty members in each department volunteer to develop and deliver short sessions in their domain areas.

The success of the programs and the importance of diversity to the college resulted in the addition of another staff position in 2007—Assistant Director of Diversity. In addition, there is a graduate student who provides assistance to the diversity office.

New Recruitment Programs

Almost immediately, the Diversity Director instituted new programs to include multicultural students and female populations and "branded" the successful past programs. The seventh to eighth grade summer camp was renamed to TOTAL (Turned on to Technology and Leadership) and continues to be offered in much the same manner as originally conceived.

A new program, TEAM (Technology Expanding All Minds), was created for female recruitment. TEAM targeted females in eighth and ninth grades. The organization and delivery of this five-day, residential, summer program was very similar to TOTAL.

TAGS (Technology Advances Girl Scouts) was developed cooperatively with local Girl Scouts (Tippecanoe County, Indiana) in 2005. Last year, TAGS moved regionally for the whole state of Indiana. The organization and delivery of this five-day, residential, summer program is very similar to TOTAL and TEAM, but the participants are fifth to seventh grade girl scouts. The

success of TAGS has resulted in the addition of a new camp to be added this year. Each camp will target different age groups:

- TAGS 1: sixth and seventh grade (rangers)
- TAGS 2: high school (ambassadors)

WOWIT—Windows of Opportunity for Women In Technology is a program in collaboration with Project Lead The Way (PLTW). PLTW teachers were encouraged to recommend and invite high school female students in their classes for a one-day Saturday program. Select programs in technology, based on their gender profile, are invited to present a session. Last year, the select programs included Mechanical Engineering Technology, Information Technology and Building Construction and Management.

DO-IT (Discovering Opportunities In Technology) started out as one-day, spring semester program for eleventh grade females. The WIT student group wanted to offer a three-day program similar to what MTA does with Vision. In spring 2007, a three-day program was offered (Thursday afternoon, all day Friday, until early afternoon Saturday). The 2006 program was presented over two days.

Cheering in the Classroom is the brainchild of the graduate student who works for the Diversity Office. As a former cheerleader, she saw an opportunity to reach an untapped market—high school cheerleaders. This program is similar to the other programs, but most activities are tied to cheerleading, so participants realize that technology can be used to support a variety of things (suggesting that a career in a technology field for a current cheerleader is a good option).

In addition to these on-campus educational programs, another way to reach more students and give them information about Technology was to visit PLTW high schools in key locations. The schools with higher, diverse student populations were targeted for on-site visits by the Diversity Office staff beginning in 2005. In the first year, 500 students were reached. 700 students were reached in 2006, and over 1200 students were reached in 2007. The focus was to talk to students in classes about all of the programs offered in Technology.

New Retention Programs

An effective diversity initiative must include retention programs to complement the successes of its recruitment programs. The Diversity Director created three new programs, continued two existing programs, and engaged in personal counseling activities. All of these are explained below.

During the summer, Purdue invites newly admitted students to attend one of the many "Day on Campus" programs. To get students started with the right tools, the Diversity Office added two Day on Campus luncheons, one for females and another for multicultural students. During this luncheon, students are given information about the college's programs for success in college. These programs include the Academic Boot Camp and three select learning communities. The three learning communities presented to participants exist to support women, students majoring in computer graphics, or students majoring in computer and information technology.

The Academic Boot Camp is a five-week, residential, summer program for newly admitted, multicultural students in technology. Boot Camp students complete activities that are based on

courses they will take in the fall semester. Students earn grades for these zero-credit courses. The top performers receive one-time, merit-based $1000-$2000 scholarships.

BEST (Building Excellence for Students in Technology) is a tutoring program developed in collaboration with MTA. BEST instructors are available twice weekly during the evenings (when few class are in session and students should be free to attend). Food is provided for participants who attend this no-cost program. The program encourages multicultural students to attend, but it is open to every student in technology.

TECH 100, Technology Freshman Seminar, is a seminar-based course available to all technology students. It provides students with information about the academic and non-academic support services available to incoming students. It helps equip students with life skills and tools for college success. Career speakers are used to share relevant experiences and provide motivation to students to stay in college.

TECH 101, Women in Technology, is another seminar-based course available to all technology students. The course brings female career speakers. The focus is on gender issues. Students learn about the top 100 companies for working women (Riss, Palagano, & Ebron 2008). More importantly, it gives students a chance to meet and network with other female students in the college.

In addition to using the previous programs and courses to reach groups of students, individual counseling is used to reach underrepresented students who are on probation or struggling academically or personally. In weekly meetings, the Diversity Director shares time management strategies and provided one-on-one mentoring. The students feel welcome to stop by the Diversity Office anytime because the Director has an open-door policy.

Results

Based on the results to date, efforts by the Diversity Office have resulted in improvements in both the female and multicultural enrollments. Figure 1 shows that the overall ethnic enrollment in the college increased from 510 students in 2003-04 to 616 students in 2007-08. Figure 2 shows that the freshman ethnic enrollment also increased, but at a much faster rate—21.6%.

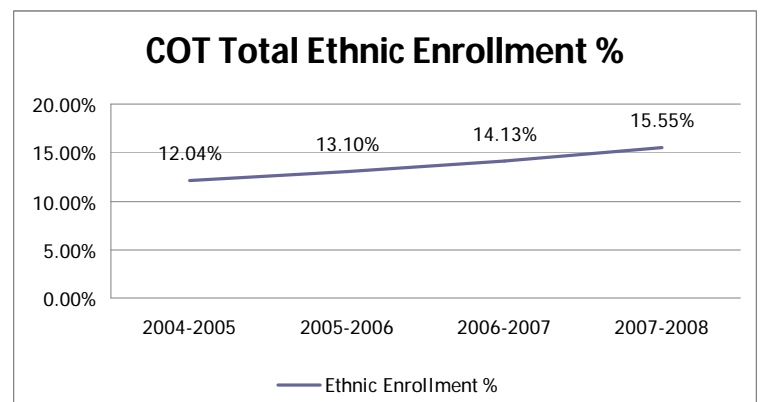| Year	Total Ethnic Enrollment	Total Enrollment	Percent Ethnic Enrollment
2003-04	510	4123	12.37%
2004-05	504	4185	12.04%
2005-06	522	3986	13.10%
2006-07	576	4077	14.13%
2007-08	616	3961	15.55%

Figure 1. Ethnic enrollment trend in the College of Technology

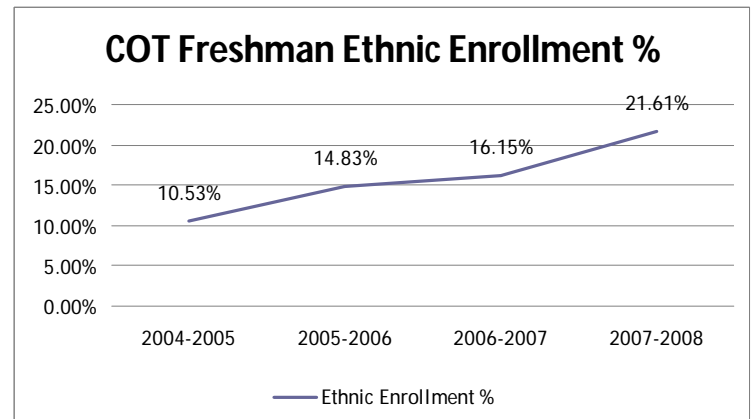| Year	Total Ethnic Enrollment	Total Enrollment	Percent Ethnic Enrollment
2003-04	82	639	12.83%
2004-05	73	693	10.53%
2005-06	106	715	14.83%
2006-07	124	768	16.15%
2007-08	129	597	21.61%

Figure 2. Ethnic freshman enrollment trend in the College of Technology

Figure 3 shows the female enrollment trend for the college experienced a dip in from 2005-07. Figure 4 shows the freshman female enrollment trend was mostly increasing, but had a slight dip in 2005-06. These figures suggest that the recruitment programs appear to be drawing underrepresented groups to the college; however, a little more work needs to be done on retention programs to keep most of these students.

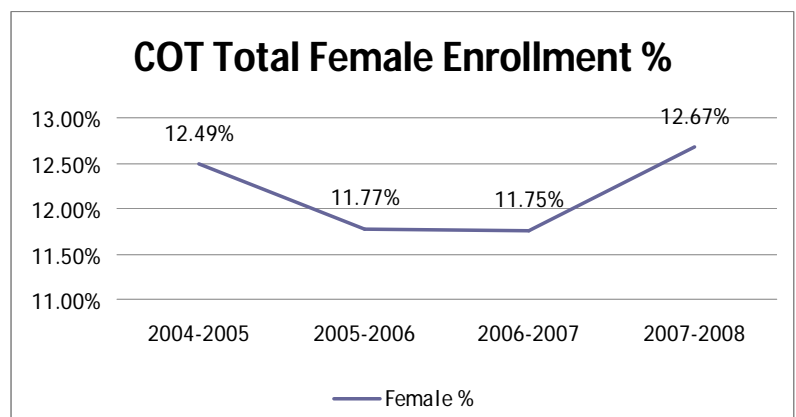| Year	Total Female Enrolled	Total Enrolled	Percent Female Enrolled
2003-04	536	4123	13.00%
2004-05	523	4185	12.49%
2005-06	469	3986	11.77%
2006-07	479	4077	11.75%
2007-08	502	3961	12.67%

Figure 3. Female enrollment trend in the College of Technology

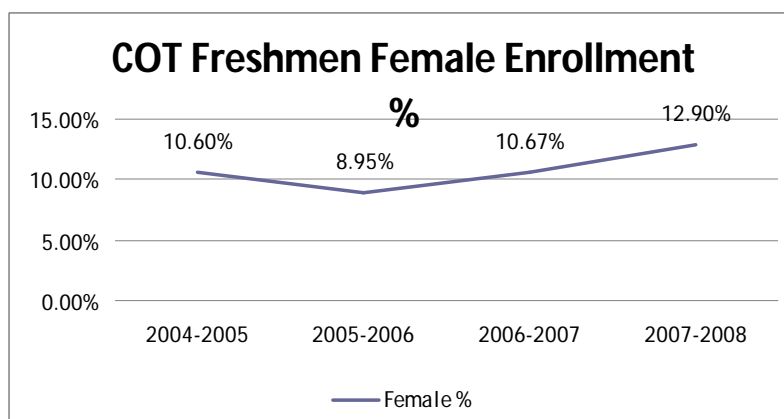| Year	Total Female Enrolled	Total Enrolled	Percent Female Enrolled
2003-04	59	639	9.20%
2004-05	74	692	10.60%
2005-06	64	715	8.95%
2006-07	82	686	10.67%
2007-08	77	597	12.90%

Figure 4. Female freshman enrollment trend in the College of Technology

Other evidence of success includes the fact that applications from women are increasing as a direct result of the various recruitment programs in place. The matriculation of admitted students has also increased. Figure 5 has graphs that depict the results from the 2006 Vision and DO-IT programs.
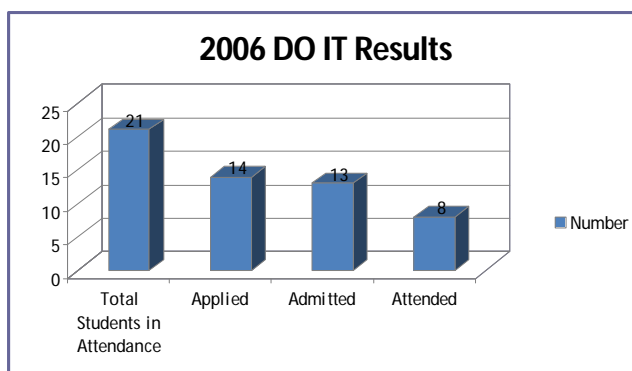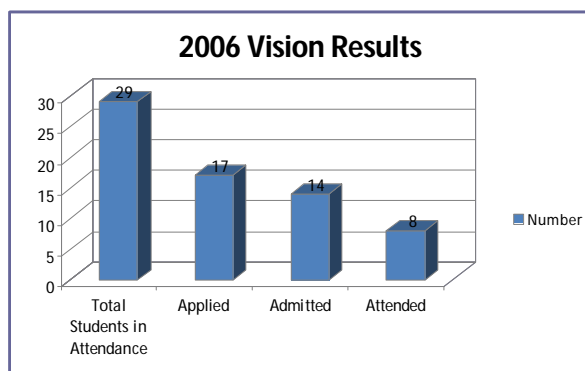

Figure 5. 2006 results from Vision and DO-IT

Conclusion

The Diversity Office in the College of Technology has made some progress in its goal to increase diversity of the student population in the college. Much of the progress is due to the success of the educational programs to recruit women and multicultural students as well as the personal support provided to students through the college's retention programs. Nonetheless, more work needs to be done, especially in terms of retaining the students that join the college. A combination of successful recruitment and retention programs will help the college achieve its goal, resulting in more skilled, diverse students that will enter the workforce.

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