

Persistence in Engineering Education: Experiences of First Year Students at a Historically Black University

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Most students are both academically prepared and motivated to study engineering when they enroll as first year students in engineering majors. Unfortunately, engineering programs experience considerable attrition during the first two years of study. Because first year experiences play a major role in reinforcing persistence for achievement in engineering, it is important for engineering educators to be aware of potential hurdles that can affect student achievement.

Method and Background

The following results about first year engineering student performance are from the Center for the Advancement of Engineering Education (CAEE) Academic Pathways Study. Quantitative and qualitative data were gathered from surveys, structured interviews, and ethnographic interviews conducted during the second semester of the participants' first year. The survey was administered to 36 participants, 28 participants took part in structured interviews, and 8 participants participated in unstructured ethnographic interviews.

What We Found

Survey results showed that 75 percent of participants indicated that the enjoyment of mathematics and science and financial concerns were primary motivational factors in their pursuit of an engineering education. Family influence was reported as a less significant factor. Results also indicated that most students were satisfied with the quality of instruction and availability of faculty, whereas they were much less satisfied with their academic advising experiences.

Seventy-five percent of participants indicated that the enjoyment of mathematics and science and financial concerns were primary motivational factors in their pursuit of an engineering education.

Structured and ethnographic interview results were compiled and evaluated according to six persistence factors: family influences, financial motivation, mathematics and science proficiency, academic advising, quality of instruction, and availability of faculty. Generalized findings include the following:

- Most students did not identify family influences as a persistence factor in the survey, although those who did had strong feelings about the influence of family.
- The survey finding that large numbers of students are motivated by money to persist in engineering was supported by comments by students in both types of interviews.

- Most students surveyed indicated that they enjoyed mathematics and science (75%) but there were a number who did not.
- Student's dissatisfaction with academic advising was clearly evident in the survey results and supported by comments made during the interviews.
- Most students were satisfied with the quality of instruction, and both satisfied and unsatisfied students had strong opinions about this topic.
- Students expressed satisfaction with the availability of faculty during the interviews.

Implications of Findings

The results of this study provide an insight into the factors that affect the persistence of students of color in engineering at a historically black university. Focusing on students of color with diverse characteristics allows the findings to be generalized to other settings with similar demographics including students of color at predominantly white institutions. The initial findings suggest that many of the persistence factors found in studies of other populations are also potential factors for students of color. One factor, financial motivation, appears to be a strong factor in persistence although other researchers (see the work of J. Grandy, *J. Higher Education*, 69(6):589-260, 1998) did not find it to be significant.

Additional survey and interview data will be gathered over the next two years from the study participants. The team anticipates being able to draw stronger conclusions about factors that influence beginning student persistence when it is known which students earned engineering degrees and what hurdles they overcame.

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