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Model Of Students' Success: Important Factors Of Student Persistence In Engineering

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Poster
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Abstract

Every year a group of quality graduates from high schools entered the engineering programs across this country, with remarkable academic record in terms of grade point average and standardized test scores. However, as reported in previous literatures, the substantial number of students switching out of engineering programs continues to be a major issue for most engineering institutions in United States. Studies have shown attrition in engineering programs as high as 50%, with a significant portion of this loss happened during or right after the first year.

Engineering students' cognitive data from high school and their non-cognitive self-beliefs can be influential factors affecting their academic success and retention decision. In order to effectively study the influences from these factors, a Model of Student Success (MSS) in engineering has been developed and modified through the past five years in a large Midwestern university. The eleven cognitive attributes in MSS include high school GPAs, standardized test scores, and the grades and number of semesters in math, science and English courses in high school. The non-cognitive variables were collected through Student Attitudinal Success Instrument (SASI). The first phase of SASI covered the following nine constructs: Leadership, Deep Learning, Surface Learning, Teamwork, Academic Self-efficacy, Motivation, Meta-cognition, Expectancy-value, and Major Decision. Later in 2007, five new constructs were added into SASI. These new constructs are: Goal Orientation, Implicit Beliefs, Intent to Persist, Social Climate and Self Worth.

Cognitive and non-cognitive data, as well as students' retention status after first year have been collected from the freshman cohorts of 2004-2009, with 1500 to 1700 entering students in each year. Several modeling methodologies have been applied to develop competing predictive models. These methods include neural networks, logistic regression, and structural equation modeling (SEM). These methods' strength and weakness were studied and compared.

To be presented in this poster:
1) The motivation for developing Model of Student Success (MSS) in engineering.
2) The structure of MSS, with various cognitive and non-cognitive factors as inputs, and different measures of student success as outcomes.
3) The most important cognitive and non-cognitive factors on student persistence/retention identified by different modeling methods.
4) A comparison of modeling methods for student retention in engineering.