Work in Progress – Reexamining the Problem of Engineering Persistence for African-American Female Students

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Abstract - This paper describes a mix-method study designed to examine the experiences and factors that influence African-American female students’ decision to leave engineering degree programs for other academic majors. Using the Students Leaving Engineering Instrument developed by the Assessing Women in Engineering (AWE) project, data is being collected from female students who entered Prairie View A&M University, a historically black university, as freshman engineering, computer science or technology majors during the 2003, 2004, and 2005 academic years, but have subsequently switched to other degree programs. The factors being examined include initial commitment and preparation for studying engineering, confidence in completing an engineering degree program, course workload and institutional climate, relationships with faculty and peers, and financial concerns.

Index Terms – gender, minority, persistence, retention

INTRODUCTION

Engineering baccalaureate degree production for underrepresented student populations is still an area of concern in the United States. A 2005 report of 334 universities by the American Society for Engineering Education (ASEE) depicts relatively low and stagnant numbers for engineering degree production for African-American and Hispanic students. From 1999 to 2005, African-American and Hispanics received less than 6% of the engineering bachelor degrees awarded for each group [1]. Comparatively, women earned roughly 20% of the engineering bachelor degrees awarded for that same time period. In 2005, African-American women earned less than 2% of the engineering degrees awarded [1]. While the percentages may vary slightly, similar numbers have been documented in other research reports [2]-[3].

Efforts to address the underrepresentation of certain student populations have focused both on recruitment and retention related activities. Examining the reasons why certain student populations subsequently leave engineering programs for other academic majors is important in understanding and developing strategies to support student retention. Prior research studies have sought to examine the factors affecting females and students of color decisions to leave engineering degree programs. Seymour and Hewitt compared students who persisted in science and engineering with those who left and found no real differences in high school preparation or ability between students who remained and those who switched majors [4]. However, they identified two categories of students who switch out of science and engineering programs: (1) students who become bored or disappointed with the curriculum, and (2) students who leave because of a loss of academic self-confidence due to a competitive science and engineering academic environment. Women and students of color are often placed in the later category [4]. In addition, a six year study at the University of Washington that tracked and measured the factors affecting the retention of undergraduate women pursuing degrees in science and engineering highlighted the role of mentoring and advisement in the retention of women [5].

This paper describes a mix-method study designed to examine the experiences and factors that influence African-American female students to leave engineering degree programs. Prairie View A&M University (PVAMU) provides an interesting environment to conduct this study. Approximately 96% (90% African-American, 3.5% Hispanic, 2.5% other ethnic minorities) of the student population is classified as ethnic minorities, of which 59% are women. The College of Engineering (COE) has seven programs accredited by the Accreditation Board for Engineering and Technology (ABET), which include computer science, chemical engineering, civil and environmental engineering, electrical engineering, engineering technology, mechanical engineering, and computer engineering. PVAMU consistently ranks among the top 25 U.S. universities for African-American engineering graduates. However, while females currently account for nearly 60% of the university’s undergraduate enrollment, they account for only about 25% of the undergraduate enrollment in the College of Engineering.

GOALS OF THE STUDY

The goals of this research study are to investigate the factors that affect the self efficacy, recruitment, and retention of African-American females in engineering and technology degree programs, to describe their experiences in these programs to understand any unique obstacles they may face,
and to examine factors that influence the decision of some to leave these programs for other academic majors. This goal is being accomplished in two phases. The first phase focuses on engineering persistence of African-American students in their third year or beyond in an engineering or technology degree program [6]. In the second phase described here, institutional databases were mined to gather statistical data and identify African-American female students who entered as freshman during the 2003, 2004, or 2005 academic year majoring in technology, computer science, or engineering, but subsequently switched to other degree programs at PVAMU. These students will be recruited to complete the Students Leaving Engineering survey.

Research Questions

The following research questions are being examined:

1. What factors influenced the initial decision to major in an engineering or technology degree program?
2. Is there a relationship between confidence at entry into the degree program and the subsequent decision to leave?
3. What are the major factors influencing students’ decision to switch from engineering or technology degree programs to other majors?

Description of Survey Instrument

Data is being collected using the Students Leaving Engineering Survey instrument developed by the Assessing Women (AWE) in Engineering Project [7]. The survey measures student reasons for deciding to leave engineering including:

- student’s initial confidence and preparation for studying engineering
- the impact of course workload, institutional climate, faculty advising and teaching, and peer interactions on students decision to leave engineering
- student participation in academic and extra-curricular activities and university support programs

This instrument was chosen because it has been administered to other student populations [8] and will provide comparative data for the results obtained from this study. This instrument is being used in conjunction with the Students Persisting in Engineering Instrument also developed by AWE [7] in an effort to gain a comprehensive picture of African-American females who persist in engineering and those who leave.

FUTURE WORK

Data collection and analysis is currently being conducted. Future work includes examination of the research results and their implications for the development of retention strategies and programs designed to attract and retain this population of students.

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REFERENCES


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