

Stony Brook University The Graduate School

Doctoral Defense Announcement

Abstract

Community College Science and Mathematics Coursetaking and Performance and Their Relationship to Graduation, Transfer, and Science Persistence

By

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Student persistence and academic outcomes in STEM were examined for over 1,500 community college students in New York State. Three years of transcript data were collected for each of three cohorts who matriculated between 2011 and 2014. Data included coursework, grades, demographics, degree change patterns, and graduation/transfer status. In the first of three distinct yet related studies, descriptive statistics indicated that students who enrolled in science and mathematics coursework were more likely to graduate or transfer and completed more of their credits successfully than those who did not. Students who did not graduate or transfer earned lower GPAs and course completion rates. Binary logistic regression models revealed that for non-STEM majors, the rate of science/mathematics course completion, enrollment, and remediation coursework were significant predictors of graduation and transfer. In the second study, 32% of students received grades of D, F, or W in introductory chemistry with 49% changing their majors and 80% of those degree changers switching to non-STEM fields. Binary logistic regression models indicated that chemistry enrollment was a significant predictor of degree change to non-STEM disciplines. In the third study, students who first enrolled in developmental mathematics experienced a higher likelihood of STEM attrition, lower credit production rates, weaker science performance, and lower graduation/transfer rates. Students who qualified for advanced mathematics as their entry level course outperformed students who initially enrolled in lower level mathematics.

These results indicated that chemistry coursetaking and performance were notable factors affecting student persistence in STEM disciplines, outcomes were largely independent of student background variables, and remediation coursework did not prepare most students for the mathematics required for STEM degrees. Community college policy makers may improve student outcomes by providing supports for science and mathematics coursework. STEM majors may benefit from reconceptualized developmental curricula focused on essential skills for success in advanced mathematics and science, as well as clarity on transferable coursework and structured pathways to reach the milestones required for STEM degrees and careers. Finally, a universal methodology for calculating transfer rates should be developed and combined with graduation rates in order to create a better assessment of the effectiveness of community colleges.

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