

# Developing strategies to improve women's active participation in engineering student group project teams

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## Need

This project addresses the potential problem of female engineering undergraduates having fewer opportunities to develop a positive sense of self-efficacy. This problem arises as a result of male students disproportionately taking on more active and technical roles in group project presentations.

Team Composition	Analysis Categories	Teams	Women	Men
All Women		6	26	-
Solo Men	Female	19	70	19
Two Men	Dominated	31	95	62
Gender Equal	Gender Equal	40	85	85
Two Women	Male	73	146	227
Solo Women	Dominated	132	132	480
All Men		155	-	682
<b>Totals</b>		<b>421</b>	<b>469</b>	<b>1470</b>

Table 1. Targeted number of teams, men, and women by team composition in analyzed videotaped presentations recorded Fall 2008 through Fall 2011. Improvement of representation for members of female-dominated teams over pilot study data analysis.

## Approach

- 1) Evaluation of student roles in video-taped team oral presentations from first year engineering design course
- 2) Ancillary data pull for demographic and academic performance data
- 3) Administration of survey instrument immediately following final presentations to assess perceptions of performance, role selection and presence of gender bias – cross-evaluated with videotape analysis
- 4) Statistical analysis of (1) - (3) to quantify team composition and gender differences across variables.
- 5) Focus Group study to determine what role, if any, gender played in students' participation in group projects and their learning experiences
- 6) Development and testing of interventions to encourage equity in the distribution of roles in student team presentations



Figure 1. Sample screen shot of video capture system used for detailed analysis of team final oral presentations.

## Preliminary Results, Video Data (N = 738):

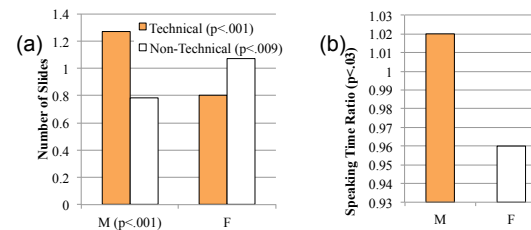


Figure 2. (a) Among men, more of their roles are technical than non-technical. Among women, there is no significant difference, although the means indicate more non-technical roles were adopted. (b) men talk for a longer than expected time compared to women, regardless of the group gender composition.

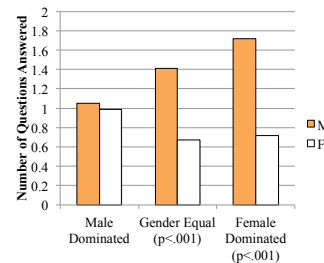


Figure 3. Men field more questions than women, except when participating in a male-dominated group. This includes a significant main effect of gender, qualified by a gender X group composition interaction,  $F(1, 731) = 6.66, p < .001$ .

## Preliminary Results, Survey Data (N = 222):

- o Men rated their performance and leadership higher in groups with more women.
- o Women rated their own performance as better in all-female groups than those in which the participant held solo status.

## Focus Group Study Results:

The focus group study consisted of 9 focus groups totaling 36 students who had completed both the engineering course and the group project presentation in a previous term.

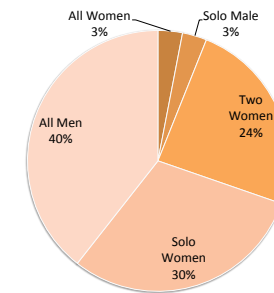


Figure 4. Distribution of 36 focus group participants across their previously experienced team compositions.

## Findings suggest:

- o Students strive for fairness in determining roles, but...
  - o Tech roles given to perceived "experts" (men)
  - o Roles conform to stereotype, but perceived as self-selected (not pressured into it)
- o Some reports of stereotyping in group dynamics
  - o Organizational roles typically fall to women ("secretary")
  - o Women tended to be seen as less competent by men
  - o Groups with only one woman reportedly did not work well ("she was quiet and did what she was told")
- o Students recognize that presenting the project/teaching others helps them master the material
- o Students recognize the importance of team member diversity
  - o Encourage mixed gender groups, discourage solo female/solo male groups
- o Students support a zero-tolerance policy on discrimination in their educational environments

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