

## **AC 2008-2266: AN ANALYSIS OF SUCCESSFUL MINORITY STUDENTS ENROLLED IN TECHNOLOGY DEGREE PROGRAMS**

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# An Analysis of Successful Minority Students Enrolled in Technology Degree Programs

## Abstract

The purpose of this study is to explore the experiences of successful minority students enrolled in engineering technology and technology management programs at a large regional university. The study employs qualitative and quantitative design approaches with the intention of describing behavior patterns and experiences of these successful students.

## Introduction

The explosion of information technology has brought the concern of workforce preparation and skills shortage in the United States. Most notably is the shortage of females in fields such as engineering, engineering technology, and computer science. Some believe that this gender gap is so serious “that the United States risks losing its economic and intellectual preeminence” <sup>(1)</sup>.

During the past decade, investigators have advanced various accounts for the critical decline in females’ interest in engineering and computer science fields. These studies reported on attitudes toward computers and technology <sup>(2,3,4)</sup>, differences in learning styles <sup>(5)</sup>, perceptions of technology <sup>(6)</sup>, and recruitment and retention <sup>(7)</sup>.

Nevertheless, the number of female enrolled in Physical Sciences, Technology, Engineering, and Math (PSTEM) is not encouraging. In 1999-2000, for example, women accounted for 0.9% (males 1.6%) of undergraduates with a declared major in Physical Sciences and 0.7% (males 0.9%) in Math. The largest disparity were reported in Computer/Information Science with 5.6% (males 12.6%) and Engineering with 1.6% (males 10.8%) <sup>(1)</sup>.

Kondrick <sup>(8)</sup> conducted an extensive review of literature in which she examined the under-representation of women in PSTEM. The author stated that “female graduates predominate in fields like psychology, education, biological sciences, and liberal and fine arts ...” but accounts for the minority in the PSTEM areas <sup>(8)</sup>.

In order to better understand these variances in career fields, some authors have suggested a qualitative exploration of gender gap issues in computer science <sup>(4)</sup>. Others have hinted towards a qualitative approach due to the fact that students’ desires “can be predicted by their self-recognition of the usefulness of computers and their perception of the usefulness of computers” <sup>(5)</sup>. These points are also supported by Kennedy and Parks <sup>(9)</sup>; the authors stated that “Science is impersonal. Women are personal. Science is objective and women are subjective. Science requires logical, analytical investigation. Women’s methods are viewed as intuitive and holistic. Science is deemed rational, whereas females are seen as emotional beings.”

This research will use a hybrid approach in which quantitative data related to self-efficacy, learning preferences, and structured interviews will be combined in an attempt to identify traits of successful female students enrolled in Engineering Technology programs at a large land-grant university in the Midwest. Hazzan and colleagues <sup>(10)</sup> writing about the advantages of using qualitative research in some studies, notably computer science education, noted that:

... in many cases, CSE research deals with topics related to learners' mental, cultural and social processes. Such processes, by nature, are rich, consisting of many details and perspectives. Accordingly, it is reasonable to assume that if we approach these processes with a qualitative approach, which concentrates on the details that constitute them, we may deepen our understanding of such processes.  
(p. 412)

## Methodology

The main question to be explored in this study is: What are the characteristics of successful minority students in engineering technology and technology management programs? Although some quantitative measures will be employed, the qualitative framework of multiple perspectives and focus on interpretation rather than prediction will guide the study's central question.

One female and one male faculty members with different ethnic backgrounds identified and interviewed several minority students. At this stage in the study, successful minority student is being defined as students of color or female students that were recent graduate or are currently enrolled in an engineering technology program or a technology management program with a graduate point average of 3.0 or higher. An attempt will be made to get a sample from different ethnic groups allowing for the exploration of diverse viewpoints on the issue being examined.

A set of questions derived from the review of literature will be used for the structured interviews with room for follow up questions and/or further exploration of potential topics that may help shed some light on the traits that characterize these successful students. The structured interview will be supplemented by quantitative data collected on self efficacy and perceived potential for success <sup>(11)</sup>, the VARK questionnaire for learning styles/preferences <sup>(12)</sup>, as well as demographic data. The study will be carried out during Spring 2008. Data collected will be analyzed and ready for presentation during the ASEE Annual Conference.

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