Student Engagement in Ethics Education: Quantity and Quality

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1. Context

Engagement

- Variety of curricular and co-curricular experiences and the amount of time student spend on them (quantity)
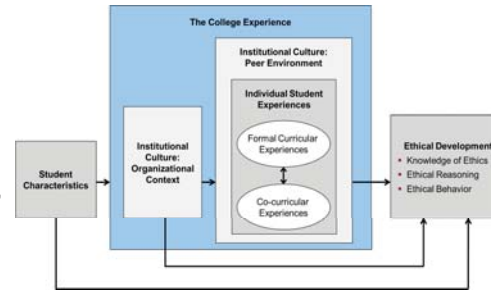- Level of involvement with those experiences (quality)

Engagement has been shown to improve outcomes including academic achievement, cognitive complexity, and **ethical development**

Research Questions

- *What is the quantity of curricular and co-curricular experiences related to ethics in which students are engaged?*
- *What is the quality of those experiences?*

2. Methods

Conceptual Framework

Data Collection

- 18 Partner institutions that vary by:
  - Size
  - Geography
  - Carnegie classification
  - Characteristics of student body
- Survey of 3,914 Undergraduate engineering students

Variables

Quantity: Participation in co-curricular activities; experience with ethics education in different settings and pedagogies

Quality: Serve as leader and participate in service; view ethics education as influential; cognitive depth of ethics education

3. Co-Curricular Quantity and Quality

	Participated occasionally or frequently	Acted as elected or appointed leader	Participated in volunteer service with group
Participated in at least one engineering-based co-curricular activity	76%	19%	46%
Average number of different types of engineering-based co-curricular activities per respondent	1.5	0.3	0.8
Participated in at least one non-engineering co-curricular activity	68%	25%	49%
Average number of different types of non-engineering co-curricular activities per respondent	1.6	0.4	0.9
Participated in at least one engineering or non-engineering co-curricular activity	88%	34%	65%
Average number of different types of engineering or non-engineering activities per respondent	3.1	0.7	1.7

- Almost all students participate in co-curriculars
- 1/3 are leaders, more than half participate in service
- Students have experiences in both engineering and non-engineering

4. Curricular Engagement Quantity and Quality

Pedagogy		Setting	
Presentation by professor	85%	Pre-college program	15%
Presentation by person speaking of own experiences	66%	Introductory engineering course	84%
Presentation by working engineer or guest speaker	59%	Out-of-class workshop	44%
Discussion with classmates	59%	Non-engineering course	44%
Movie or film	43%	Advanced engineering course (jrs/srs only)	29%
Skit	23%	Sr design/capstone course (jrs/srs only)	19%
In-class game	28%	Other	19%
Role-playing	40%		
Online modules	30%		

- Quantity of curricular experiences is high
- Curricular experiences spread among variety of pedagogies and settings
- Almost all students receive ethics education in introductory engineering classes
- Much ethics instruction occurring outside of engineering classes
- High cognitive depth is needed for most influential experience
- Fewer than half would rely on most influential experience when encountering engineering ethics dilemma in the future

Pedagogy of "most influential" experience		
	Presentation by a professor	36%
	Presentation by professional engineer	23%
	Presentation by guest speaker	14%
	Discussion with classmates	9%
	Movie or film	3%
	Skit	1%
	In-class game	1%
	Role-playing	5%
	Online modules	1%

Setting of "most influential" experience		
	Pre-college program	2%
	Introductory engineering course	51%
	Out-of-class workshop	15%
	Non-engineering course	8%
	Advanced engineering course (jrs/srs only)	26%
	Sr design/capstone course (jrs/srs only)	11%

Cognitive depth of "most influential" experience		
	Justify the decision you would make	47%
	Critically evaluate ethical decisions made by others	16%
	Identify relevant info needed to make ethical decision	10%
	Apply information learned to new ethical situations	6%
	Recognize ethical concerns faced by prof engineers	9%
	Remember facts presented through this activity	4%
	None of the above	9%
Would use experience more than half the time in future		**43%**

5. Suggestions for Educators

1. Incorporate students' co-curricular experiences into formal ethics education
2. Connect ethics education to students' inclination to engage in service through co-curricular activities
3. Provide opportunities for faculty to share ideas and strategies for teaching ethics
4. Help students connect non-engineering curricular ethics education to engineering context
5. Spread ethics education throughout the engineering curriculum
6. Emphasize how curricular ethics instruction connects to students' future professional ethical dilemmas