

## **ORIENTATION INTO ENGINEERING AND COLLEGE SUCCESS: A SIX YEAR EVALUATION**

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### **ABSTRACT**

Extended orientation courses continue to be introduced as curriculum offerings that assist students to persist in postsecondary institutions. Research on the outcomes of such courses in terms of students retention and achievement is, with regards to race, however, is not proceeding at the same pace. The purpose of this study was to test the theories of Tinto<sup>1</sup> and Pascarella, Terenzini, and Wolfe<sup>2</sup> concerning the impact of social and academic integration on achievement and retention when presented through an extended orientation on African American engineering students

With respect to minority engineering students, it should be noted that over the past 10 years, while almost 45,000 minority students earned bachelor's degrees in engineering, more than 75,000 dropped out. Furthermore, given that only 6% of the nation's minority high school students graduate with the academic prerequisites to enroll in an undergraduate engineering program, their loss, this far along in the pipeline, is a major forfeiture of the nation's human resources.<sup>3</sup>

The sample in the study consisted of 398 students who were members of the 1990-95 freshmen engineering classes of Louisiana State University in Baton Rouge, Louisiana. 210 of these students elected to enroll in an extended orientation course, Engineering 1050. Four hypotheses were tested to determine if differences existed between African American freshmen engineering students who elected to enroll in the course and those who did not.

The results indicate that the orientation course was a beneficial experience that led to greater achievement and retention among the enrolled students.

## INTRODUCTION

Since the founding of Harvard in 1636, institutions of higher education have been confronted with the dilemma of students withdrawing from college.<sup>4</sup> Over the past 50 years student attrition from institutions of higher education has become a matter of concern and extensive study.<sup>5</sup> Approximately one-third of all freshmen do not re-enroll at their original institution after their first year, and as many as 35% of the students who enroll in higher education never receive a degree.<sup>6</sup> Students who fail to complete a higher education degree program almost never reach the same level of social and monetary achievement as college graduates.

As orientation may be defined as any institutional effort to ease the transition of students. It is the provision of structured goals and objectives, on the part of the institution, that assist the intellectual, academic, emotional, and social growth of the student. Extended orientation is an acknowledgment of the need for more intrusive efforts on the part of the institution to provide an active learning experience for the students it serves.<sup>7</sup>

Such programs and courses have been introduced into an increasing number of institutions. These avenues for assisting students to persist in postsecondary colleges and universities have been accepted by more and more administrators and faculty who realize that institutional commitment must include the placement of greater emphasis on the student's academic and non-academic needs and concerns.<sup>8</sup> Individual needs and concerns are often contributing factors in students' decisions to withdraw from the institution or in their academic dismissal.

African American students have many of the same needs as White students entering college; however, culturally related factors compounding their developmental outcomes must be addressed. Successful students are those who are empowered with the inner security needed to negotiate their environment on a predominantly White university campus.

Retention of students in colleges of engineering, in particular, is an issue of current concern, since engineering graduates provide a high percentage of tomorrow's technical workforce.<sup>9</sup> In fact, student retention rates are rapidly becoming a popular measure upon which institutional comparison are made and their effectiveness judged.<sup>10</sup> Recently, the National Action Council of Minorities in Engineering reported in its study of 112 engineering schools that 59.3 % of nonminority engineering students are retained to graduation, compared to only 35% of minority graduates.<sup>3</sup>

## REVIEW OF THE RELATED LITERATURE

Freshman orientation courses have been offered for credit since 1911. They have generally shown that participants have higher achievement and retention than nonparticipants.<sup>11</sup> Most studies examined the effect from the first to the second year of college. Of the few studies on the longitudinal effect of this strategy, the University 101 course at the University of South Carolina has been reported on the most. More recent work by Boudreau and Kromrey,<sup>12</sup> continue to affirm the positive impact of participation in an orientation course on student performance. A common fault of these studies is the lack of participants from the underrepresented student groups.

Effective orientation courses function to help new students make this difficult transition to the world of the college, and lay the foundation for the development of the important personal linkages which are the basis for eventual incorporation of the individual into the social and intellectual life of the institution.<sup>2</sup> Moreover, Fidler and Hunter indicate that "participation in these seminars can help the talented student perform better academically while at the same time helping weaker students survive."<sup>11</sup> The major concept of this study is that academic achievement and retention of African American engineering students is positively impacted by the participation in an orientation course.

## METHODOLOGY

Little research has been done, however, on African American students in general, and none could be found on African American engineering students, in particular. Additionally, since gender, high school academic record, and admissions test scores (ACT) have been shown by previous research to be related to outcomes, these factors were also used in matching the Engineering 1050 participants with an equivalent number of students who did not take the course. Identifying these factors in the population to be studied provided the opportunity to determine if there were differences in academic performance among subgroups of the population, and how these differences were related to participation in the Engineering 1050 course.

Through the use of quantitative techniques, the high school grades and ACT scores, as well as the college academic performance, retention, and graduation rates were examined over the six year period, 1990-1995. The research utilized a causal-comparative design.

This study was limited by the single institution sample, the limited sample size, and voluntary nature of Engineering 1050 course. Because data for this study were collected at a single institution, any conclusions drawn about the impact of participation of African American students in an engineering freshman orientation course is limited to similar institutions. An additional limitation is the fact that students

self select into participation in the Engineering 1050 course. The course is not a pre-requisite for graduation. These factors may indicate more motivation, or maturity on the part of the participants, but these factors were not examined. Finally, because of the time limits of this research project, it was only possible to track two cohorts to graduation, and one cohort has only a years' matriculation to consider.

## **RESULTS**

Several statistically significant relationships were found between the completion of the Engineering 1050 course and retention and academic performance when students who completed the course were compared to students who did not take the course from 1990-1995. A higher proportion of Engineering 1050 participants (45%) were found to be persisters than were nonparticipants (22%). Additionally, Engineering 1050 participants were less likely to change from engineering to another major (25%) compared to the nonparticipants (35%). Lastly, the actual number of participants that graduated from the university was more than double (5) that on nonparticipants (2).

## **DISCUSSION/CONCLUSIONS**

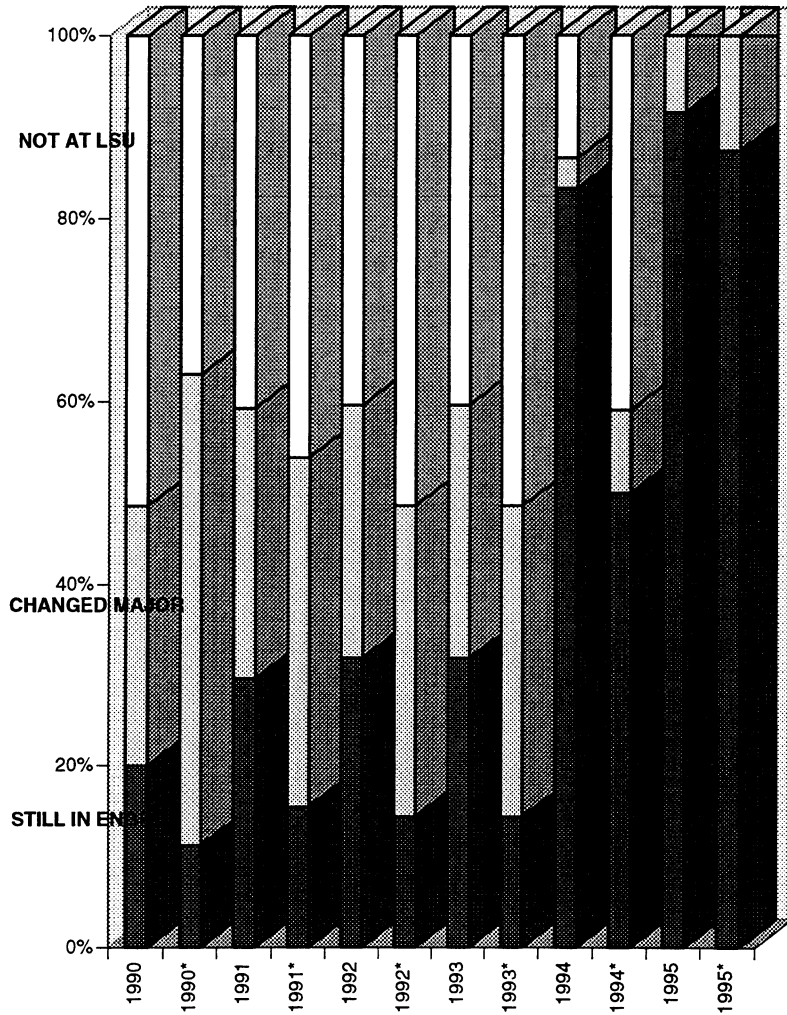
Based on this exploratory study, it appears that the Engineering 1050 course is an effective and substantial student retention program. Certainly, it is possible that the students who choose to take the course are more motivated and have personality types that dispose them to participate more actively in the collegiate environment

These results provide additional support for Tinto's (1985) theory of social and academic integration as a product of an orientation course. The application of theory to the development of orientation courses is significant to the goal of student achievement and retention.

In conclusion, this study suggest that a freshman seminar program is an effective way to provide support for African American engineering students during a critical time of transition, and bears fruit with respect to retention , academic standing, and GPA.

There is a great need for future research into the effects of an orientation course on new students. Though often inconclusive, this study has attempted generally to contribute to literature supporting the effectiveness of freshmen orientation courses, and specifically engineering orientation courses for African American students. In that regard, it seems to have been successful.

# RETENTION OF MINORITY ENGR STUDENTS



\* STUDENTS NOT ENROLLED IN ENGR 1050

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