

## STUDENT TEAM EXPERIENCES AT PURDUE UNIVERSITY

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### INTRODUCTION

Women engineering students entering the workplace today lack a set of experiences that come from participating in teams. [5] The undergraduate student experience seldom includes teamwork which nurtures leadership skills, gives experience in designing and researching programs, and also enhances oral and written communications [5,7]. Usually undergraduate studies consist of one-way learning directed from professor to student. Rarely does cross learning occur between students or in a student - professor relationship. [5] In addition, undergraduates are not regularly encouraged to work in a team situation like the one described above, except on rare occasions when a group project is assigned. Primarily focusing on independent work hinders women engineers when they start their professional careers, for, they are placed in group oriented departments with little or no team experience. [5] It is then that they realize their undergraduate education did not provide them with some necessary skills for surviving in today's workplace.

In order to address this problem, the theoretical models of Arnold [1] and Juran [3], which are related respectively to academic and professional settings, were studied. Arnold's research model was used to examine the quality of campus life for women and her work involved collaborative research on the part of students and student affairs practitioners. Juran's team model was related to the workplace setting. His participatory approach incorporated a flat team structure which meant that every team member was equally important in obtaining the team's goals and had defined roles and responsibilities. Further, the entire team was equally responsible for the team's successes and failures. The Sloan Team, comprised of 10 undergraduate women engineering students at Purdue University, is modeled after these two approaches.

Currently, it is not known whether team experiences have an impact on the leadership skills, academic life, personal experiences or professional careers of women engineering students. We do know that intervention efforts can

provide needed personal support for undergraduate students. [2] Programs and/or team experiences are *thought* to nurture individual leadership skills and it is *assumed* that they present opportunities for students to begin to form networks in an academic atmosphere. Social relationships formed in network groups are *believed* to increase the retention rate of engineering students. Also, team experiences are *considered* to be a valuable part of a student's professional career. In a recent survey titled "What Your Boss Values Most," 125 executives working in human resources ranked "team player" as most important. [4] Professionals *think* that if students are exposed to teams and/or programs in an educational institution, then, graduates would have already gained essential group skills. Further, training prior to entering the workplace would benefit not only undergraduate students, but academia and industries as well.

What we lack is data regarding the impact of team experiences on women engineering students. Therefore, this paper addresses the following questions:

1. Do team experiences influence the leadership skills of women engineering students?
2. Do team experiences influence the academic lives of women engineering students?
3. Do team experiences influence the personal experiences of women engineering students?
4. Do team experiences influence the professional careers of women engineering students?

### METHOD

The theoretical models mentioned above, in conjunction with materials from Joiner Associates Inc. [6], were used as reference points when considering Sloan Team members, setting, meetings, programs and roles, also evaluations.

#### Members

The first Sloan Team consisted of six women engineering students. As initial members of the team graduated, it became necessary to replace them. New team members were chosen through nominations by the Quality Advisor, Team Leader or general team members. Nominees were interviewed to determine level of enthusiasm, outside activities and personal strengths. Interest in programs worked on and time availability were likewise examined. After input from general team members, the Quality Advisor and Team Leader made final decisions on new team members. The current 1992-1993 Sloan Team has ten women engineering students.

### Setting and Meetings

Each week team members gather in the Civil Engineering Building around a large conference table for meetings. Team members are assigned to different meeting roles by the Team Leader. The roles include that of meeting facilitator, warm-up person, and multiple reporters. The meeting facilitator is selected in a "round robin" fashion and she follows the agenda which covers necessary topics and current concerns. The person in charge of warm-up creates an experience that helps people transition from pre-meeting events to the meeting itself. Reporters give accounts of what is happening with their program activities. Discussions are informal and involve not only those reporting, but everyone present at the meeting. Smaller weekly meetings are held for groups working on program activities. These gatherings are in a smaller room which creates a more intimate atmosphere, and, they are led by the Quality Advisor and actively participated in by the entire group. The time is used to plan program activities and reach consensus on program and personal concerns.

### Programs and Roles

Five Sloan Team members work on the Personal Connection Program (PCP). Furthermore, this group is divided into programmers and evaluators. The programmers are responsible for creating, devising and gathering materials and finally executing this pre-college activity. The evaluators have separate responsibilities for matching participants, coding data, analyzing and then interpreting results of returned evaluation forms. The PCP members have developed a close rapport as they have labored together for the recruitment of women engineering students.

The remaining five Sloan Team members are assigned to the Mentees and Mentors Program (M&M). As with the PCP group, the M&M group can be broken down into programmers and evaluators. Programmers organize the agenda, food, and materials for monthly college activities. Evaluators assess each program event, tabulate results and devise a summative survey. Tasks for the M&M group are rotated between team members, therefore, individuals become aware of and sensitive to all program responsibilities. The M&M members have worked very hard to increase the retention of women engineering students.

### Evaluations

Both quantitative and qualitative evaluations related to the Sloan Team were constructed in order to measure the effect of student team experiences on members. Quantitative measurement was done through a six page survey administered at the beginning and end of the semester to team members. Qualitative results were acquired through personal statements written by team members. Findings from these evaluations make it possible to assess the impact of Sloan Team experiences on the leadership skills, academic life, personal experiences and professional careers of members.

## QUANTITATIVE RESULTS

The pre-survey, administered at the start of the spring semester, asked members to reflect on the state of their leadership skills before they joined the Sloan Team. The post-survey, administered at semester end, asked members to note the impact of the student team experience on not only their leadership skills, but also, their academic life, personal experiences and professional careers. The following is a summary of results from pre and post surveys.

### Leadership Skills

The leadership skills category of the survey can be further broken down into three sub-areas, knowledge, studies, and actions. Team members circled a number from 1 (none) to 5 (extensive) for knowledge they have concerning women in engineering (WIE) programs, for studies they have conducted on WIE recruitment or retention activities, and for actions they have taken regarding WIE pre-college or college efforts. Numerical responses for all members were added and mean scores obtained for the team on pre and post surveys. Results are shown below in Table 1.

Table 1. Leadership Skills.

Leadership Skills	Knowledge	Studies	Actions
Pre-survey	2.1	1.6	1.8
Post-survey	4.4	3.1	4.1

The post-survey also included main and follow-up questions concerning the academic, personal, and professional lives of Sloan Team members. For example, one main question on the survey asked, "Do you think your experiences on the Sloan Team have affected your present campus life?" Members responded to main questions by circling a number from 1 (strongly disagree) to 5 (strongly agree). The above item was then followed up with the question "If being on the Sloan Team has affected your present campus life, has the effect been...?" Responses to the follow-up questions were made on a scale from 1 (very negative) to 5 (very positive).

### Academic Life

Academic life is divided into two areas, academic work and non academic involvement (e.g. participation in student organizations). Like leadership skills, results in this category were analyzed using team averages (see Table 2).

Table 2. Academic Work and Non-Academic Involvements

Academic		Non academic	
<u>Agree</u>	<u>Affect</u>	<u>Agree</u>	<u>Affect</u>
3.9	3.7	4.4	4.4

### Personal Experiences

The affect of the Sloan team experience on the personal lives of team members was the next area to be evaluated. One illustration of a main question was, "Do you think your experiences on the Sloan Team have affected your personal life?" An example of a follow-up question was, "If being on the Sloan team has affected your personal life, has the effect been...?" The sub-area's in this category include social relationships, personal support, and self confidence. Results of mean scores for the team are shown in Table 3.

Table 3. Personal Experiences

Social Relationships		Personal Support		Self Confidence	
<u>Agree</u>	<u>Affect</u>	<u>Agree</u>	<u>Affect</u>	<u>Agree</u>	<u>Affect</u>
4.1	4.1	4.3	4.3	4.2	4.3

### Professional Careers

Finally, the affect of the Sloan team experience on team members' professional lives was evaluated. One main question asked, "Do you think your experiences as a Sloan Team member will influence your professional life?" The follow-up question inquired, "If your Sloan Team experiences will influence your professional life, will the effect be..." The sub-area's in this category are interviewing, securing a career position, and performing in that career position. Table 4 illustrates mean scores for team responses in this category.

Table 4. Professional Careers

Interviewing		Securing		Performing	
<u>Agree</u>	<u>Affect</u>	<u>Agree</u>	<u>Affect</u>	<u>Agree</u>	<u>Affect</u>
4.2	4.3	3.9	3.9	4.1	4.3

## DISCUSSION OF QUANTITATIVE RESULTS

### Leadership Skills

The leadership skills of women engineering students were affected by their involvement's on the Sloan Team. There were increases in knowledge, studies and actions from pre to post surveys with the greatest growth occurring in knowledge and actions. Changes in leadership skills can be attributed to the enormous amount of time and effort that team members put into forming, processing and evaluating program activities.

### Academic Life

Involvement on the student team had a positive affect on both the academic work and non-academic involvement's of members. Specifically, there was a greater positive affect on non-academic or extra-curricular activities, a place where leadership skills are very much needed. Opportunities to practice

oral and written communication and to facilitate group meetings expand the people skills of team members.

### Personal Experiences

The personal lives of members were positively influenced by their involvement's on the Sloan Team. Students agreed that social relationships, personal support and self confidence had been affected and that the affect was positive. Apparently, learning the art of compromise, cooperating in an activity, and being affirmed by other women translates into increased awareness, greater encouragement and heightened self esteem.

### Professional Careers

Finally, the affect of the Sloan Team experience on job interviewing, securing a career position and performing in a professional career were evaluated. Members agreed that their experiences on the Sloan Team had a positive affect in each of these three areas. The means for securing a position were slightly lower. This could be a reflection of current concerns about the job market. However, all three team members who graduated in May, 1993, have secured positions as professional women engineers.

## QUALITATIVE RESULTS

Qualitative evaluations consist of one page statements that were written by individual team members concerning the impact of the Sloan Team on their lives. Some comments from these personal statements are as follows:

- Being a member of the Sloan Team at Purdue University for the past year and a half has significantly strengthened my leadership skills. Joanne Faroh
- [The team experience] has helped me to develop my confidence as a leader. Andra Sewell
- My role as a team member has increased my awareness of the importance of oral and written communication. Tracy Richmond
- ...it has been the Sloan Team that has introduced me to undergraduate research. Wendy Valenzo
- Through our weekly meetings, we became more than a research team, we became a close knit support group. Heather Hoekstra
- ...my leadership skills have been developed and refined to a level which I believe will make me much more marketable as a senior in the midst of my job search. Wendy Valenzo
- Becoming part of the Sloan Team has been one of the most unique and rewarding experiences of my college life. Joanne Faroh

## DISCUSSION OF QUALITATIVE RESULTS

Qualitative results are like our quantitative findings in that the leadership skills, personal support networks and professional careers of group members have been enhanced through student team experiences. Further, communication skills and research experiences of members have been affected through their involvements in women in engineering program activities. Finally, it is important to note that there has been a 100% retention rate for members of the Sloan Team who are women students in the various Schools of Engineering at Purdue University.

## CONCLUSIONS

Reflecting on the four original questions, we found that team experiences positively influenced the leadership skills, academic life, personal experiences and professional careers of women engineering students. Within these four major categories, some effects had greater intensity than other effects. In the leadership category, there were notable gains in knowledge and actions of team members. When considering the academic category, students definitely agreed that skills developed through team experiences had "carried over" into non-academic involvement's. Students also concurred that two areas under the personal category, support and confidence, were strengthened through team membership. Lastly, women engineering students agreed that team experiences positively affected their interviewing and performing in professional careers.

## REFERENCES

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