CHAPTER II

LITERATURE REVIEW

"One of the most difficult challenges facing college faculty members in the twenty-first century is the ability to develop an understanding of how to meet diverse student needs, while maintaining and improving upon present standards of excellence" (Scott, 1995, p.5). Academic performance, retention rates, and graduation rates (see Table 5 and 11) have been at the forefront of discussion for African American students in higher education and technical majors like engineering. The resolution of this dilemma can be further facilitated through research and an understanding of historical, social and political influences on the education of African Americans in the United States (Scott, 1995). The findings from this study will add to the literature on advising special student populations, such as African Americans in engineering at a Predominantly White Institute (PWI).

This literature review has been constructed by discussing the following topics: (a) historical background of African Americans in education; (b) comparative data by race; (c) African Americans in higher education; (d) African Americans in engineering; (e) African Americans at Virginia Tech; (f) academic advising in higher education; (g) academic advising at Virginia Tech; (h) the importance of African American students communication with faculty; (i) hurdles approaching faculty at a PWI; and (j) African American faculty at PWIs.

Historical Background of African Americans in Education

Descendants from Africa were first brought to the United States in 1619 when a Dutch ship landed at Jamestown, Virginia with 20 slaves. African people were used as
slaves during the first 244 years in this country, most notably in the South. During slavery, it was against the law for African Americans to be educated (Sloan, 1971). History has shown since the early 1860s that African Americans in the United States have been affected significantly by court decisions and congressional legislation (Jones-Wilson, Asbury, Okazawa-Rey et al., 1996; Nettles, 1988; Sloan, 1971; Trotter, 2001). As an illustration, on January 1, 1863, President Lincoln signed the Emancipation Proclamation that freed all African American people from the bondage of slavery. The Thirteenth Amendment abolished slavery, and the Fourteenth Amendment gave African American people citizenship (Sloan, 1971).

The first known African American college student, Alexander Lucias, graduated from Middlebury College in 1823 (Jones-Wilson et al., 1996). In African American history, two important men who inspired many African Americans towards education were Booker T. Washington and W.E.B. DuBois. During the period between 1900-1950, these men influenced many African Americans to obtain more education in a variety of professional fields and occupations such as agricultural, education, and engineering (Nettles, 1988; Trotter, 2001).

In the 1896 historic court case *Plessy versus Ferguson*, the Supreme Court upheld the doctrine of separate but equal educational facilities for African Americans, a method used to keep African Americans from obtaining legal education (Jones-Wilson et al., 1996; Nettles, 1988). Segregated school systems lasted until 1954 when the U. S. Supreme Court handed down its landmark decision declaring racial segregation in public schools to be unconstitutional in *Brown versus Board of Education of Topeka, Kansas* (Jones-Wilson et al., 1996). This court order was a monumental progression for African
Americans towards racial equality in our society. After centuries of discrimination, and for the first time in 355 years, African American students were to attend school alongside Whites. This monumental integration led to another increase of African Americans being educated in professional fields such as law, medicine, business, and engineering (McDavis, Parker, & Parker, 1995; Nettles, 1988).

The push for reform was continued through the inspiring wisdom of several other well-known leaders. "I have a dream that my four little children will one day live in a nation where they will not be judged by the color of their skin but by the content of their character" (King, 2002). Those are the famous words of Dr. Martin Luther King, spoken at the march on Washington in 1963. These were words that cried out for justice on behalf of African Americans who for so long had been denied equal access to the American dream because of their race. African Americans saw some of King's dream come true when President Lyndon B. Johnson signed the Civil Rights Act of 1964, which provided a legal basis for nondiscrimination in education and public life. Senator Claiborne Pell in 1972, helped to foster the next surge in African American enrollment in universities, with the passage of the Pell Grant legislation. With this legislation many African American students who lived in poverty, and who were able to show a financial need, were awarded Pell Grants to attend college (Jones-Wilson et al., 1996; Nettles, 1988).

The African American struggle for equality continued through the judicial system. The Federal Court decision of 1973, in the case Adam versus Richardson, compelled institutions of higher education to develop desegregation plans, especially at southern White colleges. In the Bakke decision of 1978, the Supreme Court ruled that race could
be used as a factor in admitting students to institutions of higher education. Colleges and universities were allowed to legally use affirmative action measures to admit and increase minority students to undergraduate and graduate programs nationally (Jones-Wilson et al., 1996; Nettles, 1988).

Since the Bakke case, many other lawsuits have been filed across the country at the university level. In the 1990s, the tide seemed to be turning against affirmative action programs. The University of California, a well known public university system, in 1995 decided that race would no longer be a factor in university admissions (University California, 2002). The following year, Proposition 209 passed in California forbidding all affirmative action programs not only in education, but also in employment and contracting as well (Proposition 209, 1996). A Circuit Court also decided in Hopwood versus Texas that the University of Texas Law School had violated the Constitution's "equal protection" clause by factoring in the race of applicants and deliberately separating applicants of African American and Latino descent (Texas Aggie, 1996). Admission's offices throughout the country currently have policies that college and universities can no longer use race as a factor, in admitting students to college.

The plight of African Americans today is far better than it was in 1619 (Nettles & Perna, 1997). Since the 1960s, increased educational opportunities for African Americans have occurred through desegregation policies that changed the demographics of most higher education institutions (Jones-Wilson et al., 1996). Court decisions and congressional acts have had both positive and negative effects on African Americans. The enrollment patterns of African American students have dramatically shifted from Historical Black Colleges and Universities (HBCUs) to PWIs (Moore, 2001; Watson &
Kuh, 1996). However, only four decades after these corrective reforms began, the nation is witnessing a distressing decline in the tide of increased educational opportunity for African Americans (Davis, 1998). Many minorities find themselves in a country that does not fully accept them. A misfortune for many African Americans is that they have internalized this racial inferiority, thus limiting their potential and building mistrust against other group members (McDavis et al., 1995). In addition to examining the historical nature of African Americans in education, it is important to note present day conditions of this population, compared to their White counterparts.

Comparative Data by Race

Below are statistics and tables that show the disproportionate enrollment rates of African American students in education as a whole as well as in engineering, the area of focus for this study. This steady trend of low enrollment rates is not only a national problem, but extends down to the state level most notably at PWIs.

Table 1 shows the comparison of African Americans and Whites in the United States population by gender.

- United States Population is 281,421,906 (US Census Bureau, 2002)
  - Males: 138,053,563 (49.1%) and Females: 143,368,343 (50.9%)
  - White: 211 Million (75.1%) and African American: 34 Million (12.3%)
  - White males: 36.8% and White females: 38.3%
  - African American males: 5.8% and African American females: 6.5%
Table 1

*Percentages of African Americans and Whites in the U.S. Population for the Year 2000 by Gender*

<table>
<thead>
<tr>
<th>Race</th>
<th>Male</th>
<th>Female</th>
<th>Total Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population ((n = 281,421,906))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>5.8</td>
<td>6.5</td>
<td>12.3</td>
</tr>
<tr>
<td>White</td>
<td>36.8</td>
<td>38.3</td>
<td>75.1</td>
</tr>
</tbody>
</table>

Table 2 shows the percentages of representation of African Americans and Whites in the age population of 18-24 in the nation by gender.

- United States Population in the ages 18-24, is \(25,157,900\) (Nettles & Perna, 1997)
  - Males:12,545,359 (49.9%) and Females: 12,612,541 (50.1%)
  - White: 17, 168, 497 (68.2%) and African American: 3,596,987 (14.3%)
  - White males: 34.1% and White females: 34.1%
  - African American males: 6.6% and African American females: 7.7%

Table 2

*Percentages of African Americans and Whites in the Undergraduate Age 18-24 Population for the United States*

<table>
<thead>
<tr>
<th>Race</th>
<th>Male</th>
<th>Female</th>
<th>Total Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population ((n = 25,157,900))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>6.6</td>
<td>7.7</td>
<td>14.3</td>
</tr>
<tr>
<td>White</td>
<td>34.1</td>
<td>34.1</td>
<td>68.2</td>
</tr>
</tbody>
</table>
Table 3 shows the comparison of African Americans and Whites in higher education in the United States by gender.

- Higher Education enrollment of undergraduate students nationally is 14,502,300 (Nettles & Perna, 1997)
  - Males: 6,396,000 (44.1%) and Females: 8,106,300 (55.9%)
  - White: 10,266,100 (71%) and African American: 1,555,100 (10.7%)
  - White males: 31% and White females: 40%
  - African American males: 4% and African American females: 6.7%
  - African American student population at Predominantly White Institutions nationally is 6.2%

Table 3

Percentages of Undergraduate Enrollment by Race and Gender in Higher Education Nationally

<table>
<thead>
<tr>
<th>Race</th>
<th>Male</th>
<th>Female</th>
<th>Total Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student (n = 14,502,300)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>4.0</td>
<td>6.7</td>
<td>10.7*</td>
</tr>
<tr>
<td>White</td>
<td>31.0</td>
<td>40.0</td>
<td>71.0</td>
</tr>
</tbody>
</table>

*Note: *African American student population at PWIs nationally is 6.2%.

Table 4 shows the comparison of males and females majoring in engineering as well as the percentages of African Americans and Whites majoring in engineering in the United States.

- Undergraduate students majoring in engineering nationally is 367,298 (Nettles & Perna, 1997)
  - Males: 81.9% and Females: 18.1%
  - White: 75% and African American: 6.8%
Table 4

Percentages of Undergraduate Students Majoring in Engineering Nationally by Race

<table>
<thead>
<tr>
<th>Race</th>
<th>Total Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>6.8</td>
</tr>
<tr>
<td>White</td>
<td>75.0</td>
</tr>
</tbody>
</table>

Student (n = 367,298)

Table 5 shows the percentages of African Americans and Whites graduating nationally with degrees in engineering.

- Undergraduate degrees conferred nationally is approximately 1,169,275 (NCES, 1999)
- Undergraduate degrees conferred in engineering nationally is approximately 78,043 (NCES, 1999)
  - White: 73.1% and African American: 4.9%
  - White males: 63.1% and White females: 10%
  - African American males: 3.5% and African American females: 1.4%
  - African American student graduating from a Predominantly White Institutions in engineering nationally is even lower at 3.5%

Table 5

Percentages of Degrees Conferred Nationally in Engineering by Race and Gender

<table>
<thead>
<tr>
<th>Race</th>
<th>Male</th>
<th>Female</th>
<th>Total Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>3.5</td>
<td>1.4</td>
<td>4.9*</td>
</tr>
<tr>
<td>White</td>
<td>63.1</td>
<td>10.0</td>
<td>73.1</td>
</tr>
</tbody>
</table>

Note: * African American students graduating from PWIs nationally are 3.5%.
Table 6 shows the comparison of African Americans and Whites in the state of Virginia.

- Population of the state of Virginia is 7,078,515, which is 2.5% of the United States total population (US Census Bureau 2002)
  - Males: 3,471,895 (49%) and Females: 3,606,620 (50%)
  - White: 5,120,110 (72.3%) and African American: 1,390,293 (19.6%)

Table 6

<table>
<thead>
<tr>
<th>Race</th>
<th>Total Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>19.6</td>
</tr>
<tr>
<td>White</td>
<td>72.3</td>
</tr>
</tbody>
</table>

Table 7 shows the percentages of African Americans and Whites in the state of Virginia in higher education.

- Out of the total 33 public and private four-year institutions in the state of Virginia there are approximately 207,789 undergraduate students (SCHEV, 2001)
  - Males: 44% and Females: 56%
  - White: 73.7% and African American: 17.2%
  - White males: 32.7% and White females: 41%
  - African American males: 6.1% and African American females: 11.1%
  - African American students enrolled in Predominantly White Institutions in Virginia is 9.9% while Whites represent 79.5%
Table 7

Percentages of Undergraduate Enrollment by Race and Gender in Higher Education in the State of Virginia

<table>
<thead>
<tr>
<th>Race</th>
<th>Male</th>
<th>Female</th>
<th>Total Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student (n = 207,789)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>6.1</td>
<td>11.1</td>
<td>17.2*</td>
</tr>
<tr>
<td>White</td>
<td>32.7</td>
<td>41.0</td>
<td>73.7</td>
</tr>
</tbody>
</table>

Note. * African American student population at PWIs in Virginia is 9.9%.

Table 8 shows the percentages of African American and White students majoring in Engineering in the state of Virginia.

- Undergraduate students majoring in Engineering in the state of Virginia is approximately 11,035 (SCHEV, 2001)
  - Males: 80.1% and Females: 19.9%
  - White: 70% and African American: 9.9%
  - African American students majoring in engineering at Predominantly White Institutions in the state of Virginia is 8.8%

Table 8

Percentages of African Americans and Whites Majoring in Engineering in the State of Virginia

<table>
<thead>
<tr>
<th>Race</th>
<th>Total Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student (n = 11,035)</td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td></td>
</tr>
</tbody>
</table>

Note. * African American students majoring in engineering at PWIs in Virginia is 8.8%. 
Table 9 shows the comparison of African American and White undergraduate students at Virginia Tech.

- Virginia Tech undergraduate student population is approximately 21,593 (SCHEV, 2001)
  - Males: 80.1% and Females: 19.9%
  - White: 81% and African American: 5%

Table 9

Percentages of African Americans and Whites at Virginia Tech

<table>
<thead>
<tr>
<th>Race</th>
<th>Total Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student (n = 21,593)</td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>5.0</td>
</tr>
<tr>
<td>White</td>
<td>81.0</td>
</tr>
</tbody>
</table>

Table 10 shows the percentages of African American and Whites majoring in Engineering at Virginia Tech.

- Virginia Tech undergraduate students majoring in engineering is approximately 4,756. This represents 22% of Virginia Tech total undergraduate student population and 43% of the state of Virginia students majoring in engineering (OMEP, 2001).
  - Males: 83% and Females: 17%
  - White: 77.1% (3,668) and African American: 4.5% (217)
  - White males: 64.6% (3073) and White females: 12.5% (595)
  - African American males: 3.3% (158) and African American females: 1.2% (59)
Table 10

Percentages of African American and Whites Majoring in Engineering at Virginia Tech by Gender

<table>
<thead>
<tr>
<th>Race</th>
<th>Male</th>
<th>Female</th>
<th>Total Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student (n = 4,756)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>3.3</td>
<td>1.2</td>
<td>4.5</td>
</tr>
<tr>
<td>White</td>
<td>64.6</td>
<td>12.5</td>
<td>77.1</td>
</tr>
</tbody>
</table>

Table 11 shows the comparison of African American and White undergraduate students receiving degrees in Engineering at Virginia Tech.

- Undergraduate degrees conferred in engineering in 2001 at Virginia Tech are approximately 962 (OMEP, 2001).
  - Males: 85.8% (825) and Females: 14.2% (136)
  - White: 84.4% (812) and African American: 3% (29)
  - White males: 72.4% (697) and White females: 11.9% (114)
  - African American males: 2.3% (22) and African American females: 0.7% (7)

Table 11

Percentages of Degrees Conferred in Engineering by Race and Gender at Virginia Tech

<table>
<thead>
<tr>
<th>Race</th>
<th>Male</th>
<th>Female</th>
<th>Total Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student (n = 962)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>2.3</td>
<td>0.7</td>
<td>3.0</td>
</tr>
<tr>
<td>White</td>
<td>72.4</td>
<td>11.9</td>
<td>84.4</td>
</tr>
</tbody>
</table>

The comparative data in this section has displayed the disproportionate figures of African American students compared to White students in higher education. In
particular, there is a significant low rate of African American students graduating with engineering degrees. This national phenomenon has raised research interest and awareness in bridging the gap for African Americans in higher education and technical fields like engineering.

African Americans in Higher Education

"Most of the college impact literature is based on the experiences of White students and the vast majority of these studies have been conducted at large research-oriented universities" (Watson & Kuh, 1996, p. 415). With the onset of underrepresented groups attending PWIs, scholars have turned their attention to the major characteristics that focus on retention and attrition rates of African American students on these campuses. According to Moore (2001), 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.

Over the years, African American students’ college attendance patterns in the United States have changed significantly (Nettles & Perna, 1997). "In 1964, 60% of African American students attended historically Black institutions. By 1968, 80% of all undergraduate degrees awarded to African Americans were earned at Black colleges or universities. By 1973, the proportion of African American students attending HBCUs declined to roughly 25%" (Allen, 1985, p. 134).

In the year 2000, there were over 34 million African American people living in the United States, which comprised one of the largest ethnic minority groups in America at 12.3% of the total population (see Table 1) (US Census Bureau, 2002). Currently society is witnessing a growing number of African American students enrolling in college
(Ginter & Glauser, 1997; MacKay & Kuh, 1994), and many attend predominantly White institutions (Ginter & Glauser, 1997; Nettles, 1988). Despite this trend, graduation rates for African Americans at PWIs have not increased along with growing enrollment trends (Carter & Wilson, 1997). With regard to higher education, African Americans are enrolled at 10.7% (see Table 3) of the college population nationally and only 6.2% at PWIs (Nettles & Perna, 1997). In addition, African American enrollment since 1990 has experienced the smallest increase among the four major ethnic minority groups (Carter & Wilson, 1997).

Research findings suggest that African American students have not fared well on predominantly White college campuses (Darden, Kamel & Jacobs, 1998; Nettles, 1988; Scott, 1995). Although African American enrollment has increased, degree attainment has stagnated and actually declined, especially for minorities in engineering fields (Hrabowski, Maton, & Grief, 1998; Hrabowski & Pearson, 1993). The overall achievement rate for African American students lags behind that of White students at PWIs (Nettles & Perna, 1997). Of the average entering group of White students, 59% graduate after five years, compared to only 35% of African American students (Jones-Wilson et al, 1996). Compared to their White counterparts, African Americans have lower persistence rates, lower academic achievements levels, less likelihood of enrollment in advanced degree programs, poorer overall psychosocial adjustment, and lower post-graduation occupational attainments and earnings (Allen, 1985; Moore, 2001; Nettles, 1988).

Although minority student enrollment at PWIs has increased dramatically, many African American students continue to face formidable cultural and transitional problems
on these campuses (Astin, 1982; Fleming, 1984; Jackson & Swan, 1991; Nettles, 1988; Thomas, 1981; Schwitzer, Griffin, Ancis & Thomas, 1999). Research results suggest that a significant portion of the African American students who attend PWIs leave by their sophomore year in college (Jackson, 1992; Jones-Wilson et al., 1996). African American students' attrition rates tend to be five-to-eight times higher than those for White students on the same campuses (Allen, 1985). Moore (2001) attributed the inadequacy of PWIs to meet the needs and expectations of African American students as a factor in poor retention rates. Moore also concluded that the needs of African American students are quite different from their Caucasian counterparts.

Cultural and Environmental Conditions

African American students often feel isolated and alienated at PWIs (Allen, 1985; Moore, 2001; Nettles, 1988; Schwitzer et al., 1999). African Americans face a greater diversity of problems on White campuses than majority students do (Carroll, 1998). Schwitzer et al. (1999) conducted a qualitative study of 32 (13 women and 19 men) African American seniors at a PWI. The findings revealed that African Americans have social adjustment problems at PWIs. Schwitzer's et al. (1999) study supports the findings of Nettle's study in 1988. Nettle's study concluded that White students have significantly greater academic integration and commitment to their institutions, while African American students have significantly greater interfering problems, less social integration, and more feelings of racial discrimination. Much of the difficulty was directly or indirectly related to African American students' negative interpersonal experiences at PWIs (Nettles, 1988).
Another study by Carroll (1998) found that African Americans at PWIs constantly felt socially isolated and uninvolved in campus activities. These students typically had lower levels of satisfaction, inability to identify with the institution, and tended to have higher levels of stress and anxiety than African Americans that attend HBCUs.

Schwitzer's et al. study findings revealed that African Americans have social adjustment problems at PWIs. For example, the participants reported feelings of being “underrepresented,” “isolated,” or “alienated” (p. 192). Respondents tended to feel distinctly less supported than they had in their home and high school communities. The students reported that they felt “unsupported” and “different” and that the transition to the institution’s social climate had been “hard,” “difficult,” “a struggle,” or “unhappy” (p. 192). As a further illustration in Schwitzer's et al. study, one African American student said she “always felt isolated. When you enter a room, you look for another Black person and you always speak” (p.192). A male student similarly in this study describes “how uncomfortable it was to walk into a class room” (p. 192). Another student reported “The first time I felt like a minority was at this school” and “It’s weird to feel like a minority.” "They also felt frustrated, overlooked, or misunderstood by others on campus because of their race" (p. 192). The stress of an alien cultural and social environment leads to more frequent academic and other problems for African American students attending PWIs (Burrell & Trombley, 1983; Nettles, 1988; Schwitzer et al., 1999).

A study by Reisber (1999) summarizes the experiences African American students often encounter at PWIs:

Having grown up in Boston, Tito Jackson experienced culture shock during his first week at the University of New Hampshire. When he saw
only one other black face at an orientation event for 2,400 freshmen, he wanted to go home, he says. A senior now, majoring in history, Mr. Jackson has adjusted to being the only black student in many of his classes. But some things still bother him - such as when he is mistaken for an athlete, not just because of his size (6-foot-2, 240 pounds) but also because of the color of his skin. "It's gotten to the point where people just ask, 'How was the game this weekend?' or 'What number are you?' not like, 'What's your major?'" he says. He has found such stereotypes common at New Hampshire, where only 73 of the 10,000 undergraduates are black. (p. A49)

African Americans in Engineering

Herbert Hoover (1874-1964), the thirty-first President of the United States, as well as an American Mining Engineer once spoke (Donaldson, 1999) on engineering:

Engineering is a great profession. There is the fascination of watching a figment of the imagination emerge through the aid of science to a plan on paper. Then it moves to realization in stone or metal or energy. Then it brings homes and jobs to men. Then it elevates the standards of living and adds to the comforts of life. That is the engineer’s high privilege. (p. vii)

A national effort began in 1972 to increase the numbers of minorities in engineering (Morning & Fleming, 1984). During the thirty year span since this effort began, some progress was made, but the attrition for minority students is still estimated at 70%. (Good, Haplan & Haplin, 2002; Morning & Fleming, 1994) "The increasing rate of African American students’ attrition is an issue of growing public concern and research
interest. This national phenomenon is particularly significant in engineering programs" (Amenkhienan, 2000, p. 27). Of the 367,298 undergraduate students majoring in engineering nationally, Whites comprise 75%, and African Americans constitute 6.8% (see Table 4) (Nettles & Perna, 1997). Out of 78,043 undergraduate engineering degrees conferred, Whites constituted 73.1% and African Americans comprise of 4.9% nationally (see Table 5) and 3.5% at PWIs (NCES, 1999). Given engineering programs' high attrition rates, there is a notable shortage in the engineering profession and under-representation of minorities (Good et al., 2002; Morning & Fleming, 1994).

The retention rate for Whites in engineering degree programs is approximately 50 percent, and for minorities, only about 30 percent (Morning & Fleming, 1994). Thus, the challenge of the 1970s to increase the number of technical professionals remains 30 years later in the new millennium. One explanation for this disparity may rest among the lack of education preparation at the elementary and secondary levels.

In today's technical workforce, nationally the high student attrition for African Americans in engineering programs is noticed as a threat to the economy (Good et al., 2002). With the world becoming increasingly technological, this means that the proportion of African Americans participating in the “technological revolution” via engineering is small as well (Amenkhienan, 2000; Morning & Fleming, 1994; Moore, 2000). Levin and Wyckoff (1995) attribute much of the attrition to inappropriate educational planning. Examining issues in engineering at the national level is but one approach. Another way to view these issues is at the institutional level. Virginia Tech is a case in point.
African Americans at Virginia Tech

Virginia Polytechnic Institute and State University (Virginia Tech) is primarily a technical school located in the mid-Atlantic. Virginia Tech currently enrolls 21,593 undergraduate students (see Table 9). African Americans make up 5% of this student population (SCHEV, 2001). At Virginia Tech, a large percentage of African American students do not experience satisfactory progress towards a degree (Scott, 1995). African American students, for unknown reasons, encounter a great deal of academic difficulty in the Virginia Tech environment. Ten years of data from the institution's research office indicate that African American students at Virginia Tech experience disproportionate levels of academic failure. Scott (1995) revealed that African American students experience a high number of failures during their freshman year at Virginia Tech. Consequently, graduation rates of African American students fall short of their White peers (Scott, 1995).

Scott's (1995) study on African American students at Virginia Tech also revealed that academic performance is related to the conditions in the academic and social environments. Two relevant themes emerged from this study to help explain these conditions: (a) the personal attributes and commitments students bring to the institution, and are willing to invest helps to navigate their academic success or failure; and (b) the experiences and interactions between African American students and faculty are pivotal to students academic behavior patterns. Another finding reported in this study was African American students believed that White faculty were uninterested in their well being and oblivious to their needs. This contention is supported in the literature with Schwitzer et al. study that revealed that African American students felt "isolated,"
"frustrated," misunderstood," and "overlooked" at PWIs (p. 192). The results from Scott's work is consistent with and echo's the findings of previous research discussed in this chapter at the national level (Allen, 1985; Burrell & Trombley, 1983; Carroll, 1998; Moore, 2001; Nettles, 1988; Reisber, 1999; Schwitzer et al., 1999).

Engineering at Virginia Tech is the most popular undergraduate degree major for incoming freshman annually. Virginia Tech is known as the home of Virginia's entrepreneurial College of Engineering, the leading College of Engineering in the Commonwealth (OMEP, 2001). Approximately 4,756 of Virginia Tech undergraduate students major in engineering. This figure constitutes 22% of Virginia Tech total undergraduate population (see Table 10) and 43% of the state of Virginia students majoring in engineering (SCHEV, 2001). In September of 2000, US News & World Report ranked Virginia Tech's College of Engineering 17th in the nation (OMEP, 2001). Among peer engineering schools nationally, Virginia Tech's College of Engineering ranked 9th of the total number of undergraduate degrees awarded and 14th for the number of women receiving degrees. The College has more than 40,000 living alumni (OMEP, 2001).

Engineering at Virginia Tech includes several fields of technology and science-related areas. Majors within engineering include Aerospace, Biological Systems, Chemical, Civil and Environmental, Computer, Electrical, Engineering Science and Mechanics, General, Industrial and Systems, Materials Science and Engineering, Mechanical, Mining and Minerals, and Ocean Engineering. This makeup differs from that of other campuses because engineering is a central focus on Virginia Tech’s campus (OMEP, 2001).
Undergraduate African Americans at Virginia Tech make up only 217 or 4.5% of the total student population (4,756) majoring in engineering (see Table 10). In 1990, there were forty African American freshmen, compared to sixty-five in 2001. From 1991 to 1997 there was a 73% attrition rate for African Americans majoring in engineering. Moreover, in 1990, 14 African American students earned engineering degrees compared to 29 (3%) out of 962 in 2001 (see Table 11). From 1993 to 2001, 198 African Americans received a degree in engineering (OMEP, 2001). The need for fresh approaches to enhancing African American students’ success in Engineering at Virginia Tech becomes apparent given the problems these students have experienced in pursuing their academic goals while adapting to a predominantly White environment. Given the issues and concerns related to the success rates of African Americans in engineering, academic advising may be an area responsive to students needs.

Academic Advising in Higher Education

Currently, academic advising is considered one of the best vehicles for promoting intellectual, personal, and social development of students (Applyby, 2001; Crocket, 1985; Crookston, 1972; Ender, Winston, & Miller, 1984; Grites & Gordor, 2000; Gordon et al., 2000; Winston, 1996). Advising and counseling has been an integral part of the college experience for many years. Academic advising was first formalized at Kenyon College in the 1820s (Frost, 1991). Academic advising was introduced to the American university in the late 1800s, with the onset of the elective system (Frost, 1991). Thus, students were given more freedom to choose their classes. At that time, the role of advising belonged to faculty members who helped students select courses.
Academic advising has undergone tremendous changes since its origin in higher education, particularly since the 1970s (Winston, 1996). During that decade it was recognized that advising was more than the scheduling of classes. Also during the 1970s, advising was seen as a viable service to assist and retain students in higher education (Gordon et al., 2000). In 1977 academic advising developed into a profession represented by national organizations such as the National Academic Advising Association (NACADA) and has since developed codes of ethics and standards (National Academic Advising Association, 2002).

Academic advising is an important part of a student's education. Today, students are responsible for their own choices and the role of the faculty advisor has become primarily one of assisting students with the transition from high school to college, program planning, course selection, and career development (Ender et al., 1984). With the increased use of technology at the university level, many students are communicating and registering for classes online. This technology has maximized educational potential through communication and information exchanges with an advisor. This process requires the involvement of both the student and the advisor.

Academic advising assists students in clarifying their career goals and in the development of educational plans for realization of these goals (Ender et al., 1984; Winston, 1996). "Academic advising is a systematic process, based on student advisor relationships, conceived to aid students in achieving academic goals, career goals, and personal goals" (Ender et al., 1984, p.18). Kuh (1997) posited:

For many students, advisors are the only institutional agents who seem to know what is required to negotiate the academic path to graduation. In a
sea of ambiguity, somebody with definitive answers is a life-saver! Few others know students as well as their academic advisors. Thus, academic advisors are uniquely qualified to help students decide not only what classes to take, but also what to make of college. (p. 9)

The faculty advisor should wear many hats and continue to serve the student as a facilitator of communication, a coordinator of learning experiences through course and career planning and academic progress review, and an agent of referral to other campus agencies as necessary (Gordon et al., 2000). Academic advisement, also called counseling, has become an invaluable service to the student in American higher education. Wicas (as cited in Paris, 1982) found the following on counseling:

Counseling is a person-to-person situation. It involves an individual on the one hand who expresses an awareness of some unhappiness, doubt, or problem troubling one, and who comes to another individual who, by reason of training and experience, is looked upon as a helping agent to assist the first individual to work through to a solution of the things troubling them. (p. 13)

Both academic advisors and counselors seek to help the students navigate their academic careers. Both are concerned with the development of students and both desire that students succeed and become the best individuals.

Academic advising has been targeted as an effective means of increasing student satisfaction and retention (Applyby, 2001; Grites & Gordon, 2001; Gordon et al., 2000; Winston, 1996). As an area of student-personnel services, academic advisement is concerned with the well-being of the student’s academic career. Academic advising is a
means of exploring careers and majors and then a method for selecting courses and
arranging schedules. As partners in the process, students can learn to discover options,
frame questions, gather information, and make decisions, which can increase their
involvement in college and encourage them to persist to graduation (Crocket, 1985;

Academic advisors have helped retain students through their guidance and
positive influence on students (Crocket, 1985; Gordon et al., 2000; Tinto, 1987; Winston, 1996). Burrell and Trombley (1983) reported that 947 institutions found retention rates
have increased at least 25% for institutions that improved academic advising programs.
Anderson (1985) found that one of the strongest factors on student persistence in college
is individual attention. The researcher believes that this attention can be expressed by
helping students:

1. Identify and clarify their purposes for attending college
2. Affirming themselves as persons in terms of potential, abilities, skills,
   worth and uniqueness to be successful
3. Deal with patterns of self-defeating behavior and anxiety.

Academic advising has the capabilities to link, promote and develop the academic and
personal worlds of students in college as they persist towards their goals of graduation
and employment. Academic advising impacts not only the lives of the students, but the
institution as well (Ender et al., 1984; Gordon et al., 2000; Winston, 1996).

Advising African Americans

Academic advisors have the opportunity to play a valuable part in easing the
transition of African American students to a PWI (Burrell & Trombley, 1983). Burrell
and Trombley (1983) surveyed a total of 542 minority (96% African Americans) students from five colleges. In this study they found that academic advising was the most important student support service across all colleges for African Americans. Scott (1995) reported that African American students at Virginia Tech thought that academic support services were very important to them. On the contrary, White students at Virginia Tech perceived academic support programs as being less important, yet they continued to attain higher grades and higher graduation rates. Another study that correlates with Burrell and Trombley's, and Scott's research is a study by Littleton conducted in 2001. Littleton (2001) surveyed four colleges in the Appalachian region of the United States. Littleton's research revealed that caring faculty and administrators at PWIs were major variables for African American students' persistence at PWIs.

The transition from high school to a PWI culture can bring special anxieties for African American students (Burrell & Trombley, 1983; Littleton, 2001; Nettles, 1988; Schwitzer et al., 1999). Advisors at PWIs can demonstrate sensitivity to their adjustment stress by encouraging African Americans to discuss their expectations of college and career aspirations (Burrell & Trombley, 1983). Early forms of successful assistance, mentoring, counseling, and advising of African American students enables the institution to respond to student needs and concerns before they materialize into significant academic or social problems (Burrell & Trombley; 1983; Herndon, 2001; Littleton, 2001; Moore, 2001; Schwitzer et al., 1999). It is clear in the scholarly literature that academic advising has benefits for African American students in general. However, academic advising may take on a different role for African Americans pursuing degrees in engineering.


Advising Engineering Students

Academic advising is believed to be an important component in student retention in engineering (Levin & Wyckoff, 1995; Morning & Fleming, 1994). There is a vast body of literature on academic advising. However, little attention has been given to exploring how academic advising activities may enhance the academic success of minorities in engineering attending PWIs. The goal of academic advising is to assist students in making informed decisions regarding educational alternatives (Crocket, 1985; Ender et al., 1984; Levin & Wyckoff, 1995; Tinto, 1987; Winston, 1996). In a qualitative study, Good, Haplin and Haplin (2002) researched 58 African American students in engineering. Their study revealed that students wanted their advisors to make more of an active effort when interacting with them. Levin and Wyckoff (1995) attribute the majority of attrition in engineering to inappropriate educational planning. The researchers continue to assert that academic advising is the key means to address attrition at PWIs.

Levin and Wyckoff (1995) studied 1,043 engineering students at a large, mid-Atlantic research university and found that academic advising for engineering students did not address the specific characteristics of individual students. They stated that academic advising in engineering focused only on course requirements for specific engineering majors and paid little attention to individual interest, ability, or appropriateness. They perceived academic advising in engineering as intuitive, unsystematic and founded upon assumptions rather than empirical findings.

Levin and Wyckoff go on to reveal that students are at risk when educational decisions are incongruent. Therefore the risk of students not succeeding increases when decisions are both incongruent and uninformed. When advisors have not been informed
by research on student variables related to persistence and success, students and advisors operate at an intuitive level, which may put students at risk (Levin & Wyckoff, 1995). Furthermore, these findings show that it is imperative that advisors, faculty, and staff be conscious of the academic advising styles preferred by African Americans students in engineering. An early form of successful assistance may enable the African American student to persist in engineering. The literature on academic advising is vast, however there are two major theoretical perspectives that dominate scholarly inquiries related to advising.

Prescriptive and Developmental Advising

Crookston (1972) first postulated a theory defining the student-advisor relationship as either prescriptive or developmental in approach. Crookston contrasted prescriptive academic advising with developmental advising, and this dichotomy still largely holds in the literature today. These two predominant models of academic advising are the chief theoretical underpinnings in the advising profession.

Prescriptive Advising

Prescriptive advising focuses on the requirements of academic performance and not on the holistic development of students. Prescriptive academic advising is a more traditional advising process, in which the advisor takes the responsibility for diagnosing the student's problems and prescribes solutions, functioning as an authority figure. Academic concerns such as course selection are the only or the primary focus of the process (Appleby, 2001; Crookston, 1972; Grites & Gorden, 2000; Winston & Sander, 1984).
Prescriptive advising sees the advisor's role as primarily that of information giver. Advice given during prescriptive advising sessions concentrates on course registration, choice of major and academic rules and regulations (Appleby, 2001; Crookston; 1972; Grites & Gordon, 2000; Lowenstein, 1999). In a classic article in the advising literature, Crookston (1972) explained prescriptive advising with the following medical metaphor: "The patients (i.e., advisees) are people who seek the advice of doctors (i.e., advisor) when they realize they have a medical (i.e., academic) problem or an ailment. The doctors are the authorities who prescribe treatments to cure patients' problems. The doctor makes a diagnosis, prescribes medication, or gives advice. Therefore, if the student follows the advice, the problem will be solved" (p. 12). According to Crookston, a prescriptive advisor assumes that “once advice is given, his responsibility is largely fulfilled; now it is up to the student to fulfill his responsibility to do what is prescribed” (p. 12). Prescriptive advising is a style of advising that is characterized by (Lowenstein, 1999):

1. hierarchical relationship
2. one-directional flow of information and ideas
3. the student as passive recipient.

The prescriptive advising model reflects a methodology typical of traditional academic advisement programs. It places an emphasis on the superior knowledge and experience of the advisor and de-emphasizes the role of the student in the advisement process. The advisor who uses the prescriptive style tends to focus on students’ limitations instead of their potential. It assumes that all students are equally prepared for the work required of majors in a particular field and merely provides them with a list of
courses needed to complete the program or degree. The burden of eliciting additional information falls on the student; the student's failure to elicit that information is often seen as evidence of the student's unreadiness for university-level work (Appleby, 2001; Crookston; 1972; Grites & Gordon, 2000; Lowenstein 1999).

Developmental Advising

Developmental advising is a style of advising that is considered the opposite of prescriptive advising. The broadened approach to advising that many schools are now employing can be summed up in the developmental advising model (Grites & Gordon, 2000). Developmental advising is an intensive process where the student and the advisor have the same measure of equality and both take an active role in advisement activities (Appleby, 2001; Crookston, 1972; Grites & Gordon, 2000). Developmental advising sees the advisor's role as primarily that of an enabler.

Developmental advising promotes a collaborative, caring relationship between advisor and student, encouraging involvement and fostering development. It 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). The goal of developmental advising is to help students clarify interests, skills, attitudes, and values as they relate to the college experience and career goals. These goals will help develop life skills that will facilitate success; experience choice and develop autonomy; experience achievement; and develop purpose and direction (Appleby, 2001; Crookston, 1972; Grites & Gordon, 2000). Ender et al., (1984) suggested that:
Developmental academic advising is defined as a systematic process based on a close student-advisor relationship intended to aid students in achieving educational, career, and personal goals through the utilization of the full range of institutional and community resources. It both stimulates and supports the students in their quest for an enriched quality of life…Developmental advising relationships focus on identifying and accomplishing life goals, acquiring skills and attitudes that promote intellectual and personal growth, and sharing concerns for each other and for the academic community. (p.19)

Crookston argued that a developmental advisor views the advising process “as a shared experience and recognizes that the student is not likely to learn from the relationship with the advisor unless the advisor himself is also open to learning” (p. 14). The burden of providing information necessary to the student's success is accepted, initially, by the advisor; the student's inexperience with higher education suggests a need for the advisor to guide the student to reliable sources of information on a broad range of topics. The student's responsibility is to take advantage of information and guidance and become active in seeking it out (Crookston, 1972; Grites & Gordon, 2000). In developmental advising, the advisor and student are seen as partners. They have a high degree of interaction between the advisor and advisees in order to define long-term as well as short-term academic goals. This style is characterized by (Lowenstein, 1999):

1. dialogue

2. two-way flow of ideas and information (while recognizing that the advisor may have specialized knowledge that the student does not)
3. question-and-answer approach

4. the student as active participant

Unlike the advisor role in prescriptive advising, the advising role becomes one of collaboration with the advisee. In this role the advisor must be able to diagnose and prescribe as well as be supportive, empathetic and involved (Crookston, 1972; Lowenstein, 1999).

Universities and academic advising offices are transforming their advising style from prescriptive to developmental to better serve the needs of diverse students, who increasingly comprise today's student population (Grites & Gordon, 2000; University Task Force, 1999). Several researchers (Crockett & Crawford, 1989; Herndon, 1993; Herndon, Kaiser & Creamer, 1996; Winston & Sandor 1984a) have concluded that students want to retain their autonomy and decision making freedom with a strong support system from their advisor, thus indicating that they prefer developmental advising. Developmental advising approach is believed to best serve the needs of American college students (Crockett & Crawford, 1989; Crookston, 1972; Herndon et al., 1996; Winston & Sandor, 1984b).

Winston and Sandor (1984a) reported that students preferred the developmental advising approach to the prescriptive advising approach. There were no significant relationships found between advising styles preferences for gender or race. This conclusion resulted from a study of 470 undergraduates at the University of Georgia, who took the Academic Advising Inventory. However, a similar study conducted by Crockett and Crawford (1989) who surveyed 201 (155 White and 46 Black) students at the University of Arkansas at Little Rock, revealed that characteristics of students such as
gender were significantly related to student preference for a developmental advising relationship. Women had a significantly higher score then men for a preference of a developmental style of advising.

A similar study by Herndon, Kaiser, and Creamer (1996) investigated at a 2-year commuter college the relationship between race and gender to determine if specific groups of students had experienced a certain style of advising, prescriptive or developmental. A statistically significant difference was found between gender and race on the type of advising students actually received from their advisor. African American males received more prescriptive advising than White males. African American females received a prescriptive style of advising but not as high of a score when compared to White females and African American males. White females also received more prescriptive advising than White males. The study also focused on the two groups' preferences for an advising style. The research indicated that all students, regardless of their group preferred developmental advising. This study also revealed that African American females strongly preferred developmental advising more than other groups.

Academic Advising at Virginia Tech

Advising is an important part of the educational experience for all students at Virginia Tech and impacts student satisfaction, retention and graduation rates (UTF, 1999). The decision to examine advising occurred as a result of a 1996 Alumni Questionnaire that indicated low levels of satisfaction with advising at Virginia Tech. In September of 1998, the Provost at Virginia Tech appointed the University Task Force on academic advising to examine undergraduate advising.
The University Task Force examined student/advisor needs, responsibilities and methods of students, and departmental structures. Based on the findings, the Task Force acknowledged the need for improved advising at the University. One of the goals of the Provost study was to move the Virginia Tech faculty academic advisor to a more developmental model advisor.

The research findings also revealed that Virginia Tech does not have a definition, philosophy or statements of expectations and responsibilities for advising. Fifty-three departments reported using faculty for advising. Five colleges reported having no release time for advising. The study revealed that there are limited professional development opportunities for advisors within the University. Both students and advisors believe opportunities for professional development are important to the success of advising.

The study continued to reveal that advisors were often unfamiliar with strategies and available resources that can assist with advising students. For example, a questionnaire about advising for minority students revealed that out of 56 departments on campus only 10 reported having special interventions for minority students, and 46 did not. Assessments of advising were found to be relatively weak. The most common indicator of advising effectiveness was the use of graduation rates. Four schools used student surveys to evaluate advising.

Primary themes and information were discovered from student focus groups and interviews, which included the following results (UTF, 1999):

1. Faculty advisors, professional advisors and staff members all have important roles in providing information and helping students through the often-confusing "academic maze."
2. Advising opportunities should be offered to all faculty members, but given only to those who accept the responsibility.

3. Many students want private, one-on-one conversations with advisors who are sincere.

4. Students expect advisors to know their advisees so, for example, they know what job opening would be suitable for certain students.

5. Students believe that effective advising requires a partnership between the student and the advisor.

6. Students have expectations that the advisors be attentive to individual needs and characteristics.

7. Students felt that the advisor were inconsistent, not interested, not familiar with policies and procedures, as well as not having enough time with advisors.

8. Advisors should listen, maintain a balance between coddling and encouragement, understand student's personal and academic issues/needs, be approachable, respect difference, not make assumptions, like students and enjoy advising, want to advise, follow up with students and have adequate time to advise and not too many advisees.

No scholarly work has been done at Virginia Tech to follow up on the previous research done by the University Task Force that was appointed by the Provost in 1998 to see if the University has changed to promote a more developmental environment. Improving advising is going to be a continuous
process. Faculty must continue to demonstrate their availability to students who seek their advice and improve their knowledge of the institution's curriculum, resources and opportunities.

This present study's goal is to see if Virginia Tech faculty in the College of Engineering have provided a developmental advising style when advising all engineering students regardless of race or gender. Furthermore, no research to date has investigated the expectations and experiences of engineering students regarding the prescriptive-developmental advising model. The findings from this study may generate additional insight for the improvement of advising and potentially increase student satisfaction, communication and persistence in the College of Engineering at Virginia Tech.

The Importance of African American Students Communication with Faculty

An important resource available to students in the transition from high school to college is a role model, who can be a faculty member, an administrator, an academic advisor, or another individual with whom the student looks up to and regularly interacts with (Herndon, 2001; Littleton, 2001; Sedlacek, 1987; Schwitzer et al., 1999; Tan, 1995). Anderson (1985) reported that a strong support system could help students persevere in college. Helping students' feel that they belong on campus and are members of a community is extremely important. A positive influence on African American students at a PWI can assist the student in dealing with issues such as racial prejudice and stereotyping (Burrell & Trombley, 1983; Nettles, 1988; Schwitzer et al., 1999; Sedlacek, 1987). In many cases an advisor has an opportunity to act as a buffer towards many social and psychological difficulties that African American students face at a PWI (Tan,
Several studies have found that African American students on PWIs who were better prepared academically, were also on better terms with faculty members. These successful students found their institutions to be generally supportive of their educational endeavors, and consequently seemed to make a greater effort to interact with their professors (Cokley, 1999; Herndon, 2001; Littleton, 2001; Moore, 2000; Schwitzer et al., 1999; Tan, 1995).

Sedlacek (1987) identified the ability to realistically appraise one's experiences as a variable in African American students' persistence at PWIs. This self-assessment pertains to both academic issues and student life (Sedlacek, 1987). Schwitzer et al. (1999) reported that the quality of African American students’ relationships with peers, faculty, and administrators tended to be almost as important as individual effort to their achievement. When African American students perceived that they were in a supportive environment, they also experienced greater satisfaction with college, adjusted to the environment and were more likely to persist through graduation. A good advisor can be correlated to better grades, higher persistence, and higher satisfaction with campus life (Cokley, 1999; Littleton, 2001; Schwitzer et al., 1999; Tan, 1995).

Schwitzer's et al. (1999) study complements Moore's (2000) study of the persistence of African-American male engineering students which revealed that their academic success was related in part to academic support services. These students believed that persistence and achievement were directly related to seeking and using the available resources on campus when needed. Such resources include interacting with faculty and peers, as well as taking advantage of supportive services provided by the Office of Minority Engineering Programs.
According to Moore (2001), 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. An important variable that is evident for African American students is a strong support system or person. African Americans often turn to friends and family for support (Herndon, 2001; Moore, 2000).

Cokley (1999) studied 206 African American students who completed the Multidimensional Inventory of Black Identity. This research found that African American students attending PWIs have less favorable relations with their professors than their counterparts at HBCUs. They found that students at HBCUs exhibited a higher degree of African self-consciousness than their counterparts at PWIs. African American students often perceive faculty and academic support services to be uninviting and inaccessible at PWIs (Moore, 2000; Nettles, 1988; Schwitzer et al., 1999; Scott, 1995; Sedlacek, 1987). Several researchers have explored the difficulties that African American students face at PWIs due to racism and a general lack of connection and support (Cokley, 1999; Herndon, 2001; Moore, 2001; Schwitzer et al., 1999; Scott, 1995; Tan, 1995). Sedlacek, (1987), Cokley (1999), and Schwitzer (1999) agree that African American students deal with racism and face difficult adjustments at a White university. They also found that African Americans are particularly in need of a person they can turn to for advice and guidance.

Hurdles Approaching Faculty at a Predominately White Institute

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. Sedlacek also identified
that poor communication with faculty, particularly White faculty members, was a problem for African American students. African American students have consistently reported believing that White faculty are prejudiced toward them (Moore, 2000; Schwitzer et al., 1999; Scott, 1995; Sedlacek, 1987). Moore (2001) reported that faculty members often view African American differently than they do White students. White professors often harbor negative stereotypes about African American students' academic ability and potential. African American students found that it is harder to receive straightforward information on which to base their evaluations of how well they are faring academically (Schmader, Major, & Gramzow; 2002; Sedlacek, 1987). White faculty members may give less consistent reinforcement to African American students than they give to White students (Moore, 2000; Moore, 2001; Sedlacek, 1987; Schmader et al., 2002; Schwitzer et al., 1999). As a result of this approach African American students begin to manifest feelings of resentment due to the belief that faculty members are ignoring them or paying less attention to them (Darden, Kamel & Jacobs, 1998). It is a misfortune that many African American students experience this displeasing perception.

In Schwitzer's et al. study respondents said that approaching professors was “kind of intimidating” or “felt too uncomfortable.” One person said she “feels dumb. He talks above me.” Another felt his faculty advisor “doesn’t really care about students.” Several people said they evaluate an instructor’s approachability by his or her classroom behavior. For example, one person said that in certain classes, “professors make it seem like you can’t ask them questions” (p. 194). Furthermore, respondents talked more directly about their concerns that being African American might negatively affect their
relationships with faculty. As an illustration, one woman said, “If I need help, I need help. Some professors feel I need help because I’m Black.” Another said that she feels “intimidated going to the teacher when a class is White and male-dominated.” Several also believed faculty members were uninformed or inexperienced in relation to African Americans. For example, they said “professors need to be aware, especially older professors,” and there is a “need to educate teachers (about diversity)” so that approaching them would feel less risky to some African American students. (Schwitzer et al., 1999, p. 194).

Faculty members as advisors are important components of this advising equation. It is important to remember that faculty members only receive one chance to make a first impression. The initial contact is extremely important with African American students. African American students already have a sense of hesitation, uncertainty, or difficulty when initiating interaction with faculty (Schwitzer et al., 1999). This hesitation is due to the fact that there is an element of mistrust of an authoritative figure, particularly one who is a nonminority (Schmader et al., 2002). A successful initial contact with a faculty member can reduce the stress for an African American student at a PWI (Burrell & Trombley, 1983). Student initiative is a necessary step in establishing working relationships with faculty. This is an obstacle for many students to overcome.

African American students often find difficulty forming relationships with White faculty and staff. African Americans who had African American role models had a higher level of satisfaction with academic experiences (Tan, 1995). Additionally, African American faculty and staff are often not available, and African American students have
expressed a need for more African American faculty and staff in general (Darden et al., 1998; Sedlacek, 1987).

African American Faculty at Predominately White Institutions

African Americans constitute one of the largest racial minority groups in the United States (US Census of Bureau, 2002). Despite three decades of affirmative action, there have been little changes in the advancement of African Americans in higher education (Jones-Wilson et al., 1996). African American faculty remains greatly underrepresented on many colleges campuses today (Darden et al., 1998). Darden et al. (1998) found that the percentage of White faculty exceeds the percentage of White students regardless of institutional type, private or public. However, the opposite relationship was found for African American faculty and African American students. The percentage of African American students exceeds the percentage of African American faculty regardless of institutional type (p. 12).

Student populations at PWIs have become more diverse. This fact has resulted in a sense of urgency to increase the representation of people of color on college faculties. Darden et al. (1998) reported that African American faculty nationally at four-year public and four-year private PWIs are only 1.3% and 1.4% respectively. Moreover, this trend is expected to continue, because the number of African Americans obtaining doctoral degrees has continued to decline over the years. "Furthermore, a large percentage of African Americans receiving doctorates have received degrees primarily in the social sciences; whereas very few have graduated with degrees in the life sciences, physical sciences, or engineering" (Darden et al., 1998, p. 6)
The faculty at Virginia Tech remains predominately White and male. This fact is consistent with other PWIs nationally (Darden et al., 1998). According to data from the Provost Administration Office, in the fall of 1997, 90 percent of tenure track faculty was White, compared to 87 percent in fall of 2001. African Americans constitute 3.1 percent of faculty at Virginia Tech. In the College of Engineering there are 281 faculty members with only five being African American (OMEP, 2001).

Scott's (1995) study revealed that African American students have expressed concerns about the lack of African American faculty and staff at Virginia Tech. Absence of powerful African American figures as role models has strong effects on the feelings of loneliness and isolation of African Americans (Burrell & Trumbley; 1983; Cokley, 1999; Hrabowski & Maton, 1995; Moore, 2001; Nettles, 1988; Schweitzer et al., 1999; Sedlacek, 1987; Tan, 1995). The lack of a variety of viewpoints or cultural perspectives relevant to African American students can also affect their learning, development, and identification with the institution (Cokley, 1999; Sedlacek, 1987; Tan, 1995).

Data from Burrell and Trombley (1983) showed that when minority students are faced with academic problems, they were most likely to turn to minority professionals. A qualitative study by Scott (1995) on the Virginia Tech campus revealed that African Americans felt a need for more African American faculty on campus. They believed that this would help to make them feel more comfortable at Virginia Tech. Faculty issues on Virginia Tech campus evolved from two perspectives. Some African American students in this study were concerned about the disproportionate under-representation of African American faculty on campus, and others were concerned about the negative behaviors of
White faculty toward African American students. Racism among White faculty members is something they believed is prevalent on this campus.

An African American student in Scott's (1995) study revealed an unpleasant experience with an academic advisor in the College of Engineering. The student shared the following comments:

When I first got here, I was an engineering student, and that did not go very well. The summer my freshman year, I wanted to take this philosophy class and the woman said, "Are you sure? It is a very difficult class, and I am looking at your high school records…it seems like you might have some trouble in this area…I don't think your should go down this avenue at all." She didn't ask me how I felt, or about my interests…It is the mentality. They put you in a category…that you are expected to turn out this way…it's just unfortunate to see people in these institutions with these positions, and they don't know the whole situation. You try to tell them, and they'll make up some excuse to cover their butts. Basically, I was very angry. (p. 160)

A common theme that Scott's study concluded in student-faculty relationships is that African American students on the Virginia Tech campus often expressed extreme emotional frustration towards interacting with White faculty and advisors. Similar statements were continuously revealed such as; "it's just not fair," "I don't understand, and they make you feel as if you can't do it" (p. 162).

Much of the research points out that interaction with faculty inside and outside of the classroom positively influences student learning. Increasing minority faculty is ideal,
but not a reality. African American students at Virginia Tech believe that faculty who care about students and who are good teachers are most important. While they would like to see more African American faculty, they are clearly more interested in faculty who care (Scott, 1995).

Summary

This literature review was designed to examine pertinent information concerning African American students related to this present study. The literature review examined the history of African Americans in higher education, engineering and at Virginia Tech. The literature also addressed communication with faculty at PWIs, as well as academic advising in higher education, and specifically at Virginia Tech.

Academic advising has been shown to play an important and influential role in student development, especially for African American students. The literature suggests that certain factors influence African American students who attend a PWI. The lack of awareness of academic advising preferences is hypothesized to be a major component of the high attrition of African American students in the College of Engineering at Virginia Tech.

Previous studies about African American students advising needs in an engineering environment are practically nonexistent in the literature. The high attrition rate for African American students in the College of Engineering makes it essential that this problem be investigated. Evidence presented strongly suggested that the advising methods used might have a positive influence on student progress and performance. The present study is an attempt to enhance the understanding of the advising styles currently experienced and preferred by African American engineering students compared to a
traditional group of engineering students. By studying these two populations, a greater understanding of the needs of each group may result so that the faculty advisors in engineering can develop more effective strategies when interacting with African American students. The following Chapter Three, Methodology, will present the data collection and analysis procedures.