Self-efficacy in Female and Male Undergraduate Engineering Students: Comparisons Among Four Institutions

Carol J. Burger, Virginia Tech
Joseph A. Raelin, Northeastern University
Rachelle M. Reisberg, Northeastern University
Margaret B. Bailey, Rochester Institute of Technology
David Whitman, University of Wyoming

PATHWAYS TO SELF-EFFICACY AND RETENTION OF WOMEN IN UNDERGRADUATE ENGINEERING

- Hypotheses
  - Self-efficacy is the principal predictor of retention of women in undergraduate engineering programs.
  - Formal co-op education and internships can predict women's retention directly and indirectly through their impact on self-efficacy.
  - Contextual support variables affect work, career, and academic self-efficacy as well as retention both directly and indirectly through self-efficacy.
  - Demographic variables have an independent effect on retention but also interact with contextual variables and with self-efficacy to indirectly affect retention

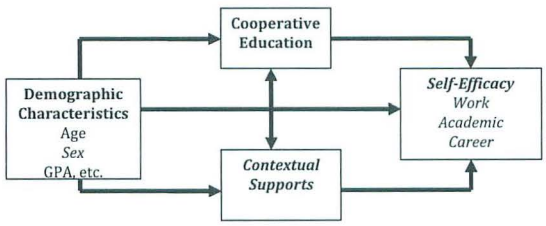
SELF-EFFICACY

- an individual's perceived level of competence or the degree to which an individual believes she is capable of completing a task.
- a dynamic trait that changes over time and can be influenced by experience.
- expectations are considered the primary cognitive determinant of whether or not an individual will attempt a given behavior

SELF-EFFICACY

- Academic: success in one's major
- Work: success in learning tasks, organizational processes, expectations
- Career: occupational information, self-assessment of future plans, problem solving

CONCEPTUAL FRAMEWORK



VARIABLE CLUSTERS

- Demographic variables: h.s. performance, SAT, GPA
- Formal work experience programs: co-op & internships
- Contextual supports: mentorships and advising
- Self-efficacy in 3 dimensions: work, academic, & career
- Principal dependent variable: retention

METHODS

- Survey administration: online, paper, in or outside of class

PRELIMINARY FINDINGS

Table 2
Significant Bivariate Gender Differences

	Academic Self-Efficacy	Career Self-Efficacy	Mentor-ship	Prof. Support	Friend Support	Friends Matter	Involve-ment
Males	**3.88***	3.67	3.98	3.54	4.25	4.19	3.60
Females	3.74	**3.74**	**4.24**	**3.75**	**4.49**	**4.43**	**3.78**
F-Ratio	5.60	2.42	2.23	6.07	12.51	14.60	4.57
Sig.	0.018	0.120	0.137	0.014	0.000	0.000	0.033

* Bold figures indicate higher value

CONCLUSIONS

- Women have lower academic self-efficacy
- Women take advantage of support mechanisms
  - Friends
  - Living/learning communities
  - Mentor
- Women believe they can succeed in an engineering career

NEXT STEPS

- Survey #2 administered 2009-10 AY
- Analyze surveys for effects of co-op and internship experiences
- Suggest the institutionalization of co-op programs?