Executive Summary

STEM Choice, Persistence, and Attrition: A Preliminary Analysis of Community College Transfers and Non-Transfers at a Four-Year Research University

It has been a priority for the nation to produce a sufficient number of graduates who are qualified for the science, technology, engineering, and mathematics (STEM) professions. Many national associations and agencies (e.g., National Academy of Science, National Governors Association, National Research Council of Science, etc.) have called for national attention and efforts to increase the number and diversity of students in STEM programs and careers in STEM fields. To attain this goal, it is important to encourage college students, especially those who begin higher education at community colleges, to enter a STEM field and to receive a STEM degree at a four-year university, as community colleges have a long history of serving diverse student populations. It is also important to reduce STEM attrition among students who have demonstrated interest in STEM fields.

The purpose of this study was to provide a deeper understanding of community college transfer students’ STEM choice, persistence, and attrition. Specifically, this study focused on students who selected a STEM major in the first semester in a four-year university but departed from STEM at a later time. This study also included non-transfers (i.e., students who began higher education directly at 4-year universities) who persisted in STEM and those who departed from STEM as comparison groups. The main research questions included:

- What are the percentages of community college transfer students and non-transfers who choose to enter a STEM major? Are they different by disciplines? Which STEM majors were most popular among the transfers and non-transfers?
- What are the percentages of community college transfer students and non-transfers who persist in STEM, leave STEM, and switch into a non-STEM major? What are the characteristics of students who persist in STEM, leave STEM, and switch into a non-STEM major among transfers and non-transfers, respectively?
- Do these students differ in their early academic performance at the four-year university?

To address these questions, descriptive analyses were conducted. The dataset used in the study tracks a cohort of full-time students who enrolled in a public four-year research university in fall 2006 and follows them over a decade. The sample included two groups of students: 1,334 community college transfer students and 1,932 first-time freshmen, or non-transfers. According to their choice and persistence in STEM, each group was classified into three types: 1) STEM Persisters, who chose and persisted in STEM, 2) STEM Leavers, who started in a STEM major but left higher education without obtaining a degree, and 3) STEM Switchers, who departed from a STEM major but obtained a non-STEM degree.

The findings of the analyses revealed several patterns. First, among the students who entered STEM fields in their first semester, proportionally more community college transfers persisted in STEM and received a STEM degree within ten years of enrolling in the university. A much smaller proportion of community college transfers did not claim a major in their first semester, whereas the percentage of non-transfer students whose majors were undeclared was almost eight times as high. Second, when compared with the transfer STEM Persisters, proportionally more female and Asian students were found to be non-transfer STEM Persisters, and a much higher proportion of non-transfer students had a gross family income of $40,000 or higher. Third, regardless of transfer status, STEM Persisters outperformed the STEM Leavers and Switchers academically. Proportionally more community college transfer students who persisted in STEM earned credit in advanced college-level mathematics in the first semester than the non-transfer Persisters.

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