



The Role of Socialization on Participation in Engineering-based Co-curricular Activities

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It is well known that participation in co-curricular activities during college is related to positive outcomes, including higher GPA, sense of belonging, engineering identity formation, and career aspirations. Several reports suggest that background characteristics, such as sex, ethnicity, and socioeconomic status, are significant predictors of such participation. Our hypothesis is that socialization, or the processes by which individuals acquire the knowledge, skills, and dispositions that make them more or less effective members of their society, also plays a role. If we were to better understand the how students decide to participate in co-curriculars, we may be then be able to design experiences that reach a wider diversity of students

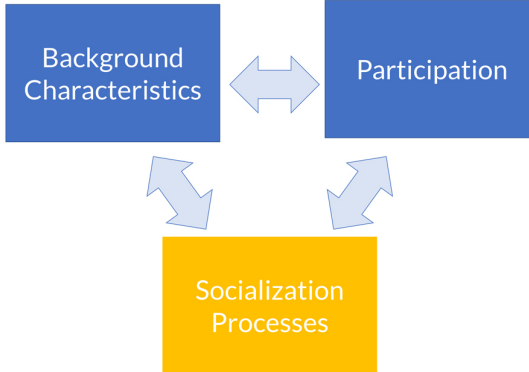
College Knowledge

	N (%)
University Engagement	
I attended a University-sponsored recruitment visit.	321 (37.3)
I spoke with a representative of the University.	265 (30.8)
I visited the University's campus.	696 (80.9)
Family Ties to the University	
I had family ties to the University (e.g., a family member that worked at the University).	88 (10.2)
I had a family member that graduated from the University.	275 (32.0)
High School College Prep	
I took Advanced Placement (AP) courses.	806 (93.7)
I spoke with a high school counselor about college.	618 (71.9)
I participated in a match, science, or engineering-focused club, organization, or camp.	492 (57.2)
College Course Taking	
I took college courses for credit (high school and/or college credit).	303 (35.2)
I took college courses non-credit.	74 (8.6)
Private College Prep	
I had a private tutor for high school classes.	53 (6.2)
I had a private tutor for SAT/ACT preparation.	135 (15.7)
I took SAT/ACT preparation courses (e.g., Kaplan, Princeton Review, etc.).	324 (37.7)
I used a college admissions or educational consultant.	123 (14.3)

Demographics

	Survey Sample (%) N = 860	Sampling Frame (%) N = 3,648
Sex		
Female	356 (41.4)	927 (25.6)
Male	504 (58.6)	2,691 (74.4)
Race/Ethnicity		
Asian/Asian American	253 (29.4)	900 (24.9)
White	571 (66.4)	2,471 (68.3)
Underrepresented minorities	85 (9.9)	353 (9.8)
Socioeconomic Indicators		
Low Income	118 (13.7)	503 (13.9)
High income	46 (5.4)	195 (5.4)
First Generation	106 (12.3)	525 (14.5)

In this work, we invited all third- and fourth-year domestic undergraduate engineering students to complete an online survey.



The survey instrument measured students' experiences with socialization processes adapted from the organizational behavior literature. (Jones, 1986; Ashford and Black, 1996). The factors that were most significant are listed below.

Socialization Processes Scales

	Description
Collective vs. Individual	Common learning experiences designed to standardized knowledge and behaviors
Feedback Seeking	Behaviors that allow new students to understand how they are being perceived by superiors and colleagues
General Socializing	Engagement with information social opportunities, helping new students adapt to institutional social norms
Networking	Active engagement with people outside of the college of engineering
Positive Framing	Recasting potentially challenging or discouraging experiences in a more optimizing light, promoting confidence and self-efficacy
Relationship Building	Efforts to form connections with more senior students.

Types of Participation

- 45% Identity Based organizations
 - Activities with an identity component (e.g. NSBE, SWE)
- 44% Design Teams:
 - Collaborative co-curricular project teams (e.g. Concrete Canoe, Solar Car)
- 40% Professional Societies
 - Student chapters of professional associations (e.g. American Society of Mechanical Eng., Tau Beta Pi)
- 33% Research
 - Worked on a research with a faculty member
- 15% College-Run Organizations
 - Official university-run activities (e.g. Peer Mentoring, Student Government)

Students were asked whether or not they were currently involved or had ever been involved in an engineering-related club or organization during college. Students who indicated that they had participated in such an organization were then asked to submit the names of no more than five engineering-related organizations, clubs, or activities for which they were most involved, followed by some additional questions about their participation in each listed organization.

Relationships to Participation

We constructed a series of logistic regression models regressed on variables related to Background Characteristics alone, another on variables related to Socialization Processes alone, and another on variables related to both, that contained each of the types of participation as outcomes. The shaded cells below indicate the model with the best fit. These results show that while some types of participation (in identity-based organizations and in research) have better fits only on Background Characteristics, the majority are related also to Socialization

	Background	Socialization	Both
Identity-Based	***	***	***
Design		***	*
Professional	***	***	***
Research	*		**
College	***	***	***

* indicates p < 0.05, ** indicates, p < 0.01, and *** indicates p < 0.001.

References

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Relationship between Background Characteristics and Socialization Processes

A series of linear regression models were constructed with each of the socialization processes as outcomes and background characteristics variables as predictors.



Speaking with a HS is associated with Collective tactics, General Socializing, and Positive Framing.



Visiting Campus is positively associated with Collective tactics, General Socializing, and Positive Framing, and negatively associated with Information Seeking and Relationship Building.



First Gen status is negatively associated with positive framing and Relationship Building.



Male sex is negatively related to general socializing behavior and positively related to relationship building with older students