

CHAPTER V

DISCUSSION AND RECOMMENDATIONS

This chapter will give an overview of the research questions and results. The next section of this chapter will consist of a discussion and implications of the results. This information will be compared to other literature in the field. Recommendations will be presented and areas for future research will be proposed.

Overview of Study and Summary of Major Results

The focus of this study was to examine the incidences and preferences of academic advising for both African American and White students in the College of Engineering at Virginia Tech. Specifically, the study examined the current practices and desired preferences for prescriptive or developmental advising between race, gender, classification, grade point average (GPA) and major. The Academic Advising Inventory (AAI) was administered via the Internet and E-mailed out to two sets of undergraduate engineering students, a total of 3,885 ($n = 217$ African American and $n = 3,668$ White). The AAI was first E-mailed out to the African American students. About a week following, due to an administrative delay, the AAI was sent to the entire White engineering student population. Four hundred and two (10.3%) undergraduate engineering students replied and participated in the study on-line. Of these, 29 were disqualified, either because they failed to complete the instrument on-line correctly or they submitted a duplicate entry. The sample consisted of a total of 373 (9.6%) undergraduate engineering students, 265 (71%) males and 108 (29%) females. African Americans made up 35% ($n = 132$) of the sample and Whites 65% ($n = 241$). The sample

consisted of 25% ($n = 93$) African American males, 10% ($n = 39$) African American females, 46% ($n = 172$) White males, and 19% ($n = 69$) White females.

The data was first analyzed to look at relationships among race, gender, classification, and major. Chi Square tests for independence were used to test relationships among these variables, using the $p < .05$ level of significance. Results of Chi-Square tests for independence indicated both African Americans and Whites were proportionate in the number of males and females in the sample. Tests for independence also revealed that age is associated with race, indicating that in this sample the Whites have more students in the age range of 21-25; whereas the African Americans have more students in the age range of 18-19.

The first null hypothesis examined whether African American and White engineering students differed in the type of advising received. The null hypothesis was rejected. There is a significant difference between the style of academic advising currently perceived by African American and White engineering students. The majority of Whites reported receiving developmental advising, and the majority of African Americans reported receiving prescriptive advising. An Independent t -test indicated that Whites reported receiving a more developmental style of advising. Results also indicated that the majority of African American females (62%), White males (70%), and White females (56%) reported receiving a developmental style of advising. The majority of the African American males (55%) perceive that they are receiving a prescriptive style of advising.

The second null hypothesis examined whether African American and White engineering students differed in the type of advising preferred. The null hypothesis was

not rejected. There is no significant difference between the style of academic advising that African American and White engineering students prefer. Findings indicated that all groups prefer a developmental advising style, and African American females have a significantly higher preference for developmental advising than any other gender groups.

The null hypothesis that examined whether the type of academic advising received by African American and White engineering students differed when categorized by classification (freshmen, sophomore, junior, and senior classes) was rejected. Results of the Chi square test of independence showed that classification standing is associated with race. There were a higher number of White juniors and seniors than African Americans. Two-way Analysis of Variance (ANOVA) indicated a main effect for race. Results show that all African American classifications reported receiving prescriptive advising, and prefer developmental advising. It should be noted that the type of advising reported by the junior class of African Americans could be described as borderline between prescriptive and developmental with a group mean score of 56.80. Results revealed that all White classifications reported receiving developmental advising, and Whites prefer developmental advising.

Another null hypothesis examined whether African American and White engineering students differed in the type of advising received when categorized by GPA. The null hypothesis was also rejected. Two-way ANOVA showed a significant main effect of race, and GPA. The ANOVA test also indicated a significant interaction between race and GPA. Results show that African Americans engineering students in the GPA categories of 1.0-1.9 and 2.0-2.9 reported receiving prescriptive advising, while the 3.0-3.9 category of African Americans reported receiving developmental advising. The

majority of White students reported receiving developmental advising and prefers developmental advising regardless of their GPA category.

The final null hypothesis tested whether African American and White engineering students differed in the type of advising they received when categorized by major; this was also rejected. Two-way ANOVA indicated a significant main effect of race. Results revealed that all African American majors (Computer, Electrical, General Eng., Industrial, and Mechanical) except for the category group "Others" reported receiving a prescriptive style of advising. The group "Others" was a combination of seven majors that had a low number of African Americans students enrolled in that particular major. Regardless of major, all African American students preferred developmental advising. The majority of White students across the various majors reported receiving developmental advising and they all prefer developmental advising.

Additional data outside of the main research questions and hypotheses revealed that African Americans report a statistically significant difference in the level of satisfaction with advising when compared to their White counterparts. Fifty percent of the African American students compared to 32% of White students either "strongly disagreed" or "disagreed" that academic advising was satisfying. Forty-four percent of the African American engineering students compared to 25.7% White students feel that they have *not* received accurate information about courses, programs, and requirements through academic advising.

When both groups were asked how they communicate with their academic advisor approximately 33% of the African American students stated that their faculty advisors either "do not understand them" or "have problems communicating" with their

advisor compared to 29% of the Whites. A Chi square test of independence indicated that a significantly larger portion of African American students than White students felt that their academic advisor does not understand them.

Both groups were asked to state what their relationship was with their academic advisor. Nearly 30% of African American students said they either "do not enjoy" visiting or "avoid" visiting their faculty academic advisor compared to about 25% of the White students. The majority of all students spent 30 minutes or less in each advising session. Other data revealed that 57.5% of the African American students visited with their advisor either 3 or 4 times during the academic year. Approximately 50% of the White students visit with their academic advisor either 2 or 3 times during the academic year. Chi Square test for independence standardized residual did reveal that a large portion of African American students visited with their advisor 4 times per year, compared to their White counterparts who visited with their advisor 2 times per year.

Discussion

Preferences

Results of this study corroborate the findings of Crockett and Crawford (1989), Herndon (1993), Herndon et al. (1996) and Winston and Sandor (1984 a & b) in the fact that all students prefer a developmental style of advising over prescriptive. The data supports the literature, validating that both groups of students prefer an advisor who promotes a collaborative and caring relationship. A developmental advisor assumes that each student is unique, with a particular level of preparedness academically, socially and emotionally (Crookston, 1972; Ender et al., 1984; Grites & Gordon, 2000; Winston & Sandor, 1984a). Both groups of students would like their faculty academic advisor to

clarify interests, skills, attitudes, and values as they relate to the college experience and future goals. Developmental advising has been known to be preferred more than prescriptive advising because there is a more equal relationship and bi-directional flow of information and ideas. The prescriptive advisor only focuses on the requirements of academic performance and not on the holistic development of students. Prescriptive advising is more of a traditional advising process that has been considered outdated (Applyby, 2001; Grites & Gordon, 2000). A prescriptive style of advising for any student, especially for students of color at a PWI would be a major limitation (Crockett & Crawford, 1989; Burrell & Trombley 1983; Herndon, 1993; Herndon et al., 1996). One of the goals of Virginia Tech Provost was to move its faculty academic advisors toward a more developmental base of advising at this university (UTF, 1999).

The data from this study also triangulates with Crockett and Crawford (1989) and Herndon, Kaiser, and Creamer (1996) with the fact that gender is significantly related to student preference for a developmental advisor. In this study as well as in Herndon, Kaiser and Creamer (1996) study, both groups of African American female students had a significantly stronger desire for a more developmental advisor compared to African American males, White males and White females. The African American females may have a stronger desire for developmental advising because they are considered a double minority in a technical field that is traditional dominated by White men. Historically in the College of Engineering at Virginia Tech African American females have had low percentages of degrees conferred (OMEP, 2001). The stronger preference for developmental advising also could be due to the fact that African American female students only represent 1.2% ($n = 59$) of the total engineering population. African

American females may be looking for an advisor with whom they feel that they have the same measure of equality, which will incorporate a high degree of interaction between the advisor and the advisee, for an overall productive and effective means of communication.

Perceptions

Race and Gender.

Results from this study also support similar findings of Herndon et al. (1996) with the relationship between race and gender to determine if specific groups of students had perceived a certain style of advising. In both this study and Herndon et al. African American males reported receiving significantly a more prescriptive style of advising than White males. A statistical analysis also confirmed that White students as a group reported receiving a more developmental style of advising than African Americans, primarily over African American males. This data could suggest that many African American students especially the male students in the College of Engineering continue to face formidable cultural and transitional problems. This would link with the literature that African American students at PWIs face an additional challenge by pursuing their education in an environment primarily structured for the needs and attitudes of White students (Allen, 1995; Carroll, 1998; Moore, 2001; Nettles, 1988; Schwitzer et al., 1999). Advising may not be meeting the transitional needs of African American students at PWIs. This may provide clues as to why African Americans have low persistence rates, low academic achievement levels, and are less likely to earn a degree from the College of Engineering compared to their White counterparts. Not meeting the advising needs of the

majority of African American students that are receiving a prescriptive style of advising may continue to lead to poor retention rates.

Grade Point Average.

When African American students were categorized by GPA, the data significantly revealed that students in the GPA range of 1.0-1.9 and 2.0-2.9 category reported receiving a prescriptive style of advising with a group mean of 32.30. This data was not consistent with White students in the GPA category of 1.0-1.9, which had a group mean of 62.44 indicating that they received developmental advising. It may be that African American engineering students with low GPAs feel isolated, frustrated, and misunderstood. These negative feelings that African American students are harboring may lead to their barriers with their perceptions of their academic advisor. It could also be the academic advisor has a negative perception towards the African American students with the low GPA, and actually present a prescriptive style of advising. When a prescriptive style of advising is prevalent, African American students may perceive academic support services to be uninviting and inaccessible (Moore, 2000; Nettles, 1988; Schwitzer et al., 1999; Scott, 1995; Sedlacek, 1987).

Visits and Satisfaction with Advisor.

Additional data in this study revealed that 57.5% of the African American students visited with their advisor either 3 or 4 times during the academic year compared to 49.5% of the White students who visit with their academic advisor an average of 2 or 3 times during the academic year. Results from this study also revealed that Whites are receiving a statistically significant difference in the level of satisfaction with advising compared to African Americans. This data reveals that African American students are

meeting with their advisors actually more than Whites, but are not satisfied with the advising received. These findings are similar to Scott (1995) who reported that African American students at Virginia Tech thought that academic support services were very important to them. The same report showed that White students perceived academic support programs as being less important, yet they continued to attain higher grades and higher graduation rates. The higher number of visits combined with the low level of satisfaction may indicate that African American students are seeking more from their faculty advisors (e.g., seeking more: time, satisfaction, interest, clarity, etc.). Moreover, the lack of developmental advising towards African Americans may give the students the impression that their faculty advisor has no interest in them.

Academic advising has been well known as an important and effective means of interacting and developing relationships with students (Winston, 1996). When asked to reflect on their relationship with their academic advisor, close to 30% of African American students and 29% of the White students either "do not enjoy" visiting or "avoid visiting" their faculty academic advisor. Regardless of race all of these figures should be alarming to the engineering department.

Communication with Advisor.

African American students were asked how they communicate with their academic advisor. Approximately 33% of the African American students stated that their faculty advisors either "do not understand them" or "have problems communicating." This data supports the research of Allen (1995), Moore (2000), Nettles (1998) Shwitzer et al. (1999) and Scott (1995) that African American students often feel isolated and alienated at PWIs. African American students found that it is harder to receive

straightforward information (Schmader et al., 2002, Sedlacek, 1987). This breakdown in communication causes African American students to begin to manifest feelings of resentment, uncertainty and frustration (Darden et al., 1998; Schwitzer et al., 1999). This study supports Nettle's study that concluded that Whites have significantly greater academic integration, while African American students have significantly greater interfering problems, lower social integration, and more feelings of racial discrimination. This communication barrier places a hurdle for African American students to approach faculty at a PWI.

The results from this study are also consistent with the findings of Schwitzer (1999) and Scott (1995) that revealed that African American students often felt "misunderstood" and had social adjustment problems at PWIs. Sedlacek (1987), Moore (2000) and Schmader et al. (2002) all identified that poor communication with faculty, particularly White faculty members, was a problem for African American students. It was found that White faculty members might give less consistent reinforcement to African American students than they give to White students. Burrell and Trombley's (1983) research revealed that academic advising was the most important student support service for African Americans across all five different colleges. Moore's (2000) study identified that academic success for African American male engineering students at Virginia Tech was related in part to successful interaction with academic support services.

The AAI revealed that both groups of students, African American and Whites, reported receiving a less developmental style of advising than they prefer. Both groups of students also indicated that they spent 30 minutes or less in an advising session. This data supports the findings of Levin and Wyckoff (1995) who also studied engineering

students and academic advising. Their study found that academic advising for engineering students does not address the specific needs of the students. They state that academic advising in engineering focuses only on course requirements for specific engineering majors and pays little attention to individual interest, ability, or appropriateness. It is important for the College of Engineering faculty to provide all students with a valuable support network. Increasing the time while interacting/communicating with all students more than 15 or 30 minutes may increase the opportunity to establish a relationship and cover a wider range of topics desired by the student and faculty member (Winston & Sandor, 1984b). When a developmental style of advising is available to all students regardless of race or gender, the engineering department may see an overall improvement in student retention as well as seeing students successfully transitioning into and completing college.

Faculty members must understand that the adjustment needs of African American students are quite different from their White counterparts. Previous studies have found a positive relationship between level of support and academic success for African American students (Burrell & Trombley 1983; Herndon, 2001; Littleton 2001; Nettles, 1988; Sedlacek, 1987). The quantitative data from this study supports the qualitative data by Good, Haplin and Haplin (2002) who researched 58 African American students in engineering. Their study revealed that African American students wanted their advisors to make more of an active effort when interacting with them. Developmental advising may be essential for African American students in engineering when the advisor is supportive, empathetic, involved and promotes a collaborative relationship between the advisor and student. Burrell and Trombley (1983), Littleton (2001), Moore (2000),

Nettles (1988), and Sedlacek (1987) all found that faculty contact outside the classroom was a significant predictor of grade point average for African American students. Similarly, results from this study revealed that African American students in the GPA range of 3.0-3.9 category reported receiving a developmental style of advising. It is vital for faculty advisors at PWIs to understand that they have the opportunity to be a valuable resource available to all students. Faculty member must understand that the quality of the advising relationship is important to the students' sense of belonging. Faculty members need to also be aware of the adjustment stress that African Americans go through in college at PWIs, specifically in a technical major like engineering.

Recommendations

Based on the results of this study, several recommendations for faculty advisors and students in the College of Engineering are indicated. It is important for academic advisors in the engineering department to understand the needs of individuals from various racial and ethnic groups. This study has shown that the majority of African American students perceive that they are receiving a prescriptive style of advising whereas they would prefer a more developmental style. The results also revealed that White students are receiving less developmental advising than they prefer. These recommendations are given so that all students will have an equal opportunity to succeed in the College of Engineering.

The primary recommendation from this study includes faculty and staff development workshops for faculty members in the engineering college as well as student orientation sessions to help prepare minority engineering students. These professional development workshops will be able to assist academic advisors to become more

knowledgeable so they can assist African American students with a more developmental advising approach. The faculty advisors will gain an understanding of the challenges that African American students face at a PWI. Advising training should include all positive aspects of the developmental approach to advisement, as it is clearly what both groups of students want from the engineering department.

Faculty Training might include:

1. A developmental advising workshop to teach faculty advisors how to help students clarify interests, skills, and attitudes that will facilitate success for a diverse group of students as they develop a purpose and direction towards earning an engineering degree. The goal of this workshop is to teach the engineering advisors how to model the developmental advising approach when working with all students.
2. Faculty members should work together to devise a plan for an effective means of advising minority freshman as they make the transition from high school to college. A recommendation is that freshman minority students are paired with the top developmental advisors in the department.
3. A workshop to encourage faculty members to become aware of African American students' challenges, differences and needs that they face at a PWI. This workshop will also include a diversity workshop on understanding and dealing with one's own multicultural awareness.
4. Faculty members should work together to devise an effective plan when advising students with low GPAs.
5. A diversity workshop to understand the challenges and needs that the women face in a technical field that is traditionally dominated by men.

6. The College of Engineering can collaborate with the Office of Minority Engineering Programs (OMEP) to create a course for all minority students. The goal of this seminar would focus on interacting and communicating with faculty, study skills, time-management, group studying, scheduling courses, and career explorations (i.e. resume and co-op). OMEP is dedicated to enriching the engineering profession through increased participation of African Americans, Hispanic Americans, American Indians, and women of all racial and ethnic backgrounds. The goal of the program is to target the current engineering students at Virginia Tech, prospective students and the Commonwealth of Virginia's pre-college community (OMEP, 2001).
7. Faculty and staff members should be notified of opportunities to interact in "bridge" programs through OMEP as well as being recognized or rewarded for their efforts.

Student Training might include workshops designed to:

8. Help students initiate contact when communicating with faculty members that might intimidate them. This workshop will help break the barrier for African American students approaching faculty members.
9. Help African American students learn skills to successfully navigate as a minority in the engineering department. Introduce students to all resources and tutorial programs that are available to assist students in making that transition from high school to college.
10. Enable African American students to become aware of the challenges, differences and needs that they face at a PWI.
11. Promote understanding and working with unique characteristics of a PWI.

Areas for Future Research

Further qualitative research can be conducted to find out:

1. Why African American males feel they are receiving a prescriptive style of advising.
2. Why African American students with low GPAs perceive that they are receiving a prescriptive style of advising. Additional research to investigate if students with low GPAs are taking advantage of campus resources (e.g., tutorial, advising, mentoring, counseling, etc.)
3. Why African American females had a significantly higher preferences or need for a more developmental style of advising than any other group.
4. Why a large portion of the engineering students feel that their academic advisor *does not understand them*. Additional research should also investigate why engineering students feel that they are *not* receiving accurate information.
5. Why African American students visit with their academic advisor more throughout the year compared to their White counterparts.

Additionally, studies such as the following would illuminate further issues related to this study:

6. A follow-up quantitative study can be conducted at other PWIs such as North Carolina State University that graduate a high number of African American engineers annually. A cross comparison of data can be analyzed between the four groups of engineering students at each university.
7. A follow-up quantitative study can be conducted at North Carolina Agricultural and Technical State University, a HBCU that has annually graduated the most African

American engineers in the nation. A cross comparison of data can be analyzed between the African American groups of engineering students at each university.

8. A follow-up quantitative study can be conducted at an urban university setting like Old Dominion University in Norfolk, Virginia compared to a rural setting like Virginia Tech in Blacksburg, Virginia. A cross comparison of data can be analyzed between the four groups of engineering students at each university.
9. A follow-up quantitative study can be conducted at Virginia Tech in the computer science department, another technical field that has a high attrition for African Americans at Virginia Tech. A cross comparison of data can be analyzed between the groups of engineering students and computer science students at Virginia Tech.
10. A follow-up quantitative study can be conducted at Virginia Tech in the Pamplin School of Business, a college on Virginia Tech campus that has a high number of African American students enrolled. A cross comparison of data can be analyzed between the groups of engineering students and business students at Virginia Tech.
11. A follow-up quantitative study can be conducted at Virginia Tech randomly surveying the entire university of undergraduate students. A comparison of data can be analyzed looking at African American and White students at Virginia Tech.
12. A meta-analysis can be conducted to summarize the results of all the studies related to advising at Virginia Tech, North Carolina State University, North Carolina Agricultural and Technical State University, and Old Dominion University. This statistical procedure can be used to search for trends in a set of quantitative research studies all involving the same research.

13. A follow-up qualitative study from the African American and White engineering students should be conducted to gain additional information about their perceptions with advising in the College of Engineering.
14. Another qualitative study can be conducted to focus on the students who have dropped out or transferred to another major or university.
15. A longitudinal study can be conducted to find any trends or changes in the advising style students are receiving over time in the College of Engineering.
16. This study could be duplicated, at the graduate level instead of the undergraduate level, to see if the African American graduate students are also receiving a prescriptive style of advising.
17. A follow-up quantitative and qualitative study should be conducted for the faculty advisors in the College of Engineering at Virginia Tech to determine their self-perception of their role as an advisor (prescriptive or developmental).

This research and its findings on academic advising perceptions and preferences between two groups of engineering students raised some interesting questions that prompt further investigation in the development of advising in the College of Engineering at Virginia Tech as well as other engineering departments nationally. Colleges and universities stand to profit from a synthesis of research findings associated with the improvement of academic achievement of African Americans in engineering. Bringing awareness of this matter may help to increase retention rates, student satisfaction, student-faculty interaction, graduation rates, and employment to "bridge the gap" for African American students in the engineering society in this new millennium.

Summary of Chapter

This study was conducted to examine the current advising perceived by African American and White students in the College of Engineering at Virginia Tech, as well as the preferences for advising (prescriptive or developmental) between the two groups. This chapter has presented an overview of the study, the results of the research, discussion, and recommendations, as well as suggestions for future research.