The Master's in Engineering Student: Does Industry Experience Change the Learner?

Elizabeth A. Gross, Diane Peters, Kettering University, Shanna R. Daly, University of Michigan

Abstract

This research is part of a multi-phase National Science Foundation grant to investigate these aspects of graduate engineering education:

- Is knowledge construction different for Direct Pathway students and Returners? If so, how?
- Do Returners and Direct Pathway students construct new knowledge differently?
- How do Returners handle forgotten knowledge?
- Is there a difference in Returners' and Direct Pathway students' mental models?

Definitions

Direct Pathway students went into their master's program directly or <5 years after undergraduate work.

Returner students had a 5-or-more year gap between their undergraduate degree and graduate enrollment.

Preliminary Questions

- Does work experience influence engineering self-efficacy?
- Is software self-efficacy the same for returners and direct pathway students?

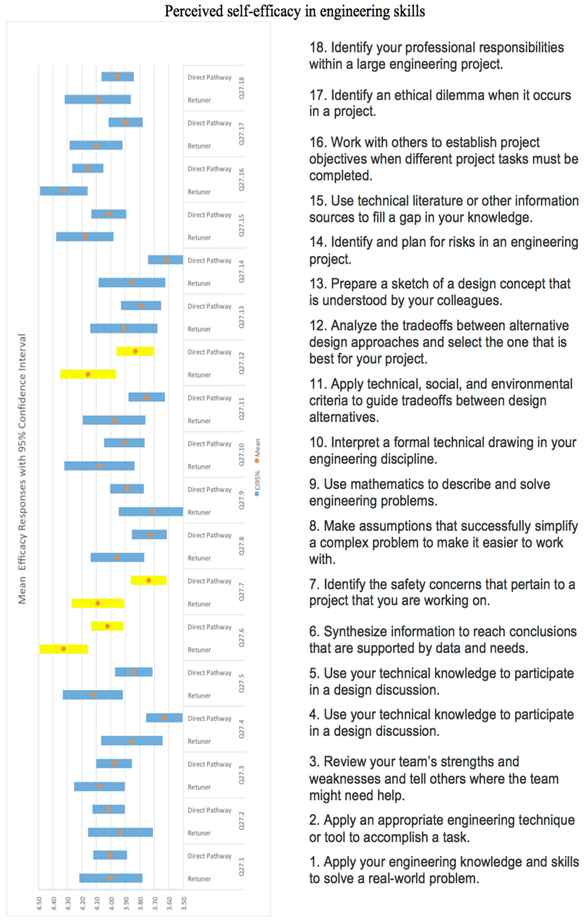
Participants

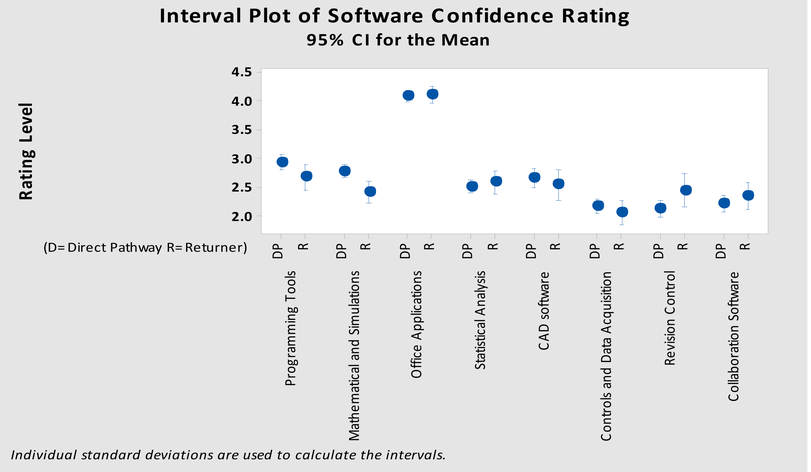
Direct Pathway	211
Returner	89
Median Age	25

Methods

- Phase One: comprehensive, anonymized survey and analysis (data was collected over a 4-month span).
- Survey distributed to 330 domestic master's in engineering students throughout the country.
  - Attempted to have equal numbers of Direct Pathway and Returner students
  - Students were all US citizens or permanent residents in the US

Results





Research Findings

Returner self-efficacy was higher in the following engineering skills:

- Analyze the tradeoffs between alternative design approaches and select the one that is best for your project.
- Identify the safety concerns that pertain to a project that you are working on.
- Synthesize information to reach conclusions that are supported by data and needs.

Software self-efficacy was consistent for both groups, but we did see a greater range of responses for Returners and Direct Pathway students, perhaps because Returners' experiences were more varied.

Future Research

- We're still looking at the data from the recently completed survey
- In preparation: face-to-face interviews to further explore mental models, along with tools such as
- Concept maps and concept inventories
- Other ways to parse knowledge construction in learners

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