A Preliminary Analysis of Correlates of Engineering Persistence

Results from a Longitudinal Study

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Context

- Persistence in Engineering (PIE) survey
- Component of Academic Pathways Study (APS) of the CAEE
- Broaden understanding of development of engineering skills and identities
- Quantitative and qualitative approaches
- Longitudinal research base on engineering student learning
Core APS Research Questions

- Skills
- Identity
- Education
- Workplace

Full details of research questions:
Eris, Chen et al.
Proc of ASEE, Portland OR, 2005
PIE Survey

- intended to identify correlates of persistence in engineering
- administered to cohort of 160 students at four institutions
- longitudinally from first to senior year
- serves as basis for national survey (APPLES)
- preliminary data analysis from first 6 (of 7) administrations presented here
Survey constructs

- 26 survey constructs
- items constant, constructs evolving
- track item-total correlations and internal consistencies (alphas)

Full details of development process:

Eris, Chen et al.
Proc of ASEE, Portland OR, 2005
Some examples of constructs and items

1a. Academic Persistence
   Do you intend to complete a major in engineering?

3a. Confidence in Math and Science Skills
   Science ability
   Math ability
   Ability to apply math and science principles in solving real world problems

11a. Academic Disengagement (Liberal Arts Courses)
   Skipped non-engineering related class
   Turned in non-engineering related assignments late
   Came late to non-engineering related class
   Turned in non-engineering related assignments that did not reflect your best work

Please see Paper AC2007-2392 for full details and references.
Persisters and nonpersisters

- persister: continuing to major in engineering
- overall persistence rate of 76%
- females: 80%; males: 73%
- persistence rate at institutions 68-84%
Correlates of persistence

- compared construct scores for persisters and nonpersisters
- exploratory statistics (t-tests; p<0.05)
- normalized scale of 0-1 for constructs
Persistence and motivation

- Persisters report greater academic, professional persistence
- Persisters, nonpersisters are similar in motivation due to financial reason or social benefit
- Persisters more likely to be motivated by an academic mentor
Motivation (Family Influence)

Normalized score over Administration (academic years) for Nonpersisters and Persisters.
Importance of, and confidence in, skills

- Nonpersisters and persisters rate the importance of math and science skills similarly.
-Persisters rate the importance of interpersonal skills higher than nonpersisters.
-Persisters and nonpersisters are similarly confident in their interpersonal skills.
Confidence in Math and Science Skills

Normalized score

Nonpersisters

Persisters

Administration (academic years)
Academic engagement and experiences

- Nonpersisters report higher disengagement in both engineering and liberal arts courses
- Similar degrees of interaction and satisfaction with instructors
-Persisters report a higher degree of satisfaction with their overall academic experience
Some emerging ideas, and future work

- senior year dataset now available
- do full ANOVAs for time/subgroup effects
- break out gender, ethnicity, immigration status, institution
- incorporate information from transcripts
- early vs late persisters?
Acknowledgments

This material is based on work supported by the National Science Foundation under Grant No. ESI-0227558, which funds the Center for the Advancement of Engineering Education.

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