

Out of the Box Snapshots

Relationship between Incoming Computer Science Students' Perceived Needs and their Academic Performance in Core Courses

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Purdue University's computer science (CS) core curriculum is designed to prepare CS students within the first two years to continue into their specializations. However, with increased course intensity, student success and persistence may decline. Prior studies have evaluated pre-enrollment variables such as SAT and ACT scores to predict student academic success. The primary objective of this study is to explore how incoming CS students' anticipated needs predict their success (GPA) in core courses.

This study analyzed students' prematriculation survey responses of anticipated needs, listed in Table 1, as potential predictors of students' core GPA. The survey garners a 98% completion rate, from which two years of CS responses were analyzed (n = 754). Exploratory factor analyses (EFA) and multiple regression analyses revealed trends highlighting which anticipated needs significantly predicted core curriculum GPA for the overall population and groups of interest.

As expected, results show that anticipating needs in math significantly predicts lower GPA for nearly all students. This effect is larger for females (-0.45 GPA) than males (-0.23 GPA); however, it is not significant for students who perform above average on SAT or ACT math tests. Additionally, anticipating needs in computer skills is a negative predictor for U.S. residents, particularly underrepresented minority students, but not for international students. This exploratory study provides useful insights into the relationship between students' envisaged needs and their academic success in CS. A similar analysis will be conducted for engineering students (n = 2,956).

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Research advisors Amy Dunford and Muhsin Menekse write: "This research stems from collaboration between the Office of Institutional Research, Assessment and Effectiveness (OIRAE), the academic advisors, and the School of Engineering Education. The goal is to explore predictive factors for student success in CS and Engineering majors and provide insights to academic advisors, so they can tailor support for incoming students."

Anticipated Need	Frequency of Need	EFA Factor	Proportion of Variance in GPA
Biology Chemistry Physics	54 82 98	1	0.090
Math	190	2	0.082
Reading Skills Writing Skills	93 227	3	0.069
Computer Skills Career Counseling Personal Counseling	110 236 72	4	0.061
Study Skills Organization Skills	275 206	5	0.046
Test Anxiety	102	N/A	N/A
Number of Students	754	Cumulative Prop. of Variance	0.348

Survey items of anticipated needs and the frequency with which they were selected; the EFA structure with proportion of variance in GPA explained.