

SMALL GROUPS FOR STUDENTS IN ENGINEERING: THE MANUAL

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INTRODUCTION

The Women in Engineering Seminar (ENGR 194) is the cornerstone of Purdue's Women in Engineering Program retention activities. It is an optional one-credit course offered during the fall semester. In the past ten years, enrollment in the seminar has ranged from 150 to 200 first year women engineering students. The seminar has two components. Students meet weekly, in one of two divisions, for the presentations given by practicing women engineers, dual career couples, student panelists, and other speakers. Each ENGR 194 student also is placed in a weekly small group of six to ten freshmen led by a senior female engineering student. In the small groups, students gain information and support from the group leader as well as through peer interaction. Group work is an enjoyable and efficient method of mentoring and an effective strategy for retention. It strengthens the academic, personal, and social development of women engineering students. Annual evaluations as well as results from mid-semester surveys, journal entries, and feedback to group leaders confirm the positive effects of this comprehensive retention strategy.

BENEFITS OF SMALL GROUP APPROACH

First year students need knowledge and support in a conducive setting for successful integration into college. They need practical knowledge about engineering careers; they also need knowledge about extra-curricular activities and reminders that involvement in organizations is an important part of college. Knowledge also and obviously entails having adequate academic preparation and skills.

Support can be provided by caring professors, advisors, and friends. Friends are of particular importance. Research has confirmed that peer influence is a critical factor in college¹. Finally, it is necessary that freshmen feel comfortable at the university they have chosen. Feeling that they fit in, that they belong occurs at various levels and places in the university community. The small group format provides a congenial and conducive setting in which students can find comfort and a sense of belonging.

Moreover, the special dynamics of the group process yield the challenges that are often a hallmark of a successful freshmen year. It is critical for first year students not only to learn what engineering is all about but also to identify with engineering and to begin to see themselves as engineers. In an article about proven strategies for the transition to college, Brower has stated: "Helping students develop future selves [self-image] as engineers may happen best through routine interactions with like-minded peers and faculty mentors, and through learning as much as possible about the day-to-day lives of real engineers: joining engineering societies, doing internships, doing class projects that force the student to come in contact with real engineers to see what their day-to-day life is like."² Our students receive this in the seminar and in the small peer groups.

SMALL GROUP LEADERS

Group leaders do great things. They provide "down to earth" explanations of their engineering major and their career plans. They provide motivation and inspiration by talking about why they chose engineering and why their particular area suits them. Group leaders also promote connections among their peer group members and motivation for involvement in student organizations by discussing the leadership roles they have held. They help with the immediate tasks students face in their freshman year; indeed, they help with whatever needs or concerns are expressed in group. Finally, they are instrumental in helping shape a beginning student's engineering identity. They facilitate discussion of who am I, where am I going, and how can I get there by telling their own stories. As they do so, they too become beneficiaries of the developmental journey. Through group sharing both members and leaders are strengthened in their resolve to complete that engineering degree.

There is no question that the group leaders learn as much about themselves as they do about their group members by such consistent weekly interacting with the freshmen. They try to inspire, to teach and to energize. And it all comes back to them in terms of the enthusiasm, curiosity, and positive attitudes—and eventually strong affection—that they receive from their first year women engineering group members.

FOCUS OF MANUAL

The writing of the manual *Small Groups for Students in Engineering*³ was prompted by the need to systematize the group leader training process. This manual was funded by a grant from the Engineering Information Foundation. It was written for the group leaders and, hence, is intended to appeal to them in its style and substance. It takes a holistic perspective and covers topics that are deemed essential for the personal and academic development of a college student. These topics are the mainstay of many a "student survival" guidebook⁴. However, the manual is unique in two ways. It includes training and experience of small group dynamics and discussion of student developmental goals. This interdisciplinary has proved to be very valuable both for group leaders and for group members. The systematic focus on group or team work supplements the skills which

group leaders have attained in student organizations. Practical training in group work prepares them for the team based approaches they will be encountering on the job after graduation. The student developmental approach increases their self-knowledge and gives them a framework for the tasks facing the first year students and for reviewing their own passage and progress in college.

CONTENTS OF MANUAL

- **Chapter one** explains the rationale for forming groups. It discusses the essentials of creating a safe place, having regular group sessions, and being a trustworthy leader.
- **Chapter two** makes clear what is critical for the very first meeting by emphasizing confidentiality, clarifying expectations and constructing group norms, assessing needs and starting on group goals.
- **Chapter three** covers certain skills, interventions and practices for effective group dynamics such as positive reinforcement and constructive feedback and explains the basic stages in group process.
- **Chapter four** summarizes effective integration into the university community by reviewing academic skills, campus resources and student services; discusses that *sine qua non* of student success--getting involved in organizations; and highlights the major tasks of college student development.
- **Chapter five** deals with helping first year students choose an engineering major and just as importantly addresses living with uncertainty.
- **Appendices** include sample forms of student needs assessment, mid-term and final evaluations for students and for group leaders.
- **Exercises/assignments** at the end of each chapter present ideas for conducting productive and lively small group sessions.
- **Topics and Things To Do** lists sample topics to talk about and possible things to do on campus which have proved beneficial for group leaders and members alike.

IMPACT AND CONCLUSION

In a recent study of science, math, and engineering (S.M.E.) majors, Seymour and Hewitt highlight the similarities and differences between the students who stayed in their majors and those who switched to other fields⁵. They point out that “survivors” and “switchers” of S.M.E. majors shared a “similar array of abilities, motivations and study-related behaviors.” Somewhat surprisingly, it seems that they also shared (to varying degrees) a similar “set of problems.” However, the science, math, and engineering majors who were survivors differed from the switchers in their “development of particular attitudes or coping strategies” which they relied on and used for persisting in S.M.E. fields of study. The students who stayed in these majors also differed from the students who left because of intervention “at a critical point in the student’s academic or personal life.” That is to say, in their time of need they had one or more people who responded to them with information and encouragement.

The small groups make possible these differences in students' lives by:

- Sharing strategies for coping and persisting
- By providing people who care and can intervene.

The manual makes clear that the group leaders' aim is to support and inform the group members; to challenge as well as to support; and finally to let go and let them do it! Group leaders gain confidence for these goals from the manual and from their weekly sessions. The manual helps to expand their repertoire of strategies and skills and confirms the wisdom of what they have learned through their own practical experience. The manual teaches leaders and member that attitudes are important; that at times perceptions are the only thing that can be controlled in a situation. Students learn to rely on each other and to become resilient. Students become more skilled at advising and informing, mentoring and caring for each other.

EVALUATIVE COMMENTS

Below are a few of the comments given in recent evaluations of the revised version of the *Small Groups for Students in Engineering* manual.

From a former group leader:

"I see the book's usefulness as trifold-

- a useful tool for group leaders in relating to their groups and planning the weekly meetings
- an insightful motivator for the leaders themselves as they look at their lives and college experiences more closely
- a reference to be used for the rest of their lives. "I know it has inspired and motivated me."

From an outside student reviewer:

"This is a great manual! The tone always engages the reader and poses questions requiring thought and reflection. There is an incredible amount of information provided in a clear format, but not so rigid as to stifle individual creativity and exploration. As a junior, I would find this manual very helpful in leading a group and I would have found the information very useful when I was a freshman. I really feel that this manual is not just related to engineering students, but can be applied to many group situations (especially the first few chapters) student and professional alike!"

From one of the first year group members:

"We had a wonderful group leader. We had open, honest discussions. The group was very supportive, and it was a relief to know that I wasn't the only one struggling in my classes. [M] was caring and went out of her way to provide us with special opportunities. Also, having people, women, other [engineering] majors was very helpful. The group was an encouragement to not give up when the classes begin to get hard. I wasn't going to take this class, but I'm really glad that I did. Thanks for everything..."

MOVING BEYOND INDIVIDUAL PROGRAMS TO SYSTEMIC CHANGE

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