AC 2008-1240: RETENTION PROGRAMMING FOR GRADUATE STUDENTS: AN INNOVATIVE GROUP MENTORING COMPONENT

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Retention Programming for Graduate Students: An Innovative Group Mentoring Component

Abstract

The Women in Engineering Program (WIEP) was introduced at Purdue University in 1969, with a focus on offering educational enhancement activities for women interested in pursuing engineering degrees. Programming has evolved over the past 38 years to include a K-12 outreach program, undergraduate recruiting activities, and graduate, undergraduate and faculty retention programs. Specifically to address the needs of our female graduate population, the Graduate Mentoring Program (GMP) was established in 1994. For more than 13 years, the WIEP Graduate Mentoring Program has provided a supportive environment to enable female engineering students to share information and strategies to achieve success personally, academically, and professionally. The goal of the GMP is to provide the participants with a networking arena to foster academic goals, establish personal connections, develop leadership and mentoring skills, and address their personal aspirations. These goals are achieved within the framework of a networking mentoring model which has been outlined by Walthall, Holloway and Reklaitis.[1] They found that students who participated in the WIEP GMP were more likely to be retained in the Purdue University College of Engineering graduate program due to the support network and community environment such a group provides. However, due to a recent decline in participation, an innovative departmental-based group mentoring component was introduced to the program in Fall 2007. The goal of the component is to encourage participants to act as both mentors and mentees when their vast, diverse experience allows. Instead of suppressing (or failing to recognize) the participants life experiences and acquired knowledge with one-on-one mentoring, our program encourage students to share their numerous experience though the group mentoring activities. This paper will provide an overview of the structure of the Purdue University Women in Engineering Graduate Mentoring Program, explore the participant data for the Graduate Mentoring Program, describe the innovative departmental-based group mentoring component, and examine the formative and summative evaluations provided by the participants.

Introduction

Hall and Sandler originally coined the term "chilly climate" to summarize the difficulties encountered by undergraduate women in the classroom.[2] However, through further research they extended this term to include female faculty, administrator and graduate students both inside and outside of the classroom.[3, 4] "Chilly climate" is used to describe an environment where women have feelings of isolation, feel subtle discrimination, and experience other persistent inequalities. While the initial study is almost 30 years old, and significant improvements have been made to the academic environment, female students still feel the "chilly climate". Litzler, Lange and Brainard show that the "chilly climate" in combination with the traditional culture of science and engineering disciplines is negatively associated with graduate student advancement and retention.[5] They found that women are more likely than men to feel isolated, that the pace is quicker, the workload is greater, and experience gender discrimination. Therefore, Litzler et al. contend that departments that can create a climate that is "interactive and facilitating" (i.e. mentors and advisors that care about student success) will lead to higher career commitment from their female students.[5]

Adding to feelings of isolation, the engineering disciplines also suffer from a lack of female role models, especially among faculty. Recent data from ASEE shows an overall slight increase in female engineering faculty; however the actual numbers remain extremely low. This is an issue in academia as female and male students tend to use mentors for different purposes. Male students will use mentors to help build a network of collaborators, publish papers, and pursue grants: all of which fall into the professional development category. While there is no doubt that female students need mentoring in the area of professional development, their mentoring relationships tend to involve additional aspects.[6] Women students are often concerned about the prospect of balancing the roles of scientist, mother, and wife, therefore female students tend to seek out mentors who are not only successful in their careers, but also maintain a healthy work-life balance. Additionally, female students often feel more comfortable in a mentoring relationship with another female, particularly when discussing family and personal struggles. Unfortunately, the scarcity of role models means that female students do not receive the mentoring that they seek.

Several strategies help women succeed in engineering and overcome the difficulties discussed above. These strategies include providing mentoring programs and exposing students to role models. A variety of mentoring philosophies exist, and the appropriate type for a particular student depends on the type of guidance and support that is needed. Traditionally, graduate student mentoring relationships occur between the student and their faculty advisor, and include exchanging information, challenging the student technically, and helping the student adapt to stress. Frequently, relationships of this type do not include the psychological guidance that many female students seek. One way for female students to get the guidance, support, and encouragement that they seek is to participate in peer mentoring programs. Peer mentors are typically more experienced students who can identify with the current struggles of the mentee, encouraging them to continue and offering advice on coping strategies. If peer mentors are not available, a collaborative or networking model may be used. In this model, a group of students is responsible collectively for each other, and meet as a group to support one another. It is also important for students to receive mentoring on a variety of topics, including career development and work-life balance. It is not necessary for one mentor to fulfill all the mentoring needs, and it is common for a student to have more than one mentor. In addition to providing students with skills for success, mentoring also helps alleviate the sense of isolation that many female students experience.

Overview of GMP

The Purdue University Women in Engineering Program (WIEP) was founded in 1969, and was the first program of its kind in the nation. The strength and success of the program is known nationwide, and as such has served as a model for other institutions to initiate similar programs. The WIEP program has three main goals: pre-college outreach, recruitment, and retention at the graduate and undergraduate levels. The Graduate Mentoring Program (GMP) was formed in 1994 to provide a supportive environment to enable female engineering students to share information and strategies to achieve success personally, academically, and professionally. The structure of the GMP is fully described in Walthall et al.[1] The program is based on Haring's networking mentoring model where a group of people coming together to share personal and

professional experiences with the help of a facilitator.[7] Unlike one-on-one mentoring where the primary benefits flow in one direction, networking mentoring participants benefit more equally by being both a mentor and a mentee depending on the situation. The success of past and present GMP participants is encouraging (having graduated nearly 500 participants in the past 13 years), however women in engineering fields still face some unique challenges.

The GMP is lead by a team of 5-8 graduate students and WIEP administrators who meet weekly throughout the year to implement the program. The networking mentoring model is achieved primarily through GMP monthly meetings where participants meet in the evening for informal networking, dinner, and a guest speaker. Participant evaluations are completed and reviewed monthly to allow for continuous adjustments and improvements to the program. This is a vital component for continued success of the program as the GMP cohort changes yearly. More rigorous evaluations are completed mid-year and year-end to gather qualitative data and solicit suggestions for future programs. To further foster the networking mentoring among the participants, the GMP leadership team (LT) also plans social activities outside the academic setting, sends monthly newsletters, and continually updates the GMP website. To provide more opportunities for the participants to engage in networking mentoring, two new components were added to the GMP in Fall 2007; Monday Munchies and Mentoring Groups. "Monday Munchies" is a weekly event held to encourage students to take a break from their busy schedules and socialize with other GMP members. The Mentoring Groups are department-based and encourage participants to meet with the other female graduate students in their departments to discuss discipline-specific issues and topics. This program is fully outlined later in this paper.

Program Assessment

The GMP is assessed throughout the year so participants can provide suggestions and feedback on the program. Monthly evaluations are done at each meeting, and more robust qualitative mid-year survey is performed in December and a year-end quantitative/qualitative survey is done in April. The LT uses the monthly evaluations to implement immediate, smaller adjustments to the program in the current year and the mid-year and year-end surveys to employ larger improvements to the program for the following year.

The monthly evaluation is distributed to the participants at the conclusion of the meeting. They are asked to rate that particular meeting in terms of the support, affirmation, and strategies for success that they received (see the Appendix for an example of the monthly evaluation). The participants rate each of these benefits on a scale of 1 to 5, with 5 being the highest. Figure 1 shows the average monthly evaluation results from the 2000-01 to 2006-07 academic years. The graph shows participant satisfaction levels have decreased by roughly 0.2 points (on a scale of 5.0) in every category the past two years. It is difficult to determine if this 4% drop was due to the particular cohort of students who were perhaps more discerning than their predecessors or to the content of the monthly programming. Perhaps this drop is not even statistically significant however it raised concern to the new Leadership Team which compelled them to develop new initiatives with the goal of increasing participant satisfaction.

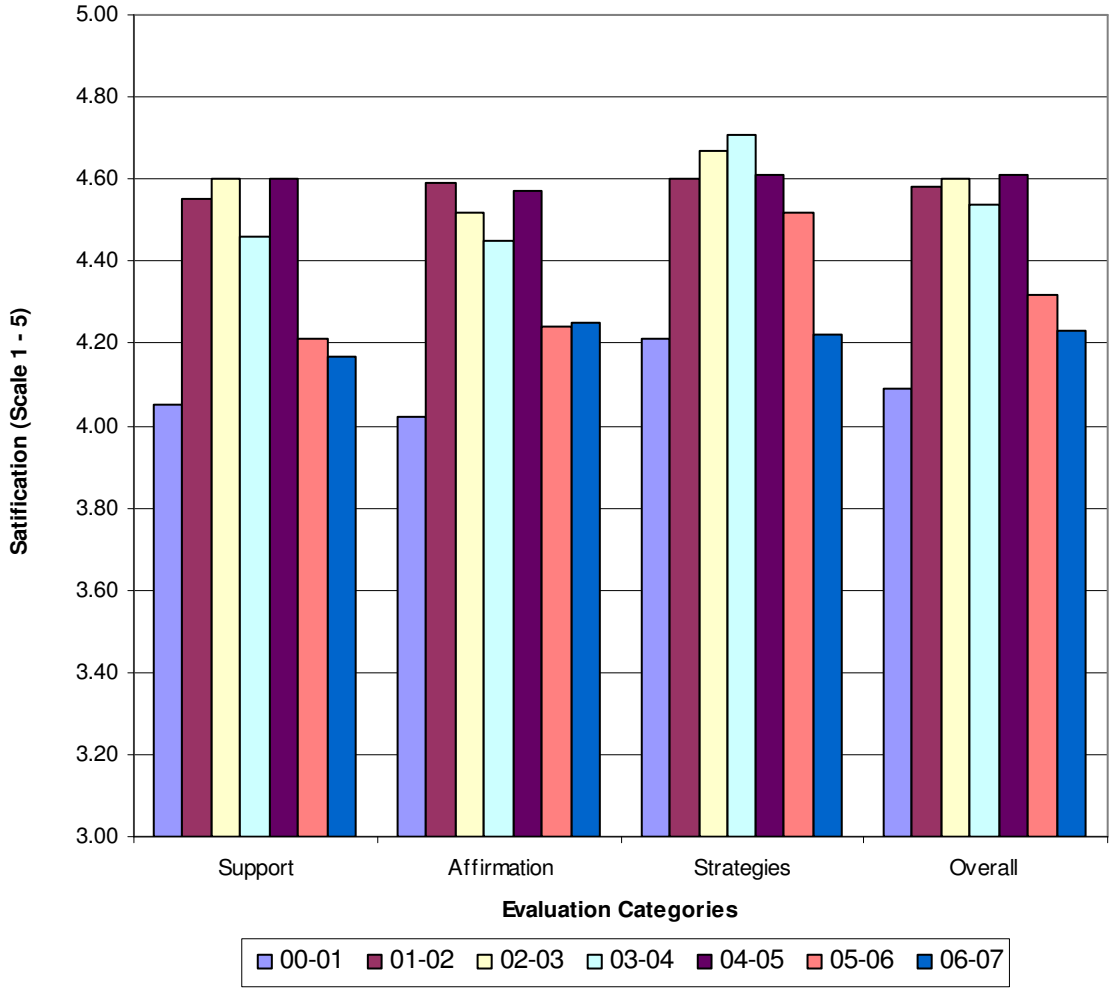

Figure 1. GMP monthly meeting average evaluation results.

The qualitative mid-year survey solicits feedback from participants on program benefits, logistics, and suggestions for improvement. The most recent mid-year survey was administered to GMP participants in November 2007. When asked to define benefits receive by participating in the program, the overwhelming responses were “friendships” and “support network”. When asked why they were not able to attend meetings, the main response was time conflict. Time conflict has been the main issues regarding a participant’s ability to attend the meetings for several years. The GMP LT addressed this a few years ago by rotating the day of the monthly meeting throughout the academic year. From the latest mid-year survey we see that time conflicts continue to persist. Finally, the participants shared suggestions for improvements to the program by providing speaker topics for the 2008-09 academic year and requesting more scheduled socials for Spring 2008.

The year-end evaluation is distributed to the participants at the final meeting of the academic year, typically April. They are asked to review the program as a whole in terms of the support, affirmation, and strategies for success that they received as well as overall satisfaction of the meetings for the entire academic year. The participants rate each of these benefits on a scale of 1 to 5, with 5 being the highest. Figure 2 shows the average year-end evaluation results from the 2000-01 to 2006-07 academic years. The graph shows a decline in participant satisfaction since 2002-03 in personal support, increased self-confidence, strategies, beneficial topics, and overall satisfaction. The 2006-07 GMP earned scores that fall at or near the bottom in 4 of the 6 categories; personal support, strategies, overall satisfaction, and recommend to others. Note: because of perceived lack of interest, social activities were not offered in 2006-07 hence, the "Enjoyed Social Activities" question was removed from the survey and there is no corresponding bar on the graph below.

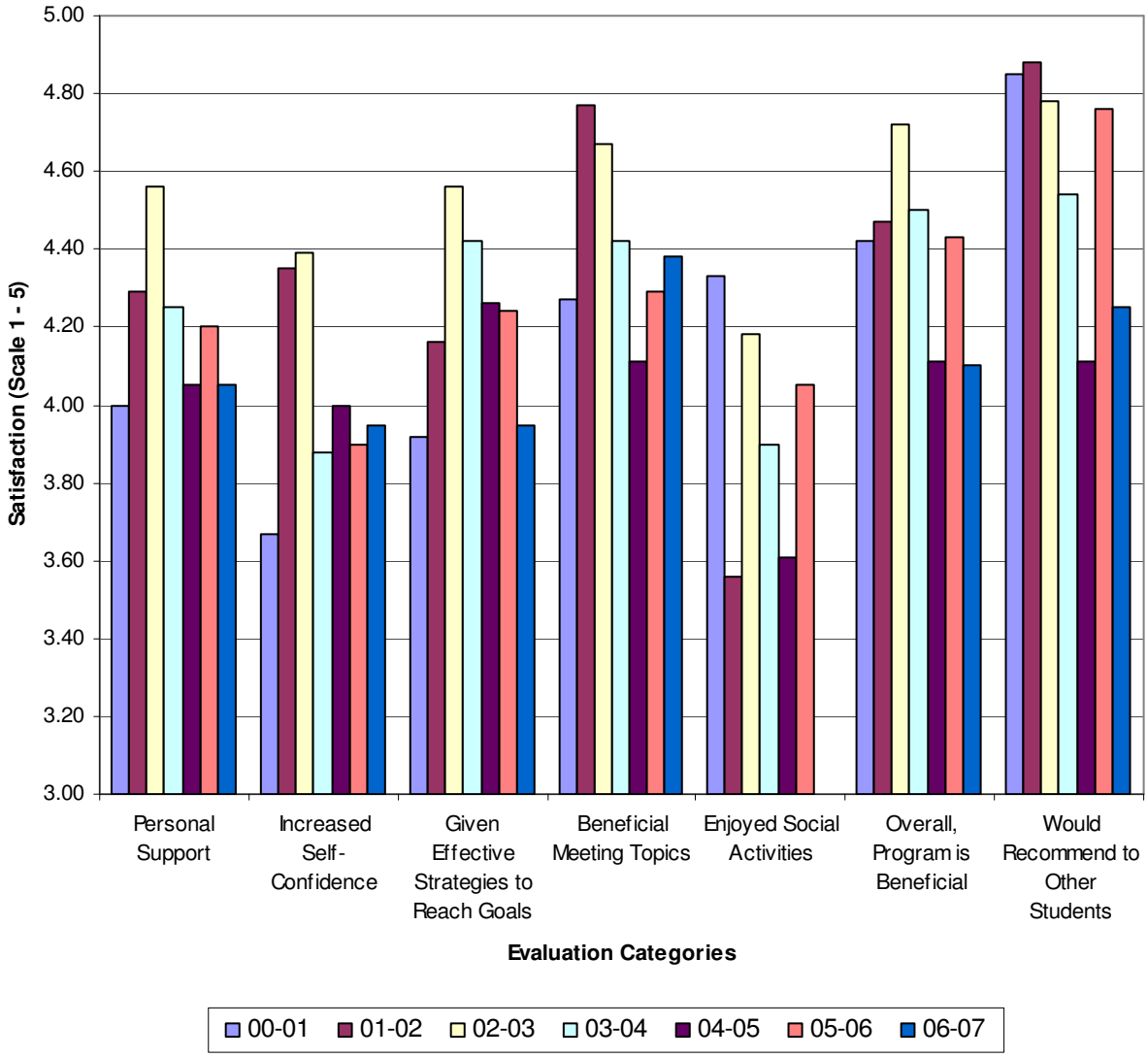

Figure 2. GMP year-end average evaluation results.

Participant Data

In recent years, there has been in increased focus on diversifying the engineering workforce. To successfully accomplish this, however, there needs to be in increase in female undergraduate and graduate students in engineering programs throughout the country. However, data from the Engineering Workforce Commission (EWC) shows that total engineering enrollments has declined for three years in a row from an all time high in Fall 2003.[8] This trend is also seen in the female undergraduate numbers; down to 17.4% in Fall 2006 from an all time high of 20.1% in 1998 and 1999. The EWC does note that the enrollment of graduate women continues to increase nationwide to 22.2% in Fall 2006, up from 21.9% in Fall 2005. However, these numbers are still alarmingly low. And with the noted decrease in current female undergraduate students, there is little hope of female graduate student numbers to continue to increase. Therefore, it is paramount that the female students that do matriculate to graduate programs are afforded the opportunity to succeed. Walthall et al. found that since 2000 at Purdue University more females have left graduate engineering programs than their male counterparts.[1] From 2000-2003 an average of 17.75% females left their cohorts each year compared to an average of 12.8% of men. However, women who participated in the GMP left their cohorts at an average rate of 8% each year. Currently, 114 female graduate students, or 25.85% of the female engineering graduate students at Purdue University, have joined the 2007-08 GMP. Of these 114 GMP participants, 79 (or 69%) attended at least one of the four monthly meetings that were offered in Fall 2008.

Innovative Group Mentoring Component: Departmental-based group mentoring

The data in Figures 1 and 2 shows a slight decrease over the past two years in GMP participant satisfaction. To address this, new strategies have been implemented to provide additional opportunities for networking mentoring to occur. Two separate programs were introduced in Fall 2007: (1) Monday Munchies, a weekly informal event meant to provide an opportunity for students to take a break and socialize and (2) Mentoring Groups, a departmental-based group mentoring program with the goal of providing a venue for the graduate students to meet within their departments on a monthly basis. A departmental-based mentoring group is crucial for graduate student success. Because of the vast differences between disciplines (including such issues as which professional organizations to join, qualifier and preliminary exams, job outlook, and departmental politics), many issues cannot be adequately addressed in the more-encompassing GMP monthly meetings. Perhaps most importantly, a departmental-based group provides further networking mentoring among women who will be the future leaders in their fields in both industry and academia. These relationships formed in graduate school can be the basis for collaborative partnerships in the early stages of their careers.

The Mentoring Group model being employed throughout the College of Engineering is based on a program that was developed and implemented in 2003 by author Zurn-Birkhimer. That particular departmental Mentoring Group continues today. The model consists of monthly hour-long departmental-based meetings held in a location where the female graduate students feel comfortable being open and honest. Depending on the departmental climate, female faculty are also invited to join the group meetings. Two graduate students (who are members of the GMP) share the chair responsibilities of arranging the meeting logistics and conversation topics. The goal is for each department to develop a self-sustaining group. The success, and sometimes

challenge, of departmental-based groups is that they can follow many formats, and the cohort determines what type of setting is most beneficial for that particular group.

The departmental-based mentoring groups were fully implemented in the GMP in Fall 2007. The initial data collected through the mid-year surveys shows that 42% of the GMP members participated in their department's Mentoring Group and 42% attended Monday Munchies (Figure 3). The most common response from students who did not participate was that they were too busy. Another positive outcome was that students who chose not to or were unable to participate in the evening GMP meetings were taking advantage of the Departmental Mentoring Group or Monday Munchies events. As discussed earlier, the data show that students who participate in the GMP are more likely to be retained in graduate school.[1] By adding the departmental-based Mentoring Group component to the GMP we are affording our female engineering graduate students more opportunities to participate in networking mentoring, as well as providing more avenues for these students to become involved. However, it is too early to tell if their participation translates to higher retention rates.

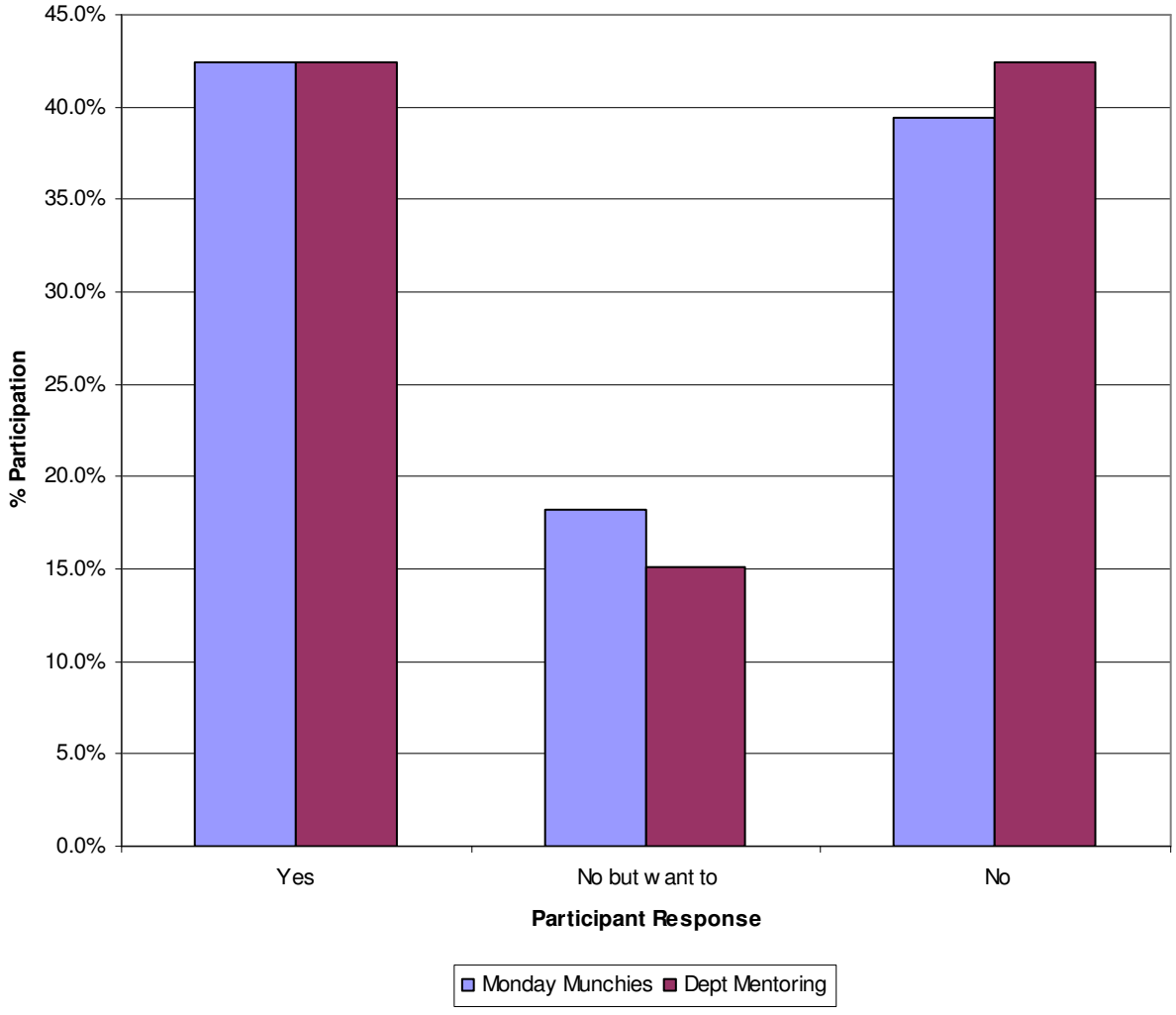

Figure 3. GMP 2007-08 Mid-Year Evaluation results.

Discussion

It is well-documented that the number of females in engineering programs is alarmingly low. Programs must be developed and implemented to retain female faculty, graduate students and undergraduate students. The Purdue University Graduate Mentoring Program has been in existence for 13 years and has successfully graduated nearly 500 participants. However, recent participant surveys show a slight decrease in the level of satisfaction with the program. In response to these numbers, additional opportunities have been developed for female students to become involved in networking mentoring programs. Such opportunities are vital to student success as research has shown that women who participate in the GMP are more likely to be retained in graduate programs over both men and women who did not participate.[1] Hence, a departmental-based Mentoring Program was implemented in Fall 2007.

Departmental-based Mentoring Groups affords students the opportunity to structure a program that is discipline specific and addresses the needs of their cohort. Groups are strongly encouraged to invite female faculty to their meetings which provides the students, especially those with male advisors, an opportunity to interact the female faculty in their departments. This is a vital component to the departmental-based Mentoring Group as research shows that mentors often associate better with mentees that are similar to themselves in terms of gender, race, and social class.[6] Departmental-based Mentoring Groups also address the number one reason GMP participants are unable to attend the GMP monthly meetings, time conflicts. By having a departmental-based group, they are able to set a time that is convenient for the majority of their students.

By expanding the number and style of networking mentoring opportunities available to the female engineering graduate students, several successful outcomes are achieved: more students are being reached, students are choosing to participate in the type of program that best suits their needs, and students who need more frequent mentoring take the opportunity to interact with other members a minimum of once each week.

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Appendix

Purdue University Women in Engineering
Graduate Mentoring Program
Monthly Meeting Evaluation

I am a: _____ Ph.D. student
_____ Master's student with more than 1 year in my degree program
_____ First year Master's student
_____ Guest / Speaker / Faculty (please circle the appropriate designation)

1. Three important benefits of mentoring are support, affirmation, and strategy development. Let us know how beneficial today's program was in meeting each of these three needs for you. (Circle one NUMBER per line)

   (1) Support: Helps you keep trying in good and bad times.

   Non-Supportive 1 2 3 4 5 Supportive

   (2) Affirmation: Makes you feel good about being in graduate school; increases self-confidence.

   Non-Affirming 1 2 3 4 5 Affirming

   (3) Strategies: Helps you learn skills that benefit you in your life and career.

   Non-Strategic 1 2 3 4 5 Strategic

2. What did you like most about tonight's meeting?

3. What did you like least about tonight's meeting?

4. Please offer any other comments or suggestions.

Thank you for taking the time to provide us with your feedback!