

ESTABLISHING PEER GROUPS: AN EFFECTIVE APPROACH TO RETAIN FIRST YEAR WOMEN IN ENGINEERING

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Peer groups have proved to be a popular and effective tool for retention of first year women in engineering at Purdue University for the past six years. Student development research consistently identifies two factors as critical for student success: the college peer group and the extent of a student's involvement in activities. Based on a sample of 24,847 freshmen, Astin (1993) concluded that "the single most important environmental influence on student development is the peer group. By judicious and imaginative use of peer groups, any college or university can substantially strengthen its impact on student learning and personal development." Kuh et al. (1991) state: "The research is unequivocal: students who are actively involved in both academic and out-of-class activities gain more from the college experience than those who are not so involved." The experience of being involved leads to a sense of belonging, of fitting in, and determines student satisfaction, hence, retention in a particular discipline.

Based on such research, the reasons for including the small group experience in Purdue's Women in Engineering Programs (WIEP) are threefold:

- to provide a structure which promotes relationships among peers with similar goals;
- to prepare an informed, trustworthy group leader who can provide information on and support for both academic questions and other concerns of first year students;
- to help first year students understand the importance of getting involved and to facilitate this process through their participation in peer groups.

ENGR 194, the Women in Engineering Seminar, is a major component of the WIEP's holistic retention strategy. It is a one credit elective chosen by 45-55% of first year women students in engineering. There is a one hour lecture component each week which features dynamic, inspiring women engineering alumnae. However, peers in an intimate, single-gender, small group setting can be even more influential. The lecture portion often provides the seminal matter for discussion in the small groups.

RECRUITING AND INTERVIEWING POTENTIAL GROUP LEADERS

The WIE seminar is offered each fall semester. In the preceding spring semester junior or senior women students are hired as group leaders. The publicity, recruiting, and interviewing are undertaken mid-March and early April, and the offers of employment along with the group assignments are sent out in late April. Because spring semester ends in early May, this process ensures that everyone is on board the leadership team and aware of their responsibilities and the training schedule before leaving campus for the summer.

IMPACTING CHANGE THROUGH COLLABORATION

1997 WEPAN/NAMEPA CONFERENCE

Publicity

The first step in recruiting group leaders is to devise a flyer advertising this unique opportunity. The flyers should contain the following information: the experience is a means of developing leadership skills; it provides a way to be of service to fellow students; it is a paid position for juniors and seniors; and interested students need to set up a half an hour interview. Prospective group leaders are reminded to bring their resumes and fall semester course schedules. Flyers are distributed during a meeting of Society of Women Engineers officers, directors, and chairs and during a chapter meeting of Phi Sigma Rho, a social sorority for engineering and technology students. As a rule, almost twice the number of students than are needed apply. (Often there are volunteers for these positions before they are advertised. These are students who enjoyed the experience as group members in their first year and are now eager to be leaders).

Interviews

A minimum of 30 minutes is scheduled for each candidate. Many questions are asked to gauge a student's commitment and natural predisposition for group leadership. Some examples of the questions: What do the words *group leader/mentor* imply for you? What experiences from your past will help you be an effective leader?

It is important that the student understands the responsibilities and tasks she will be facing and that she truly understands the *time* needed for this commitment—usually an average of five hours per week (beyond the initial training)—so that groups can truly be enjoyable.

Leader Qualities

The character, or what group work theorists call the personhood, of a small group leader is critical for group success. Choosing a “natural” group leader is essential since there is limited time to develop leadership skills. Two of the most important characteristics are motivation and resiliency. A high degree of motivation is needed to ensure the commitment of time and energy required for leading small groups. Invariably during the course of the semester, a group leader will have periods where pressures from engineering classes and other extra-curricular activities take a toll. It is here that judicious selection of “the right person” (one who is motivated to stay on course and keep up with her responsibilities) really pays off. Resiliency can be defined as the capacity for recovering from pressure or shock unchanged or undamaged. Resiliency is needed on the part of the leader for handling her own pressures and those that may develop in group. Resiliency is also needed for handling an unexpected and sometimes uncomfortable topic raised by a group member. Finally, in making the selection of group leaders, it is useful to have as many of the engineering disciplines as possible represented by the leaders so that they can rely on one another for a broad range of information.

TRAINING FOR GROUP LEADERS

An initial training session of two hours is held for all group leaders on the weekend before classes begin. The schedule includes the following:

Overview & Getting Acquainted

This first step simply refers to presenting the agenda for the training session and going through a few energizing ice-breakers.

Group Format & Structure

Group format covers physical setting. Groups are scheduled in small classrooms and sitting in a circle is the norm. One of the essential things to convey to the leaders is the need for balance between encouraging an open or a structured group. Structure in groups refers to relying on consistent procedures and relying on topics and activities which have been prepared in advance. Procedural structure is essential in every group particularly in opening and closing the sessions. Group leaders are asked to start with a “go-around” (everyone in the group is given a chance to respond) on topics such as how the weekend or week went or if there are any particular questions. For closing, a “go-around” asking members how the group went and a summary of the group discussion by the leader are recommended. Structure is more important in the beginning stages of groups, that is to say, until both leader and group members feel more at ease with the process. Group leaders need to understand that it is essential to be open to any issue which is brought up. Meeting the needs of students is paramount. Experience indicates that engineering student leaders and members more often exhibit greater comfort with a structured agenda, therefore leaders need to be reminded to maintain this balance throughout the semester.

Group Processes--Stages & Skills

Since the leaders meet weekly as a group themselves, it is sufficient in the initial training to present just a brief overview (with handouts) of the stages in group development and the basic skills for group leaders. During the initial training, it is important to focus on the beginning stage of the group, which is often punctuated by silences or other awkward moments. This helps leaders understand that such moments are normative and are not due to lack of experience. It is also important to let them know what can be expected in the termination stage of their groups. As a rule, few people are adept at dealing with impending loss or bringing closure to relationships. In fact, some groups decide to continue on an informal basis for the following semester. It is beneficial for the group leaders to see this experience as a process which has a beginning and an end. This approach prepares them to be patient and not to expect a close knit, cohesive group at the beginning. Trust takes time—often a lot of time—to establish.

The more basic of the interpersonal skills required for small group work are covered at this time, such as active listening skills, facilitating participation by all members, asking open-ended questions, strategies for dealing with potential problem members, using silence, providing feedback, and use of referrals and resources.

Guidelines for First Group Session

The first session has a special role and consequences in group work. In it the tone is set and ground rules established. It is best to follow a discussion of its pivotal role with the leaders doing some role-playing. The discussion part includes the following topics:

- Importance of preparing group members (includes importance of their free choice and informed consent in taking this course)
- Ground rules (attendance, punctuality, respect for individual rights & responsibilities)
- Confidentiality (what is said in group stays in group)
- Setting goals and establishing the commitment of group members.

The centrality of goals is a given in group work, but theory is not often put into practice. As Peg Carroll (1990) notes, “Although defining goals would seem to be a rather simple

task for those who do group work, it is not. And clearly defined, timely goals are imperative for group members and leaders alike.” Establishing goals has two functions. It expedites members taking ownership of their group and it is a means of evaluation. Measuring objectives in terms of goals that were attained provides one convenient scale of success. Hence, during the training session, leaders are asked what personal goals they have for themselves in group and what goals they envision for their group members.

Role-Playing & Feedback

Role-Playing and Feedback are often the most popular parts of training. Depending on their number, the leaders are divided into two or three groups and asked to pretend it is their first session with the first year students. To make leaders more comfortable with the role-playing, they are given an outline of the guidelines for the first session. They initiate some creative and humorous ice-breakers. They take turns practicing and become comfortable by observing each others’ hesitant beginnings. It often happens that the students who are repeat group leaders relish their role and strive mightily to act the part of potential problem members. Group leaders are instructed to provide positive and constructive feedback and always do so in a caring manner. By the time the initial training session is over they are more confident and eager to meet their own groups.

Administrative Details & Closing

Among the mundane items that need to be covered are ascertaining that everyone has an updated list of leaders with the various types of addresses (campus mail, e-mail, etc.), and with meeting times and rooms of each group. The forms for Purdue employment are passed out and described as well as the procedure for time cards and payment. Before closing, another “go-around” provides each member with the opportunity to voice her expectations or concerns for the coming semester. Light snacks at the conclusion of the training session encourage informal conversation among group leaders.

GROUPS IN ACTION: WEEKLY MEETINGS-DAILY PROBLEMS

In addition to the initial training session, group leaders meet weekly in a session with one another and their supervisor. (For twelve leaders, two groups of six each are scheduled on a weekly basis.) The purpose here is twofold: learning by sharing information and learning by experiencing. They share concerns, seek advice, and counsel each other by trading tips on what is working especially well in their groups. They also advise each other on where to get information for questions that may have arisen in group. Just as useful and even more exciting is the learning by experience. They themselves experience the processes and stages wherein groups develop. They too are initially more reserved, they too can suffer setbacks in trust, endure moments of silence, and watch the group leader/supervisor deal with shy or monopolizing members in their group. They learn to be patient with the process; they learn that there can be several effective solutions to dealing with a group problem; they learn to deal with the unexpected. All the while they are assimilating real-life skills, greatly needed by engineers. The need for engineers to be able to function in the types of settings just described is gaining greater recognition. Lih (1997) states, “To become leaders, engineers need to be able to handle complexity along with simplicity; uncertainty as well as precision; flexibility in addition to efficiency; problem formulation as well as problem solving; individual work and teamwork.” Group work, fortunately, exposes our students to all this and more.

A monthly supervision session between each group leader and the supervisor provides time for the student leader to analyze the group experience and to work through any

unresolved issues. She is encouraged to see the groups in terms of a process and as a whole. During this session the student leader is asked to identify stages and issues in each group and to make comparisons between her two groups. She is also encouraged to discuss concerns that were not covered in the leaders' group because of lack of time. Finally, this session presents the supervisor with an opportunity to make sure that the individual leader is satisfied with her efforts and to thank and praise her.

EVALUATION

Several different evaluative techniques are used each semester to assess the small groups' effectiveness in meeting course goals, to identify areas of potential improvement and to determine the effect of the course on the retention of women in engineering. The goals for the small groups are:

- to provide a structure which promotes relationships among peers with similar goals;
- to prepare an informed, trustworthy group leader who can provide information on and support for both academic questions and other concerns of first year students;
- to help first year students understand the importance of getting involved and to facilitate this process through their participation in peer groups.

Survey Results

At the last class meeting of the semester, students are asked to complete a fairly extensive survey. Student responses to items indicate their level of agreement with various statements. Almost 90% of the students "agree" or "strongly agree" with every statement on the survey (e.g. "I enjoyed the group" [92.4%], "I felt my opinions were respected" [91.7%] and "The group experience was beneficial to me" [88.5%]). In addition to the structured items, students respond very positively to open ended items requesting their comments: "I thought my group was excellent. We...plan to continue meeting next semester."; "It was nice to have that sort of contact after coming from a small high school"; and "(The small group) helps me relieve my stress and settle my problems."

Journal Entries

Any student may keep a journal to fulfill the writing option for the course. Students are asked to share their feelings about the class, engineering and Purdue on a weekly basis in the journal. Their entries often indicate how various course goals are being met: "The (group leaders) honestly understand our fears and anxieties"; "I loved being able to exhaust all my frustrations and know that I was not the only one experiencing the feeling"; and "the group was diversified so we all had different views to share".

Feedback to Group Leaders

Each student is asked to give written comments as feedback to her group leader. Again, these comments often provide good measures of the effectiveness of the small group: "You made the group feel welcome and relaxed."; "You made the experience of getting into college mode from high school mode easier"; and "thank-you for understanding and letting us feel free to discuss whatever we needed to."

Retention Statistics

Summative evaluation using data provided by the university Registrar indicates the positive effect of the course on retention. In the first three years after adding the small group component, statistics indicated an increase in retention from freshman to junior year

of 3-9% for the students in the course compared to those who had not taken the course. For the last two years such differences were small because other retention activities are available to students who do not take the course. Also, since each student in the small group portion of the course is also in the lecture portion, it is impossible to attribute differences in retention to the small groups only.

Evaluation from Group Leaders

Each semester several measures are used to determine if the selection and training of group leaders is effective. In addition to the student input, the leaders themselves complete survey instruments and provide open ended comments to the course instructor. Although space prohibits the results from being shared in this paper, these measures indicate that the selection and training processes are effective.

SUMMARY

Peer groups can be a successful component of a comprehensive retention program. They work especially well as an adjunct to a lecture series whereby they provide a forum for assimilating and personalizing the information that is presented weekly. Group work is both a powerful and efficient method of mentoring. Small groups offer women engineering students a supportive environment, furnish answers to the many questions students have during the transition from high school to college, and start them off thinking and working in teams. At the same time, the small groups provide the opportunity for upperclass students to have a rewarding experience and develop team building. Various measures of effectiveness have shown evidence that the course is meeting stated goals and that there is an effect on retention of first year women in engineering.

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