

Alfred University psychology, engineering profs take on mystery of engineering students' academic success

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Professors Beth Johnson,
Danielle Gagne and Steve
Pilgrim

What personal psychological factors contribute to the success of an undergraduate engineering student? It's a bit of a mystery.

But three Alfred University professors — Steve Pilgrim in the Inamori School of Engineering, and Beth Johnson and Danielle Gagne in the College of Liberal Arts and Sciences -- have initiated research into the question. Their collaboration resulted in a scholarly paper that was recognized as one of five “Best of the Best” by the First Year Program Division of the American Society for Engineering Education, as part of the June 2017 National ASEE meeting. The work was praised in particular for the interdisciplinary nature of the research, as well as the scholarly rigor of the project.

"This represents one of the core missions of AU," Gagne says, "Our small size allows fruitful collaboration between schools, and allows us to maximize individual skill sets to pursue research questions outside 'normal' realms of investigation."

“Creating a Psychological Profile of Successful First-Year Engineering Students” employed three principal criteria in an effort to assemble a profile educators could use for purposes of attracting and retaining engineering students: The need for cognition (“broadly defined as one’s proclivity to engage in and enjoy complex cognitive activity”); locus of control (“the agent to whom one ascribes causal influences on outcomes” — internal vs. external); and attributional style (dimensions of self-motivation related to circumstantial controllability and stability).

The study surveyed approximately 270 undergraduate engineering students enrolled in the first-year seminar with an average age of 18.1 years. Each component of the three-part survey involved questions relating to each of the criteria, and a tentative hypothesis anticipated correlations, for example, between students with a high proclivity for cognitive activity and those students’ successful continuation in undergraduate engineering.

However, the authors note, they were surprised to learn only “small differences” emerged between students who remained engineers, students who transferred to other programs in the university and students who left the university. “(T)he study did not find evidence to support the hypothesis that the individual differences associated with academic success in general would predict success or failure in engineering.”

Their conclusion: Further research is called for.

“As we continue this line of research, we will continue investigating additional factors from which persistence in engineering can be predicted,” the authors write. If positive correlations can be found between certain psychological

features and undergraduate success in a rigorous program such as engineering, the findings could be valuable for educators& and administrators& efforts to recruit and retain successful students.

The positive value of that development, the authors conclude, would remain “uncontested.”