African-American Males in Computer Science – Examining the Pipeline for Clogs

by

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**African-American Males in Computer Science – Examining the Pipeline for Clogs**

Daryl Bryant Stone

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Abstract

The literature on African-American males (AAM) begins with a statement to the effect that “Today young Black men are more likely to be killed or sent to prison than to graduate from college.”

Why are the numbers of African-American male college graduates decreasing? Why are those enrolled in college not majoring in the science, technology, engineering, and mathematics (STEM) disciplines? This research explored why African-American males are not filling the well-recognized industry need for Computer Scientist/Technologists by choosing college tracks to these careers.

The literature on STEM disciplines focuses largely on women in STEM, as opposed to minorities, and within minorities, there is a noticeable research gap in addressing the needs and opportunities available to African-American males.

The primary goal of this study was therefore to examine the computer science “pipeline” from the African-American male perspective. The method included a “Computer Science Degree Self-Efficacy Scale” be distributed to five groups of African-American male students, to include: 1) fourth graders, 2) eighth graders, 3) eleventh graders, 4) underclass undergraduate computer science majors, and 5) upperclass undergraduate computer science majors.

In addition to a 30-question self-efficacy test, subjects from each group were asked to participate in a group discussion about “African-American males in computer science.” The audio record of each group meeting provides qualitative data for the study.

The hypotheses include the following:

1. There is no significant difference in “Computer Science Degree” self-efficacy between fourth and eighth graders.
2. There is no significant difference in “Computer Science Degree” self-efficacy between eighth and eleventh graders.

3. There is no significant difference in “Computer Science Degree” self-efficacy between eleventh graders and lower-level computer science majors.

4. There is no significant difference in “Computer Science Degree” self-efficacy between lower-level computer science majors and upper-level computer science majors.

5. There is no significant difference in “Computer Science Degree” self-efficacy between each of the five groups of students.

Finally, the researcher selected African-American male students attending six primary schools, including the predominately African-American elementary, middle and high school that the researcher attended during his own academic career. Additionally, a racially mixed elementary, middle and high school was selected from the same county in Maryland. Bowie State University provided both the underclass and upperclass computer science majors surveyed in this study.

Of the five hypotheses, the sample provided enough evidence to support the claim that there are significant differences in the “Computer Science Degree” self-efficacy between each of the five groups of students. ANOVA analysis by question and total self-efficacy scores provided more results of statistical significance. Additionally, factor analysis and review of the qualitative data provide more insightful results.

Overall, the data suggest ‘a clog’ may exist in the middle school level and students attending racially mixed schools were more confident in their computer, math and science skills. African-American males admit to spending lots of time on social networking websites and emailing, but are ‘dis-aware’ of the skills and knowledge needed to study in the computing disciplines. The majority of the subjects knew little, if any, AAMs in the ‘computing discipline pipeline’. The collegian African-American males, in this study, agree that computer programming is a difficult area and serves as a ‘major clog in the pipeline’.
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<td>African American Males</td>
</tr>
<tr>
<td>ACM</td>
<td>Association for Computing Machinery</td>
</tr>
<tr>
<td>AIDS</td>
<td>Acquired Immune Deficiency Syndrome</td>
</tr>
<tr>
<td>AMIGOS</td>
<td>Arranged Mentor for Instructional Guidance and Organizational Support</td>
</tr>
<tr>
<td>ANOVA</td>
<td>Analysis of Variance</td>
</tr>
<tr>
<td>AWIS</td>
<td>Association for Women in Science</td>
</tr>
<tr>
<td>AWISE</td>
<td>Association for Women in Science and Engineering</td>
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<tr>
<td>BSU</td>
<td>Bowie State University</td>
</tr>
<tr>
<td>BYU</td>
<td>Brigham Young University</td>
</tr>
<tr>
<td>CCWEST</td>
<td>Canadian Coalition of Women in Engineering, Science and Technology</td>
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<tr>
<td>CETL</td>
<td>Center for Excellence in Teaching and Learning</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence Interval</td>
</tr>
<tr>
<td>CS</td>
<td>Computer Science</td>
</tr>
<tr>
<td>CSDSE</td>
<td>Computer Science Degree Self Efficacy</td>
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<tr>
<td>CTEC</td>
<td>Computer Technology</td>
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<tr>
<td>CWSE</td>
<td>Committee on Women in Science and Engineering</td>
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<tr>
<td>ECRI</td>
<td>Exemplary Center for Reading Instruction (BYU)</td>
</tr>
<tr>
<td>GPA</td>
<td>Grade Point Average</td>
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<tr>
<td>GVC</td>
<td>Grand View College</td>
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<tr>
<td>HBCU</td>
<td>Historically Black Colleges and Universities</td>
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<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<td>HSTP</td>
<td>Howard Street Tutoring Program (Chicago)</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>IEEE</td>
<td>The Institute of Electrical and Electronics Engineers</td>
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<td>MAP</td>
<td>Minority Advisors Program</td>
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<td>NRC</td>
<td>National Research Council</td>
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<td>National Science Foundation</td>
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<td>PAA-ES</td>
<td>Predominately African-American Elementary School</td>
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<td>PAA-MS</td>
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<td>PWI</td>
<td>Predominately White Institutions</td>
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<td>Racially Mixed Elementary School</td>
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<td>Scholastic Aptitude Test</td>
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<td>South Plains College</td>
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<td>SPSS</td>
<td>Statistical Package for the Social Sciences</td>
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<td>Science, Technology, Engineering and Mathematics</td>
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<td>SWE</td>
<td>Society of Women Engineers</td>
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<td>TWI</td>
<td>Traditional White Institution</td>
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<td>VCU</td>
<td>Virginia Commonwealth University</td>
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<td>WEPAN</td>
<td>Women in Engineering Program Advocates Network</td>
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<tr>
<td>WIE</td>
<td>The Women in Engineering Initiative</td>
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<td>Women in Science and Engineering Network</td>
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<tr>
<td>WITI</td>
<td>International Network of Women in Technology</td>
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<td>WITS</td>
<td>Women, Information Technology, and Scholarship</td>
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CHAPTER I

Statement of the Problem

In March 2005, the National Science Foundation (NSF) released a report that summarized discussions and recommendations resulting from a workshop convened at the NSF in 2003. This workshop was held to examine issues surrounding the development of a diverse and well-prepared science and engineering workforce for the twenty-first century. The workshop did not seek to achieve consensus on programmatic recommendations, nor was it able to speak to all the questions underlying the issues raised (NSF, 2005). However, it did put forward one major problem: the workforce to support science and technology-based industries will be suffering from shortfalls that will severely affect national competitiveness.

The report was presented in three sections:

1) Section 1 describes and elucidates the problem by citing data to document the current lack of diversity in the Science, Technology, Engineering and Mathematics (STEM) workforce.

2) Section 2 offers recommendations from workshop participants based on research and exemplary programs to address the problem.

3) Section 3 describes a future vision of the enterprise of science focused on developing human intellectual potential (NSF, 2005).

The section of the report titled “Building an Academic Base” stated:

“Members of under-represented groups suffer from high rates of attrition at each transition point in the pathway toward a faculty position: graduating from high school, from college to graduate school, from graduate school to postdoctoral fellowships, and from fellowships to faculty positions. Furthermore, the under-representation of some groups in teaching positions is a problem throughout the educational system, including in K-12 education. Without role models and mentors, members of groups under-represented in a STEM fields are less likely to see
themselves pursuing these subjects and succeeding in a STEM career. Efforts to broaden the participation of U.S. students in these fields must include incentives to increase the number of women, minorities, and people with disabilities in academic positions” (NSF, 2005, p. 8)

While the NSF report supports the need to increase the numbers of women, minorities, and people with disabilities in academic positions, many more reports note the need to increase women and minorities in all areas of STEM. Besides faculty, these areas include mentors and enrollments in undergraduate and graduate programs, all dedicated to building the ability of the workforce to integrate women and minorities.

Thus it can be concluded from this NSF report as well as others to be cited (Luftman, 2008; Williams, 2003; Lopez & Schulte, 2002; Fashola, 2005; Davis, 2005; Hrabowski, Maton, & Greif, 1998) that there is a clear call for more research to support both policy and action to increase the number of women and minorities in the STEM area. This dissertation is designed to add to that effort in clarifying the background, factors, dynamics, and potentials for achieving an increase in the numbers of African-American males in the computing discipline.

**Motivation**

*BSU Experience*

As a Computer Science professor at Bowie State University (Bowie, Maryland; a traditionally Black college), the researcher has on-the-ground experience with African-American males (AAMs) majoring in Computer Science; in fact, he himself attended the same school in the same program. Bowie State admits various academic levels of AAMs majoring in this subject, ranging from excellent to below-average.

The researcher recalls an exchange overheard as a Junior Computer Science major at Bowie State in 1991:

Staff Member 1: “He’s a great student and majoring in Computer Science.”
Staff Member 2: “That’s O.K. But our goal should be to get more students at this level by their Junior year, so that even he won’t stand out!”

That conversation continues to motivate the researcher to assist students, particular African-American males, who generally seek him out as a mentor. This experience has yielded a good familiarity with the problems and challenges facing AAMs in this role, and provided plenty of material for thinking about the issues involved. It has prompted a more formal approach through this dissertation research. Since taking the position at Bowie State University, the goal has been to create a norm of excellence: to have AAMs doing outstanding work in Computer Science. This study itself will institute this as a new goal: to raise the standard of performance to make it “normal” for AAMs to excel in Computer Science. Judged by this objective, the study will begin to have an immediate effect toward its objective.

_Talented Tenth_

While the researcher has the motivation to “reach back” and assist those following in his footsteps, this impulse is in line with others also calling for this effort to “reach back.” In January 2005, the researcher received an email from a Bowie State classmate. The email’s subject line read, “I consider you in the talented tenth!”

Attached was a Washington Post article (Millory, 2004) discussing statements made by Dr. Henry Louis Gates, Jr., Harvard’s Chair of African and African-American Studies Department, during his book-signing for “America behind the Color Line”, 2004. In this book, Gates tries to answer the question: “How have Black people fared in the 35 years since the assassination of Martin Luther King, Jr.?”

Gates discussed the current problems facing the African-American community, such as low college enrollment, the negative influence of hip-hop music, and the high rate of imprisonment. To combat these problems and more, Gates called for a new civil rights movement within the Black community. For that movement to succeed, he cites the need for the “talented tenth,” a term coined by Dubois in 1903 – meaning college-educated Blacks – to address and correct self-defeating behavior, in themselves and others.
(Millory, 2004). This imperative places the responsibility for leadership squarely on the college-educated to take the problems of the group upon themselves to solve.

In summary, the motivation for this project comes from 1) the desire as an educator to continue to assist AAMs majoring in Computer Science, starting at Bowie State University, and with implications broadening from this base to higher education in general; 2) the call from the community to follow the directive a) “To reach back and help others”; b) “To those to whom much is given, much is expected”; and c) “Each one, teach one.”

**Significance of the Study**

It is already clear that there is a need, based on the call by the NSF for more research that can indicate ways to support and increase the numbers of women and minorities in the STEM disciplines. At the very least, this study will answer that call to increase the number of African-American males in Computer Science by adding to the research base on this topic. Although there is a well documented call for increasing the number of women as well as minorities, the fact that there is very little research on African-American males in Computer Science makes this study significant to the literature by addressing that research gap.

*What is happening?*

In the guidebook *Scientific Research in Education* (Shavelson, 2002), scholars representing the National Research Council (NRC), detail three types of research questions, based on:

1. **Description – What is happening?**

2. **Cause – Is there a systematic effect?**

3. **Process or mechanism – Why or how is it happening?**

The first question, “What is happening?” uses description of various kinds to properly characterize a population of students, understand the scope and severity of a problem, develop a theory or conjecture, or identify changes over time among different
educational indicators: for example, achievement or teacher qualifications. Descriptive education research can make general factual statements about the national scope of a problem by documenting its nature and scope and identifying major patterns.

The book proceeds to suggest that when there is little research in an area, the descriptive research type may offer the method of choice (Shavelson, 2002). As there is little research in the area of African-American males in Computer Science, the “descriptive – what is happening” category will be employed.

The National Research Council guide discusses quantitative versus qualitative studies. It was noted that reliance on both quantitative and qualitative methods in a study might provide the best solution to finding out “What is happening?” The NRC guide provides examples of quantitative studies in which the researchers indicated in their Discussion of Results their discovered need for qualitative methods in the completed study. This study will therefore provide both quantitative and qualitative data to address this need.

The Dissertation

This dissertation is presented in six chapters. Chapter 1 covers the background, motivations, and proposed objective, approach, and significance for this work. Chapter 2 reviews the literature to survey the basic subject areas involved to identify what is known and what needs to be learned. Chapter 3 presents the methodology for the proposed dissertation. Chapters 4 and 5 unveil the quantitative and qualitative results, respectfully. Finally, Chapter 6 shares the summary, conclusions and suggested future studies. The appendices include: references, self-efficacy questionnaire, protocol summary, parental
informed consent form, assent to participate in a research study, university student
informed consent form, audio release forms, and transcripts from interviews.
CHAPTER 2
LITERATURE REVIEW

African-American Education

Civil War and Reconstruction

Before the end of the Civil War, most of the southern states had long standing legislation making it a crime to teach enslaved children to read or write. At the same time, by contrast, a massive campaign to achieve popular schooling for free (White) Americans developed between 1830 and 1860, and out of this effort came designs for state systems of public education. Not until the latter nineteenth century were the organization, scope, and role of schooling transformed into a carefully articulated structure of free tax-supported public institution (Anderson, 1988).

In 1863, enslaved Americans were emancipated and they joined the ranks of the nation’s free citizens. This occurred at the very moment public educational systems were evolving into modern form. African-Americans campaign for first-class citizenship, however, was successfully undermined by federal and state governments as well as extralegal organizations and tactics (Anderson, 1988).

Soon after the late 1870s, Blacks were disfranchised; their civil and political subordination became fixtures in southern law. They were trapped by statutes and social customs which, in an agricultural economy, rested heavily on coercive control and allocation of labor (Anderson, 1988).

From the end of Reconstruction until the late 1960s, Black southerners existed in a social system that virtually denied them citizenship, the right to vote, and the voluntary control of their labor power. They remained oppressed people. As stated by Woodson,
“When you control a man’s thinking you do not have to worry about his actions.”
(Woodson, 1933, p. xiii)

Black education developed within this context of political and economic oppression. Although Black southerners were officially free during the time when American popular education was formalized as a critical social institution, their schooling took a different path (Anderson, 1988).

Initially ex-slaves attempted to create an educational system that would support and extend their emancipation. But their children were pushed into a system of industrial education that presupposed Black political and economic subordination. This conception of education as an outcome of the social order – supported by northern industrial philanthropists, some Black educators, and most southern school officials – conflicted with the aspirations of ex-slaves and their descendants, resulting at the turn of the century in a bitter national debate over the purposes of education as a Black institution.

Because Blacks lacked economic and political power, White elites were able to control the structure and content of Black elementary, secondary, normal, and college education during the first third of the twentieth century. Nonetheless, Blacks persisted in their struggle to develop an educational system in accordance with their own needs and desires (Anderson, 1988).

Creation of US academic Apartheid

Most Historically Black Colleges and Universities (HBCUs) were created at a time when Black students could not attend white institutions. HBCUs were established
before 1964, the year the Civil Rights Act outlawed racial segregation, with the intention of serving African American community

Following the Civil War, many of the churches that had advocated abolition and founded schools in the North established private colleges for Blacks in the South. Before 1870, the American Missionary Association, a Congregationalist group, had founded seven colleges and 12 normal schools (that prepared teachers). The American Baptist Home Mission Society founded three colleges, and the Methodist Episcopal Church founded two. By 1890, more than 200 colleges dedicated to serving Black students were established and graduating students. These schools were financed by a combination of funds from missionary groups, Black church groups, and the Freedman's Bureau, a federal agency created after the Civil War to provide financial assistance to Blacks as well as poor Whites.

Most Black colleges founded before 1890 were private. Many public colleges for Blacks, however, were founded in response to the Second Morrill Act of 1890. This act provided federal financial support to states to found land-grant colleges. It stipulated, however, that states would either have to provide Blacks equal access to the land-grant colleges or establish separate institutions for Black students. Most southern states chose the latter course, and, between 1890 and 1899, 17 all-Black public colleges were founded. These institutions, in combination with the surviving private ones, became the backbone of Black postsecondary education for the next 60 years; by 1895 they had already produced 1,100 college graduates yearly.

Public and private institutions differed significantly, however, in their nature and function. Private institutions tended to provide a comprehensive liberal arts education.
Most of their graduates were prepared to be teachers and preachers. Public institutions, on the other hand, were more vocationally oriented. While some were normal schools that prepared teachers, most trained skilled industrial and agricultural workers. This split in the type of institution and their objectives was reflected in a corresponding pedagogical split among educators. Some, like Booker T. Washington, viewed vocationally oriented education as better suited to the economic progress of Blacks. Washington argued that such education would provide the skills requisite to enter the upper levels of the labor force to be competitive with Whites. Others, like W.E.B. Du Bois, viewed a liberal arts education as preferable. He argued that such an education (traditionally linked to citizenship and democracy) would better prepare students to become leaders of their communities; including helping less-educated Blacks to become more successful.

A series of Supreme Court decisions from 1935 through 1954 gradually worked to change the system. These cases involved the issue of out-of-state tuition grants. In some states, no separate professional school for Blacks existed. Further, when Blacks applied to a state's White professional school and qualified for admission, they were generally offered tuition grants providing financial support to attend a professional school in another state.

The Supreme Court held that this arrangement was unconstitutional by creating an unnecessary hardship for Black applicants. It was not until Brown v. Board of Education of Topeka (1954), however, that desegregation began in earnest. There are currently fewer than one hundred 4-year HBCUs in the United States, located almost exclusively in the southern and eastern states. (US Department of Education, 2006)
Advocates of HBCUs have suggested various potential justifications for these schools. One tradition, going back to W.E.B. DuBois, emphasizes their ability to prepare Black students to become community leaders. Indeed, HBCUs have been responsible for training teachers and social workers, and their graduates are some of the best-known public figures. Martin Luther King, Jr., Thurgood Marshall, and Andrew Young, Jr., all graduated from HBCUs. A second tradition, going back to Booker T. Washington, emphasizes the vocational benefits of HBCUs. Many of these schools emphasize the sciences and engineering, encouraging Black students to enter careers in those professions (Wenglinsky, 1997).

African-American Males as Students

Slavery ended in American about a century and a half ago as an official institution. Does this mean there are no contemporary issues of African-American education? Clearly this is not the case. There are specialized and pressing reasons to attend to issues of African-American Males (AAM) in education. One is the growing concern that “young Black men are more likely to be killed or sent to prison than to graduate from college” (Hrabowski et al., 1998, and Kitwana, 2002). In the following section, a single term is regarded as being a major contributor to the state of AAMs in education. That term is “disidentification.”

Disidentification

In Osborne (2001) and Majors and Billson (1992), the term “disidentification” is used to describe a negative identity. This identity is adopted by Black boys who resist
appearing to be smart, doing well in school, or assisting a teacher, etc.; in short, for them, being “smart” is not “cool.”

They continue the definition by saying, “There are two good reasons why Black students should disidentify, or selectively devalue academics: to reduce anxiety and improve self-esteem by eliminating a source of negative evaluation – academics” (Osborne, 2001, p. 47). The logic of the concept is that if students do not devote any effort to and/or take an interest in academics, they therefore need not worry about the anxiety or low self-esteem stemming from judgment or failure. Black students who feel they don’t have a chance for positive evaluation either way can easily pose the question “Why bother?”

Steele (1992, 1997), however, argues that disidentification is not a normal state of affairs for Black students; that they do not begin schooling disidentified. He goes on to argue that all students naturally enter into schooling strongly identified with academics (learning), so that there must therefore be some variable in the educational environment itself to cause students to become disidentified.

Majors and Billson (1992) argue that Black males adopt a “cool pose,” or ritualized form of masculinity that allows survival in an environment of social oppression and racism. ‘Cool Pose’ allows the Black male to survive by projecting a strong, aloof front of fearlessness without emotion; this posturing is created to counter a host of ills: the inner pain from damaged pride, poor self-confidence, and fragile social competence that come from living as a member of a subjugated group.

Unfortunately “Cool Pose” depicts Black males as victims of their own coping strategies. In terms of education, “Cool Pose” often leads to such counterproductive
behaviors as flamboyant, disruptive, and rebel behavior drawing punishment in school settings (Steele, 1992). Equally unfortunate, the development of a cool self-concept appears to be directly opposed to that of a hard-driving, motivated, “identified” student. Thus, Black boys, according to this perspective, adopt a strategy for coping with group membership that is quite incompatible with identification with academics and its requirements for success (Osborne, 2001).

Results found by Osborne (1997) support the notion that most students begin schooling identified with academics and learning. Even as late as eighth grade there is no evidence of relative group-level disidentification among any group, especially Black boys. Osborne (1997) found the beginnings of disidentification was found earlier, but the good news from his work is that, while the seeds of disidentification are undoubtedly sown much earlier, there is a long grace period within which we can work to prevent or intervene with disidentification.

A final piece of this puzzle is the question of why Black boys would be more likely to disidentify than other students. Steele (1992, 1997) argued that it is heightened anxiety associated with concern over conforming to the stereotype of the group as intellectually inferior that drives this phenomenon. Osborne has found that a state of anxiety while testing, for instance, explains up to 46 per cent of White-Black differences in test performance.

In a discussion of how to derail disidentification, Osborne (2001) states that Black males need to see that they can, in fact, achieve in academic domains and be well able to become career successes as scientist, engineer, mathematician, teacher, etc. Majors and Billson (1997) encourage closer links between high schools and postsecondary
institutions to facilitate high-school completion, as the Upward Bound program has done. All authors on this subject agree that much work remains to be done.

Disidentification – Relevance to this study

In this study disidentification plays an important role. The research was designed to test and indicate whether AAMs “disidentify” with computer subjects as they matriculate through elementary, middle, high school and college.

African-Americans in Science, Technology, Engineering and Mathematics (STEM)

Beating the Odds: Raising Academically Successful African-American Males

Freeman A. Hrabowski III (President, University of Maryland, Baltimore County), Kenneth I. Maton, and Geoffrey L. Greif wrote Beating the Odds: Raising Academically Successful African-American Males (1998). In this book college-level African-American male students (AAMs) are interviewed about their experiences in STEM. In addition to the students, their parents were interviewed. Student subjects were academically successful AAMs within the program area of STEM. In fact, each student is a Meyerhoff Scholar.

The Meyerhoff Scholarship program was founded at the University of Maryland, Baltimore County (UMBC) in 1988 with a grant from the Robert and Jane Meyerhoff Foundation, under the guidance of future UMBC President Freeman A. Hrabowski, III. It is a program focused on the development of underrepresented minority learning and awareness in the STEM disciplines. (Hrabowski, Maton, & Greif, 1998)

By interviewing parents and children from a range of economic and educational backgrounds, coming from both single and two-parent homes, the authors identify those
constants that contribute to academic achievement, offering step-by-step guidance on six essential strategies for effective parenting: child-focused love; strong limit-setting and discipline; continually high expectations; open, consistent, and strong communication; positive racial identity and positive male identity; and full use of community resources.

This book provides useful background for this dissertation study in its focus on AAMs in STEM and what leads them to or deflects them from careers in computer science. However, the present research will extend back further, starting with elementary school, and will generate both qualitative and quantitative data from survey and discussion findings.

*Charting the Pipeline: African-Americans in STEM*

The purpose of the Williams (2003) study was to identify the critical elements related to the success of African-Americans in science, engineering, and mathematics. Specifically, the study was designed to answer the following questions as they pertained to African-American graduate students: What factors were perceived to have contributed to: the students’ initial interest in science, engineering, or mathematics? Which pertain to student decisions to continue their studies in their specific areas of interest? As associated with the K-12 schooling experience, what factors contributed to graduates’ success in science, engineering, or mathematics? (Williams, 2003)

The data for the study were obtained from interviews with 32 African-American students (16 males and 16 females) engaged in graduate work in science, engineering, or mathematics. Twenty of the thirty-two subjects earned their undergraduate degree at a HBCU. Each student was interviewed separately. While the interviewer didn’t want to
script the entire discussion, each student was asked the identical eight questions at some point in the interview to provide a comparable response structure.

Four major themes emerged from analysis of the interview response data. All students were involved in experiences that allowed them significant levels of participation in science, engineering, or mathematics. Associates, teachers, or peers provided positive personal interventions. Each thought that studying science, engineering or mathematics would lead to a positive outcome. Finally, all students believed they possessed intrinsic traits that qualified and prepared them for their involvement in science, engineering or mathematics.

In addition to the individual themes, the significance of some themes varied with time. As a result, the discussion of the results of the study was divided among three developmental periods: 1) the interest-building phase (birth – age 12); 2) the knowledge-acquisition phase (12 –20 years); and 3) the career-building phase (20 and older).

The majority of the students involved in the study entered the world of science, engineering, and mathematics very early in their lives. During the interest-building phase, parents and community members filled the roles of supporters and role models in the lives of the students in the study. One of the most commonly cited positive outcomes centered on the idea of mathematics- and science-related learning as a fun and exciting activity--for example, ‘math races’ with flash cards.

Next, in the knowledge-acquisition phase, students engaged in a more formal exploration of science, engineering, and mathematics aimed at developing their knowledge and competence in these areas. Unlike the interest-building phase, most experiences took place within the more structured confines of the classroom or in
content-specific program. This phase is characterized by an increase in the number of perceived obstacles to student success, such as limiting stereotypes of the abilities of African-Americans in science, engineering, and mathematics.

During the career-building phase following knowledge acquisition, students made the transition from exploring science, engineering, and mathematics to membership in the science, engineering, and mathematics communities. A few students explained, “It’s not fun like it used to be….Now it’s more like work” (Williams, 2003, p. 146). Because the student subjects were still at the start of their career-building phase, they could not be expected to provide as much feedback content as for the other two phases.

The findings from the Williams study offer some indication of the critical element involved in the development of successful African-American scientists, engineers, and mathematicians, and will help future STEM educators by posing successful examples of successful schooling to shed light on what is needed to solve the problem of under-representation of people of color in professions within these fields.

William’s (2003) study offers an example of qualitative data to enrich the quantitative side; this will take the form of the qualitative interview questions (8) in this study. In terms of the pipeline concept, my study will take into account pre-college, pre-high school subjects.

*Educating African-American Males: Voices from the Field*

*Educating African-American Males: Voices from the Field* is a collection of research papers published in 2005 by editor O. Fashola. Each of the research articles addresses educating AAMs; all were presented at the Conference on African-American Male Achievement, co-sponsored by the U.S. Department of Education and Howard
University. The articles bring important dimensions to the issue by offering unique perspectives ranging across sociological, emotional, economic, pedagogical, and cognitive realms (Fashola, 2005).

The primary goal of the conference and the book is to showcase the positive academic achievement of African-American males. Fashola states that the majority of the current literature on Black males covers failures and dysfunctional behaviors, most generously described as a response to oppression and disadvantage. These articles address the problems with Black families, the legacies of slavery, and their impact on Black males in the struggle to exercise responsibility for themselves and their families.

In the preface, the author asks:

“What is going on in the minds of African American male students who are not succeeding in school? At what point in their young academic lives do they realize that because of sociological, psychological, educational, and environmental factors that count against them, they are really not supposed to be successful in the classroom?” (Fashola, 2005, p. ix)

Fashola proceeds to pose further questions:

“Does this begin in September when the summer ends? If one attempted to paint a realistic picture of the back-to-school period, one would realize that not all school-aged children are always excited about returning to school. Some are returning to school after being held back a grade. Some are returning after numerous suspensions the previous year. Others are ill-equipped to succeed behaviorally, academically, economically, culturally,
or socially, and it is only a matter of time before these poorly performing students join the nation’s population of dropouts” (Fashola, 2005, p. ix).

An important point is made, with reference to the proposed research, in the Introduction. The author states, “The reality is that even when controlling for socioeconomic status, African American males still lag behind their Caucasian counterparts academically. Thus, even in communities where we would expect this racial-and gender-driven achievement gap to be virtually eliminated, we still find race-related discrepancies pertaining to the achievement of African American males” (Fashola, 2005, p. xiii). The task of further research is to discover the reason for this discrepancy and address its component indicators.

Rather than show African-American males as a lost cause, Fashola asks that we begin to investigate various ways for the community of educators and researchers to bring their experience and knowledge together in order to explore better means to improve the educational achievement, attainment, and experiences of African-American males. In the next sections, a brief summary of the majority of the articles is provided.

“Cultural Issues in Comprehensive School Reform”

Although there is general understanding among educators, policy makers, and researchers that at-risk students are culturally and ethnically diverse, as well as disproportionately African-American, Latino, and Native American, we have yet to develop adequate policies and practices for taking full advantage of students’ cultural histories as part of their education potential. Although multicultural education and
culturally relevant pedagogy/curricula are slowly penetrating as comprehensive school reform, there is little evidence of a definable significant impact on the achievement and school success of African-American males (Cooper and Jordan, 2005).

In “Cultural Issues in Comprehensive School Reform,” Cooper suggests that schools need to provide a vehicle of social mobility for disadvantaged and minority students while middle-class students are given the skills to reproduce—to leverage—their social status in the classroom. “However, educational and social mobility is a zero-sum game; success for one individual reduces the probability of success for another” (Cooper and Jordan, 2005 p. 14).

Suppose, for example, that school dropout was eliminated and that every high school graduate was suddenly qualified to attend college. Even if this were to happen, we do not have the higher-education infrastructure to support such an influx of new students (Cooper and Jordan, 2005).

The final point Cooper makes is that in the case of AAMs, many reform agendas have been tried but missed the mark. AAMs are at risk in school just as they are at risk in the larger society. There is a need for implementation both of school reform and for positive, role models to counteract negative influences and images that create the gap between the members of this demographic population and their peers.

“Developing the Talents of African American Male Students during the Non-School Hours”

This article by O. Fashola begins by answering the question, “Why focus on African American Males?” African-American adult males have some of the highest incarceration
and homicide rates in the country, and this has been the case for more than a decade. In addition, this group has one of the highest expulsion and dropout rates from high school and college, and statistics show that, following from these figures, AAMs are also choosing not to enroll in college.

Fashola makes the strong deduction that “since society provides few, if any, opportunities for advancement to young African American males with less than a high school diploma, the simple ability to remain in the workforce may soon become an unreachable goal for this population” (Fashola, 2005, p. 20).

She suggests after-school programs as one solution to this problem. The paper presents four existing effective models proven successful in improving the academic achievement of AAMs. These academic programs include examples such as: ECRI (Exemplary Center for Reading Instruction started at BYU, Utah) to improve elementary-school reading level, and HSTP (Howard Street Tutoring Program, Chicago), specifically designed with AAMs in mind and having produced the desired results. Programs such as Reading is Fundamental and Boys and Girls Clubs of America, although created for a more general population, are sensitive to the needs of their African-American male participants and look for ways to improve the services provided to the students and monitor attendance.

“The Trouble with Black Boys: The Role and Influence of Environmental and Cultural Factors on the Academic Performance of African American Males”

All the most important quality-of-life indicators suggest that African-American males are in deep trouble. They lead the nation in homicides, both as victims and perpetrators
(Skolnick & Currie, 1994), and in what observers regard as an alarming trend, they now show the fastest-growing rate of suicide (Poussaint & Alexander, 2000). For the past several years, Black males have been contracting HIV and AIDS at a faster rate than any other segment of the population (Whitehead, 1997), and their incarceration, conviction, and arrest rates have been at the top of the charts in most states for some time (Skolnick & Currie, 1994). In the labor market, they are the least likely to be hired and in many cities, the most likely to be unemployed.

Pedro Noguera (2005) goes on to repeat some of the same negative educational indicators as outlined in the articles above: AAMs are more likely to be suspended, expelled, drop out of school, classified as mentally retarded or suffering from a learning disability, placed into special education, and absent from advanced-placement and honors courses. Noguera points out that in contrast to most other groups in which males commonly perform at higher levels than females (the gender divide), as in math-and-science-related courses, the reverse is true for Black males. Moreover, compared with their White peers, middle-class AAMs lag significantly behind both in grade-point average and on standardized tests.

To show an example of the harmful culture and environmental forces, Noguera displays the following chart:

<table>
<thead>
<tr>
<th>My Teachers Support Me and Care About My Success in Their Class</th>
<th>(in percentages) (N=537 seniors at academic magnet high school)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>Black Male</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>8</td>
</tr>
<tr>
<td>Disagree</td>
<td>12</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>38</td>
</tr>
</tbody>
</table>

Table 2.1 – Teach Support and Care
The chart above (Noguera, 2005, p. 67) shows that many African-American males feel that their teachers do not support and/or care about their academic success. The author concludes that it would be a mistake to think that until we find ways to change the attitudes and behaviors of Black males, nothing can be done to improve their academic performance.

_There is no doubt that if schools were to become more nurturing and supportive, students would be more likely to perceive schools as a source of help and opportunity rather than an inhospitable place that one should seek to escape and actively avoid. Changing the culture and structure of schools such that African American male students come to regard them as sources of support for their aspirations and identities will undoubtedly be the most important step that can be taken to make high levels of academic achievement the norm rather than the exception._ (Noguera, 2005, p. 73)

“Early Schooling and Academic Achievement of African American Males”

One factor consistently associated with the achievement gap is school disengagement, another term for (Majors and Billson, 1992) disidentification, on the part of African-American males (Carter, 2003). Despite the prevalent view that achievement matters, research studies provide only modest evidence of the effects of disengagement among Black boys in their early school years. Little evidence is available on the antecedents of underachievement for young males – the exception being the negative effects of some family and schooling background variables. This is due, in part, to the
sparse data available on the experiences and outcomes of African-American males in the early grades (Davis, 2005).

Davis points out that one reason commonly mentioned for the disengagement, alienation, and poor academic performance of Black males is that they perceive most educational activities as feminine and irrelevant to their masculine identity and development. Furthermore, it is also believed that schools, specifically teachers, impose a feminine culture on males that induces oppositional behaviors. Davis states that African-American male images within popular culture are violent, disrespectful, unintelligent, hyper-sexualized and threatening.

As for “disengagement,” Carter (2003) presents research to show growing evidence that Black male disengagement with schooling develops in the early grades and continues to intensify as they progress through school. By all indicators, Black males consistently fall behind other students in early school performance and lead their peers in school infractions and other negative behaviors. From the current literature, it is difficult to establish between disengagement and low achievement as the antecedent.

Davis found that five-year-old Black boys are more likely to lack confidence about their abilities in school compared with Black girls (23.5% vs. 9.7%), and black boys are less likely to speak out in class compared with black girls. In the study, he found that, in general, African-American boys have very positive experiences in early schooling and almost all (98%) report looking forward to going to kindergarten each day. His research goes on to reveal that beginning in the fourth grade, Black boys experience a sharp decline in their test scores.
Davis concludes by calling for further research and programs for AAMs in the early years. “A concerted research program and research-based interventions aimed at disentangling the achievement quagmire hold the possibility for ensuring that African American males reach their highest achievement potential. The nation’s social and economic stability are dependent on these efforts” (Davis, p. 145).

“What’s Happening to the Boys? Early High School Experiences and School Outcomes among African American Male Adolescents in Chicago”

Roderick (2005) conducted a qualitative study to discover what happens as adolescents move through their early high school years that could explain declines in motivation and school engagement and increasing divergence between gender and racial groups.

The study takes a close look at the transition to high school among a group of African-American males who were part of a longitudinal study in Chicago. A qualitative analysis of patterns in the school development of 15 African-American males in the South Side Chicago sample during transition to high school was undertaken to discover relevant explanatory patterns.

The 15 students were classified into one of three categories: 1) Withdrawers – students who eventually withdrew from school; 2) The Disengaged – those who attended school, but were not motivated to excel academically, and 3) The Resilient – students who were challenged with a number of “barriers,” but who each found a way to graduate from high school.
At the end of the study, the withdrawers were out of school, pursuing alternative degrees with varying levels of participation, unemployed, and not engaged in any meaningful activity. The disengaged, though still attending school regularly, were doing virtually nothing, seldom attending classes, and failing courses. Many of the graduates (‘the Resilient’), though just barely getting by academically, were managing to complete school.

The withdrawer faced significant barriers to doing the work at high-school level. They had extremely low skills, little parental support for their education, and high rates of family disruption and loss making them vulnerable to gang pressure and providing few coping resources to manage developmental demands.

The disengaged group also experienced academic difficulty, stress, and lack of support. But this group entered high school with high levels of engagement in learning, high expectations and commitment to schooling, and adequate skills to take on the task. But for this group, a lack of consistent and concrete home support for their education, added to the stresses experienced outside school, made them even more vulnerable to their challenges at school.

The conclusion to be drawn from the experiences of both the disengaged and the resilient is that these students needed an effective high school context to be successful. Although we are continually asking more of students, high schools themselves are not facing equal demands to change and improve. The reform of high-school environments should be top priority in addressing the racial achievement gap and in improving college prospects of African-American students, particularly males (Roderick, 2005).
“Athletics, Academics, and African American Males”

The final article review from the book Educating African American Males: Voices from the Field is “Athletics, Academics and African American Males” (Braddock, 2005). This study first examines participation patterns in athletics among AAMs. Second, it reviews evidence on the relationship between athletic involvement and academic resiliency and achievement. Finally, it describes a conceptual framework for understanding the relationship between athletic involvement and academic success and discusses possibilities for expanding the role of athletics in curricular and extracurricular settings.

Research shows that African-American males participate in middle- and high-school sports more than their non-Black counterparts—but the representation in sports does, in fact, vary across categories. Compared to non-Black males, AAMs are significantly over-represented in football and basketball, but significantly under-represented in baseball, soccer, swimming, and some other team sports. (Individual sports, such as golf and tennis, were not covered.)

The relationship between African-American involvement in sports and social mobility comes under two opposing themes: 1) The sports-enhance-mobility hypothesis assumes that sport have often served minority groups to further their assimilation into American life (Boyle, 1963). 2) The sports-impede-mobility hypothesis contends, on the other hand, that the few African-Americans who have become wealthy and successful professional athletes are exceptions. According to Eitzen and Sage (1978), “Youngsters who devote their lives to the pursuit of athletic stardom are, except for the fortunate few,
doomed to failure in sports and failure in the real world where sports skills are essentially irrelevant to occupational placement and advancement” (Braddock, 2005, p. 263).

Nevertheless, most of the empirical literature on this topic reports that sports participation is positively associated with a variety of academic-achievement outcomes. Sports are also important to parents. According to a 1996 Gallup survey, when asked if they would prefer their oldest child to be “a straight-A student” or “an average student who is involved in sports and extracurricular activities,” only 29% of parents chose the former, while 60% chose the latter (Phi Delta Kappan, 1996).

Braddock found that high-school athletes, compared to non-athletes, were more likely to graduate from college and earn higher salaries even when controlling for social class and background and intelligence. Additionally, athletes tended to have higher grade-point averages than non-athletes, even when intelligence, class background, and type of curriculum were taken into account.

Research has shown that students who are not engaged are less involved, committed, and attached to school and are less likely to integrate academic material into their lives. Furthermore, students with low levels of engagement become increasingly at risk for school failure and dropout (McNeal, 1995). Sports play a role in keeping engagement levels high by involving students in the team ethic and the acquisition of skills and strategy inherent in athletics.

Winning in sport competitions is commonly thought to enhance self-esteem and self-efficacy among students, even losses may internalize a sense of accomplishment. A game well played tends to generate respect between teams and players and the wider student population, which not only reduces the impact of loss, but also contributes to the
self-esteem and self-efficacy of players. Rutter (1987) contends that self-esteem and efficacy are in large measure based on an individual’s successful accomplishment of tasks important to that individual. This system, once activated, becomes self-reinforcing.

In conclusion, Braddock suggests ways to incorporate sports into normal teaching and learning routines. For example, both athletes and non-athletes could write or contribute to sport columns in school and local newspapers, thereby enhancing student writing and language skills. Students could collect team and player statistics for a variety of school and local sport activities, enhancing their crucial and often underdeveloped mathematics skills.

Given the interest in sports among African-American male students, who may be the least attached to academic programs, sports offer tremendous potential for making academic investment more salient for their existing interests. The article suggests that educators capitalize on student athletic investments by creating sport-related opportunities that entail simultaneous academic investments and help students to apply the skills developed in athletic competition toward the academic arena.

**Summarizing Educating African-American Males: Voices from the Field**

In the introduction to each article in this volume, editor O. Fashola clearly makes clear that AAMs are in a dilemma with regard to academic achievement. In fact, there appear to be a number of barriers facing AAMs well before the final challenge of graduating from an academic institution. AAMs, need to stay out of jail, stay out of
gangs, and stay out of the way of bullets. AAMs must also go to school, go to classes, go to the library, and go home and study.

Fashola calls for change in both environmental and cultural factors in schools. Current programs that work, along with proposed programs and potential solutions, are presented among the book’s articles. A major term, “disengagement,” was used throughout. Disengagement refers to the many students who attend school but do nothing there to advance their education or their futures. Such disengaged students feel that “School is not the place for me,” “There is no way for me to excel in school,” and “Nobody cares whether I succeed.” The contributing authors cry out for these issues and attitudes to be addressed by educational research.

Attracting Young Minority Women to Engineering and Science

Heller and Martin (1994) developed and implemented a program to attract young minority females to Computers, Engineering and Science. The program held at George Washington University was funded by the National Science Foundation (NSF) from 1989 through 1993. Young minority females utilized computer technology and participated in cooperative learning in a university setting to interest young minority women in engineering and science careers.

Heller and Martin’s (1994) research revealed that although female students were as good or better in mathematics during the early years, there was a clear lack of interest in math and science as they mature. This disinterest in math and science has been attributed to social pressures (Heller and Martin, 1994).

Heller and Martin set out to develop a program to address this disinterest in math and science. Additionally, they stated, “young minority women have special needs that
must be met in order to provide them access to science and engineering education” (Heller and Martin, 1994, p. 8).

The article mentioned six noteworthy problems facing young minority women attempting to access science and engineering.

“Typically, these girls do not have access to science or engineering activities or hobbies in their neighborhoods. Role models in science and engineering are rare. Parents of minority girls often do not have a college education nor do they see the need for supporting one for their daughter(s). Their family income is often limited. Additionally, family responsibilities and cultural and peer values impinge on the girls’ opportunities to pursue science and engineering” (Heller and Martin, 1994, p. 8).

As a result of the success of the George Washington University program, a working conference was held in 1991, to study exemplary programs in order to determine how such programs could be expanded and institutionalized. No fewer than twenty experts attended the meeting and participated in a brainstorming activity in which participates were asked to describe programs with which they were familiar that attracted women and minorities to engineering and science.

The brainstorming activity produced a list of 47 characteristics of programs to attract young minority females to science and engineering. These 47 characteristics were ranked on a scale of 10 (essential) down to one (not important).

With regards to this study, two of the more important characteristics were ‘role models’ and ‘use of computers to enhance skills and confidence’. These two
characteristics are part of the explanation of ‘self-efficacy’. Part of self-efficacy means one must be confident and see others who have succeeded in a task which one wishes to complete.

In addition to exposing a link to ‘confidence’ and ‘role models’, with regards to attracting minorities to the area of computers, math and engineering, this paper was one of the first to address the need to attract minority women. Additionally, the issue of disinterest in math and science as women grow promote the suggested idea to study the computing ‘pipeline’ as presented in this study. The paper concluded that there is not a single answer to the challenge of increasing minority women and simply opening doors to once-restricted career fields will not be enough.

_African-American Women in Computing Sciences_

Few women select to major in the Computing Disciplines. In addition, African-Americans do not often select to major in the Computing Disciplines. In Lopez and Schulte (2002), a preliminary analysis of data collected by the NSF presents an interesting anomaly with regard to African-American women in Computer Science CS.

Although fewer and fewer women are finding their way to completing a bachelor’s degree in one of the computing sciences, Lopez and Schulte present some preliminary analysis to suggest that research is needed to better understand how the production of bachelor’s degrees in CS for African-American women have remained relatively stable at HBCUs.

The shrinking population of females in the computing disciplines (the prominent ones being, computer engineering, computer science, software engineering, information systems, and information technology) has been researched for years (Carver, 2001; Haller
& Fossum, 1998; and Scragg & Smith, 1998). While rationales vary, it is yet unclear why females leave the domain of the Computing disciplines.

In 2000, a report from the American Association of University Women entitled “Tech-Savvy: Educating Girls in the New Computer Age,” stated that females were “alarmingly underrepresented” in the computing disciplines. Using CS as a representative discipline, the percent of females graduating with bachelor’s degrees in CS has declined from 37% in 1985 to just over 27% in 1997.

The gap between the genders receiving bachelor’s degrees is substantial and widening. The gap between African-American males and AA females on the same measure is small to almost non-existent. For African-American females, Lopez and Schulte (2002) put forward the idea that award of a bachelor’s degree in CS has less to do with gender differences and more with cultural factors.

Lopez and Schulte call for efforts to understand and facilitate African-Americans’ academic and career-choice behavior with respect to one of the computing disciplines — computer science —as aided by comprehensive career theories currently being applied in other math and science-intensive disciplines.

Since HBCUs produce the majority of African-American scientists and engineers, Lopez and Schulte also looked at the data from the reporting HBCUs to detect any differences between African-American female and male students attending and those not attending HBCUs. The data showed that at HBCUs consistently more African-American females are awarded bachelor’s degrees in CS than their male counterparts. The opposite holds for African-American females and males attending non-HBCUs.
The data further showed that there was statistical association between knowing the gender of an African-American receiving a bachelor’s degree in CS in 1997 and the kind of institution (HBCU or non-HBCU) that awarded the degree and vice-versa. Again, the researchers call for more data in order to understand the academic-choice behaviors of these substantially different groups.

The authors summarize other findings to show that: General social pressures discourage females from pursing BS degree in CS; females feel more strongly that they want to raise a family and, that a CS career is incompatible with this goal. In addition, female CS students often underestimate their own abilities, are reluctant to try new techniques and apply their knowledge, simply because they have less hands-on experience with computers. However, departmental environments can encourage or discourage female persistence in the CS undergraduate level. It is also true that females who may be interested in majoring in one of the computing disciplines have few role models to encourage them.

Prior studies have addressed the issue of the low numbers of African-Americans studying in the computing disciplines, especially focusing on the male-female balance. In this study, I am seeking to look further along the ‘pipeline,’ before the undergraduate stage. The AA female is introduced to the discussion in order to contrast and possibly help explain the AAM situation.

**The Shortage of Computer Scientists and Technologists**

Although there is a documented need for more graduates with degrees in the computing disciplines, there is just as much data to show that women and minorities are not filling the need (Lopez & Schulte, 2002; Shavelson, 2002). Studies have shown that
if underrepresented groups were fully participating in the IT workforce, this fact would go far in addressing the IT shortage (Hughes, 2001). In fact, in 2001 25 companies pledged to spend at least $1 million annually until 2011 to help women and minorities prepare for high-tech careers (Hughes, 2001).

In a 2008 article titled, “The IT skills famine plaguing the United States is only going to get worse”, Luftman (2008) provided some compelling explanations that the shortage of computer scientist and technologist still exist.

Luftman (2008) explained that there is current shortage of skilled students and workers in the computing discipline. In a 2007 Society for Information Management (SIM) survey of 130 senior IT executives, 51% of the executives agreed that their top concern was recruiting, training and retaining IT professionals.

As evidence of the shortage of students, Luftman (2008) shares the National Center for Education’s report that undergraduate enrollments in computer science between 2001 and 2006 dropped 40%. Additionally, the National Center for Education reveals educators in K-12 school systems have reported declines in math and science competence in their graduates.

Luftman (2008) provides reasons he believes shortage will get worse, far worse. Although five of the 30 occupations projected by the U.S. Bureau of Labor Statistics to grow the fastest by 2006 are IT-related, by 2010, 40% of the U.S. workforce is set to retire. The Bureau of Labor Statistics predicts that in 2010, there will be 52% more people in the 55-to-64 age bracket than there were in that age group in 2000 (Luftman, 2008). Furthermore, McKinsey & Company believe 70 million baby boomers will exit
the workforce in between 2008 and 2023 and only 40 million people will enter the workforce (Luftman, 2008).

The after-effects of post 9-11 only add to the ‘shortage crisis’. While some suggest that organizations should hire more foreign students being educated in the United States, two problems exist. One, since 2007, American colleges and universities received 27% fewer graduate applications from international students than in 2003. F-1 visas issued to international students fell 10% between 2001 and 2005 (Luftman, 2008).

Second, military and government agencies seek to employ U.S. citizens. Again, when the baby boomers exit the workplace, these openings will include military and government jobs in the computing discipline. Military and government agencies will be seeking talented U.S. citizens to fill the computing discipline job openings.

Luftman (2008) presents a bleak picture of the current public school system. It is reported, by the Organization for Economic Cooperation and Development, that in math literacy, the United States ranked 24th of out the 29 nations in the organization. He stated, “Public school teachers and counselors are unable to communicate the opportunities available in IT. Parents aren’t encouraging children to get into the IT field because of the dot-com failures and inaccurate media reports about all IT-related jobs going to India.” (Luftman, 2008, p. 2).

Luftman (2008) calls for all the major U.S. stakeholders to work together “revitalize the appropriate pipeline of candidates”. These stakeholders include private industry, educational systems at all levels, government agencies, students, parents, and guidance counselors.
“In the past, the United States inspired young people to get into science, technology, engineering and mathematics (STEM) education with a vision: to put a man on the moon. This national mandate worked beyond anyone’s expectations and illustrates how a shared vision can drive a desired outcome.” (Luftman, 2008, p. 2)

IBM and MicroSoft, along with Society for Information Management, are investing in programs which work with high schools and colleges (Luftman, 2008). These organizations are promoting the visitation to colleges and high schools, by their employees.

With respects to these large companies outsourcing to offshore locations, the article (Luftman, 2008) explains large and mid-size companies are both increasing the amount of work they outsource. But small businesses, which make up 99% of U.S. businesses according to U.S. Small Business Administration, are increasing their in-house IT staffs. Thus, more U.S. based IT Professionals will be needed.

The Bureau of Labor Statistics (Luftman, 2008) reports that five of the eleven ‘hottest jobs’ in the ‘Projected increases between 2006 and 2016’, are IT related. These jobs include: Network systems and data communications analysts, applications software engineers, computer system analysts, database administrators, and systems software engineers.

In summary, Luftman (2008) presents evidence explaining a current shortage of IT workers. Additionally, as 70 million baby boomers retire, there will be a surplus of thirty million unfilled jobs. Five of the eleven ‘hottest jobs projected to increase’ are IT related. Thus, there is call by Luftman (2008) for all stakeholders to come together and
overcome the current thin pipeline and the impending baby boomer retirement. This study addressed the call for educators to contribute to this important cause.

**Eating Our Seed Corn – Revisited**

This current ‘CS Crisis’ can not be finished without discussing the ‘CS Crisis’ of the early 1980’s. Peter Denning (1981) coined the phase ‘Eating Our Seed Corn’ in his ACM President’s Letter, published in the Communications of the ACM.

Denning’s phrase, ‘Eating Our Seed Corn’, was summarizing a phenomenon in which corporations were hiring Computing Discipline Graduates and not leaving enough applicants for College and University teaching positions. Who would teach the next generation of computer scientist?

Eventually, salaries for Professors rose to a competitive level and government agencies, such as NSF, developed programs aimed at increasing the pool of CS faculty (Denning, 1981).

In this current crisis, there is no shortage of CS faculty, now. The shortage, in the pipeline, exists at the student level. Thus, projecting forward, a shortage of students now could result in a shortage of CS faculty later. This research endeavor seeks to address the current CS crisis, while preventing ‘Eating Our Seed Corn – Part II’.

**Charting the Research on Women in Computing**

As noted above, there are many articles, studies, and organizations that address the area of women in computing. The following two tables, table 2.2 and table 2.3, present an overview:
<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
<th>Summary</th>
</tr>
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<tbody>
<tr>
<td>(Frenkel, 1990)</td>
<td>Women in computing</td>
<td>The reasons why women are not seeking computer science degrees.</td>
</tr>
<tr>
<td>(Klawe, 1995)</td>
<td>Women in computing: Where are we now?</td>
<td>Explanations for why more women are entering the computer science now v. the past.</td>
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<tr>
<td>(Pearl, 1990)</td>
<td>Becoming a computer scientist: Report by the ACM committee on the status of women in computing science</td>
<td>Representation of women in the computer science field</td>
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<tr>
<td>(Sackrowitz, 1996)</td>
<td>An unlevel playing field: Women in the introductory computer science courses</td>
<td>Study showing the number of women receiving degrees in computer science</td>
</tr>
<tr>
<td>(Bernstien, 1991)</td>
<td>Comfort and experience with computing: Are they the same for women and men?</td>
<td>Study on the comfort level of men and women in computer science dept. based on skill</td>
</tr>
<tr>
<td>(Kahn, 2005)</td>
<td>Women in computer science careers</td>
<td>Describes the careers of five women in the computer science field: Maria Gini, Jessica Hodgins, Fern Hunt, Bonnie Labosky, and Misha Mahowald.</td>
</tr>
<tr>
<td>(Carlson, 2006)</td>
<td>Wanted: Female computer-science students</td>
<td>Survey of programs and clubs for women in computer science at colleges across the U.S. Initiatives taken by Carnegie Mellon University, Pittsburgh, Pennsylvania and the</td>
</tr>
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</table>
University of Maryland, Baltimore County, to provide social support for women in the discipline. A report from the National Center for Education Statistics shows that the proportion of women in computer and information sciences has dwindled in the past 20 years, especially compared with other fields in mathematics and sciences.

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<tr>
<th>Source</th>
<th>Title</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>(Smith &amp; Balka, 2000)</td>
<td>Women, work, and computerization: Charting a course to the future</td>
<td>Congresses of: Women computer engineers; women in computer science; women electronic-data processing-personnel; women in information science</td>
</tr>
<tr>
<td>(Margolis &amp; Fisher, 2005)</td>
<td>Unlocking the clubhouse: Women in computing</td>
<td>Major source in women in computing topic. Jane Margolis, a social scientist, and Allan Fisher, a computer scientist and college dean, devised a four-year study (based on some 230 interviews) at Carnegie Mellon School of Computer Science. They found that the 7% female undergraduates started out with as much excitement and talent as their male counterparts, but often wilted early on,</td>
</tr>
<tr>
<td>(Larwood, 1992)</td>
<td>Women workers as users of computer technology</td>
<td>Increased use of computers in the workplace and the computer industry's emergence as a major player in the American business world has affected women in different ways than men. The computer industry has need for workers with engineering, mathematical, scientific, and/or managerial backgrounds, fields in which women are the minority. Men are more likely to be designing computers; women are more likely to be using them. In the workplace, computers are replacing workers, often in positions traditionally held by women.</td>
</tr>
<tr>
<td>(Laslett, 1996)</td>
<td>Gender and scientific authority</td>
<td>Women over the centuries in many domains of science.</td>
</tr>
<tr>
<td>(Libbon, 1999)</td>
<td>Is everyone majoring in some sort of computer specialty</td>
<td>Although computers are now ubiquitous on</td>
</tr>
</tbody>
</table>
| (Burger, 2002) | Helping girls take a byte out of technology | School principals can encourage girls to be more positive about technology by implementing strategies that seek to increase girls' confidence in and success with computers. Specifically, principals should be aware of parents' |}

> college campuses, conferred bachelor’s degrees in the computer sciences lag behind the numbers for other disciplines. The present and future leader of bachelor's degrees conferred remains business management, as most students realize that more income can be made in business. The relative unpopularity of computer science as a field of study is also explained by the higher numbers of women attending college; men are still more likely to major in a computer specialty, while women are far more likely to major in an area such as education, which is one of the most popular and yet lowest-paying fields for college graduates.
| (Thom, 2001) | Young women's progress in science and technology studies: Overcoming remaining barriers | Girls and young women have made great progress in increasing their performance and participation in science and technology studies in recent years. This article discusses that progress and remaining roadblocks. It describes strategies to continue promoting science and technology studies among female students to ensure a technologically prepared workforce. It summarizes the secondary-school section of a national report, Balancing the equation: Where are women and girls in science, engineering and technology? |

| | | attitudes toward technology and science, seek out programs that work for girls, make technology instruction "girl-friendly," emphasize cooperative and active learning, show the positive effects of technology on society, provide mentors for girls, and encourage activities that link technology and science with other areas. |
(Abernathy, 1999) | Second and fourth rocks from the sun | Women are missing out on computer-related careers by not enrolling in formal technology studies. Women have now caught up with men in terms of Internet usage, with Media Metrix reporting that the proportion of male Internet users has fallen from around 82% in 1996 to its current figure of approximately 50%. However, fewer women are embarking on computer science studies. Although a college degree in computer science is not required for success in online-related projects, the failure of women to pursue college-level technology studies is expected to limit the number of women in the technology’s executive ranks. On a positive note, the next generation entering the workforce is certain to eliminate gender stereotypes as its members incorporate the Internet into their daily lives.

<p>| Table 2.2 – Women in Computing – Articles and Books |</p>
<table>
<thead>
<tr>
<th>Name</th>
<th>Purpose, Mission, or Brief Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Association for Women in Science (AWIS)</td>
<td>AWIS is an organization dedicated to increasing the educational and employment opportunities for both girls and women in all fields of science.</td>
</tr>
<tr>
<td>Association for Women in Science and Engineering in the UK (AWISE)</td>
<td>AWISE acts as a forum, support group, and information center for women scientists and engineers.</td>
</tr>
<tr>
<td>CCWEST</td>
<td>CCWEST is a list (and a site of resources) for women and girls in science and technology in Canada. To subscribe, send the message SUB CCWEST Your Name to <a href="mailto:LISTPROCESSOR@CUNEWS.CARLETON.CA">LISTPROCESSOR@CUNEWS.CARLETON.CA</a> (Internet).</td>
</tr>
<tr>
<td>Caltech Women's Center</td>
<td>The Caltech Women's Center was founded in 1993 to work for the advancement of women in science and engineering. The Center works to supports the central mission of the California Institute of Technology: to promote the education and development of all scientists and engineers. The Caltech Women's Center operates as a central meeting place, information resource, program center, and support for the entire Caltech community.</td>
</tr>
<tr>
<td>Committee on Women in Science and Engineering (CWSE)</td>
<td>Established by the National Research Council within the Office of Scientific and Engineering Personnel in 1990, the committee is responsible for activities aimed at increasing the entry and retention of talented women into scientific and engineering careers.</td>
</tr>
<tr>
<td>FIST</td>
<td>The purpose of this mailing list is to discuss feminists in science and technology, feminist science, and feminist critiques of science and technology. In addition, the purpose includes discussion of the teaching of science and the implementation of technology. To subscribe, send a message to <a href="mailto:listserv@dawn.hampshire.edu">listserv@dawn.hampshire.edu</a>, no</td>
</tr>
</tbody>
</table>
| **Forward in Science, Engineering, and Mathematics** | Focus on reaching women in academics, research, and development in Science, Engineering and Mathematics. An implementation project for the recruitment and retention of women in advanced science, engineering, and mathematics. In addition, Forward has included the focus of assisting women in obtaining a tenure-track position in SEM.

Forward institutions include: Gallaudet University and The George Washington University (Has included: Hampton University, Hood College, National Technical Institute for the Deaf, and Smith College.

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| **Graduate Women in Science, Inc. (SDE/GWIS)** | Mission Statement: "Sigma Delta Epsilon/Graduate Women in Science (SDE/GWIS) is an interdisciplinary society of scientists who encourage and support women to enter and achieve success in science through full participation in: 1) their scientific research and its application; 2) development and advancement of women; 3) integration of their careers, personal goals, and society's needs; and 4) professional networking and mutual inspiration." |

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| **Graduate Women in Science Electronic Discussion Group** | This email-based discussion group, affiliated with Sigma Delta Epsilon/Graduate Women in Science (SDE/GWIS), has the goal of connecting all interested women scientists with access to the Internet. One need not be a member of GWIS to participate.

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| **Women in Technology (WIT) - Harvard Graduate School of Education** | The Women in Technology (WIT) group at the Harvard Graduate School of Education is a coalition for all members of the HGSE community with interests in girls / women vis a vis technology. This site lists WIT members, information about the WIT mini-conference, Take Our Daughters to Work Day and lists of related websites.

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| **IEEE Women in Engineering** | Issue No. 1 published December 1993. The IEEE Steering Committee on Women in Engineering publishes this electronic newsletter to focus on the activities of women in our profession. To contribute articles send email to b.ettinger@ieee.org. To receive Issue #1 including subscription information, send email |
| **International Society for Women in Cognitive Neuroscience** | A network of women and men interested in increasing career opportunities for women in this field. Biannual newsletter, an email network, and a dissertation travel award to fund an outstanding student's travel to the annual Cognitive Neuroscience Society meeting. |
| **National Center for Women in Information Technology** | NCWIT's work leverages the efforts of organizations across the country, and connects efforts to increase women's participation in IT along the entire pipeline, from K-12 and higher education through industry and academic careers. NCWIT encourages its members to undertake institutional change within their organizations, and our work provides them with the tools and support to be change agents. |
| **National Research Council Committee on Women in Science and Engineering** | The NRC (the chief operating agency of the National Academy of Sciences and the National Academy of Engineering) has appointed this committee. |
| **Lesbians in Science** | Internet: requests: LIS-REQUEST@KENYON.EDU, postings: LIS@KENYON.EDU |
| **Los Alamos Women in Science (WIS)** | Purpose: "To create an atmosphere of active communication, support, and assistance among women pursuing careers in science and engineering; and to foster further development of their professional skills; and to act as mentors and role models for women and young people by providing support, encouragement, and assistance in the development of their careers in science and engineering."

**Society of Women Engineers (SWE)** | The Society of Women Engineers (SWE) is a non-profit organization whose goals and objectives are to: Inform young women, their parents, counselors, and the general public of the qualifications and achievements of women engineers and the opportunities open to them, assist women engineers in re-entering themselves for a return to active work after temporary retirement, serve as a center of information on women in engineering in the United States, and encourage women engineers to attain high levels of education and professional achievement. |
| **Systers in Engineering (SIE)** | SIE, Systers in Engineering, is a new list for lesbians and bisexual women in engineering and computer sciences. |
| **WISENET: Women in Science and Engineering Network** | The focus of this group is issues relevant to the education and employment of women in the sciences, mathematics, and engineering. To subscribe, send a message to listserv@UICVM.CC.UIC.EDU, no subject, with the message "subscribe wisenet first_name last_name". |
| **WITI: International Network of Women in Technology** | An organization committed to supporting professional development, personal growth, and self-improvement for women in science and technology. WITI maintains a substantial Web site called The WITI Campus (www.witi.com). |
| **WITS: Women, Information Technology, and Scholarship** | An interdisciplinary group of women faculty, academic professionals, and graduate students on the University of Illinois Urbana-Champaign campus, working to help insure that new communications technologies will be structured and used in ways beneficial and equitable for all. |
| **The Women in Engineering (WIE) Initiative** | University of Washington, College of Engineering |
| **Women in Engineering Program Advocates Network (WEPAN)** | Founded to provide greater access for women to careers in engineering. Assists colleges and universities to establish innovative programs or expand existing programs. WEPAN includes representatives from industry, government, and academia. |
| **Women in Science and Engineering (WISE) Groups** | Located around the world, the mission of the Women in Science and Engineering (WISE) Program is to expand and improve the educational and professional opportunities for women in all fields of science and technology by facilitating institutional and social change. |
| **WOMUNSCI - Women Undergraduates in Science** | WOMUNSCI, for WOMen UNdergraduates in SCIence, is a mailing list for discussion concerning the topic of increasing participation of undergraduate women in science. Science is exciting and holds promising career options, but women are increasingly under-represented |
at every successive level of education and employment. What can be done to attract and retain women in the sciences? This list is devoted to looking at that question at the undergraduate level. Membership is open to college science educators and administrators (of both genders) and women undergraduates interested in science. This list should be a comfortable place in which to freely engage concerns and ideas. The list grew out of a workshop held in January 1994 at Middlebury College and funded by NECUSE, the New England Consortium for Undergraduate Science Education.

<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women in Science &amp; Technology Forum</td>
<td>On November 4, 2005, <em>FIRST</em> Place and the University of New Hampshire, Manchester host a one-day science and technology event for over 300 senior high-school students, educators, and science and technology professionals. Participants explore the role of women in science and technology, review college and career choices, and connect with a network of science and technology professionals specifically chosen to inspire and mentor young women.</td>
</tr>
<tr>
<td>The Grace Hopper Celebration of Women in Computing</td>
<td>The Grace Hopper Celebration of Women in Computing 2006 is the sixth in a series of conferences designed to bring the research and career interests of women in computing to the forefront. Presenters are leaders in their respective fields, representing industrial, academic, and government communities. Leading researchers present their current work, while special sessions focus on the role of women in today's technology fields.</td>
</tr>
<tr>
<td>Careers of Women in Science: Issues of Power &amp; Control</td>
<td>This conference is intended to expand diversity in the scientific workforce by encouraging the participation of young women, and particularly young women of color, in pursuing scientific careers. It combines a broad recruitment conference coordinated with schools and organizations for high-school girls and undergraduate women with a scholarly conference analyzing the extent to which women have obtained power in scientific employment situations and control over their working lives. Presentations, panels, informational displays, and demonstrations integrated both threads of the conference. The audience included high-school girls from the Bay Area, science and engineering faculty from northern California universities, and others.</td>
</tr>
<tr>
<td>Women in Science</td>
<td>A &quot;Women in Science&quot; conference hosted at the Oak</td>
</tr>
<tr>
<td>Conference</td>
<td>Ridge National Labs in Oak Ridge, Tennessee in mid-March 1996. For information, contact: ORISE / Marilyn Murray / Oak Ridge Associated Universities / PO Box 117 / Oak Ridge, TN 37831-9978</td>
</tr>
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</tr>
<tr>
<td>Women Shaping Technology Conference</td>
<td>Women Shaping Technology is a by-invitation-only conference exclusively for women executives. The speaker list includes women CEO's of public and private companies, venture capitalists, authors, and educators who have developed successful strategies for high performance careers in information technology.</td>
</tr>
<tr>
<td>Bridging the Gender Gap in Engineering and Science: the Challenge of Institutional Change</td>
<td>Special Conference on Women in Engineering and Science Carnegie Mellon University, Pittsburgh, PA</td>
</tr>
</tbody>
</table>
| The Society of Women Engineers National Convention | 4,000 attendants at the most powerful professional-development conference for women in engineering and technology. Undergraduate and graduate students, entry-level engineers and experienced professionals; three-day program of sessions, tours, networking, and career opportunities.  
2006 National Conference Oct. 12 – 14, Kansas City, MO  
2008 National Conference Nov. 6 – 8, Baltimore, MD |
| WITI's Women and Technology Summit | WITI conferences provide a quality environment for both sharp-minded business people seeking to rise to the top of their chosen field and a comfortable breeding-ground where relationships are fostered and connections can be made. October 29 – 31, 2006 Hyatt Regency, Santa Clara, CA. |

Table 2.3 – Women in Computing – Organizations, Website (List) and/or Conferences
Retention Studies

One of the leading problems facing all colleges and universities across the US is retention. Once a student enters college, the goal is to graduate with a degree in four to six years. Like most large or long-term projects, this is far easier said than done. Retention is a universal higher-education issue, but research shows that African-American students are even more likely to drop out of school than their White counterparts (Hrabowski et al., 1998; Majors & Billson, 1992).

Improving Retention

In 2002, the “DEEP” (Documenting Effective Educational Practices) project was developed to reverse the trend of students leaving college before graduation (attrition). The effort was the first in a series of activities undertaken by the National Survey of Student Engagement (NSSE), an annual survey of colleges designed to improve the success rates of undergraduate students (Black Issues in Higher Education, 2002).

From 2002 to 2004, the project researchers looked closely at about twenty colleges and universities with better-than-predicted performance on the annual NSSE and higher-than-predicted graduation rates. Table 2.4 shows these schools:

<table>
<thead>
<tr>
<th>Alverno College</th>
<th>Miami University (OH)</th>
<th>University of the South</th>
</tr>
</thead>
<tbody>
<tr>
<td>California State University, Monterey Bay</td>
<td>Sweet Briar College</td>
<td>Ursinus College</td>
</tr>
<tr>
<td>Fayetteville State University</td>
<td>The Evergreen State College</td>
<td>Wabash College</td>
</tr>
<tr>
<td>George Mason University</td>
<td>University of Kansas</td>
<td>Wheaton College (MA)</td>
</tr>
<tr>
<td>Gonzaga University</td>
<td>University of Maine, Farmington</td>
<td>Winston Salem State University</td>
</tr>
</tbody>
</table>
Table 2.4 - Schools with high scores on the NSSE and high graduation rates.

Over the past few years, NSSE presented a series of policy briefs based on in-depth examinations of the 20 Project DEEP schools that have higher-than-predicted graduation rates and have demonstrated through NSSE results as having in force effective policies and practices for working with students of different abilities and aspirations. These briefs provide useful suggestions for promoting student success to a wide range of audiences and stakeholders, including university administrators and leaders, faculty, students, and the general public. Each brief is titled “Promoting Student Success” and is subtitled “What [Administrators, Faculty, Students, Advisors, Media, Business Leaders, Accreditation Teams] can do.”

Retention Assessment

The 2001 increase in college entrance rates among minority students brought little comfort when compared alongside the retention statistics. Nationwide, the five-year graduation rate barely exceeded 50 percent of those entering four-year colleges and universities. The figure for Black students was more than a full 10 percentage points lower (Prime, 2001).

Politicians and academicians have focused on lower levels of college preparedness, socioeconomic differences, and social interaction and adjustment as causes of minority students’ low graduation rates. Some proposals such as career planning assistance and various forms of instructional enrichment were sought to address the academic and
intellectual gaps in the college experience. These measures reflect what might be called a "deficiency model" within the issue of minority retention. They suggest that minority students are deficient in areas that have proven critical to persistence in college, not just admission-worthiness.

Prime argues that very few have questioned the validity of the assessment strategies used to tell students whether they are succeeding, and to make decisions about whether students are allowed to progress to higher levels. This could lead to a misunderstanding of the data and its implications (Prime, 2001).

When a single method of assessment is used almost exclusively to measure learning, then only those for whom there is a good fit to that method will be successful. “Socioeconomic factors undoubtedly are important in the retention issue, but it is naive to treat assessment itself as unproblematic. It might well be that assessment is one of the missing elements in the retention discussion” (Prime, p 50).

Retention Success Stories

There are plenty of articles to boast of programs that result in improving retention rates. This section provides a review of four such cases. The 2008 Noel Levitz Retention Excellence Award will be reviewed first. Next, two articles that stress the importance of mentoring as a means to improving retention will be summarized. The second mentoring article speaks to the effect of mentoring to improve the retention of African-American male students. The final retention article deals with retaining students in an online degree program.
The Noel Levitz Retention Excellence Award

Noel Levitz is a higher-education consulting firm that advises colleges and universities about student programs and annually recognizes colleges and universities with higher retention rates. These schools are recognized based on measurable results, originality of programs, resource use, and adaptability to other institutions (Hammer, 2003).

The 2008 award was conferred on the following three schools: Grand View College (IA), South Plains College (TX), and Virginia Commonwealth University (VA). Noel-Levitz.com presents an overview of these schools and a summary of the overview follows.

Grand View College – Retention Excellence Award Winner

Grand View College (GVC) is a four-year private college located in Des Moines, Iowa. Grand View College offers thirty-six majors, maintains a student population of 1800 and a faculty to student ratio of one to thirteen (GVC, 2008).

Grand View College was awarded the 2008 Noel Levitz Retention Excellence Award primarily for their development of the widespread student success programs and added two key positions to oversee early alert and academic support.

The goal of GVC is to improve retention and achievement of the at-risk students. GVC dedicates staff to identify students who meet designated risk factors and provide positive intervention.
Grand View College award winning program consist of four key strategies: 1) First Year Connections, 2) Early Alert and Student Support, 3) Viking Edge and 4) Center for Excellence in Teaching and Learning (CETL).

The first year connection includes a required learning community, which allows students to live and learn together with fellow students. Additionally, these students are linked with faculty advisors and mentors.

The early alert and student support is maintained by a dedicated staff of counselors. These counselors identify risk factors and monitors students, while looking for these factors. Once identified, the counselor meets with the student with hopes of providing a positive intervention plan.

The Viking Edge is not a program, but more of a way of thinking. Grand View College seeks to maintain an environment where all members of the community work together to form an overall positive experience. E.D.G.E. stands for engaging in the community, discovering your career path, growing in leadership and educating with integrity. (GVC, 2008)

The Center for Excellence in Teaching and Learning (CETL) is a comprehensive faculty development program to enhance student learning through improved teaching and advising. (Noel Levitz, 2008) CETL provides Summer Institutes, which puts students and experts throughout the campus in the same place. The groups discuss topics such as learning strategies, assessment, learning community pedagogies, course design and student engagement.
Implementation of these four strategies, First Year Connections, Early Alert and Student Support, the Viking Edge and Center for Excellence in Teaching and Learning (CETL) allowed Grand View College to accomplish some major retention results.

“The GPA and percentage of students earning a C or above in learning communities (LC) classes are generally higher than students enrolling in non-LC sections. Student-faculty interactions (as measured by National Survey of Student Engagement benchmark) have increased from 33.7 to 36.2 for freshmen and from 41.6 to 42.9 for seniors since 2004.

GVC increased the five-year average freshman to sophomore retention from 61 percent to 68.3 percent and the freshman to junior retention rate from 47 percent to 54 present. Further, the five-year graduation rate increased from 33 percent to 37.9 percent.” (Noel Levitz, 2008)

South Plains College – Retention Excellence Award Winner

South Plains College (SPC) is a two year public community college located in Levelland, Texas. More than 9,000 students attend SPC each semester. Through its Arts and Sciences Division, the college offers students 43 academic transfer options in 22 disciplines which lead to the Associate of Arts and Associate of Science degrees. (SPC, 2008)

South Plains College was awarded the 2008 Noel Levitz Retention Excellence Award primarily for their successful development of a comprehensive retention plan from the ground up. The new retention plan required the academic and student affairs
divisions to collaborate for the first time. This partnership resulted in a campus-wide focus on retention and a Noel Levitz Excellence in Retention award.

A Retention Team comprised of over twenty faculty and staff formed a Comprehensive Retention Plan. The plan had three main initiatives: Academic Advising, Early Alert and Individualized Success Plans.

The academic advising piece required the formation of an Advisement Team made up of members of the Counseling Centers and the Student Support Services Office and a faculty representative from each academic department. While this group advises all students, it targets the specialized student groups: academic probation students, suspension students and students who have not passed the college placement tests.

The Early Alert System assists student retention by identifying students who demonstrate a lack of academic success strategies. Faculty members identify the students and complete an online Early Alert form, which is received by the Office of Enrollment Management. This office reports the information to multiple departments across South Plains College. These departments are able to appropriately assist the students.

The Individualized Success Plan is an online success module. It is designed to give students a road map for their college career at South Plains College. It guides the students from the beginning, including any developmental work if necessary, until the student is ready to transfer credits from the two-year community college.

The success is shown in the retention numbers. Since the Retention Team begun their work in 2005, the fall to spring retention rates for full-time students increased from 69
percent to 73 percent and the fall-to-fall retention rates increased from 35 percent to 44 percent.

“The first pilot group that had contact with advisors at least four times during the Fall 2005 semester was retained for Spring 2006 at 84 percent, compared to 46 percent for the control group. For the cohort group on academic probation after Spring 2006, retention to Spring 2007 increased by 11.4 percent. Students completing 12 or more hours doubled from 8.87 percent to 17.73 percent. Further, students achieving a 3.0 or higher GPA doubled from 10.28 percent to 22.34 percent” (Noel Levitz, 2008)

Virginia Commonwealth – Retention Excellence Award Winner

Virginia Commonwealth University (VCU) is a four-year public University, located in Richmond, Virginia. VCU enrolls nearly 32,000 students in 205 certificate and degree programs in the arts, sciences and humanities. (VCU, 2008) VCU is Virginia’s largest university.

Virginia Commonwealth University was awarded the 2008 Noel Levitz Retention Excellence Award mainly for their successful advising program for undeclared students. VCU established a Discovery Program and the Discovery advisors help undeclared students consider education options and make appropriate choices.

VCU studied and discovered that undeclared students were struggling academically. With undeclared students making up ten percent of VCU’s
undergraduates, something had to be done. VCU pulled five of the thirty full-time advisors and dedicated their efforts to the Discovery Program.

The Discovery Program highlights are presented below:

− Freshman students meet Discovery Program advisors at orientation.

− Throughout the year, the advisors maintain regular contact through email, Blackboard and Facebook.

− Discovery advisors meet every first-year student three times in the fall and twice in the spring.

− Advisors assess how each student is adjusting to college.

− Advisors teach three of the freshman orientation courses.

“VCU has created a successful, proactive advising program for undeclared students. Over the past four years, the number of undeclared students rose from 791 to 850, but the first-year retention for this cohort increased from 74.8 percent to 82 percent. The rate of undeclared students who met with an advisor a minimum of four times in the first year rose from 32 percent to 61 percent while those expressing the highest level of satisfaction with advising rose from 58 percent to 77 percent. Finally, the rate of undeclared students in good standing at the end of the first year rose from 70 percent to 75 percent.” (Noel Levitz, 2008)
Mentoring

Vernon J. Hurte, a former student of the Honors College of Bowie State University, believes that mentoring is a practical tool for retaining minority students. He says that it is often the case that mentors of minority students begin to mentor when the students near graduation from the institution, but this can be a problem because not all students persist to that stage. Hurte believes that the benefits of mentoring programs have been established as a tool that helps retain minority students, but thinks the newest battle is in identifying who the ideal candidates are to serve as mentors. (Hurte, 2002).

Hurte is a Program Coordinator for the Minority Advisors Program (MAP) at the University of Tennessee, which provides personal academic support and assistance, social guidance, and positive campus survival skills to first-year and transfer minority students. He states that the most popular mentoring model referenced today is “The Arranged Mentor for Instructional Guidance and Organizational Support” (AMIGOS) model.

Under the AMIGOS model, after matching a protégé with a mentor on the basis of a careful assessment of both the prospective mentor and protégé, the pairs participate in problem-based activities, training and information sessions about classes, assignments, and other institutional resources. In using this model, it is noted that selection of the proper mentor for a selected protégé is crucial to the program’s success.

In most cases, the mentor selection process becomes a problem because most mentoring managers look to faculty members and other professionals as the ideal candidates. In this model, more than others, the mentor must be available for interaction with their protégé more often than for other mentoring models. For this reason Hurte
believes that successful college and university students, rather than faculty and counselors, should be the new targets as prospective mentors.

**Mentoring the African-American Male College Student**

“It comes as no surprise that African-American men are in a precarious position when it comes to persistence in higher education. The declining numbers nationally of African-American males attending and graduating from college are distressing not only because of the immediate implications for the men themselves, but also because of long-term economic, social and political consequences for society” (Wilson, 2000, p.175).

Today African-American men have better access than ever before to colleges of their choice. Statistically there is a high probability, however, that they will not complete their basic coursework. Retention experts say that a student’s ability or inability to find their “niche” in a college atmosphere has a direct impact on the student’s potential staying power to graduate. This truth makes it all the more difficult for a Black male transferring to a predominantly White college or university (Wilson, 2000).

One variable used to combat these social/educational problems is the presence of formally assigned mentors on campus who are similar in ethnicity and the same gender to serve as a solution to the immediate-attrition problem of African-American men. This presence also keeps predominately White colleges and universities “culturally sound.”

It is generally accepted that institutionalizing mentoring is a valuable first step in the direction of increasing Black enrollment and retention in colleges and universities across America. It is Wilson’s belief that once “institutionalized mentoring” is in place, eventually there will be more African-American male graduates. This outcome will also
contribute to and ensure a productive future for the Black family by improving career prospects that result from the degree.

**Self-Efficacy**

Bandura (1994) defined self-efficacy as “People’s belief about their capabilities to produce designated levels of performance that exercises influence over events that affect their lives” (Bandura, 1994, p. 71). Bandura found that people with high self-efficacy approached difficult tasks as challenges rather than threats, whereas those who doubted their abilities shied away from these challenges, which they viewed as threats. Bandura (1986) also noted that “People regulate their level and distribution of effort in accordance with the effects they expect their actions to have. As a result, their behavior is better predicted from their beliefs than from the actual consequences of their actions” (Bandura, 1994, p. 71).

Bandura (1997) also distinguished between self-efficacy and confidence, noting that “the construct of confidence is a nondescript term that refers to strength of belief but does not necessarily specify what the certainty is about” (Bandura, 1994, p. 71). Self-efficacy is context-specific, and it can be influenced by certain external sources. Eachus and Cassidy (1997) present that a person may have high levels of self-efficacy within a particular domain, a sport for example, and a low sense of self-efficacy toward another, such as academic ability.

Bandura (1997) identified four principal sources of influence on self-efficacy. They included 1) mastery experiences, 2) vicarious experiences, 3) verbal persuasions and social influences, and 4) physiological and affective states. Successful mastery experiences, the most influential of the four influences, built a strong sense of efficacy.
Failures weakened it, especially if failures occurred before a sense of efficacy was firmly established. Self-efficacy was also raised through vicarious experiences, such as learning from modeling and appraising capabilities in relation to the capabilities of others. A third influence on self-efficacy was verbal persuasion, which was often in the form of constructive feedback, particularly during the early stages of performance. The fourth influence, physiological and affective states, increased self-efficacy because positive moods and physical feelings contribute to positive self-efficacy in certain situations.

Bandura’s work in self-efficacy serves as the theoretical backdrop for this study in using a questionnaire based on Bandura’s self-efficacy definition and dimensions. This study looked at confidence levels with regard to obtaining a computer-related degree, of fourth-, eighth-, and twelfth-graders, as well as college-level students.

Recent Dissertations on Self-Efficacy topics

Table 2.5 lists four recent dissertations based on the self-efficacy concept. Included in the table is a listing for the present study as the fifth study for comparison purposes. The table shows some of the differences and similarities between my study and these dissertation topics.

<table>
<thead>
<tr>
<th>Title</th>
<th># of Self-Efficacy Questions</th>
<th># of subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCCT &amp; Racial Composition of College Campus: Predicting Graduate School Consideration for Undergraduate Black Males</td>
<td>62</td>
<td>184 African-American males</td>
</tr>
<tr>
<td>(Ford, 2003)</td>
<td>30</td>
<td>335 students in the 3rd – 5th grades</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
<td>----</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>Classroom Racial Composition and Perceived Self-efficacy of African-American Students (Williams-Daugherty, 2003)</td>
<td>30</td>
<td>121 teachers</td>
</tr>
<tr>
<td>Factors Influencing Elementary Teachers’ Instructional Use of Computers (Dawson, 1998)</td>
<td>30</td>
<td>140 Total</td>
</tr>
</tbody>
</table>

Table 2.5 – Recent Dissertations based on the Self-Efficacy Concept

**Predicting Graduate-School Consideration of African-American Males**

The purpose of Ford’s study (2003) was to explore the applicability of a social cognitive career theory to the vocational behavior of Black undergraduate males in pursuit of graduate education. The purpose can further be explained by reviewing his three hypotheses:
Hypothesis 1: Black males at HBCUs are expected to significantly differ from Black males at PWIs on academic self-efficacy (undergraduate and graduate) and outcome-expectations instruments. Specifically, Black males at HBCUs are expected to have higher academic self-efficacy and more positive outcome expectations than Black males at PWIs (Predominantly White Institutions).

Hypothesis 2: Undergraduate self-efficacy and graduate self-efficacy will predict outcome expectations.

Hypothesis 3: Undergraduate academic self-efficacy, graduate academic self-efficacy, outcome expectations, long-established academic major, and math-science relatedness of academic major, will predict graduate-school consideration for Black males.

Ford (2003) surveyed 184 full-time Black male undergraduate students. The participants were selected from two public institutions of higher learning: a Predominantly White Institution (PWI) in the Midwest and an HBCU in the South. A total of 113 students were sampled from the HBCU and 71 students were sampled from the PWI. The student classifications are as follows: 11 freshman, 8 sophomores, 76 juniors, 89 seniors. Finally, students were majoring in both science and non-science areas.

The academic self-efficacy instrument used in the study was based on a scale developed by Lent, Brown, and Hackett (1996), and adapted by Hackett and Byars (1996). The scale assesses college students’ academic self-efficacy in their ability to
complete the academic requirements for attaining an undergraduate and/or graduate degree.

The instrument measures academic self-efficacy by two subscales. The first subscale measures self-efficacy based on undergraduate tasks. Items on the instrument include such questions as: “How confident are you that you could complete the first two years of college with a G.P.A. of 3.0 or better?” The second subscale consists of fourteen items reflecting tasks encountered on the way to completing a graduate degree. Two such items are: “How confident are you with the idea that that you could successfully complete a doctoral program?” and “How confident are you that you could score well on the Graduate Record Exam (GRE)?”

Findings

Hypothesis 1: “Black males at HBCUs are expected to significantly differ from Black males at PWIs on academic self-efficacy (undergraduate and graduate) and outcome expectations instruments.” Specifically, Black males at HBCUs are expected to have higher academic self-efficacy and more positive outcome expectations than Black males at PWIs. The hypothesis was unsupported by the data. Black males from the HBCU sample did not differ significantly from those from the PWI sample on the academic self-efficacy measures.

The high confidence of Black males attending HBCUs may be attributed to the “supportive environments” of Black college campuses. The faculty and staff creating a nurturing environment in and outside the classroom, along with high academic standards, make HBCU graduates feel competent about their academic skills.
However, the equally high confidence of Black males at the PWI may be attributed to the types of support services (examples: McNair Scholars Program, Undergraduate University Division, and the College Advancement Achievement Program) offered by the university. The PWI level equaled the HBCU.

Hypothesis 2: “Undergraduate self-efficacy and graduate self-efficacy will predict outcome expectations.” The results provided partial support for this hypothesis. Undergraduate and graduate academic self-efficacy was the strongest variable to predict college outcome expectations. Black males in the study felt efficacious and perceived that positive results would occur because of their efforts from completing a bachelor’s or graduate degree.

Hypothesis 3: “Undergraduate academic self-efficacy, graduate academic self-efficacy, outcome expectations, long-established academic major, and math-science relatedness of academic major, will predict graduate school consideration for Black males.” The data did not fully support this hypothesis. Undergraduate academic self-efficacy was the strongest predictor of graduate-school consideration. Graduate academic self-efficacy was the next-strongest predictor to influence graduate-school consideration. Both variables were statistically significant.

**Summary and Relevance to this study**

Ford’s study showed self-efficacy directly predicted graduate-school consideration of Black college males. The results also provided evidence that Black males attending HBCUs or PWIs had equally high confidence levels about attending graduate school.
This study looked at confidence levels of fourth-, fifth-, eighth-, and twelfth-graders, as well as college-level students. Based on Ford’s findings that Black males had high confidence levels about attending graduate school, the results of this study would lead one to believe that the college-level students, in the proposed study, will have a high confidence level.

*Classroom Racial Composition and Perceived Self-Efficacy of African-American Students*


In order to accomplish this objective, the study explored self-efficacy beliefs of African-American students in racially mixed and predominantly African-American classrooms. Predominantly African-American schools had a minimum 85 percent enrollment of African-American students. The racially mixed schools had at least 35-65 percent of its student enrollment either African-American or White.

The study was conducted in six elementary schools in the Memphis City School District. The study was limited to students in grades three through five for a participation rate of thirty-five percent. Frequency responses were reported for all students who completed the survey. Additionally, Analysis of Variance and Pearson-R statistical methods were used to analyze survey data and to determine significant relationships (Williams-Daugherty, 2003).
The thirty-question self-efficacy questionnaire provided a four-point Likert scale which yielded scores ranging from 30 to 120. Scores ranging from 30 to 60 exemplified low self-efficacy; scores ranging from 90 to 120 indicated high self-efficacy.

Findings

The responses of students on the self-efficacy survey together with TCAP (Tennessee Comprehensive Assessment Program – Achievement Test) scores provided the following findings: First, the racial composition variable was not significantly related to perceived self-efficacy of African-American students. This indicated that African-Americans in both racial mix categories have a moderate to high belief in their academic ability. Second, there was no support for the hypothesis that an interaction existed between grade-level and gender variables with the dependent variable, self-efficacy score.

In summary, the majority of respondents had a positive perception of school. There was no significant difference between self-efficacy scores of the racially mixed classrooms and those of the predominantly African-American classrooms.

Relevance to this study

There are two major areas of this study that stand out as relevant to this dissertation. One, the age range of the subject in the study was third, fourth, and fifth-graders. It could be that there were no significant differences between self-efficacy scores because the ages were clustered too closely. In this study, the grade range is fourth, eighth, twelfth, and college (two levels).

The second area of relevance was covered by Williams-Daugherty (2003) in the Recommendation section. The author recommended that a qualitative study be
conducted as well as the self-efficacy exam. Again, this study included the qualitative element in addition to the self-efficacy questions.

**Summary**

Reading current literature on AAMs in education reveals the term “disidentification” (Osborne, 2001; Majors, 1992). The term is disheartening because until the past century, African-Americans have been denied the right to education. However, now that Blacks have access to free primary education, Osborne (2001) and Majors (1992), among many others, expose that a great percentage of AA boys resist appearing to be smart, doing well in school, or furthering their learning careers (Osborne, 2001).

The “disidentification” factor, as many sources directly or indirectly show, establishes the challenge to encourage and assist AAMs in the rigorous and demanding areas of science, technology, engineering and mathematics a tremendously difficult endeavor. Research has made known some successful efforts. Hrabowski (1998) presented the summary of interviews with Meyerhoff Scholars and their parents. This qualitative research was one of the efforts, along with Williams (1994), which led the researcher of this project to include a qualitative approach in the proposed study.

*Educating African-American Males: Voices from the Field* (2005), a contributed collection of research articles, showcased the positive academic achievement of AAMs. Editor Fashola (2005) asks that we begin to investigate better means to improve the educational achievement and experiences of AAMs.

This research answers Fashola’s call to improve AAM education and establishes a documented need for more graduates with computing disciplines degrees (Luftman, 2008; Williams, 2003; Lopez & Schulte, 2002; Hrabowski, Maton, & Greif, 1998). The
Hughes (2001) article states that if underrepresented groups in the US were fully participating in the IT workforce, this inclusion itself would eliminate the projected computing discipline shortage. In an attempt to promote and encourage women and minorities in the IT area, there is an enormous amount of research in women in computing (see ‘Women in computing’ tables – Tables 2.1 and 2.2). However, female participation in STEM careers is actually shrinking. The AAM focus, on the other hand, shows the potential to resolve social, class, income, and occupational problems for this sizable population, as well as addressing the shortfall in industry.

The Habrowski (1998) and Williams (1994) efforts have directed this study’s qualitative method. The primary theoretical backdrop for the study is in using a questionnaire based on Bandura’s self-efficacy definition and dimensions, stated as “People’s belief about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives” (Bandura, 1994, p. 71).


The present research addresses the “disidentification” issue, while seeking to discover, as an aspect of self-efficacy, why AAMs are not filling the IT shortage. The researcher seeks to accomplish this by looking at the educational pipeline in the self-
efficacy dimension to determine where, starting in elementary grades, variables are located. The goal is to identify and locate these variables to indicate further research toward possible interventions.
CHAPTER III

Methodology

The metaphor of a “pipeline” is used in this study. The primary purpose of this research endeavor is to examine the “pipeline.” A pipeline has a beginning, middle, and end, so that in order to examine it and its workings, each of these areas and their interaction must be researched.

In this study, African-American males are attempting to travel through a “pipeline” starting with elementary schools and culminating with an undergraduate degree in Computer Science. In examining this process, this study will survey African-American males in the fourth, eighth, and twelfth grades as well as in both lower-level and upper level computer science courses at the college level.

The study objective is to measure and compare levels of self-efficacy between and across these grade levels. Self-efficacy is a key to the ability to persevere, take on challenging subjects, and successfully complete a grade or program. The “pipeline” concept in this study is a self-efficacy pipeline.

The study seeks to explore the self-efficacy of students at each level in order to identify which if any of the attributes defined in the self-efficacy literature may reveal the reasons African-American males are not filling the well-recognized industry need for Computer Scientist/Technologists by failing to choose the college tracks to these careers. Any differences between grade levels will be noted as the subject for further exploration for future studies.
Research Design

This exploratory case study relies on quantitative and qualitative information concerning the perceived self-efficacy of AAM students at various school levels to study computer science. In addition to a 30-question self-efficacy questionnaire, which generates the quantitative data, the subjects from each group were asked to participate in a group discussion on the topic of “African-American Males in Computer Science.” The audios from the eight separate group meetings provide qualitative data for the study.

Population and Sample

African-American male students attending the same schools the researcher attended during his academic career served as subjects for this study. These schools are located in a suburb in Prince George’s County, Maryland, USA, a suburb of Washington, D.C. The schools are labeled: 1) Predominately African-American Elementary School (PA-ES), 2) Predominately African-American Middle School (PA-MS) and 3) Predominately African-American High School (PA-HS).

In addition to these schools, three schools were chosen with a racially mixed population. These schools will be referred to as: 1) Racially Mixed Elementary School (RM-ES), 2) Racially Mixed Middle School (RM-MS), and 3) Racially Mixed High School (RM-HS). The goal was to recruit at least 20 subjects from each school.

The following are exact number of participates:

- 11 AA Males – 4th Graders at PA-ES
- 13 AA Males – 4th Graders at RM-ES
- 30 AA Males – 8th Graders at PA-MS
- 11 AA Males – 8th Graders at RM-MS
- 23 AA Males – 11th Graders at PA-HS
11 AA Males – 11th Graders at RM-HS

20 AA Males – University Underclassmen
21 AA Males – University Upperclassmen

140 Total

**Predominately African-American Elementary School**

The following seven tables are based on the “Maryland Report Card”
(http://www.mdreportcard.org):

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total enrollment</td>
<td>538</td>
<td>567</td>
<td></td>
</tr>
<tr>
<td>African-Americans</td>
<td>484 (90%)</td>
<td>477 (84%)</td>
<td></td>
</tr>
<tr>
<td>African-American Males</td>
<td>240</td>
<td>238</td>
<td></td>
</tr>
<tr>
<td>Fourth Graders</td>
<td>83</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td>School Attendance Rate</td>
<td>94.3%</td>
<td>93.7%</td>
<td></td>
</tr>
<tr>
<td>MSA Reading 4th GR– Advance</td>
<td>3.6%</td>
<td>3.9%</td>
<td></td>
</tr>
<tr>
<td>MSA Reading 4th GR– Proficient</td>
<td>67.5%</td>
<td>81.8%</td>
<td></td>
</tr>
<tr>
<td>MSA Reading 4th GR– Basic</td>
<td>28.9%</td>
<td>14.3%</td>
<td></td>
</tr>
<tr>
<td>MSA Math 4th GR– Advance</td>
<td>10.8%</td>
<td>14.3%</td>
<td></td>
</tr>
<tr>
<td>MSA Math 4th GR– Proficient</td>
<td>61.4%</td>
<td>66.2%</td>
<td></td>
</tr>
<tr>
<td>MSA Math 4th GR– Basic</td>
<td>27.7%</td>
<td>19.5%</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.1 – Predominately African-American Elementary School
### Racially Mixed Elementary School

Enrollment, Attendance & Reading and Math scores.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total enrollment</td>
<td>576</td>
<td>500</td>
</tr>
<tr>
<td>African-Americans</td>
<td>276 (48%)</td>
<td>237 (47.4%)</td>
</tr>
<tr>
<td>African-American Males</td>
<td>145</td>
<td>120</td>
</tr>
<tr>
<td>Fourth Graders</td>
<td>105</td>
<td>74</td>
</tr>
<tr>
<td>School Attendance Rate</td>
<td>94.2%</td>
<td>94.7%</td>
</tr>
<tr>
<td>MSA Reading 4th GR– Advance</td>
<td>17%</td>
<td>25.0%</td>
</tr>
<tr>
<td>MSA Reading 4th GR– Proficient</td>
<td>64%</td>
<td>59.7%</td>
</tr>
<tr>
<td>MSA Reading 4th GR– Basic</td>
<td>19%</td>
<td>15.3%</td>
</tr>
<tr>
<td>MSA Math 4th GR– Advance</td>
<td>41.6%</td>
<td>34.7%</td>
</tr>
<tr>
<td>MSA Math 4th GR– Proficient</td>
<td>47.5%</td>
<td>58.3%</td>
</tr>
<tr>
<td>MSA Math 4th GR– Basic</td>
<td>10.9%</td>
<td>6.9%</td>
</tr>
</tbody>
</table>

**Table 3.2 – Racially Mixed Elementary School**
### Predominately African-American Middle School

Enrollment, Attendance & Reading and Math scores.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total enrollment</td>
<td>667</td>
<td>670</td>
</tr>
<tr>
<td>African-Americans</td>
<td>534 (80%)</td>
<td>494 (74%)</td>
</tr>
<tr>
<td>African-American Males</td>
<td>266</td>
<td>255</td>
</tr>
<tr>
<td>Eighth Graders</td>
<td>257</td>
<td>306</td>
</tr>
<tr>
<td>School Attendance Rate</td>
<td>94.3%</td>
<td>96.0%</td>
</tr>
<tr>
<td>MSA Reading 4th GR– Advance</td>
<td>12.4%</td>
<td>15.3%</td>
</tr>
<tr>
<td>MSA Reading 4th GR– Proficient</td>
<td>48.2%</td>
<td>43.5%</td>
</tr>
<tr>
<td>MSA Reading 4th GR– Basic</td>
<td>39.4%</td>
<td>41.2%</td>
</tr>
<tr>
<td>MSA Math 4th GR– Advance</td>
<td>8.0%</td>
<td>9.1%</td>
</tr>
<tr>
<td>MSA Math 4th GR– Proficient</td>
<td>29.9%</td>
<td>24.6%</td>
</tr>
<tr>
<td>MSA Math 4th GR– Basic</td>
<td>62.2%</td>
<td>66.3%</td>
</tr>
</tbody>
</table>

**Table 3.3 – Predominately African-American Middle School**
## Table 3.4 – Racially Mixed Middle School

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total enrollment</td>
<td>1190</td>
<td>1105</td>
</tr>
<tr>
<td>African-Americans</td>
<td>790 (66%)</td>
<td>779 (70%)</td>
</tr>
<tr>
<td>African-American Males</td>
<td>402</td>
<td>410</td>
</tr>
<tr>
<td>Eighth Graders</td>
<td>443</td>
<td>410</td>
</tr>
<tr>
<td>School Attendance Rate</td>
<td>94.5%</td>
<td>95.9%</td>
</tr>
<tr>
<td>MSA Reading 4th GR – Advance</td>
<td>17.8%</td>
<td>17.6%</td>
</tr>
<tr>
<td>MSA Reading 4th GR – Proficient</td>
<td>47.7%</td>
<td>45.7%</td>
</tr>
<tr>
<td>MSA Reading 4th GR – Basic</td>
<td>34.5%</td>
<td>36.7%</td>
</tr>
<tr>
<td>MSA Math 4th GR – Advance</td>
<td>18.3%</td>
<td>18.9%</td>
</tr>
<tr>
<td>MSA Math 4th GR – Proficient</td>
<td>32.1%</td>
<td>34.0%</td>
</tr>
<tr>
<td>MSA Math 4th GR – Basic</td>
<td>49.6%</td>
<td>47.1%</td>
</tr>
</tbody>
</table>
**Predominately African-American High School:**

Enrollment, Attendance & Reading and Math scores.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total enrollment</td>
<td>1718</td>
<td>1644</td>
</tr>
<tr>
<td>African-Americans</td>
<td>1592 (92.6%)</td>
<td>1524 (92.7%)</td>
</tr>
<tr>
<td>African-American Males</td>
<td>834</td>
<td>787</td>
</tr>
<tr>
<td>Eleventh Graders</td>
<td>390</td>
<td>342</td>
</tr>
<tr>
<td>School Attendance Rate</td>
<td>89.1%</td>
<td>91.2%</td>
</tr>
<tr>
<td>MSA English 2 All Grades - Advance</td>
<td>6.1%</td>
<td>11.6%</td>
</tr>
<tr>
<td>MSA English 2 All Grades – Proficient</td>
<td>34.0%</td>
<td>46.8%</td>
</tr>
<tr>
<td>MSA English 2 All Grades – Basic</td>
<td>59.9%</td>
<td>41.6%</td>
</tr>
<tr>
<td>MSA Algebra All Grades - Advance</td>
<td>5.3%</td>
<td>2.5%</td>
</tr>
<tr>
<td>MSA Algebra All Grades – Proficient</td>
<td>31.9%</td>
<td>28.4%</td>
</tr>
<tr>
<td>MSA Algebra All Grades – Basic</td>
<td>62.8%</td>
<td>69.2%</td>
</tr>
</tbody>
</table>

Table 3.5– Predominately African-American High School
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total enrollment</td>
<td>2842</td>
<td>2894</td>
</tr>
<tr>
<td>African-Americans</td>
<td>1688 (59.3%)</td>
<td>1806 (62.4%)</td>
</tr>
<tr>
<td>African-American Males</td>
<td>843</td>
<td>899</td>
</tr>
<tr>
<td>Eleventh Graders</td>
<td>628</td>
<td>679</td>
</tr>
<tr>
<td>School Attendance Rate</td>
<td>91.3%</td>
<td>93.5%</td>
</tr>
<tr>
<td>MSA English 2 All Grades - Advance</td>
<td>17.7%</td>
<td>24.3%</td>
</tr>
<tr>
<td>MSA English 2 All Grades – Proficient</td>
<td>39.0%</td>
<td>46.5%</td>
</tr>
<tr>
<td>MSA English 2 All Grades – Basic</td>
<td>43.3%</td>
<td>29.2%</td>
</tr>
<tr>
<td>MSA Algebra All Grades - Advance</td>
<td>11.8%</td>
<td>12.1%</td>
</tr>
<tr>
<td>MSA Algebra All Grades – Proficient</td>
<td>39.6%</td>
<td>40.6%</td>
</tr>
<tr>
<td>MSA Algebra All Grades – Basic</td>
<td>48.7%</td>
<td>47.4%</td>
</tr>
</tbody>
</table>

Table 3.6 – Racially Mixed High School
Bowie State University

Bowie State University (BSU) is Maryland’s oldest historically black institution, recognized as a national leader among HBCUs in graduating students in technology. Located in Prince George’s County, BSU is one of the four regional comprehensive universities in the University System of Maryland. It has grown to a campus of over one million square feet of academic and auxiliary buildings, located on 338.5 acres in Bowie, Maryland. The university comprises four schools: School of Arts and Sciences; School of Education; School of Professional Studies, and School of Business. Bowie State offers a doctoral program in educational leadership; 11 master’s degree programs, and 25 undergraduate majors in disciplines as diverse as computer science, education, human resource development, communications, and nursing (www.usmd.edu). Table 7 displays statistics and information about Bowie State University.

<table>
<thead>
<tr>
<th>Bowie State University</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information, statistics and more</td>
</tr>
<tr>
<td>(US News &amp; World Report – Best Colleges 2008)</td>
</tr>
<tr>
<td>Total Undergraduate enrollment (Fall 2006)</td>
</tr>
<tr>
<td>Full-time Enrollment (Fall 2006)</td>
</tr>
<tr>
<td>Part-time Enrollment (Fall 2006)</td>
</tr>
<tr>
<td>Female Enrollment (Fall 2006)</td>
</tr>
<tr>
<td>Male Enrollment (Fall 2006)</td>
</tr>
<tr>
<td>African-American Enrollment (Fall 2006)</td>
</tr>
<tr>
<td>Students attending who live in Maryland (Fall 2005)</td>
</tr>
<tr>
<td>Students living on campus (Fall 2005)</td>
</tr>
<tr>
<td>Average age of full-time student (Fall 2005)</td>
</tr>
<tr>
<td>Percentage of students over age 25 (Fall 2005)</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Average SAT (25/75 percentile) – Critical Reading</td>
</tr>
<tr>
<td>Average SAT (25/75 percentile) – Math</td>
</tr>
<tr>
<td>Average SAT (25/75 percentile) – Combined</td>
</tr>
<tr>
<td>Total Applicants</td>
</tr>
<tr>
<td>Total Accepted</td>
</tr>
<tr>
<td>Freshman Enrollment</td>
</tr>
<tr>
<td>In-state Tuition</td>
</tr>
<tr>
<td>Out-of-state Tuition</td>
</tr>
<tr>
<td>Class Size of fewer than 20 students</td>
</tr>
<tr>
<td>Class Size of 20 – 49 students</td>
</tr>
<tr>
<td>Class Size over 50 students</td>
</tr>
<tr>
<td>Freshman Retention Rate</td>
</tr>
<tr>
<td>Average six-year Graduation Rate</td>
</tr>
<tr>
<td>CS/CTEC Majors – AY 2007 – 2008 (BSU COSC Dept)</td>
</tr>
<tr>
<td>CS/CTEC Degrees conferred in May 2008 (COSC dept.)</td>
</tr>
<tr>
<td>% majoring in Computer &amp; Info. Sciences (US News &amp; World Report)</td>
</tr>
</tbody>
</table>

**Table 3.7 – Bowie State University**
Instrumentation

The “Computer Science” Self-Efficacy scale was adapted from the Wall (2004) Self-Efficacy scale. The Computer Science scale was used to determine the African-American male’s computer science self-efficacy. The survey statements ask for responses on a seven-point Likert scale; participants to rate each statement from “strongly disagree” to “strongly agree.” The 30-item scale can be found in Appendix B.

In addition to taking the 30-question self-efficacy test, the subjects from each group were asked to participate in a group discussion about “African-American Males in Computer Science.” Audio recordings of the five separate group meetings provide qualitative data for the study. The qualitative questions that will be posed to lead the discussions can be found in Appendix C.

Data Collection

The researcher completed the necessary paperwork and obtained permission to survey human subjects from The George Washington University and Prince George’s County (Maryland) School System. During the Spring 2007 semester, the parental consent form was sent out to each of the 4th, 8th, and 12th-grade African-American males at the participating schools.

Students were recruited by the researcher with the help of each grade-level classroom teacher. The researcher visited the class to explain the study and distribute the parental consent form. The classroom teachers encouraged submissions and collect the signed forms.
Procedures

Data collection for each of the grade levels was conducted on different days, but followed the same procedures. Prior to the date of collection, the researcher requested a separate room to conduct the study, for example, a room like the cafeteria, which held 20 or more subjects. The audio recorder was in place and prepared to record the group study.

All subjects reported to the room and the researcher briefly explained:

Study protocols

1) This is a study of African-American males in computer science.

2) There are NO wrong answers.

3) Your name is not on the sheet; no one will know which answers are yours.

4) Answer truthfully and to the best of your knowledge.

5) Once you complete the form, hand it in and wait for the group discussion.

6) Thanks for you participation.

Once the subject completed the Computer Science Self-Efficacy form, they turned in the form, were thanked, and were reminded to stay seated for the group discussion. When the last form was retrieved, the researcher 1) started the audio recorder and 2) led the discussion by asking the questions found in Appendix C.

During the group discussion, each question was posed to the entire group, one question at a time. Each student was able to answer the current question, before the researcher asked the next question. Students were not required to answer a given question.

The researcher refrained from adding commentary, until the last question was discussed. At which point, the researcher took questions from the students.
Limitations of the Study

In the collection of the data, the researcher’s presence as an insider in the group being studied may have had some influence on the subject’s answers. The researcher’s presence as a role model of the issue being studied may have had some influence on the subject’s answers.

The collegiate students who participated in this study were drawn from the University where the researcher serves as a faculty member. Collegiate students, as all others subjects, volunteered to participate in the study. Furthermore, the researcher had not previously discussed the research topic at the University.

Additionally, before distributing the self-efficacy questionnaire and holding group discussions, all the subjects in this study were advised to discount the researcher as an African-American male they know in the Computing Discipline.

Lastly, since the researcher is an insider in the group being studied, the interpretation of the interview data may be influenced. The inherent possibility of data contamination exists.

Data Analysis

Quantitative and qualitative data were collected and analyzed. The results of the responses to the Computer Science Self-Efficacy scale and background information were entered into a statistical software package, SPSS. One-way analyses of variance (ANOVA) were performed to test the hypotheses for statistical significance at the 0.05 confidence level.

Additionally, a factor analysis was done to determine: "What are the patterns of relationship among these data?" The audio recordings from each group discussion were reviewed and analyzed.
Hypothesis

The hypotheses include the following:

H1  There is no significant difference in “Computer Science Degree” self-efficacy (CSDSE) between any 2 sequenced levels of students in the study.

H1a  There is no significant differences in CSDSE between fourth and eighth graders.

H1b  There is no significant difference in CSDSE between eighth and twelfth graders.

H1c  There is no significant difference in CSDSE between twelfth graders and lower-level computer science majors.

H1d  There is no significant difference in CSDSE between lower-level computer science majors and upper-level computer science majors.
CHAPTER IV

Quantitative Results

The purpose of this study was to research “what is happening” to African-American males with regards to selecting to major in the computing discipline. Bandura’s self-efficacy questionnaire was modified and distributed to AAMs in fourth, eighth, eleventh grade and the University level; pre-college students were drawn from both racial mixed and predominantly African-American schools. This chapter presents the quantitative results.

Results involving students at the Predominately African-American schools are prefaced with “PA”. For example, PA-ES refers to the elementary school with a Predominately African-American population. RM-ES refers to the elementary school with a more racially mixed or less of an African-American student population.

Self-efficacy Questions

The survey was composed of thirty questions. The “Computer Science” Self-Efficacy scale was adapted from the (Wall, 2004) Self-Efficacy scale. The “Computer Science” scale was used to determine the African-American male’s “Computer Science” self efficacy. The seven point Likert-type survey required participants to rate each statement from “strongly disagree” to “strongly agree.” The mean score of thirty questions among the eight groups are given below in table 4.1:

<table>
<thead>
<tr>
<th></th>
<th>Upper Class</th>
<th>Under class</th>
<th>PA-HS</th>
<th>RM-HS</th>
<th>PA-MS</th>
<th>RM-MS</th>
<th>PA-ES</th>
<th>RM-ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 I find</td>
<td>6.35</td>
<td>6.29</td>
<td>5.70</td>
<td>6.18</td>
<td>5.63</td>
<td>6.18</td>
<td>5.55</td>
<td>6.23</td>
</tr>
</tbody>
</table>

87
<table>
<thead>
<tr>
<th>Question</th>
<th>Score 1</th>
<th>Score 2</th>
<th>Score 3</th>
<th>Score 4</th>
<th>Score 5</th>
<th>Score 6</th>
<th>Score 7</th>
<th>Score 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>working with computers very easy</td>
<td>6.80</td>
<td>6.95</td>
<td>6.70</td>
<td>7.00</td>
<td>6.80</td>
<td>6.45</td>
<td>6.73</td>
<td>7.00</td>
</tr>
<tr>
<td>Q2 Computers frighten me</td>
<td>6.05</td>
<td>6.24</td>
<td>5.78</td>
<td>6.09</td>
<td>5.53</td>
<td>5.64</td>
<td>4.64</td>
<td>5.31</td>
</tr>
<tr>
<td>Q3 I seem to have difficulties most of the times I use the computer</td>
<td>6.00</td>
<td>5.81</td>
<td>5.13</td>
<td>6.09</td>
<td>5.10</td>
<td>5.18</td>
<td>3.82</td>
<td>4.46</td>
</tr>
<tr>
<td>Q4 If I get stuck on the computer, I can get it working again.</td>
<td>5.95</td>
<td>6.38</td>
<td>5.87</td>
<td>5.82</td>
<td>5.53</td>
<td>6.00</td>
<td>6.00</td>
<td>5.38</td>
</tr>
<tr>
<td>Q5 I learn lots of new things on the computer</td>
<td>6.65</td>
<td>6.67</td>
<td>6.13</td>
<td>6.36</td>
<td>6.00</td>
<td>6.18</td>
<td>5.64</td>
<td>6.38</td>
</tr>
<tr>
<td>Q6 I am very bad with computers</td>
<td>5.25</td>
<td>5.33</td>
<td>5.39</td>
<td>5.82</td>
<td>5.57</td>
<td>6.00</td>
<td>6.45</td>
<td>6.15</td>
</tr>
<tr>
<td>Q7 I work hard in school</td>
<td>5.85</td>
<td>6.48</td>
<td>6.26</td>
<td>6.82</td>
<td>6.27</td>
<td>6.09</td>
<td>5.91</td>
<td>6.85</td>
</tr>
<tr>
<td>Q8 Even if I try, I wont get good grades</td>
<td>3.00</td>
<td>2.43</td>
<td>3.52</td>
<td>3.45</td>
<td>4.10</td>
<td>3.09</td>
<td>4.45</td>
<td>3.54</td>
</tr>
<tr>
<td>Q9 Most of my classmates like math because it is easy</td>
<td>4.60</td>
<td>5.14</td>
<td>5.00</td>
<td>4.91</td>
<td>5.20</td>
<td>5.00</td>
<td>5.00</td>
<td>5.08</td>
</tr>
<tr>
<td>Q10 I am not good in math</td>
<td>5.05</td>
<td>4.38</td>
<td>5.17</td>
<td>5.45</td>
<td>4.73</td>
<td>6.18</td>
<td>3.82</td>
<td>5.15</td>
</tr>
<tr>
<td>Q11 I am a good science student</td>
<td>6.25</td>
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<td>6.70</td>
<td>7.00</td>
<td>6.40</td>
<td>7.00</td>
<td>6.27</td>
<td>6.15</td>
</tr>
<tr>
<td>Q12 I will not graduate from High School</td>
<td>6.25</td>
<td>6.48</td>
<td>6.48</td>
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<td>6.30</td>
<td>6.55</td>
<td>6.45</td>
<td>6.92</td>
</tr>
<tr>
<td>Q13 I will graduate from college</td>
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<td>6.52</td>
<td>3.65</td>
<td>4.27</td>
<td>4.13</td>
<td>5.00</td>
<td>3.64</td>
<td>4.77</td>
</tr>
<tr>
<td>Q14 I will study Computer Science in College</td>
<td>6.15</td>
<td>6.05</td>
<td>3.78</td>
<td>4.73</td>
<td>3.70</td>
<td>4.36</td>
<td>2.82</td>
<td>3.69</td>
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<tr>
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<td>6.15</td>
<td>6.05</td>
<td>3.78</td>
<td>4.73</td>
<td>3.70</td>
<td>4.36</td>
<td>2.82</td>
<td>3.69</td>
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<td>3</td>
<td>4</td>
<td>5</td>
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</tr>
<tr>
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<td>3.67</td>
<td>4.22</td>
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<td>4.87</td>
<td>4.09</td>
<td>4.27</td>
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<tr>
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<td>5.15</td>
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<td>5.13</td>
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<td>4.50</td>
<td>4.00</td>
<td>4.91</td>
<td>4.31</td>
</tr>
<tr>
<td>Q18 I can become a pro Football, Basketball, Baseball or other sports player</td>
<td>4.45</td>
<td>5.38</td>
<td>3.48</td>
<td>3.00</td>
<td>2.43</td>
<td>3.00</td>
<td>2.55</td>
<td>1.54</td>
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<tr>
<td>Q19 Adults who have good jobs probably were good students when they were kids</td>
<td>4.25</td>
<td>4.05</td>
<td>3.87</td>
<td>4.36</td>
<td>5.87</td>
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<td>6.00</td>
<td>6.54</td>
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<tr>
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<td>4.24</td>
<td>4.35</td>
<td>5.36</td>
<td>4.43</td>
<td>5.27</td>
<td>4.45</td>
<td>3.46</td>
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<td>6.00</td>
<td>6.76</td>
<td>6.35</td>
<td>6.09</td>
<td>6.20</td>
<td>6.64</td>
<td>6.09</td>
<td>6.85</td>
</tr>
<tr>
<td>Q22 My teacher thinks I am smart</td>
<td>5.95</td>
<td>5.19</td>
<td>5.87</td>
<td>6.45</td>
<td>5.63</td>
<td>6.18</td>
<td>6.18</td>
<td>6.00</td>
</tr>
<tr>
<td>Q23 It is important to go to College</td>
<td>6.70</td>
<td>6.57</td>
<td>6.83</td>
<td>6.36</td>
<td>6.73</td>
<td>6.45</td>
<td>6.82</td>
<td>7.00</td>
</tr>
<tr>
<td>Q24 I know a lot of people who work with computers</td>
<td>5.95</td>
<td>5.81</td>
<td>5.83</td>
<td>5.73</td>
<td>4.33</td>
<td>5.91</td>
<td>3.82</td>
<td>4.92</td>
</tr>
<tr>
<td>Q25 I know a lot of black men who work with computers</td>
<td>4.65</td>
<td>5.14</td>
<td>5.22</td>
<td>4.27</td>
<td>3.77</td>
<td>5.09</td>
<td>2.64</td>
<td>3.77</td>
</tr>
<tr>
<td>Q26 I will keep trying until I get it right</td>
<td>6.10</td>
<td>6.24</td>
<td>6.30</td>
<td>6.27</td>
<td>5.73</td>
<td>6.36</td>
<td>6.91</td>
<td>6.08</td>
</tr>
<tr>
<td>Q27 I will quit school as soon as I can</td>
<td>6.00</td>
<td>6.62</td>
<td>6.48</td>
<td>6.91</td>
<td>6.60</td>
<td>7.00</td>
<td>6.91</td>
<td>6.15</td>
</tr>
<tr>
<td>Q28 Being smart is cool</td>
<td>6.10</td>
<td>6.38</td>
<td>6.78</td>
<td>6.64</td>
<td>5.73</td>
<td>5.91</td>
<td>6.00</td>
<td>5.77</td>
</tr>
<tr>
<td>Q29 I am good at video games</td>
<td>6.05</td>
<td>5.62</td>
<td>6.48</td>
<td>5.55</td>
<td>6.23</td>
<td>6.00</td>
<td>6.91</td>
<td>6.85</td>
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<tr>
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<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Q30 People tell me I’m good with computers</td>
<td>6.55</td>
<td>5.62</td>
<td>4.65</td>
<td>5.55</td>
<td>4.23</td>
<td>5.27</td>
<td>3.91</td>
<td>4.15</td>
</tr>
</tbody>
</table>

| Table 4.1 - Mean score of thirty questions among the eight groups |

A one way ANOVA was used to test whether there is any significant difference in the mean score of each of the thirty questions among the eight groups. The null hypothesis is that there is no difference among the eight groups. The significant items are highlighted below in table 4.2.

<table>
<thead>
<tr>
<th>ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Q1 I find working with Computers very easy</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Q2 Computers frighten me</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Q3 I seem to have difficulties most of the times I use the computer.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Q4 If I get stuck on the computer, I can get it working again</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Question</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Q5 I learn lots of new things on the computer</td>
</tr>
<tr>
<td>Q6 I am very bad with computers.</td>
</tr>
<tr>
<td>Q7 I work hard in school</td>
</tr>
<tr>
<td>Q8 Even if I try, I won’t get good grades.</td>
</tr>
<tr>
<td>Q9 Most of my classmates like math because it is easy</td>
</tr>
<tr>
<td>Q10 I am not good in math.</td>
</tr>
<tr>
<td>Q11 I am a good science student</td>
</tr>
<tr>
<td>Q12 I will not graduate from High</td>
</tr>
</tbody>
</table>

Total: 479.221

Between Groups: 7

Within Groups: 132

Within Groups: 2.666*
<table>
<thead>
<tr>
<th>Q13 I will graduate from college</th>
<th>Within Groups</th>
<th>285.694</th>
<th>132</th>
<th>2.164</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td>300.136</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>Q14 I will study Computer Science in College</td>
<td>Between Groups</td>
<td>4.593</td>
<td>7</td>
<td>.656</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>235.950</td>
<td>132</td>
<td>1.788</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>240.543</td>
<td>139</td>
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<tr>
<td>Q15 I can get a job working with computers</td>
<td>Between Groups</td>
<td>207.093</td>
<td>7</td>
<td>29.585</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>339.507</td>
<td>132</td>
<td>2.572</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>546.600</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>Q16 Studying computers in college is hard</td>
<td>Between Groups</td>
<td>45.133</td>
<td>7</td>
<td>6.448</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>407.038</td>
<td>132</td>
<td>3.084</td>
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<tr>
<td>Total</td>
<td></td>
<td>452.171</td>
<td>139</td>
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</tr>
<tr>
<td>Q17 I can become a rapper or singer</td>
<td>Between Groups</td>
<td>30.529</td>
<td>7</td>
<td>4.361</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>638.692</td>
<td>132</td>
<td>4.839</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>669.221</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>Q18 I can become a Pro Football, Basketball, Baseball or other sports player</td>
<td>Between Groups</td>
<td>188.884</td>
<td>7</td>
<td>26.983</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>472.966</td>
<td>132</td>
<td>3.583</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>661.850</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>Q19 Adults who have good jobs probably were good students when they were kids.</td>
<td>Between Groups</td>
<td>139.446</td>
<td>7</td>
<td>19.921</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>324.554</td>
<td>132</td>
<td>2.459</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>464.000</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Between Groups</td>
<td>Within Groups</td>
<td>Total</td>
<td>df</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-------------------------</td>
<td>-------------------------</td>
<td>-------------</td>
<td>----</td>
</tr>
<tr>
<td>Q20 I am one of the best students in class.</td>
<td>33.143, 7, 4.735, 1.726</td>
<td>362.029, 132, 2.743</td>
<td>395.171, 139</td>
<td></td>
</tr>
<tr>
<td>Q21 No one cares if I do well in school</td>
<td>12.260, 7, 1.751, 0.925</td>
<td>249.883, 132, 1.893</td>
<td>262.143, 139</td>
<td></td>
</tr>
<tr>
<td>Q22 My teacher thinks I am smart.</td>
<td>17.458, 7, 2.494, 1.717</td>
<td>191.763, 132, 1.453</td>
<td>209.221, 139</td>
<td></td>
</tr>
<tr>
<td>Q23 It is important to go to College.</td>
<td>3.977, 7, .568, 1.021</td>
<td>73.423, 132, .556</td>
<td>77.400, 139</td>
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</tr>
<tr>
<td>Q24 I know a lot of people who work with computers</td>
<td>80.326, 7, 11.475, 4.458*</td>
<td>339.809, 132, 2.574</td>
<td>420.136, 139</td>
<td></td>
</tr>
<tr>
<td>Q25 I know a lot of black men who work with computers</td>
<td>85.048, 7, 12.150, 3.815*</td>
<td>420.345, 132, 3.184</td>
<td>505.393, 139</td>
<td></td>
</tr>
<tr>
<td>Q26 I will keep trying until I get it right</td>
<td>12.981, 7, 1.854, 1.353</td>
<td>180.905, 132, 1.370</td>
<td>193.886, 139</td>
<td></td>
</tr>
<tr>
<td>Q27 I will quit school as soon as I can</td>
<td>13.419, 7, 1.917, 1.380</td>
<td>183.402, 132, 1.389</td>
<td>206.811, 139</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Between Groups</td>
<td>Within Groups</td>
<td>Total</td>
<td>df</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>----------------</td>
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<td>--------</td>
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</tr>
<tr>
<td>Q28 Being smart is cool</td>
<td>20.927</td>
<td>216.294</td>
<td>237.221</td>
<td>7</td>
</tr>
<tr>
<td>Q29 I am good at video games</td>
<td>25.456</td>
<td>192.337</td>
<td>217.793</td>
<td>7</td>
</tr>
<tr>
<td>Q30 People tell me I’m good with computers</td>
<td>102.996</td>
<td>361.997</td>
<td>464.993</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 4.2 - ANOVA results of thirty questions among the eight groups.

The null hypothesis must be rejected as the p value is less than the significance level (p < .05). The sample provides enough evidence to reject the null hypothesis that there is no significant difference in the mean score for the variables: Questions 4, 11, 14, 15, 16, 18, 19, 24, 25, 29 and 30, among the 8 schools.
| Q15 | I can get a job working with computers | 6.55 | 5.62 | 4.65 | 5.55 | 4.23 | 5.27 | 3.91 | 4.15 |
| Q16 | Studying computers in college is hard | 3.05 | 3.67 | 4.22 | 4.27 | 4.87 | 4.09 | 4.27 | 4.31 |
| Q18 | I can become a Pro Football, Basketball, Baseball or other sports player | 4.45 | 5.38 | 3.48 | 3.00 | 2.43 | 3.00 | 2.55 | 1.54 |
| Q19 | Adults who have good jobs probably were good students when they were kids. | 4.25 | 4.05 | 3.87 | 4.36 | 5.87 | 6.00 | 6.00 | 6.54 |
| Q24 | I know a lot of people who work with computers | 5.95 | 5.81 | 5.83 | 5.73 | 4.33 | 5.91 | 3.82 | 4.92 |
| Q25 | I know a lot of black men who work with computers | 4.65 | 5.14 | 5.22 | 4.27 | 3.77 | 5.09 | 2.64 | 3.77 |
| Q29 | I am good at video games | 6.05 | 5.62 | 6.48 | 5.55 | 6.23 | 6.00 | 6.91 | 6.85 |
| Q30 | People tell me I’m good with computers | 6.55 | 5.62 | 4.65 | 5.55 | 4.23 | 5.27 | 3.91 | 4.15 |

**Table 4.3 -** Mean score of questions with significance differences among the eight groups

These eleven questions, when presented in the discussion and conclusion chapter, will address Bandura’s vicarious factor (Q24 and Q25), mastery factor (Q4, Q11, Q15) and verbal persuasion factor (Q30). The data reveals most AAMs know few, if any, AAMs in computing disciplines. Additionally, students attending racially mixed schools had more overall confidences in their ‘mastery’ of computers and science.
Questions by two groups: Predominately AA and Racially-Mixed

Each question can be compared after parsing the subjects into two groups: Group 1 – Predominately African-American elementary, middle and high schools and Group 2 – Racially-Mixed elementary, middle and high schools.

Student’s t test is applied to examine whether there is significant difference in the mean score of the two groups. The details are shown below, in table 4.4, and the items which are significant are highlighted.

<table>
<thead>
<tr>
<th>Question</th>
<th>PAA</th>
<th>RM</th>
<th>t test</th>
<th>sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 I find working with Computers very easy</td>
<td>5.6406  0.2094</td>
<td>6.2000  0.2453</td>
<td>-1.6629</td>
<td>0.0996</td>
</tr>
<tr>
<td>Q2 Computers frighten me</td>
<td>6.7500  0.9260</td>
<td>6.8300  0.8570</td>
<td>-0.4142</td>
<td>0.6796</td>
</tr>
<tr>
<td>Q3 I seem to have difficulties most of the times I use the computer.</td>
<td>5.4688  0.2065</td>
<td>5.6571  0.2687</td>
<td>-0.5497</td>
<td>0.5838</td>
</tr>
<tr>
<td>Q4 If I get stuck on the computer, I can get it working again</td>
<td>4.8906  0.2441</td>
<td>5.2000  0.3400</td>
<td>-0.7460</td>
<td>0.4577</td>
</tr>
<tr>
<td>Q5 I learn</td>
<td>5.7344  0.1448</td>
<td>5.7143  0.2768</td>
<td>0.0710</td>
<td>0.9435</td>
</tr>
<tr>
<td>Question</td>
<td>Response</td>
<td>T1</td>
<td>T2</td>
<td>T3</td>
</tr>
<tr>
<td>----------</td>
<td>----------</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>lots of new things on the computer</td>
<td>5.9844</td>
<td>0.1830</td>
<td>6.3143</td>
<td>0.2081</td>
</tr>
<tr>
<td>Q6 I am very bad with computers.</td>
<td>5.6563</td>
<td>0.1699</td>
<td>6.0000</td>
<td>0.1966</td>
</tr>
<tr>
<td>Q7 I work hard in school</td>
<td>6.2031</td>
<td>0.1957</td>
<td>6.6000</td>
<td>0.1843</td>
</tr>
<tr>
<td>Q8 Even if I try, I won’t get good grades.</td>
<td>3.9531</td>
<td>0.2544</td>
<td>3.3714</td>
<td>0.3669</td>
</tr>
<tr>
<td>Q9 Most of my classmates like math because it is easy</td>
<td>5.0938</td>
<td>0.2661</td>
<td>5.0000</td>
<td>0.3932</td>
</tr>
<tr>
<td>Q10 I am not good in math.</td>
<td>4.7344</td>
<td>0.2127</td>
<td>5.5714</td>
<td>0.2219</td>
</tr>
<tr>
<td>Q11 I am a good science student</td>
<td>6.4844</td>
<td>0.2029</td>
<td>6.6857</td>
<td>0.2199</td>
</tr>
<tr>
<td>Q12 I will not graduate from High School.</td>
<td>6.3906</td>
<td>0.1521</td>
<td>6.6286</td>
<td>0.1695</td>
</tr>
<tr>
<td>Q13 I will graduate from college</td>
<td>3.8750</td>
<td>0.2383</td>
<td>4.6857</td>
<td>0.2863</td>
</tr>
<tr>
<td>Q14 I will study Computer Science in College</td>
<td>3.5781</td>
<td>0.2099</td>
<td>4.2286</td>
<td>0.2596</td>
</tr>
<tr>
<td>Q15 I can get a job working with computers</td>
<td>4.5313</td>
<td>0.2193</td>
<td>4.2286</td>
<td>0.2753</td>
</tr>
<tr>
<td>Question</td>
<td>Value 1</td>
<td>Value 2</td>
<td>Value 3</td>
<td>Value 4</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>Studying computers in college is hard</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q17 I can become a rapper or</td>
<td>4.7969</td>
<td>0.2810</td>
<td>4.0000</td>
<td>0.3356</td>
</tr>
<tr>
<td>Q18 I can become a Pro Football, Basketball, Baseball or other sports player</td>
<td>2.8281</td>
<td>0.2583</td>
<td>2.4571</td>
<td>0.3185</td>
</tr>
<tr>
<td>Q19 Adults who have good jobs probably were good students when they were kids</td>
<td>5.1719</td>
<td>0.2255</td>
<td>5.6857</td>
<td>0.2681</td>
</tr>
<tr>
<td>Q20 I am one of the best students in class</td>
<td>4.4063</td>
<td>0.2213</td>
<td>4.6286</td>
<td>0.3015</td>
</tr>
<tr>
<td>Q21 No one cares if I do well in school</td>
<td>6.2344</td>
<td>0.1913</td>
<td>6.5429</td>
<td>0.2023</td>
</tr>
<tr>
<td>Q22 My teacher thinks I am Strongly disagree smart.</td>
<td>5.8125</td>
<td>0.1680</td>
<td>6.2000</td>
<td>0.1778</td>
</tr>
<tr>
<td>Q23 It is important to go to College.</td>
<td>6.7813</td>
<td>0.0721</td>
<td>6.6286</td>
<td>0.1483</td>
</tr>
<tr>
<td>Q24 I know a lot of people who work with</td>
<td>4.7813</td>
<td>0.2309</td>
<td>5.4857</td>
<td>0.3078</td>
</tr>
</tbody>
</table>
Table 4.4 - ANOVA results of thirty questions among the two groups.

There are only two questions with significant difference in their means among the two groups. They are questions 11, “I am a good science student” and question 14, “I will study computer science in college”. Students attending the racially mixed schools rated higher.

This is one of several results, in this study, which leads to a major finding. The forthcoming factor and qualitative analysis will further illustrate that students attending the racially mixed schools were overall more confident, than students attending the predominately African-American schools.
Self-efficacy Scores (Total Scores)

The previous section presented the results by question. This section reveals the results based on the total score on the “Computer Science” Self-efficacy survey. The following, table 4.5, shows the descriptive statistics:

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
<th>95% Confidence Interval for Mean</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Upper Bound</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UPPER</td>
<td>20</td>
<td>168.05</td>
<td>13.133</td>
<td>2.937</td>
<td>161.90</td>
<td>174.20</td>
<td>138</td>
</tr>
<tr>
<td>UNDER</td>
<td>21</td>
<td>170.33</td>
<td>10.456</td>
<td>2.282</td>
<td>165.57</td>
<td>175.09</td>
<td>148</td>
</tr>
<tr>
<td>PA-HS</td>
<td>23</td>
<td>163.09</td>
<td>15.986</td>
<td>3.333</td>
<td>156.17</td>
<td>170.00</td>
<td>123</td>
</tr>
<tr>
<td>RM-HS</td>
<td>11</td>
<td>166.82</td>
<td>16.400</td>
<td>4.945</td>
<td>155.80</td>
<td>177.84</td>
<td>141</td>
</tr>
<tr>
<td>PA-MS</td>
<td>30</td>
<td>158.30</td>
<td>13.453</td>
<td>2.456</td>
<td>153.28</td>
<td>163.32</td>
<td>137</td>
</tr>
<tr>
<td>RM-MS</td>
<td>11</td>
<td>168.09</td>
<td>14.053</td>
<td>4.237</td>
<td>158.65</td>
<td>177.53</td>
<td>146</td>
</tr>
<tr>
<td>PA-ES</td>
<td>11</td>
<td>155.55</td>
<td>9.491</td>
<td>2.862</td>
<td>149.17</td>
<td>161.92</td>
<td>139</td>
</tr>
<tr>
<td>RM-ES</td>
<td>13</td>
<td>160.77</td>
<td>11.966</td>
<td>3.319</td>
<td>153.54</td>
<td>168.00</td>
<td>139</td>
</tr>
<tr>
<td>Total</td>
<td>140</td>
<td>163.74</td>
<td>13.928</td>
<td>1.177</td>
<td>161.41</td>
<td>166.06</td>
<td>123</td>
</tr>
</tbody>
</table>

Table 4.5 – Descriptive data for total self-efficacy scores for all eight groups.

To determine the results reliability, a confidence interval was conducted. Below is the 95% confidence interval (CI) for self-efficacy scores for all eight groups. The CI shows a relatively small interval, thus it’s considered a more reliable result.
Figure 4.1 – 95% Confidence interval (CI) for self-efficacy scores for all 8 groups.

Self-efficacy Scores by two groups: Predominately AA and Racially-Mixed

A major part of the study was surveying subjects in two groups: Group 1 – Predominately African-American elementary, middle and high schools and Group 2 – Racially-Mixed elementary, middle and high schools.

The mean self efficacy score, for each group, is given below. Clearly the mean self efficacy score is high for Group2 (RM). The independent sample t-test whether this difference is significant.
<table>
<thead>
<tr>
<th></th>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Efficacy Score</td>
<td>Group 1 (PAA)</td>
<td>64</td>
<td>159.55</td>
<td>13.962</td>
<td>1.745</td>
</tr>
<tr>
<td></td>
<td>Group 2 (RM)</td>
<td>35</td>
<td>164.97</td>
<td>14.097</td>
<td>2.383</td>
</tr>
</tbody>
</table>

**Table 4.6 – PA and RM Mean Self-efficacy Scores.**

One important assumption of student t test is the equality of variance. Student’s t test is applied to examine whether there is significant difference in the mean score of the two groups. This is tested using the Levene's Test for Equality of Variances. Levene's Test for Equality of Variances suggests that the assumption of equal variance is valid. The t statistic is insignificant. Thus there is no significant difference in the Self Efficacy Score among the two groups. The details are shown below and the items are which are significant are highlighted.

<table>
<thead>
<tr>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>---</td>
<td>------</td>
</tr>
<tr>
<td>.423</td>
<td>.517</td>
</tr>
</tbody>
</table>

**Table 4.7 – t test for PA and RM Mean Self-efficacy Scores.**
To determine the results reliability, a confidence interval was conducted. Below is the 95% confidence interval (CI) for self-efficacy scores for both groups (Group 1 – PAA and Group 2 – RM). The CI shows a fairly small interval, thus it’s considered a more reliable result.

Figure 4.2 – 95% CI for self-efficacy scores for two groups.

*Self-efficacy Scores by two groups: High Schools – PA and RM*

The mean score for self efficacy between the Predominately African-American High School and the Racially Mixed High School is given below. The mean self efficacy
score is high for RM-HS. The independent sample t test was used to determine whether this difference is significant.

<table>
<thead>
<tr>
<th>Group Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>PA-HS</td>
</tr>
<tr>
<td>RM-HS</td>
</tr>
</tbody>
</table>

Table 4.8 – PA-HS and RM-HS Mean Self-efficacy Scores.

To determine the results reliability, a confidence interval was conducted. Below is the 95% confidence interval (CI) for self-efficacy scores for both groups (Group 1: PA-HS and Group 2: RM-HS). The CI shows a somewhat small interval, thus it’s considered a more reliable result.
Figure 4.3 – 95% CI for self-efficacy scores for PA-HS and RM-HS.

<table>
<thead>
<tr>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.9 – t test for PA-HS and RM-HS Total Self-efficacy scores.
Levene's Test for Equality of Variances suggests that the assumption of equal variance is valid. The t statistic is insignificant. Thus we can conclude that there is no significant difference in the Self Efficacy Score among PA –HS and RM –HS.

**Self-efficacy Scores by two groups: Middle Schools – PA and RM**

The mean score for self efficacy between the Predominately African-American Middle School and the Racially Mixed Middle School is given below. The mean score for self efficacy is given below. Clearly mean self efficacy score is high for RM-MS. The independent sample t test is used to determine whether this difference is significant.

<table>
<thead>
<tr>
<th>Group Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Self Efficacy Score</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

*Table 4.10 – PA-MS and RM-MS Mean Self-efficacy Scores.*

Levene's Test for Equality of Variances suggests that the assumption of equal variance is valid. The t statistic is significant.
Table 4.11 – t test for PA-MS and RM-MS Total Self-efficacy scores.

To determine the results reliability, a confidence interval was conducted. Below is the 95% confidence interval (CI) for self-efficacy scores for both groups (Group 1: PA-MS and Group 2: RM-MS). The CI shows a relatively small interval, thus it’s considered a more reliable result.

Figure 4.4 – 95% CI for self-efficacy scores for PA-MS and RM-MS.

It can be concluded that there is significant difference in the Self Efficacy Score among PA-MS and RM-MS. As you will see in chapter six, the fact that self-efficacy scores among the two middle schools show significance indicates that a ‘clog’ may exist at the middle school level. The qualitative data will support this finding.
Self-efficacy Scores by two groups: Elementary Schools – PA and RM

The mean score for self efficacy between the Predominately African-American Elementary School and the Racially Mixed Elementary School is given below. The mean score for self efficacy is given below. Clearly mean self efficacy score is high for RM-ES. We use the independent sample t test to determine whether this difference is significant.

| Group Statistics |
|------------------|------------------|
| School           | N    | Mean  | Std. Deviation | Std. Error Mean |
| Self Efficacy Score | PA -ES  | 11   | 155.55 | 9.491 | 2.862 |
|                  | RM-ES | 13   | 160.77 | 11.966 | 3.319 |

Table 4.12 – PA-ES and RM-ES Total Self-efficacy scores.

Levene's Test for Equality of Variances suggests that the assumption of equal variance is valid. The t statistic is insignificant. Thus we can conclude that there is no significant difference in the Self Efficacy Score among PA–ES and RM-ES.

<table>
<thead>
<tr>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>---</td>
<td>------</td>
</tr>
<tr>
<td>.272</td>
<td>.607</td>
</tr>
</tbody>
</table>

Table 4.13 – t test for PA-ES and RM-ES Total Self-efficacy scores.
To determine the results reliability, a confidence interval was conducted. Below is the 95% confidence interval (CI) for self-efficacy scores for both groups (Group 1: PA-ES and Group 2: RM-ES). The CI shows a pretty small interval, thus it’s considered a more reliable result.

![Figure 4.5 – 95% CI for self-efficacy scores for PA-ES and RM-ES.](image)

**Self-efficacy Scores by four groups: Elementary, Middle, High Schools and University**

<table>
<thead>
<tr>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
<th>95% Confidence Interval for Mean</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Upper Bound</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Table 4.14 – Total Self-efficacy scores by four groups: ES, MS, HS and University.

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2256.733</td>
<td>3</td>
<td>752.244</td>
<td>4.140</td>
<td>.008</td>
</tr>
<tr>
<td>Within Groups</td>
<td>24708.489</td>
<td>136</td>
<td>181.680</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>26965.221</td>
<td>139</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.15 – ANOVA results for four groups: ES, MS, HS and University.

An ANOVA was conducted to determine if there were significant differences between the self efficacy scores of the groups: College, High Schools, Middle Schools, Elementary Schools. The differences are significant ($F (3, 136) = 4.4, p < .008$).

To determine the results reliability, a confidence interval was conducted. Below is the 95% confidence interval (CI) for self-efficacy scores for all four groups. The CI shows a relatively small interval, thus it’s considered a more reliable result.
Figure 4.6 – 95% CI for SE scores for four groups: ES, MS, HS and University.

The ANOVA suggests that there is significant difference in mean self efficacy score among College, High school, Middle school and Elementary schools. Below is the outcome of the post hoc analysis that compares the mean pairwise. This result shows a significant difference pairwise between College and Middle School and College and Elementary School:

<table>
<thead>
<tr>
<th></th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
</tr>
<tr>
<td>College</td>
<td>High Schools</td>
<td>4.925</td>
<td>3.126</td>
<td>.117</td>
</tr>
<tr>
<td></td>
<td>Middle Schools</td>
<td>8.293*</td>
<td>2.977</td>
<td>.006</td>
</tr>
</tbody>
</table>
Table 4.16 – Post hoc analysis for four groups: ES, MS, HS and University.

<table>
<thead>
<tr>
<th></th>
<th>Elementary Schools</th>
<th>College</th>
<th>Middle Schools</th>
<th>High Schools</th>
<th>Elementary Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>-4.925</td>
<td>3.126</td>
<td>.117</td>
<td>-11.11</td>
<td>1.26</td>
</tr>
<tr>
<td>Middle Schools</td>
<td>3.367</td>
<td>3.126</td>
<td>.283</td>
<td>-2.82</td>
<td>9.55</td>
</tr>
<tr>
<td>Elementary Schools</td>
<td>5.919</td>
<td>3.594</td>
<td>.102</td>
<td>-1.19</td>
<td>13.03</td>
</tr>
<tr>
<td>Middle Schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>-8.293*</td>
<td>2.977</td>
<td>.006</td>
<td>-14.18</td>
<td>-2.41</td>
</tr>
<tr>
<td>High Schools</td>
<td>-3.367</td>
<td>3.126</td>
<td>.283</td>
<td>-9.55</td>
<td>2.82</td>
</tr>
<tr>
<td>Elementary Schools</td>
<td>2.552</td>
<td>3.464</td>
<td>.463</td>
<td>-4.30</td>
<td>9.40</td>
</tr>
<tr>
<td>Elementary Schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>-10.845*</td>
<td>3.464</td>
<td>.002</td>
<td>-17.70</td>
<td>-3.99</td>
</tr>
<tr>
<td>High Schools</td>
<td>-5.919</td>
<td>3.594</td>
<td>.102</td>
<td>-13.03</td>
<td>1.19</td>
</tr>
<tr>
<td>Middle Schools</td>
<td>-2.552</td>
<td>3.464</td>
<td>.463</td>
<td>-9.40</td>
<td>4.30</td>
</tr>
</tbody>
</table>

Hypothesis Outcome

The previous chapter ended with five hypotheses:

1. There is no significant difference in “Computer Science Degree” self-efficacy between fourth and eighth graders.
2. There is no significant difference in “Computer Science Degree” self-efficacy between eighth and eleventh graders.
3. There is no significant difference in “Computer Science Degree” self-efficacy between eleventh graders and lower-level computer science majors.
4. There is no significant difference in “Computer Science Degree” self-efficacy between lower-level computer science majors and upper-level computer science majors.
5. There is no significant difference in “Computer Science Degree” self-efficacy between each of the five groups of students.
The following sections reveal the data analysis with regards to the five hypotheses above.

**Hypothesis 1: Self-Efficacy Scores of Elementary and Middle School Students**

“There is no significant difference in “Computer Science Degree” self-efficacy between fourth and eighth graders”. Viewing the table below, the previously stated null hypothesis fails to be rejected.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Schools</td>
<td>24</td>
<td>158.38</td>
<td>10.997</td>
<td>2.245</td>
</tr>
<tr>
<td>Middle Schools</td>
<td>41</td>
<td>160.93</td>
<td>14.138</td>
<td>2.208</td>
</tr>
</tbody>
</table>

**Table 4.17 – Self-Efficacy Scores of Elementary and Middle School Students**

T statistic =-0.759  
df=63  
P value =0.541  
Conclusion : Fails to reject the null hypothesis

**Hypothesis 2: Self-Efficacy Scores of Middle and High School Students**

“There is no significant difference in “Computer Science Degree” self-efficacy between eighth and eleventh graders”. Viewing the table below, the previously stated null hypothesis fails to be rejected.
<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle Schools</td>
<td>41</td>
<td>160.93</td>
<td>14.138</td>
<td>2.208</td>
</tr>
<tr>
<td>High Schools</td>
<td>34</td>
<td>164.29</td>
<td>15.969</td>
<td>2.739</td>
</tr>
</tbody>
</table>

**Table 4.18 – Self-Efficacy Scores of Middle and High School Students**

T statistic = -0.968  
df=73  
P value = 0.336  
Conclusion: Fails to reject the null hypothesis

**Hypothesis 3: Self-Efficacy Scores of High School and Underclass University Students**

“There is no significant difference in “Computer Science Degree” self-efficacy between eleventh graders and lower-level computer science majors”. Viewing the table below, the previously stated null hypothesis fails to be rejected.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Schools</td>
<td>34</td>
<td>164.29</td>
<td>15.969</td>
<td>2.739</td>
</tr>
<tr>
<td>Under</td>
<td>21</td>
<td>170.33</td>
<td>10.456</td>
<td>2.282</td>
</tr>
</tbody>
</table>

**Table 4.19 – Self-Efficacy Scores of High School and Underclass University Students**

T statistic = -1.539  
df=53  
P value = 0.130  
Conclusion: Fails to reject the null hypothesis
Hypothesis 4: Self-Efficacy Scores of Underclass and Upperclass University Students

“There is no significant difference in “Computer Science Degree” self-efficacy between lower-level and upper-level computer science majors”. Viewing the table below, the previously stated null hypothesis fails to be rejected.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under</td>
<td>21</td>
<td>170.33</td>
<td>10.456</td>
<td>2.282</td>
</tr>
<tr>
<td>Upper</td>
<td>20</td>
<td>168.05</td>
<td>13.133</td>
<td>2.937</td>
</tr>
</tbody>
</table>

Table 4.20 – Self-Efficacy Scores of Underclass and Upperclass University Students

T statistic =0.617  
df=39  
P value =0.54  
Conclusion : Fails to reject the null hypothesis

Hypothesis 5: Self-Efficacy Scores of each of the five groups

“There is no significant difference in “Computer Science Degree” self-efficacy between each of the five groups”. Viewing the table below, the previously stated null hypothesis can be rejected.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
<th>Minimu m</th>
<th>Maximu m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper</td>
<td>20</td>
<td>168.05</td>
<td>13.133</td>
<td>2.937</td>
<td>138</td>
<td>198</td>
</tr>
<tr>
<td>Under</td>
<td>21</td>
<td>170.33</td>
<td>10.456</td>
<td>2.282</td>
<td>148</td>
<td>186</td>
</tr>
<tr>
<td>High Schools</td>
<td>34</td>
<td>164.29</td>
<td>15.969</td>
<td>2.739</td>
<td>123</td>
<td>196</td>
</tr>
<tr>
<td>Middle Schools</td>
<td>41</td>
<td>160.93</td>
<td>14.138</td>
<td>2.208</td>
<td>137</td>
<td>193</td>
</tr>
<tr>
<td>Elementary Schools</td>
<td>24</td>
<td>158.38</td>
<td>10.997</td>
<td>2.245</td>
<td>139</td>
<td>185</td>
</tr>
<tr>
<td>Total</td>
<td>140</td>
<td>163.74</td>
<td>13.928</td>
<td>1.177</td>
<td>123</td>
<td>198</td>
</tr>
</tbody>
</table>

ANOVA

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
</table>

115
Table 4.21 – Self-Efficacy Scores of each of the five groups

The sample provides enough evidence to support the claim that there is significant difference in “Computer Science Degree” self-efficacy between each of the five groups of students (F (4,135) = 3.2, p < .02).

<table>
<thead>
<tr>
<th></th>
<th>Mean Difference</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under</td>
<td>-2.283</td>
<td>4.222</td>
<td>.590</td>
<td>-10.63</td>
<td>6.07</td>
</tr>
<tr>
<td>High Schools</td>
<td>3.756</td>
<td>3.808</td>
<td>.326</td>
<td>-3.78</td>
<td>11.29</td>
</tr>
<tr>
<td>Middle Schools</td>
<td>7.123</td>
<td>3.686</td>
<td>.055</td>
<td>-1.17</td>
<td>14.41</td>
</tr>
<tr>
<td>Elementary Schools</td>
<td>9.675*</td>
<td>4.092</td>
<td>.019</td>
<td>1.58</td>
<td>17.77</td>
</tr>
<tr>
<td>Under</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper</td>
<td>2.283</td>
<td>4.222</td>
<td>.590</td>
<td>-6.07</td>
<td>10.63</td>
</tr>
<tr>
<td>High Schools</td>
<td>6.039</td>
<td>3.751</td>
<td>.110</td>
<td>-1.38</td>
<td>13.46</td>
</tr>
<tr>
<td>Middle Schools</td>
<td>9.407</td>
<td>3.626</td>
<td>.011</td>
<td>2.23</td>
<td>16.58</td>
</tr>
<tr>
<td>Elementary Schools</td>
<td>11.958*</td>
<td>4.038</td>
<td>.004</td>
<td>3.97</td>
<td>19.94</td>
</tr>
<tr>
<td>High Schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper</td>
<td>-3.756</td>
<td>3.808</td>
<td>.326</td>
<td>-11.29</td>
<td>3.78</td>
</tr>
<tr>
<td>Under</td>
<td>-6.039</td>
<td>3.751</td>
<td>.110</td>
<td>-13.46</td>
<td>1.38</td>
</tr>
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<td>Middle Schools</td>
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<td>3.135</td>
<td>.285</td>
<td>-2.83</td>
<td>9.57</td>
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<td></td>
<td>Elementary Schools</td>
<td>Middle Schools</td>
<td>Upper</td>
<td>Under</td>
<td>High Schools</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------</td>
<td>----------------</td>
<td>-------</td>
<td>-------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>5.919</td>
<td>-7.123</td>
<td>3.603</td>
<td>3.626</td>
<td>.103</td>
</tr>
<tr>
<td>Middle Schools</td>
<td>-5.919</td>
<td>-11.958*</td>
<td>3.603</td>
<td>4.038</td>
<td>.019</td>
</tr>
</tbody>
</table>

* The mean difference is significant at the 0.05 level.

Table 4.22 – Multiple Comparisons of Self-Efficacy Scores of each of the five groups

Of the five hypotheses, the sample provided enough evidence to support the claim that there are significant differences in the “Computer Science Degree” self-efficacy between each of the five groups of students. These finding suggest there is a ‘clog’ from the early years (elementary and middle) to the later years (college). In chapter six, a review of the qualitative data will reveal the recommendations the college students have for the primary school students.

**Factor Analysis**

Factor Analysis was done to determine: "What are the patterns of relationship among these data?" The principal component analysis utilizing varimax rotation in combination with inspection of the scree plot suggested the presence of six factors among the 30 items comprising the self-efficacy scale.
Figure 4.7 – Scree Plot
### Rotated Component Matrix

<table>
<thead>
<tr>
<th></th>
<th>Component</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>I find working with Computers very easy</td>
<td></td>
<td>.184</td>
<td>-.81</td>
<td>-.004</td>
<td>-.078</td>
<td>-.032</td>
<td>-.090</td>
<td>.165</td>
<td>-.081</td>
<td>.051</td>
<td>-.169</td>
</tr>
<tr>
<td>Computers frighten me</td>
<td></td>
<td>-.046</td>
<td>.712</td>
<td>-.044</td>
<td>.059</td>
<td>.070</td>
<td>-.123</td>
<td>.002</td>
<td>-.012</td>
<td>-.142</td>
<td>.005</td>
</tr>
<tr>
<td>I seem to have difficulties most of the times I use the computer.</td>
<td></td>
<td>.163</td>
<td>.723</td>
<td>-.110</td>
<td>-.184</td>
<td>-.073</td>
<td>-.059</td>
<td>.067</td>
<td>.137</td>
<td>.186</td>
<td>.262</td>
</tr>
<tr>
<td>If I get stuck on the computer, I can get it working again</td>
<td></td>
<td>.193</td>
<td>.200</td>
<td>.162</td>
<td>-.118</td>
<td>-.078</td>
<td>.230</td>
<td>.618</td>
<td>-.035</td>
<td>-.096</td>
<td>.160</td>
</tr>
<tr>
<td>I learn lots of new things on the computer</td>
<td></td>
<td>.067</td>
<td>-.070</td>
<td>-.049</td>
<td>.191</td>
<td>.109</td>
<td>.043</td>
<td>.737</td>
<td>.012</td>
<td>.030</td>
<td>-.062</td>
</tr>
<tr>
<td>I am very bad with computers.</td>
<td></td>
<td>.086</td>
<td>.334</td>
<td>.073</td>
<td>.024</td>
<td>.069</td>
<td>-.178</td>
<td>.474</td>
<td>.244</td>
<td>-.082</td>
<td>.042</td>
</tr>
<tr>
<td>I work hard in school</td>
<td></td>
<td>-.018</td>
<td>-.116</td>
<td>.657</td>
<td>.207</td>
<td>.064</td>
<td>.189</td>
<td>.140</td>
<td>-.054</td>
<td>-.059</td>
<td>-.172</td>
</tr>
<tr>
<td>Even if I try, I won’t get good grades.</td>
<td></td>
<td>.008</td>
<td>.419</td>
<td>.266</td>
<td>.003</td>
<td>.517</td>
<td>.009</td>
<td>.169</td>
<td>1.160E-5</td>
<td>-.138</td>
<td>-.299</td>
</tr>
<tr>
<td>Most of my classmates like math because it is easy</td>
<td></td>
<td>.037</td>
<td>-.158</td>
<td>.284</td>
<td>.099</td>
<td>-.234</td>
<td>-.079</td>
<td>-.211</td>
<td>.037</td>
<td>.700</td>
<td>.066</td>
</tr>
<tr>
<td>I am not good in math.</td>
<td></td>
<td>-.036</td>
<td>-.010</td>
<td>-.017</td>
<td>.059</td>
<td>.171</td>
<td>-.011</td>
<td>.049</td>
<td>-.026</td>
<td>.017</td>
<td>.770</td>
</tr>
<tr>
<td>I am a good science student</td>
<td></td>
<td>.187</td>
<td>.145</td>
<td>.076</td>
<td>.036</td>
<td>-.065</td>
<td>.518</td>
<td>-.098</td>
<td>-.344</td>
<td>.068</td>
<td>.155</td>
</tr>
<tr>
<td>I will not graduate from High School.</td>
<td></td>
<td>.030</td>
<td>-.160</td>
<td>.078</td>
<td>.027</td>
<td>.764</td>
<td>-.153</td>
<td>-.008</td>
<td>.132</td>
<td>.027</td>
<td>.180</td>
</tr>
<tr>
<td>I will graduate from college</td>
<td></td>
<td>.176</td>
<td>-.123</td>
<td>.026</td>
<td>.663</td>
<td>.039</td>
<td>.175</td>
<td>.053</td>
<td>-.137</td>
<td>-.079</td>
<td>.012</td>
</tr>
<tr>
<td>I will study Computer Science in College</td>
<td></td>
<td>.675</td>
<td>.060</td>
<td>-.020</td>
<td>.012</td>
<td>-.124</td>
<td>.031</td>
<td>.193</td>
<td>.019</td>
<td>-.342</td>
<td>.144</td>
</tr>
<tr>
<td>I can get a job working with computers</td>
<td></td>
<td>.786</td>
<td>.029</td>
<td>.082</td>
<td>-.081</td>
<td>-.084</td>
<td>-.062</td>
<td>.127</td>
<td>.160</td>
<td>-.187</td>
<td>.111</td>
</tr>
<tr>
<td>Studying computers in college is hard</td>
<td></td>
<td>-.257</td>
<td>.151</td>
<td>-.129</td>
<td>-.178</td>
<td>.245</td>
<td>.101</td>
<td>.221</td>
<td>-.154</td>
<td>.574</td>
<td>-.046</td>
</tr>
<tr>
<td>I can become a rapper or</td>
<td></td>
<td>-.085</td>
<td>.025</td>
<td>-.041</td>
<td>.075</td>
<td>.006</td>
<td>-.091</td>
<td>.005</td>
<td>.800</td>
<td>.039</td>
<td>-.107</td>
</tr>
<tr>
<td>I can become a Pro Football, Basketball, Baseball or other sports player</td>
<td></td>
<td>.314</td>
<td>.045</td>
<td>-.137</td>
<td>-.109</td>
<td>.077</td>
<td>.109</td>
<td>.128</td>
<td>.653</td>
<td>-.162</td>
<td>.283</td>
</tr>
<tr>
<td>Adults who have good jobs probably were good students when they were kids.</td>
<td></td>
<td>-.295</td>
<td>.029</td>
<td>.301</td>
<td>.315</td>
<td>-.125</td>
<td>-.402</td>
<td>-.074</td>
<td>-.367</td>
<td>-.071</td>
<td>.207</td>
</tr>
<tr>
<td>I am one of the best students in class.</td>
<td></td>
<td>.282</td>
<td>-.004</td>
<td>.677</td>
<td>-.247</td>
<td>.142</td>
<td>.036</td>
<td>-.070</td>
<td>-.243</td>
<td>.185</td>
<td>.111</td>
</tr>
</tbody>
</table>
Table 4.23 – Rotated Component Matrix

The eigenvalues of the 10 factors were 2.855, 2.250, 2.076, 1.918, 1.873, 1.726, 1.720, 1.701, 1.341 and 1.280 respectively. The “total variance explained”, shown in table 4.25, list the eigenvalues and reveals that the 10 factor solution explains 62.471% of the total variance, calculated across the 30 self-efficacy variables.
Table 4.24 – Total Variance Explained

Table 4.25 shows the items arranged within the 10 factors and loading values. One variable, “I am good at video games”, did not load to any factor because its absolute value is not >= .4.
<table>
<thead>
<tr>
<th>Item Description</th>
<th>Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1: Career in Computers</strong></td>
<td></td>
</tr>
<tr>
<td>I can get a job working with computers</td>
<td>.786</td>
</tr>
<tr>
<td>I know a lot of people who work with computers</td>
<td>.697</td>
</tr>
<tr>
<td>I will study computers in college</td>
<td>.675</td>
</tr>
<tr>
<td>I know a lot of black men who work with computers</td>
<td>.638</td>
</tr>
<tr>
<td>People tell me I’m good with computers</td>
<td>.505</td>
</tr>
<tr>
<td><strong>Factor 2: Self-assessment of Computer Skills</strong></td>
<td></td>
</tr>
<tr>
<td>I seem to have difficulties most of the times I use the computer.</td>
<td>.723</td>
</tr>
<tr>
<td>Computers frighten me</td>
<td>.712</td>
</tr>
<tr>
<td>I find working with computers very easy.</td>
<td>.681</td>
</tr>
<tr>
<td><strong>Factor 3: Disidentification with hard work and being smart</strong></td>
<td></td>
</tr>
<tr>
<td>My teacher thinks I am smart.</td>
<td>.766</td>
</tr>
<tr>
<td>I am one of the best students in class.</td>
<td>.677</td>
</tr>
<tr>
<td>I work hard in school.</td>
<td>.657</td>
</tr>
<tr>
<td><strong>Factor 4: Confidence to finish college</strong></td>
<td></td>
</tr>
<tr>
<td>It is important to go to college</td>
<td>.795</td>
</tr>
<tr>
<td>I will graduate from college</td>
<td>.663</td>
</tr>
<tr>
<td><strong>Factor 5: Disidentification with School</strong></td>
<td></td>
</tr>
<tr>
<td>I will not graduate from High School</td>
<td>.764</td>
</tr>
<tr>
<td>I will quit school as soon as I can</td>
<td>.584</td>
</tr>
<tr>
<td>No one cares if I do well in school</td>
<td>.562</td>
</tr>
<tr>
<td>Even if I try, I won’t get good grades</td>
<td>.517</td>
</tr>
<tr>
<td><strong>Factor 6: Disidentification with being smart and trying</strong></td>
<td></td>
</tr>
<tr>
<td>Being smart is cool.</td>
<td>.689</td>
</tr>
<tr>
<td>I will keep trying until I get it right</td>
<td>.615</td>
</tr>
<tr>
<td>I am a good science student</td>
<td>.518</td>
</tr>
<tr>
<td>Adults who have good jobs probably were good students when they were kids.</td>
<td>.402</td>
</tr>
<tr>
<td><strong>Factor 7: Self-assessment of Computer Skills</strong></td>
<td></td>
</tr>
<tr>
<td>I learn lots of new things on the computer</td>
<td>.737</td>
</tr>
<tr>
<td>If I get stuck on the computer, I can get it working again.</td>
<td>.618</td>
</tr>
<tr>
<td>I am very bad with computers</td>
<td>.474</td>
</tr>
<tr>
<td><strong>Factor 8: Career in Sports or Entertainment</strong></td>
<td></td>
</tr>
<tr>
<td>I can become a rapper or singer.</td>
<td>.800</td>
</tr>
<tr>
<td>I can become a Pro Football, Basketball, Baseball or other sports player.</td>
<td>.653</td>
</tr>
<tr>
<td><strong>Factor 9: Math and Computer Skills Assessment</strong></td>
<td></td>
</tr>
<tr>
<td>Most of my classmates like math because it is easy.</td>
<td>.700</td>
</tr>
<tr>
<td>Studying computers in college is hard</td>
<td>.574</td>
</tr>
</tbody>
</table>
Factor 10: Math Assessment

I am not good in math

.770

Table 4.25 - Summary of factors, items, and loading

Factor Scores and Elementary Schools – PA-ES and RM-ES

The mean for each factor score, for each group (PA-ES and RM-ES), is given below. The null hypothesis tested is:

H0: There is no significant difference in the mean factor scores 1 through 10 among PA-ES and RM-ES.

H1: There is significant difference in the mean factor scores 1 through 10 among PA-ES and RM-ES.

The descriptive statistics are given below.

<table>
<thead>
<tr>
<th>School</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>REGR factor score 1</td>
<td>PA-ES</td>
<td>11</td>
<td>-1.1719139</td>
<td>1.00305762</td>
</tr>
<tr>
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<td>RM-ES</td>
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<td>-.6054003</td>
<td>1.27110911</td>
</tr>
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<td>REGR factor score 2</td>
<td>PA-ES</td>
<td>11</td>
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<tr>
<td></td>
<td>RM-ES</td>
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<td>REGR factor score 3</td>
<td>PA-ES</td>
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<tr>
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<td>RM-ES</td>
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<td>1.20359162</td>
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</tr>
<tr>
<td></td>
<td>RM-ES</td>
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</tr>
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<td>PA-ES</td>
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<td>RM-ES</td>
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<td>RM-ES</td>
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<td>1.39003066</td>
</tr>
<tr>
<td>REGR factor score</td>
<td>PA-ES</td>
<td>RM-ES</td>
<td></td>
<td></td>
</tr>
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<td>11.1301554</td>
<td>.51709252</td>
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<td>13.171500186</td>
<td>.34840571</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.26 – Factor Scores Group Statistics for Elementary Schools

Student’s t test is used to validate the above hypothesis. One important assumption of student t test is the equality of variance among the two independent groups. Levene’s test will check this assumption.

**Independent Samples Test**

Assumptions=Equal variances assumed

<table>
<thead>
<tr>
<th>Levene’s Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td>REGR factor score 1</td>
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</tr>
<tr>
<td>REGR factor score 2</td>
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</table>

124
<table>
<thead>
<tr>
<th>REGR factor score 3</th>
<th>.003</th>
<th>.955</th>
<th>.428</th>
<th>22</th>
<th>.673</th>
<th>.20648101</th>
<th>.48266353</th>
<th>-.79450187</th>
<th>1.20746390</th>
</tr>
</thead>
<tbody>
<tr>
<td>REGR factor score 4</td>
<td>2.304</td>
<td>.143</td>
<td>1.597</td>
<td>22</td>
<td>.125</td>
<td>.39318823</td>
<td>.24620445</td>
<td>-.90378501</td>
<td>.11740855</td>
</tr>
<tr>
<td>REGR factor score 5</td>
<td>.448</td>
<td>.510</td>
<td>.098</td>
<td>22</td>
<td>.923</td>
<td>.04315225</td>
<td>.44237108</td>
<td>-.87426922</td>
<td>.96057373</td>
</tr>
<tr>
<td>REGR factor score 6</td>
<td>1.911</td>
<td>.181</td>
<td>.654</td>
<td>22</td>
<td>.520</td>
<td>.30606615</td>
<td>.46786881</td>
<td>-.66423438</td>
<td>1.27636667</td>
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<td>REGR factor score 7</td>
<td>1.020</td>
<td>.323</td>
<td>.558</td>
<td>22</td>
<td>.582</td>
<td>.27539507</td>
<td>.49352090</td>
<td>-.74810463</td>
<td>1.29889477</td>
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<td>REGR factor score 8</td>
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<td>.436</td>
<td>1.353</td>
<td>22</td>
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<td>.50047308</td>
<td>.37001685</td>
<td>-.26689490</td>
<td>1.26784107</td>
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<tr>
<td>REGR factor score 9</td>
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<td>.394</td>
<td>.743</td>
<td>22</td>
<td>.465</td>
<td>.36106066</td>
<td>.48595406</td>
<td>-.64674637</td>
<td>1.36886770</td>
</tr>
<tr>
<td>REGR factor score 10</td>
<td>1.993</td>
<td>.172</td>
<td>.145</td>
<td>22</td>
<td>.886</td>
<td>.08809408</td>
<td>.60732097</td>
<td>-1.17141252</td>
<td>1.34760067</td>
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</tbody>
</table>

Table 4.27 – Independent Samples Test for Elementary Schools
Factor Analysis Conclusion for Elementary Schools – PA-ES and RM-ES

The Levene’s test suggests that Equality of Variances assumption is valid for factor score 2 (Self Assessment of Computer Skills). Since observed significance (p = 0.008) is less than the significance level (p < .05), we reject the null hypothesis that there is no significant difference in the mean factor score 2 (Self Assessment of Computer Skills) among PA-ES and RM-ES.

As you will see in chapter six, the fact that PA-ES and RM-ES self assessment of computer skills shows significance indicates that students are gaining or losing confidence in their computer skills at an early age. The qualitative data suggest there is a need to introduce computer terminology, concepts and basic skills at an early age, thus enhancing the confidence.

Factor Scores and Middle Schools – PA-MS and RM-MS

The mean for each factor score, for each group (PA-MS and RM-MS), is given below. The null hypothesis tested is:

H0: There is no significant difference in the mean factor scores 1 through 10 among PA-MS and RM-MS.

H1: There is significant difference in the mean factor scores 1 through 10 among PA-MS and RM-MS.

The descriptive statistics are given below.

<table>
<thead>
<tr>
<th>School</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>REGR factor score 1 PA-MS</td>
<td>30</td>
<td>-0.5441611</td>
<td>0.91884089</td>
<td>0.16775663</td>
</tr>
<tr>
<td>RM-MS</td>
<td>11</td>
<td>0.3365558</td>
<td>0.49189689</td>
<td>0.14831249</td>
</tr>
</tbody>
</table>
### Table 4.28 – Factor Scores Group Statistics for Middle Schools

Student’s t test is used to validate the above hypothesis. One important assumption of student t test is the equality of variance among the two independent groups. Levenes test will check this assumption.

#### Independent Samples Test

Assumptions=Equal variances assumed

<table>
<thead>
<tr>
<th>REGR factor score</th>
<th>PA-MS</th>
<th>RM-MS</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>30</td>
<td>-.0541303</td>
<td>1.11897034</td>
</tr>
<tr>
<td>3</td>
<td>30</td>
<td>-.0210889</td>
<td>1.22541443</td>
</tr>
<tr>
<td>4</td>
<td>30</td>
<td>-.0283989</td>
<td>.82924525</td>
</tr>
<tr>
<td>5</td>
<td>30</td>
<td>-.0475678</td>
<td>1.09612701</td>
</tr>
<tr>
<td>6</td>
<td>30</td>
<td>-.4049748</td>
<td>1.24196226</td>
</tr>
<tr>
<td>7</td>
<td>30</td>
<td>-.1057165</td>
<td>1.06538203</td>
</tr>
<tr>
<td>8</td>
<td>30</td>
<td>-.3212658</td>
<td>1.02910158</td>
</tr>
<tr>
<td>9</td>
<td>30</td>
<td>.2692876</td>
<td>.72964977</td>
</tr>
<tr>
<td>10</td>
<td>30</td>
<td>.1334882</td>
<td>.97379566</td>
</tr>
<tr>
<td>REGR factor</td>
<td>score</td>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>-------------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>3.115</td>
<td>.085</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>.080</td>
<td>.778</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>.573</td>
<td>.454</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>2.870</td>
<td>.098</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>5.232</td>
<td>.028</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>4.370</td>
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</tr>
<tr>
<td>7</td>
<td></td>
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<td>.550</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>5.130</td>
<td>.029</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>1.415</td>
<td>.241</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>.125</td>
<td>.726</td>
</tr>
</tbody>
</table>

Table 4.29 – Independent Samples Test for Middle Schools
Factor Analysis Conclusion for Middle Schools – PA-MS and RM-MS

The Levenes test suggests that Equality of Variances assumption is valid for factor score 1 (Career in Computers). Since observed significance (p = 0.005) is less than the significance level (p < .05), we reject the null hypothesis that there is no significant difference in the mean factor score 1 (Career in Computers) among PA-MS and RM-MS.

Chapter six discusses the college level students’ suggest to introduce basic programming skills at the middle school level. The goal is to increase the interest and confidence in pursuing a career in computers, among both groups.

Factor Scores and High Schools – PA-HS and RM-HS

The mean for each factor score, for each group (PA-HS and RM-HS), is given below.

The null hypothesis tested is:

\[ H_0: \text{There is no significant difference in the mean factor scores 1 through 10 among PA-HS and RM-HS.} \]

\[ H_1: \text{There is significant difference in the mean factor scores 1 through 10 among PA-HS and RM-HS.} \]

The descriptive statistics are given below.

<p>| Group Statistics |
|------------------|----------------|----------------|----------------|
| School           | N   | Mean           | Std. Deviation | Std. Error Mean |
| REGR factor score 1 PA-HS | 23   | -.0841037       | .76467512      | .15944578       |
| REGR factor score 1 RM-HS | 11   | .2424730        | .56671081      | .17086974       |
| REGR factor score 2 PA-HS | 23   | -.1024509       | 1.02704014     | .21415267       |
| REGR factor score 2 RM-HS | 11   | .0694469        | .88049054      | .26547789       |
| REGR factor score 3 PA-HS | 23   | -.2101963       | .77364058      | .16131521       |</p>
<table>
<thead>
<tr>
<th>REGR factor score</th>
<th>Group</th>
<th>Mean Difference</th>
<th>Std. Error Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>RM-HS</td>
<td>.3620211</td>
<td>.60251971</td>
<td>.18166653</td>
</tr>
<tr>
<td>5</td>
<td>PA-HS</td>
<td>.1214867</td>
<td>.69757745</td>
<td>.14545495</td>
</tr>
<tr>
<td></td>
<td>RM-HS</td>
<td>-.6710313</td>
<td>1.55301299</td>
<td>.46825103</td>
</tr>
<tr>
<td>6</td>
<td>PA-HS</td>
<td>.1342168</td>
<td>.99061795</td>
<td>.20655812</td>
</tr>
<tr>
<td></td>
<td>RM-HS</td>
<td>.3990044</td>
<td>.41153273</td>
<td>.12408179</td>
</tr>
<tr>
<td>7</td>
<td>PA-HS</td>
<td>.5789759</td>
<td>.79570910</td>
<td>.16591682</td>
</tr>
<tr>
<td></td>
<td>RM-HS</td>
<td>.2841780</td>
<td>.70236596</td>
<td>.21177131</td>
</tr>
<tr>
<td>8</td>
<td>PA-HS</td>
<td>-.2383208</td>
<td>1.03562878</td>
<td>.21594353</td>
</tr>
<tr>
<td></td>
<td>RM-HS</td>
<td>.1823904</td>
<td>.91280277</td>
<td>.27522039</td>
</tr>
<tr>
<td>9</td>
<td>PA-HS</td>
<td>.3160058</td>
<td>.82515948</td>
<td>.17205765</td>
</tr>
<tr>
<td></td>
<td>RM-HS</td>
<td>-.3696887</td>
<td>1.30186873</td>
<td>.39252819</td>
</tr>
<tr>
<td>10</td>
<td>PA-HS</td>
<td>.4447609</td>
<td>1.00636428</td>
<td>.20984146</td>
</tr>
<tr>
<td></td>
<td>RM-HS</td>
<td>.0903164</td>
<td>.86936759</td>
<td>.26212419</td>
</tr>
<tr>
<td>11</td>
<td>PA-HS</td>
<td>-.2020837</td>
<td>.91448445</td>
<td>.19068319</td>
</tr>
<tr>
<td></td>
<td>RM-HS</td>
<td>-.0851055</td>
<td>.98560549</td>
<td>.29717124</td>
</tr>
</tbody>
</table>

**Table 4.30 – Factor Scores Group Statistics for High Schools**

Student’s t test is used to validate the above hypothesis. One important assumption of student t test is the equality of variance among the two independent groups. Levene’s test will check this assumption.

**Independent Samples Test**
**Assumptions=Equal variances assumed**
<table>
<thead>
<tr>
<th>REGR factor score</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.033</td>
<td>0.858</td>
</tr>
<tr>
<td>2</td>
<td>0.140</td>
<td>0.711</td>
</tr>
<tr>
<td>3</td>
<td>0.743</td>
<td>0.395</td>
</tr>
<tr>
<td>4</td>
<td>5.265</td>
<td>0.028</td>
</tr>
<tr>
<td>5</td>
<td>3.497</td>
<td>0.071</td>
</tr>
<tr>
<td>6</td>
<td>1.157</td>
<td>0.694</td>
</tr>
<tr>
<td>7</td>
<td>0.295</td>
<td>0.591</td>
</tr>
<tr>
<td>8</td>
<td>5.425</td>
<td>0.026</td>
</tr>
<tr>
<td>9</td>
<td>0.371</td>
<td>0.547</td>
</tr>
<tr>
<td>10</td>
<td>0.091</td>
<td>0.765</td>
</tr>
</tbody>
</table>

Table 4.31 – Independent Samples Test for High Schools
Factor Analysis Conclusion for High Schools – PA-HS and RM-HS

The Levene’s test suggests that Equality of Variances assumption is valid for factor score 3 (Dis-identification with hard work and being smart) and factor score 4 (Confidence to finish college). Since observed significance (p = 0.039 and p = 0.046 respectfully) is less than the significance level (p < .05), we reject the null hypothesis that there is no significant difference in the mean factor score 3 (Dis-identification with hard work and being smart) and mean factor score 4 (Confidence to finish college) among PA-HS and RM-HS.

The qualitative data strongly supports and explains the significant difference between RM-HS and PA-HS as it relates to disidentification. Students at the PA-HS are aware disidentification exists and one student maintains it was invited at the PA-HS in this study.

Factor Scores and College Students – Underclass and Upperclass

The mean for each factor score, for each group (Under and Upper), is given below. The null hypothesis tested is:

H0: There is no significant difference in the mean factor scores 1 through 10 among Underclassmen and Upperclassmen.

H1: There is significant difference in the mean factor scores 1 through 10 among Underclassmen and Upperclassmen.

The descriptive statistics are given below.
### Table 4.32 – Factor Scores Group Statistics for College Students

Student’s t test is used to validate the above hypothesis. One important assumption of student t test is the equality of variance among the two independent groups. Levene’s test will check this assumption.
### Independent Samples Test

Assumptions: Equal variances assumed

<table>
<thead>
<tr>
<th>Factor Score</th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>t</td>
</tr>
<tr>
<td>REGR factor 1</td>
<td>.008</td>
<td>.928</td>
<td>.450</td>
</tr>
<tr>
<td>REGR factor 2</td>
<td>.450</td>
<td>.506</td>
<td>-.140</td>
</tr>
<tr>
<td>REGR factor 3</td>
<td>.036</td>
<td>.851</td>
<td>1.112</td>
</tr>
<tr>
<td>REGR factor 4</td>
<td>.007</td>
<td>.935</td>
<td>.138</td>
</tr>
<tr>
<td>REGR factor 5</td>
<td>6.671</td>
<td>.143</td>
<td>2.885</td>
</tr>
<tr>
<td>REGR factor 6</td>
<td>.027</td>
<td>.870</td>
<td>-.638</td>
</tr>
<tr>
<td>REGR factor 7</td>
<td>2.160</td>
<td>.150</td>
<td>-.086</td>
</tr>
<tr>
<td>REGR factor 8</td>
<td>1.537</td>
<td>.223</td>
<td>.080</td>
</tr>
</tbody>
</table>
The Levene's test suggests that Equality of Variances assumption is valid for factor score 5 (Dis-identification with School). Since observed significance ($p = 0.006$) is less than the significance level ($p < 0.05$), we reject the null hypothesis that there is no significant difference in the mean factor score 5 (Dis-identification with School) among underclassmen and upperclassmen.

**Factor Scores with Elementary and Middle Schools**

The mean for each factor score, for each group (both elementary and both middle schools), is given below. The null hypothesis tested is:

- **H0:** There is no significant difference in the mean factor scores 1 through 10 among elementary and middle schools.
- **H1:** There is significant difference in the mean factor scores 1 through 10 among elementary and middle schools.

The descriptive statistics are given below.
<table>
<thead>
<tr>
<th>REGR factor score</th>
<th>Elementary School</th>
<th>Middle School</th>
<th>Elementary School</th>
<th>Middle School</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.0083715</td>
<td>0.93480413</td>
<td>0.19081609</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.0472115</td>
<td>1.12519360</td>
<td>0.17572572</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.3119925</td>
<td>1.15705282</td>
<td>0.23618242</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0.0570634</td>
<td>0.96170167</td>
<td>0.15019257</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>-0.2781426</td>
<td>1.05630772</td>
<td>0.21561791</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>0.0570634</td>
<td>0.96170167</td>
<td>0.15019257</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>-0.1315004</td>
<td>1.18649884</td>
<td>0.24219306</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>-0.4168254</td>
<td>0.95258061</td>
<td>0.14876810</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>-0.2265780</td>
<td>0.91934160</td>
<td>0.18765982</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>0.2174168</td>
<td>0.81405456</td>
<td>0.12713396</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>-0.0662932</td>
<td>1.17459082</td>
<td>0.23976235</td>
<td></td>
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<tr>
<td>13</td>
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<tr>
<td>14</td>
<td>-0.1778730</td>
<td>1.45055992</td>
<td>0.29609430</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.34 – Factor Scores Group Statistics for Elementary and Middle Schools
Student’s t test is used to validate the above hypothesis. One important assumption of student t test is the equality of variance among the two independent groups. Levene’s test will check this assumption.

### Independent Samples Test
Assumptions=Equal variances assumed

<table>
<thead>
<tr>
<th></th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>REGR factor score 1</td>
<td>2.978</td>
<td>.089</td>
</tr>
<tr>
<td>REGR factor score 2</td>
<td>.066</td>
<td>.798</td>
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<tr>
<td>REGR factor score 3</td>
<td>.545</td>
<td>.463</td>
</tr>
<tr>
<td>REGR factor score 4</td>
<td>2.814</td>
<td>.098</td>
</tr>
<tr>
<td>REGR factor score 5</td>
<td>.425</td>
<td>.517</td>
</tr>
<tr>
<td>REGR factor score 6</td>
<td>.114</td>
<td>.737</td>
</tr>
</tbody>
</table>
Table 4.35 – Independent Samples Test for Elementary and Middle Schools

Factor Analysis Conclusion for Elementary and Middle Schools

The Levene’s test suggests that Equality of Variances assumption is valid for factor score 1 (Career in Computers) and factor score 4 (Confidence to finish college). Since observed significance (p = 0.036 and p = 0.010 respectfully) is less than the significance level (p < .05), we reject the null hypothesis that there is no significant difference in the mean factor score 1 (Career in Computers) and mean factor score 4 (Confidence to finish college) among elementary and middle school students.

Introducing computer terminology and concepts at the elementary level was already mentioned and will be further explained in chapter six. Initiating programs which brings the current AAMs in the field of computing to the classroom will also be discussed in chapter six. These ideas may lead to additional members of both groups, elementary and middle school students, seeking college degrees and careers in computers.
**Factor Scores with Middle and High Schools**

The mean for each factor score, for each group (both middle and both high schools), is given below. The null hypothesis tested is:

- **H0:** There is no significant difference in the mean factor scores 1 through 10 among middle and high schools.
- **H1:** There is significant difference in the mean factor scores 1 through 10 among middle and high schools.

The descriptive statistics are given below.

<table>
<thead>
<tr>
<th>Group Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level</td>
</tr>
<tr>
<td>REGR factor score 1</td>
</tr>
<tr>
<td>REGR factor score 1</td>
</tr>
<tr>
<td>REGR factor score 2</td>
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<tr>
<td>REGR factor score 2</td>
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<td>REGR factor score 3</td>
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<tr>
<td>REGR factor score 3</td>
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<tr>
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<td>REGR factor score 5</td>
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<tr>
<td>REGR factor score 5</td>
</tr>
<tr>
<td>REGR factor score 6</td>
</tr>
<tr>
<td>REGR factor score 6</td>
</tr>
<tr>
<td>REGR factor score 7</td>
</tr>
</tbody>
</table>
Table 4.36 – Factor Scores Group Statistics for Middle and High Schools

Student’s t test is used to validate the above hypothesis. One important assumption of student t test is the equality of variance among the two independent groups. Levene's test will check this assumption.

**Independent Samples Test**

Assumptions=Equal variances assumed

<table>
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<th>High School</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>Std. Error Difference</th>
<th>95% Confidence Interval of the Difference</th>
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Levene's Test for Equality of Variances | t-test for Equality of Means

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<tr>
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<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
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<td>.26285314</td>
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<td>-</td>
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<tr>
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</tr>
</tbody>
</table>

Table 4.37 – Independent Samples Test for Middle and High Schools

Factor Analysis Conclusion for Middle and High Schools

The Levene’s test suggests that Equality of Variances assumption is valid for factor score 6 (Dis-identification with being smart and trying) and factor score 8 (Career in sports and entertainment). Since observed significance ( p = 0.001 and p = 0.021
respectfully) is less than the significance level (p < .05), we reject the null hypothesis that there is no significant difference in the mean factor score 6 (Dis-identification with being smart and trying) and mean factor score 8 (Career in sports and entertainment) among middle and high school students.

The qualitative data will confirm the admiration for sports among primary school students. Students in the study admit to holding on the dream of becoming a professional athlete or entertainer until there high school years. Some students at the predominately AA High School confess to still possessing those aspirations.

*Factor Scores with High School students and Underclassmen*

The mean for each factor score, for each group (both high school and underclassmen), is given below. The null hypothesis tested is:

- **H0:** There is no significant difference in the mean factor scores 1 through 10 among high school and underclassmen.
- **H1:** There is significant difference in the mean factor scores 1 through 10 among high school and underclassmen.

The descriptive statistics are given below.

<table>
<thead>
<tr>
<th>Group Statistics</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>REGR factor score 1</td>
<td>Under</td>
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<td>.7621712</td>
<td>.48222198</td>
</tr>
<tr>
<td>REGR factor score 1</td>
<td>High Schools</td>
<td>34</td>
<td>.0215535</td>
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</tr>
<tr>
<td>REGR factor score 2</td>
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<td>REGR factor score 2</td>
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</tr>
<tr>
<td>REGR factor score 3</td>
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<td>1.10026344</td>
</tr>
<tr>
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<td>High Schools</td>
<td>34</td>
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<td>1.09402923</td>
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<tr>
<td>----------------------</td>
<td>--------------</td>
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<td>-------------</td>
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<tr>
<td>REGR factor score</td>
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<td>High Schools</td>
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<td>High Schools</td>
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</table>

Table 4.38 – Factor Scores Group Statistics for High Schools and Underclassmen

Student’s t test is used to validate the above hypothesis. One important assumption of student t test is the equality of variance among the two independent groups. Levene’s test will check this assumption.

**Independent Samples Test**
Assumptions=Equal variances assumed
<table>
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<th>REGR 3</th>
<th>REGR 4</th>
<th>REGR 5</th>
<th>REGR 6</th>
<th>REGR 7</th>
<th>REGR 8</th>
<th>REGR 9</th>
<th>REGR 10</th>
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<td>.109</td>
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<td>.722</td>
<td>1.650</td>
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</table>

**Table 4.39 – Independent Samples Test for High School and Underclassmen**

**Factor Analysis Conclusion for High School students and Underclassmen**

The Levenes test suggests that Equality of Variances assumption is valid for factor score 1 (Career in Computers) and factor score 9 (Math and Computer Skills.
Assessment). Since observed significance (p = 0.000 and p = 0.003 respectively) is less than the significance level (p < .05), we reject the null hypothesis that there is no significant difference in the mean factor score 1 (Career in Computers) and mean factor score 9 (Math and Computer Skills Assessment) among high school students and underclassmen.

The qualitative data suggest the students are not receiving a strong foundation of mathematics and computer programming and logic skills at the high school level. Chapter six will further discuss this finding.

*Factor Scores with All Predominately AA and All Racially Mixed Schools*

The mean for each factor score, for group one (Predominately AA schools including: PA-ES, PA-MS and PA-HS) and group two (Racially Mixed schools including: RM-ES, RM-MS and RM-HS) is given below. The null hypothesis tested is:

H0: There is no significant difference in the mean factor scores 1 through 10 among predominately AA and racially mixed schools.

H1: There is significant difference in the mean factor scores 1 through 10 among predominately AA and racially mixed schools.

The descriptive statistics are given below.

<table>
<thead>
<tr>
<th>Group Statistics</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
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(Predominately)
<table>
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<th></th>
</tr>
</thead>
<tbody>
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<tr>
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</table>

Table 4.40 – Factor Scores Group Statistics for Predominately AA and Racially Mixed

Student’s t test is used to validate the above hypothesis. One important assumption of student t test is the equality of variance among the two independent groups. Levene’s test will check this assumption.

Independent Samples Test
Assumptions=Equal variances assumed

<table>
<thead>
<tr>
<th></th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
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<tr>
<td>REGR factor score 1</td>
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<td>.552</td>
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<tr>
<td>REGR factor score 2</td>
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<td>REGR factor</td>
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</table>

**Table 4.41 – Independent Samples Test for Predominately AA and Racially Mixed**

*Factor Analysis Conclusion for predominately AA and racially mixed schools*

The Levenes test suggests that Equality of Variances assumption is valid for factor score 1 (Career in Computers) and factor score 8 (Career in Sports or Entertainment). Since observed significance (p = 0.000 and p = 0.003 respectfully) is less than the significance level (p < .05), we reject the null hypothesis that there is no significant difference in the mean factor score 1 (Career in Computers) and mean factor score 8 (Career in Sports or Entertainment) among predominately AA and racially mixed schools.
### Summary of Quantitative Results

Table 4.43 provides a summary of all the results which there was a significant difference between groups. Chapter six will expand on the remarks listed in the table below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Group(s)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q4 - If I get stuck on the computer, I can get it working again</td>
<td>mean score of each of the thirty questions among the eight groups</td>
<td>Students at the racially mixed and University had a higher mean score than the students attending the Predominately AA schools.</td>
</tr>
<tr>
<td>Q11 - I am a good science student</td>
<td>mean score of each of the thirty questions among the eight groups</td>
<td>Students at the Racially Mixed Schools had a higher mean score than all other groups.</td>
</tr>
<tr>
<td>Q14 - I will study Computer Science in College</td>
<td>mean score of each of the thirty questions among the eight groups</td>
<td>With a survey that seeks to discover those who have confidence in studying in a computing discipline, it is good that those who are currently studying computer science in college, had a much higher mean score then all the other groups.</td>
</tr>
<tr>
<td>Q15 - I can get a job working with computers</td>
<td>mean score of each of the thirty questions among the eight groups</td>
<td>While college students had the higher mean scores, it should be noted that students at the Predominately AA schools had a lower mean score than students at the racially mixed schools.</td>
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<tr>
<td>Q16 - Studying computers in college is hard</td>
<td>mean score of each of the thirty questions among the eight groups</td>
<td>University students admitting that studying computers is hard.</td>
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<tr>
<td>Q18 I can become a Pro Football, Basketball, Baseball or other sports player</td>
<td>mean score of each of the thirty questions among the eight groups</td>
<td>Elementary school students were confidently aspiring to become professional athletes. As students got older, that goal diminished.</td>
</tr>
<tr>
<td>Q19 - Adults who have good jobs probably were</td>
<td>mean score of each of the thirty questions among the eight groups</td>
<td>Elementary and Middle school students</td>
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<tr>
<td>Question</td>
<td>Description</td>
<td>Mean Score of Each of the Thirty Questions Among the Eight Groups</td>
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<td>-----------------------------------------------------------------</td>
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<tr>
<td>Q24</td>
<td>I know a lot of people who work with computers</td>
<td>mean score of each of the thirty questions among the eight groups</td>
</tr>
<tr>
<td>Q25</td>
<td>I know a lot of black men who work with computers</td>
<td>mean score of each of the thirty questions among the eight groups</td>
</tr>
<tr>
<td>Q29</td>
<td>I am good at video games</td>
<td>mean score of each of the thirty questions among the eight groups</td>
</tr>
<tr>
<td>Q30</td>
<td>People tell me I’m good with computers</td>
<td>mean score of each of the thirty questions among the eight groups</td>
</tr>
<tr>
<td>Q11</td>
<td>I am a good science student</td>
<td>ANOVA results of thirty questions among two groups: All Predominately AA school students and Racially Mixed school students</td>
</tr>
<tr>
<td>Q14</td>
<td>I will study Computer Science in College</td>
<td>ANOVA results of thirty questions among two groups: PAA schools and RM schools</td>
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**Total Self-Efficacy Scores**

<table>
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<tr>
<th>Subjects</th>
<th>Mean Score</th>
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<td>Middle Schools – PAA schools and RM schools</td>
<td>The mean self-efficacy score, 168.09, for RM-MS students was nearly 10 points higher than the mean, 158.30, for PAA-MS students.</td>
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<tr>
<td>Four Groups – Elementary, Middle, High and University</td>
<td>The mean self-efficacy score increased at each level: Elementary – 158.38, Middle – 160.93, High - 164.29, and University – 169.22.</td>
</tr>
<tr>
<td>Hypothesis 5: Self-Efficacy</td>
<td>Five Groups – Elementary, Middle, High, Underclassmen and Upperclassmen</td>
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<tr>
<td>Factor Analysis</td>
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<td>Factor Analysis</td>
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<td>Factor Analysis</td>
<td>Elementary and Middle School Students</td>
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<tr>
<td>Underclassmen and High School Students</td>
<td>High School students were more self-assured about their math and computer skills than Underclassmen.</td>
</tr>
<tr>
<td>Students attending Predominately African-American schools and students attending Racially Mixed schools</td>
<td>Students attending the Predominately AA schools were less likely to pursue a career in computing.</td>
</tr>
<tr>
<td>Students attending Predominately African-American schools and students attending Racially Mixed schools</td>
<td>Students attending the Racially Mixed schools were less likely to pursue a career in sports and entertainment.</td>
</tr>
</tbody>
</table>

**Table 4.42 – Summary of all the results with a significant difference between groups**

The quantitative results presented in this chapter identified a few possible ‘clogs’ in the ‘pipeline’. The fact that PA-MS and RM-MS had significant differences in total self-efficacy scores indicates a possible obstacle. The information that PA-ES had lower overall confidence in their computer and science skills signifies a possible hindrance. The forthcoming qualitative chapter, five, will summarize the interviews with subjects.

Chapter Six will integrate the quantitative and qualitative findings.
CHAPTER V

Qualitative Results

Introduction

After the students completed the Computer Science Self-Efficacy questionnaire, they participated in a group discussion on African-American males in the Computing Discipline. A pre-determined set of questions was asked one at a time. Subjects were not required to participate in the discussion of each question.

Once all the questions were talked about, students were allowed to pose questions to the researcher. The synopsis of these discussions is presented in this chapter.

The audio was transcribed and reviewed by the researcher. This chapter presents data in order of the pipeline: Elementary, Middle, High, Underclassmen and Upperclassmen. Within the school levels, the examination of the transcript revealed several major categories: 1) use of the computer, 2) use of social networking websites, 3) AA males in computers, 4) pursuing a college degree in a computing discipline, 5) school promotion of the computing discipline and 6) family promotion of the computing discipline.

Elementary Schools

Overall, AAM subjects at the racially mixed elementary school (RM-ES) appeared to be more knowledgeable about computers. They spoke of using the computer to program it. When asked how they used the computer in school, several students at the RM-ES answered, “to do math and social studies homework”.

On the other hand, students at the predominantly African-American elementary school (PA-ES) mostly spoke of using the computer to go on the Internet and play games, check email and communicate on social networking websites such as mySpace or Bebo.
The researcher would summarize this observation as “tool and/or entertainment” versus “tutor”. Students at the RM-ES were more likely to use the computer as a tutor, while students at the PA-ES used the computer as an device for entertainment and/or communication.

With regards to knowing AAMs who work with computers, it was the students in the RM-ES who knew males that worked in the computing discipline. These students knew AAMs who, “…worked on networks, programmed the computer and fixed the computer.” In contrast, students at the PA-ES primarily knew AAMs who used the computer at work to do their primary job as bankers, accountants and government careers.

Both elementary school students agreed that it was important to go to college. When asked, “What do you think about college”, the students at the PA-ES were not very descriptive. Most said, “it will be hard” or “I can learn more”. In contrary, most students at the RM-ES spoke to the learning that takes place at college:

Student 1: I think that it is going to be good for me so I can get education and work somewhere that I get a lot of money.

Interviewer: OK. Very good.

Student 2: I think that going to college will help me learn more.

Interviewer: OK

Student 3: I think that going to college will help me get a major in science because science is my favorite subject.

Interviewer: OK. Does anybody else have any comments?

Student 4: I want to go to college because it will push me to my limit and I will get good jobs that I like and get a lot of money.
Interviewer: OK

Student 5: I think going to college will be a good challenge for me.

In the PA-ES, there was a discussion of ‘disidentification’. The researcher asked, “Is it cool to be smart?” The responses lead the researcher to believe it was neither “cool” nor “not cool” to be smart at the PA-ES. Some subjects responded that “sometimes people make jokes about smart students”.

In a dialogue about social networking websites (My Space and Bebo) and playing video games occurred in the PA-ES, students revealed that they spend “a lot” of time on these social networking websites. The majority of the students admitted to spending more time playing video games and on the social networking websites, than doing their homework.

In summary, students in the RM-ES knew more AAMs working in the computing discipline. Additionally, RM-ES students were primarily using the computer as tutors for various subjects. The students at the PA-ES were spending a great deal of time on the computer to play games, email and participate in social networking websites.

Middle Schools

At the predominately African American middle school (PA-MS) about fifty percent of subjects still had aspirations to become a professional athlete. While at the racially mixed middle school (RM-MS) none of the subjects expressed an interest in becoming a professional athlete. Although most of the students at the RM-MS had a good idea of what a computing career entailed, none of them were seeking a position in
Students at the predominately African American middle school use the computer for homework, checking email, playing video games and communicating on the social networking websites. In contrast, students at the racially mixed middle school use the computer for reports, research, checking grades and PowerPoint presentations. At the RM-MS, students have the opportunity to check out laptops for use in the classroom. One student pointed out that his science teacher often reserves the laptop for research projects.

Neither school had a number of students who knew many African-American males in the computer industry. Two students at the RM-MS and one student at the PA-MS had a family member who fixed computers. Students at both middle schools mentioned knowing African-American males who use the computer at their job.

Subjects at the racially mixed middle school appeared to be somewhat upset with the term disidentification:

Student 1: I do (see disidentification). I see it but I could care less cause it could help me in the long run.

Interviewer: As long as you are getting good grades, it doesn’t matter.

Student 1: Yeah I try.

Interviewer: Strive to be the best. That’s good. Anyone else?

Student 2: I think grades are very important and for the people that are laughing because they think I’m a genius, I just ignore them.

Interviewer: You just ignore them. OK. Anyone else? Any comments on disidentification?
Student 3: Why should people care if somebody else is getting good grades or if somebody else is doing their hardest in school? Shouldn’t they just try to be the best that they can be?

Interviewer: Yeah, that’s what we hope but doing some of the reading that I have been doing, they say a lot of folks, if they find out someone is doing well in school, they may talk about them, make jokes about them. I guess what I’m hearing here is that it doesn’t really happen at your school. OK we have two more people.

Student 4: I would like to be smart and be in Algebra and Geometry and stuff like that.

Student 5: When you are getting good grades, people say that you are a nerd because you are doing better than they are because they are not applying their self.

Thus, students at the racially mixed school focus on their own academic accomplishment and need not take notice to disidentification that does occur in their school.

Both middle school groups agreed to playing video games, but said they finish homework first. About eighty percent of students at the PA-MS confessed to spending a lot more time on social networking websites and video games, than homework. While most students in the RM-MS spent a good amount on time on social networking websites, at first, but now say they are bored with it and only use it a minimal amount of time, primarily to quickly check their messages.

**High Schools**

When interviewing the high school students, the discussion on disidentification stood out. The two groups, PA-HS and RM-HS, were on separate sides of the issue. The students attending the PA-HS could relate to the term, disidentification, and admitted it
existed at their school. While at the RM-HS, students understood the meaning of disidentification, but viewed it as a term which in no way applied to them.

When told the definition of disidentification, a student at the PA-HS responded, “It was made here at PA-HS”:

Interviewer: “…some of the authors talk about us African American males disidentify with anything that has to do with school and doing good in school. They disidentify with majoring in a science like Biology or computers or computer science. So that is the term disidentification and they say that is a real high issue and something that needs to be addressed. What do you think about that do you think that it is something that exist here at PA-HS?”

PA-HS Student: “It was made here at PA-HS.”

Another student at the PA-HS chimed in with “I think it does exist but we can change.”

And yet another student said, “It’s stereotypical.”

At the RM-HS the overall thought was, “…it used to be not cool to be smart, but now students are trying to get their grades straight.” Students at the RM-HS school spoke about a cool image, which didn’t necessarily mean others, had to know they were excelling academically.

Student 1: “I feel like, like he said they rather not say it they are just action. People might be doing good but they keep underneath. They rather you see it then they tell you.”

Interviewer: “OK. Got you. That’s a good point. Anyone else?”

Student 2: “I think it’s an image thing.”
When asked about a long term career goal, none of the students attending the RM-HS mentioned a computing career. But when asked specifically about computer courses at college, a few agreed that they may take a course.

At the PA-HS, some students had aspirations to obtain a career in the computing disciplines. Some of those career choices included: computer animation, video game designer and computer engineer.

Few of the students at the PA-HS, who stated they were not interested in computers, listed a few things that would turn their interest in the computer field:

Student 1: Seeing the wonders of it.
Student 2: I want to get more familiar with it.
Student 3: More classes about computers.
Student 4: Meeting Bill Gates.
Student 5: If someone could show me how I could use it in my field of study.
Student 6: If someone was to tell me it was a lot of money involved.

Thus, even at the high school level, AAMs thought it important to learn more about the computers and how they are utilized in the computing disciplines. Students at the PA-HS went on to reveal that the school doesn’t have courses which allow them to explore the computer beyond email, video games and social communication networks.

On the contrary, RM-HS students expressed adequate exposure to computers. In addition to using the computer to do research and write reports, the RM-HS offered an Engineering Concepts and Website Design courses.
As with the disidentification topic, the two high schools differed with respect to the allotment of their time on video games and social communication networks, such as mySpace and Facebook. One student said Facebook was “addictive”. Most PA-HS students admitted to spending a few hours a day playing video games and on social communication networks.

Alternatively, the consensus at the RM-HS was video games and social communication networks take up valuable time. The comments below summarize their remarks:

Interviewer: You said your parents said as long as you do your work then they are not going to complain or anything. OK. Anyone else? Alright my last question is actually kind of fun. I like to hear this it’s fun for me is Facebook and Myspace. How much time do you spend on Facebook and Myspace?

Student 1: Zero

Interviewer: Zero. So you are willing to say zero? Has it always been like that or have you.

Student 2: I never had it and never wanted to have it.

Interviewer: OK

Student 3: I don’t even have it.

Interviewer: Don’t even have it. OK.

Student 4: I have a myspace and facebook but I don’t get on it like I’m not a computer freak where I stay in house and do it. I get on the computer when I come home and the only reason I get on is to check my messages then I get right off.

Interviewer: OK

Student 4: I don’t just sit on there.

Interviewer: It’s not a lot of time. Anyone else comments or answers to that one.
Student 5: Yeah I used to get on it but my brother he came out the army and said you should do something productive and not stay on myspace all day so I don’t do much of myspace.

Interviewer: Oh OK.

Student 6: So I try to find something productive on the computer to do.

Interviewer: OK got one over there?

Student 7: If I have nothing else to do I’ll go on facebook.

Interviewer: Nothing else to do you’ll just on facebook. OK. What about video games? OK go ahead.

Student 1: I really don’t have much time at home so . . .

Interviewer: You just don’t have much time at home. You involved in a lot of activities, you’d rather go out. What about video games? Same thing not too much time for video games or more time?

Student 2: As you get older it gets played out.

Interviewer: As you get older video games get played out?

Student 3: I mean when you get older video games get played out but when you get new systems. I don’t like video games like that either but when I played that new Xbox 360 make me like but the prices is crazy so I don’t . . .

Student 4: When you first get it you play it a lot more than you would play it after a month. See when you say games and computers see computers are used for more than one thing.

Interviewer: Right.

Student 5: Learn and to have fun but on a game. If all you do is play video games, you can’t learn on a video game.


Student 6: I think it’s a money issue. If I had the money to supply it, I would probably spend have my day playing and getting used to it. When I was little I used to play a lot but right now it’s too much money and its
gets boring after a while. I wouldn’t say game is just for playing because I know a lot of people who make their living off playing games. Like Madden tournaments and stuff like that. They make a lot of money just like playing video games. So I mean if you are good at it I wouldn’t say stop entirely.

Interviewer: It could turn into a career. OK.

Student 7: I think the older you get the less time you have for these video games. The more things you are involved in and people you need to talk to; you don’t really have time to sit in front of TV playing video games.

**Under-classmen University**

Most under-classmen stated they were first interested in computers while finishing middle school or starting high school. Thus, at the ages of thirteen to fifteen, most of the under-classmen said it was the involvement in computers by a relative which got them interested. One student shared that his father said he was spending so much time on the computer; he needed to find out how he could make some money on the computer.

When choosing a major in college, most of the under-classmen agreed the primary reason for pursuing this interest in computers was the financial benefits. A few students revealed that the success of Bill Gates was a motivating factor.

The consensus among the group was primary schools did not influence their interest in computers. Only a few under-classmen spoke of former primary school teachers, classes, organizations or clubs that nurtured their interest in computers. A small number of students had taken a beginning programming course in high school.

In fact, the under-classmen suggests introducing computer courses as early as middle school to help foster the interest in computers. Additionally, they advised providing primary aged students with information on computer related careers.
The under-classmen’s advice to incoming freshman majoring in the area of computing is to read a lot, stay on the computer, and focus more on computer projects and less on collegiate partying. Most of the under-classmen admitted they had to learn to put more time into their major courses than they expected when entering college.

A few under-classmen disclosed their former desire to change their major. The lack of success in the data structures and algorithms course was the primary reason. Thus, they were recently contemplating their decision. The under-classmen didn’t want to start over and subsequently waste time and money on credits already taken toward the computing major. They put more time into reading and programming and eventually passed the course.

Some of the under-classmen held positions in the field of computing. Those who held such positions agreed the majority of co-workers were Caucasian or Asian males. One student said the African-American male in the area of computers was a “rare commodity”. Another student shared a conversation he had with a friend about the subject:

Student: Yeah I agree with them. I was talking with some guy over the weekend, he was like what’s you major and I said computer science. He was like you are going to be the only chocolate chip in the whole cookie.

The under-classmen didn’t have too much feedback about the term disidentification. They seemed to stay more focus on their own self-control to accomplish what their goals. A self-confidence to achieve seemed to override any discussion of disidentification.

While Facebook (and any other social networking websites) didn’t carry a lot of interest, the majority of the under-classmen acknowledged spending a substantial amount
of time playing video games. A good number stated that they finish any school work and then partake in video games as a stress release.

**Upper-classmen University**

Most upper-classmen, just like the under-classmen, stated they were first interested in computers while finishing middle school or starting high school. One student said it wasn’t until his sophomore year that computers caught his attention enough to choose it as a major.

While the majority said it was a computer club or relative that sparked their interest in computers, one upper-classman said when the computer kept beating him at chess, he was motivated to learn how the computer works.

The upper-classmen had a variety of incentive for turning their interest into a major in computing. The better portion of upper-classmen sought the financial rewards of obtaining a computing degree. Additionally, upper-classmen discovered more job security was found in the area of computing.

One student read that studies revealed that a good number of students change their major from computing. He did not want to become a statistic. Other upper-classmen found helping others with computing and solving problems was rewarding. In general, upper-classmen felt once they became interested in computers, the more they learned, the more they were motivated to stay in the field.

As with the under-classmen, the upper-classmen mentioned a relative and the success of Bill Gates as motivations to participate in the computing discipline. One student
mentioned a professor, and another said it was a high school ROTC teacher who provided the motivation.

One student remembered a fifth grade field trip to a major corporation. The student met the Head of Engineering, who happened to be an African-American male. The executive made such a positive impression, the student set his goal to achieve the same success in the area of science, technology, engineering or mathematics.

Then there was one student who was inspired by negative impressions. This student said he had seen so many negative role models; he wanted to serve as a positive role model.

Besides Head of Engineering, the African-American male whom one student met on a field trip, there were no other African-American males mentioned by the upper-classmen. Before attending college, none of the other upper-classmen could remember an African-American male in the computing discipline who encouraged them to their discipline.

The upper-classmen agreed with the under-classmen with regards to advising former schools on preparing future computer discipline majors. Upper-classmen suggested computer programming courses in high school and computer concepts as early as the late elementary years. Additionally, upper-classmen recommended incorporating fun activities while learning computer concepts at such a young age.

A few upper-classmen had considered changing their major after enrolling in the data structures and algorithm course. For the same reason as the under-classmen, the upper-classmen did not want to waste time and money by changing their major. Again, there
was the one student who did not want to be a negative statistic. The upper-classmen agreed that any computer programming or math class was tough.

Most upper-classmen concurred with the fact that disidentification was present when they were matriculating through primary school. One student spoke about attending predominately Caucasian primary schools. Because of the disidentification factor, he was motivated to excel academically and prove that African-Americans do not dis-identify with academic success.

Now in college, the upper-classmen feel students will joke about the smarter students, but they tend to give respect to their academic success. In fact, the same students who joke, tend to be the same students who ask for help with assignments. The upper-classmen stated, regardless of race, being smart in college is cool.

The upper-classmen provided age as a factor for not participating in the social networking websites or video games. One student conceded the popularity of the social network and asked that it not “get out” that he doesn’t have a social networking webpage. A few other students, almost shamefully, admitted choosing to read a book, instead of video games or social network websites.

Student: I think I’m getting older and my interest is not going away from video games, but going in a different direction now. I hated reading books now I read books. I can’t believe it. I talk to my parents and they like reading a novel in their free time… I’m like what’s wrong with you? Now I’m reading novels so video games is a lot less important but still fun.
Lastly, the majority of the upper-classmen wanted to pursue professional athletics when they were in elementary school.
CHAPTER VI

Summary, Conclusions and Future Studies

This study was conducted to examine the relationship between African-American males and obtaining a degree in the computing discipline. Chapters four and five presented the quantitative and qualitative results, respectively. This chapter offers a summary, conclusion and future studies.

Quantitative Summary

Table 4.43, at the end of chapter IV, Quantitative Results, provides a summary for this research effort. The summary of all the results which there was a significant difference between groups can be found in table 4.43.

This section provides a narrative summation of the quantitative data. The quantitative outcomes are reviewed in three groups: 1) By Question, 2) By Total Self-Efficacy Scores and 3) By Factor Analysis.

Quantitative Summary by Question

A one way ANOVA was used to test whether there is any significant difference in the mean score of each of the thirty questions among the eight groups. A review of the eleven questions which there was significant difference among the eight groups (PAA-ES, RM-ES, PAA-MS, RM-MS, PAA-HS, RM-HS, Undergraduates and Upperclassmen) was conducted. This review results in a summary look into three areas: 1) racially mixed vs. predominately African-American, 2) subject’s school level and 3) all groups.
An assessment of the questions based on RM vs. PAA schools revealed that subjects attending the racially mixed schools were overall more confident, with regard to most of the survey questions, than students attending the predominately African-American schools.

Subjects at the racially mixed schools were surer about their ability to solve a problem involving being stuck on a computer. These same subjects answered more positively when asked about their achievements in the area of science.

Additionally, these subjects were told they are good at computers more often then subjects at the PAA schools. This last assessment supports Bandura’s verbal persuasion influence on self-efficacy.

As compared to the students at the PAA schools, subjects at the RM schools were more positive about pursuing a career in the computing discipline. They knew more African-American males working in the computer industry. Again, one of Bandura’s influences on self-efficacy, vicarious experiences, is supported.

The survey used in the study seeks to reveal subjects who possess a high level of “Computer Science” self-efficacy. It is reassuring that the subjects who are currently majoring in a computing discipline attained the highest scores on the question asking how confident the subject is in majoring in a computing discipline.

Simultaneously, it was these same subjects, college students, who were more certain that majoring in the computing discipline was hard. The qualitative results further
explained that most college subjects felt that any computer programming course was difficult. Specifically, the data structures and algorithm course caused quite a few of the subjects to consider changing their major.

It was the younger subjects, elementary school students, who knew fewer people with careers in a computing discipline. Thus, Bandura’s vicarious experiences on self-efficacy are not prevalent.

The quantitative data overwhelmingly illustrates that the youngest subjects, elementary school students, were more interested in professional athletic careers. Further investigation of the data shows that as the school level increased, there was a little less interest in pursuing a career as a professional athlete.

At the same time, it was the younger students who placed a higher emphasis on school. The elementary school students agreed most with the statement: “Adults who have good jobs were probably good students.” Subjects at the higher grade levels were less agreeable.

In summary, the college level students were more confident in majoring in a computing discipline and agreed it was a challenging endeavor. The younger students were more interested in athletic careers, had fewer role models in the computing discipline and placed more emphasis on doing well in school to obtain a good job.

*Question Summary by All Groups*

Of the eight questions in the study with a significant difference among the groups, there was one statement where all groups were in agreement: “I am good at playing video games”.

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The qualitative results verify the popularity of video games amongst all subjects. The younger students admit to spending an extreme amount of time on video games, while the older students admitted to spending slightly less time on video games.

*Quantitative Summary by Total Self-Efficacy Scores*

In reviewing the total self-efficacy scores, two results were statistically significant: 1) the mean self-efficacy scores increased as the school level increased and 2) the RM-MS scores were higher than the PAA-MS scores.

*Self-Efficacy Scores – All School Levels*

The mean self-efficacy score increased at each school level: Elementary – 158.38, Middle – 160.93, High - 164.29, and University – 169.22. In the previous section, the “review by question” explains why the students at the lower school levels scored lower.

The “review by question” details the younger student’s higher interest in athletics. Additionally, the younger the student, the less assured they are with their skills and knowledge of computers and the area of science. They are less confident about majoring in computers and have fewer role models in the area of computers. These aspects contribute to the lower self-efficacy scores for primary school levels.

*Self-Efficacy Scores – Middle Schools*

The mean self-efficacy score, 168.09, for RM-MS students was nearly 10 points higher than the mean, 158.30, for PAA-MS students. The qualitative data provides insight on this result.
The majority of the students at the PAA-MS spoke about pursuing a career in athletics, while not one student at the RM-MS had such aspirations. Students at the RM-MS are using the computer for reports, research and PowerPoint presentations, while students at the PAA-MS were using the computer for checking email, playing video games and communicating on the social networking websites. Furthermore, the RM-MS students have the opportunity to check out laptops for use in the classroom.

Students at the RM-MS spoke more positive about their computer skills and were upset with the term disidentification. The RM-MS students spoke more about excelling academically.

*Factor Analysis Summary*

Factor Analysis was done to determine: "What are the patterns of relationship among these data?" A review of the results with significant differences in the mean factor scores 1 through 10, among the groups, was conducted. This review provides a summary look into three areas: 1) racially mixed vs. predominately African-American, 2) subject’s school level and 3) all groups.

*Factor Analysis Summary by Racially Mixed vs. Predominately African-American*

The factor analysis corroborates the results provided by the analysis by question and total self-efficacy score. The factor analysis results continue to indicate that subjects at the racially mixed schools were overall more confident, with regard to most of the survey questions, than subjects attending the predominately African-American schools.

Factor analyses reveal elementary school subjects attending the racially mixed school were more confident in their computer skills, than elementary school subjects
attending the predominately AA school. At the middle school level, subjects attending
the RM-MS were more likely to pursue a career in a computing discipline than subjects at
the PAA-MS.

Subjects attending the predominately AA High School showed more assurance in
graduating from college, than the subjects attending the racially-mixed High School. It
was the subjects at the RM-HS who disagreed with the notion of African-Americans
disidentifying with hard work and being smart. The qualitative results reveal that the
some subjects, who attend the PAA-HS, took pride and ownership of disidentification.

Factor Analysis Summary by School Level

In reviewing the factor analysis results, elementary students have less self-belief
about pursuing a career in computing, than middle school subjects. The qualitative data
confirms that elementary school students are being shown the very basics of computers,
such as checking email. The college subjects strongly suggest introducing immediate
topics, such as HTML webpage development, at the elementary school level.

Subjects at the elementary schools were more confident about finishing college,
than the middle school subjects. The high school subjects were more confident about
pursuing a career in sports and entertainment, then the middle school subjects. As
expected, underclassmen currently majoring in a computing discipline were more
confident about a career in computing than high school students.

Once again the data points to the middle school level as a possible ‘clog’ in the
pipeline to produce students in the computing discipline. Previous data present the
difference in the total self-efficacy scores between subjects at the RM-MS and PAA-MS.
The factor analysis confirms that future studies need to further investigate the middle school level.

**Factor Analysis Summary by All Groups**

Subjects attending the predominately African-American schools (elementary, middle or high) were less likely to pursue a career in computing, then the subjects attending the racially mixed schools.

The qualitative data suggest Bandura’s mastery and vicarious factors of self-efficacy may be part of the reasons. Subjects attending the PAA schools were not as confident in their computer skills and they did not know a lot of people, specifically AA males, who work in the computing discipline.

The subjects attending the racially mixed schools were less likely to be aspiring entertainers or professional athletes. Most of the younger subjects, attending RM-ES and PAA-ES, had high hopes of becoming entertainers or professional athletes. A substantial amount of subjects at the predominately African-American middle and high schools continued to hold on to that goal.

**Quantitative Summary**

The quantitative data reveal a number of outcomes. One evident result was the subjects at the racially mixed schools were more confident with their computer skills, solving problems and they knew more people working in a computing discipline.

The quantitative data suggest a possible clog at the middle school level. The mean self-efficacy score for subjects at the predominately African-American middle
school was significantly lower, near ten points, than the subjects attending the racially mixed middle school.

Subjects attending predominately African-American schools had higher aspirations as entertainers or professional athletes, then pursuing a career in a computing discipline. And of all of the groups, the college level subjects agreed most with: “studying computers in college is hard.”

Lastly, the quantitative data revealed the younger students, specifically the subjects attending the predominately African-American schools, scored low in Bandura’s mastery and vicarious experience factors of self-efficacy. The younger subjects had low confidence in their computer skills and did not know many people working in the computer field.

Qualitative Summary

The major themes deduced from the qualitative data include self-efficacy elements, disidentification, social networking websites, dis-awareness, and Computer Programming and Mathematic courses.

Self-Efficacy Elements

Bandura (1997) identified four principal sources of influence on self-efficacy. They included 1) enactive mastery experiences, 2) vicarious experiences, 3) verbal persuasions and social influences, and 4) physiological and affective states.
Enactive Mastery experiences

Successful mastery experiences, the most influential of the four influences, build a strong sense of efficacy. Most subjects, elementary to upper-classmen, feel a sense of ease using the computer. A deeper investigation reveals that what students mean about using the computer is surfing the World Wide Web, writing emails and participating in a social networking websites. These are not necessarily computing discipline skills.

Vicarious experiences

Self-efficacy is also raised through vicarious experiences, such as learning from modeling and appraising capabilities in relation to the capabilities of others. The majority of subjects, from elementary to upper-classman, rarely come in contact with an African-American male working in a computing discipline.

Verbal persuasions

The third influence on self-efficacy is verbal persuasion, which is often in the form of constructive feedback, particularly during the early stages of performance. The study reveals that while some of the subjects are told they are good with computers, future studies need to be completed to determine if the subjects are good with skills deemed necessary to complete a degree in a computing discipline.

Physiological and affective states

Positive moods and physical feelings contribute to positive self-efficacy in certain situations. The study did not expose a positive nor negative mood or feeling with regard to African-American males obtaining a degree in a computing discipline. Although
subjects who attend college and work agreed working in an office with zero or very few African-American males was uncomfortable at times. Future studies should explore attributes which would contribute to a positive physiological and affective state.

Disidentification

Osborne (2001) and Majors (1992), among many others, expose that a great percentage of AA boys resist appearing to be smart, doing well in school, or furthering their learning careers (Osborne, 2001). In this study, the subjects at the predominately African-American schools are in accord and state disidentification still exists.

As if to take ownership and pride, a few students at the predominately African-American High School went so far as to say that “disidentification was born at this school”. In contrast, subjects at the racially mixed schools held that disidentification may be present, but they ignore it and advise others to do the same. Subjects in college shared the same sentiment as the subjects at the racially mixed school.

Social Networking Websites

It is clear that most subjects spend a good amount of time on the computer. They spend a lot of time on social networking websites. While the majority of subjects admit to having an account on MySpace or Facebook, subjects at the predominately African-American primary schools spend a lot more time socializing on the web.

Subjects at the racially mixed primary schools and college subjects agree to spending a great deal of time once they create an account, but after a while they spend far less time socializing on the web.
Fashola (2005) states, “African-American males must go to school, go to classes, go to the library, and go home and study.” This study suggest that we add: African-American males need to go to more academically productive websites.

Dis-awareness

“Disidentification” speaks of the resistant to being smart or excelling in school and “disinterest” refers to young girls being disinterested in computing. This study reveals a new term: “dis-awareness”.

Dis-awareness addresses two phenomenons discovered in this study. The first phenomenon is that African-American males spend an enormous amount of time on the computer, but are unaware of all the knowledge about the computing discipline on the Internet. Secondly, while there is not a large number of African-American males in the computing discipline, subjects were unaware and unexposed to the few who exist.

Subjects on the Internet are involved in social networking website, using email and playing games. They are unaware or rarely visit websites which teach computer terminology, computer basics, networking and databases and more. Subjects are not informed about websites which teach computer programming and free software such as Alice and high level computer programming compilers.

While a few subjects spoke of knowing or meeting an African-American male in the computing discipline, the overwhelming amount of subjects were unaware of African-American males who teach in the computing discipline, serve as network administrators, database developers, software engineers or directors of OIT Departments. Not one
primary school student mentioned knowing an African-American male attending college to major in a computer discipline.

Programming and Mathematics Courses

Some college subjects confessed to serious consideration to change their major. Trouble with computer programming and mathematic courses were strong contributors to this consideration. The quantitative results reveal as students get older, they feel weaker in mathematics. Subjects in this study were majors in the computing discipline, thus they persevered and most said “study groups” helped.

Literature Review and the Findings of this Study

In this section, major themes of the literature review will be revisited and evaluated within the outcomes of this study. Previous sections have already discussed the most major literature review theme, Bandura’s Self-Efficacy. Another key subject matter, disidentification, will be further examined. Additionally, other topics, which were presented in the literature review, such as: achievement gaps, mentoring, retention, AAMs in athletics will be re-examined.

Disidentification

Osborne (2001) and Majors and Billson (1992) define disidentification as the act of black boys who resist appearing to be smart, doing well in school, or assisting a teacher, etc. Carter (2003) uses a similar term, disengagement, when researching the achievement gap.
All these authors call for more research in the area of disidentification. Carter specifically calls for more targeted research on the disengagement of AAMs and its effect on education at early ages.

This study answers those calls. The data collected in the quantitative and qualitative measurements of this study addressed disidentification. The factor analysis revealed three factors involving disidentification: “Disidentification with hard work and being smart”, “Disidentification with school”, and “Disidentification with being smart and trying”. In the qualitative measurement, during interviews, subjects were told the definition of disidentification and asked to comment on disidentification.

Davis’ (2005) research reported that five-year-old AA males, in his study, were more likely to lack confidence about their abilities in school compared with AA females. In this study, it was further recognized that subjects attending the predominately AA elementary school, were less confident in their computer skills and ability to solve a problem when they get stuck.

In a somewhat differing statement, Majors and Billson (1992) state that young AA males do not begin schooling disidentified. They maintain that as AAMs get older, they form a “Cool Posse” and the members of the posse reinforce disidentification. This was very evident during the discussion of disidentification at the predominately African-American High School. The majority of the subjects spoke proudly of disidentification, took ownership of it and even stated: “Disidentification was born at this school.”

This study reaffirms that disidentification exists in the schools that participated. The college students, who participated in this study, admitted disidentification existed in their primary and secondary schools. Once in college, these students admit
disidentification exists, but most college students ignore it and try to excel. Their thoughts were more in line with the students attending the racially mixed primary and secondary schools.

*Charting the Pipeline*

Williams’ (2003) dissertation titled, “Charting the Pipeline: Identifying the Critical Elements in the Development of Successful African American Scientists, Engineers, and Mathematicians”, examine African-American graduate students. Thirty-two graduate students were interviewed, as Williams explored the factors which contributed to African-Americans successful completion of an undergraduate degree in science, engineering or mathematics.

The factors that Williams (2003) revealed centered around two of Bandura’s self-efficacy elements: mastery and vicarious experience. The graduate students spoke of involvement in science, engineering, or mathematics experiences. Additionally, each of the students shared experiences they had with teachers, associates or peers, who proved positive personal motivation to pursue a career in science, engineering, or mathematics.

Contrary to the Williams study, the majority of the subjects in this study did not experience mastery and vicarious experience. The students at the racially mixed school, specifically the middle school, talked about using the computer beyond checking email and surfing the Internet. Very few subjects spoke about writing a computer program, learning intermediate or advanced computer terms or any other skills required in a computer discipline.
The college level subjects suggest exactly what the successful students, in the Williams (2003) study, had experienced. The college students would like programming and advanced computer concepts to be introduced as early as middle school.

Whereas the subjects in the Williams (2003) study were guided by mentors, most subjects in this study did not speak of mentors. The primary and secondary school students didn’t know many people majoring or working in a computer discipline. The college students, who were currently working or had worked an internship, said there were few, if any, African-American males working in their area.

Recruiting in the Computing Discipline

The literature review made two clear points with regards to the need for more people in the computing field: 1) there is a need to recruit and 2) there is a need to retain those students who aim to achieve a career in a computing discipline.

Over the past twenty years, the literature reports the need for more students to major, employees to work, and professors to teach in the computing disciplines. The NSF held a workshop in 2005, to examine issues surrounding the development of a diverse and well-prepared science and engineering workforce for the twenty-first century.

In dealing with the need for more qualified personal in the computing discipline, the literature review provided numerous references which address “Women in Computing”. Heller and Martin’s (1994) program to attract young minority females to Computers, Engineering and Science would provide benefit to the subjects in this study.

Some of the six noteworthy problems revealed in Heller and Martin’s (1994) study were present in the current work. While Heller and Martin’s subjects didn’t have
access to science or engineering activities, the subjects in this study had access to computers, but were not utilizing the computer to obtain skills and knowledge which may lead to their achieving success in the computing disciplines.

As with the females in Heller and Martin’s (1994) study, role models and or mentors were not available for the males in this study. In reviewing the background data collected on the males who participated in this study, most of their parents completed or finished college. This differs from the Heller and Martin’s (1994) study, as most of the parents of the females in their study did not have a college education.

Heller and Martin (1994) listed forty-seven characteristics of programs to attract young minority females to science and engineering. Two of the more important characteristics were ‘role models’ and ‘use of computers to enhance skills and confidence’. The results of this study include and suggest the same two characteristics.

*Watering Our Seed Corn*

The CS Crisis of the early 1980’s brought about Denning’s (1981) term, ‘Eating Our Seed Corn’. Corporations were hiring potential CS Professors at a rate which left the CS community wondering who would teach the next generation of computer scientist.

In this current crisis, there is no shortage of CS faculty, now. The shortage, in the pipeline, exists at the student level. Thus, projecting forward, a shortage of students now could result in a shortage of CS faculty later. This research endeavor seeks to address the current CS crisis, while preventing ‘Eating Our Seed Corn – Part II’.

In an effort to increase students in the CS pipeline, the CS community needs to ‘Water Our Seed Corn’. As documented in this study, students are on the computer, thus
Retention in the Computing Discipline

One of the leading problems facing all colleges and universities across the US is retention. Regardless of academic area, retaining students is a major challenge. The literature review highlighted a few retention success stories. The majority of these success stories included mentoring, a summer workshop or an educator intervention program.

The college level subjects in this study spoke about the importance of mentors when taking a computer programming course. Some subjects admitted the desire to quit, because of the computer programming. Mentoring from fellow students and educators allowed them to avoid leaving the computing discipline. While mentoring is important at all stages of education, in this study, it was the college level students who embraced mentoring.

Very few of the subjects, at any grade level, mentioned a summer program or intervention program in the area of computers. One college student shared his experience at “Take your child to work”, where he, by chance, met an African-American male who worked in computers.

Achievement Gap

The literature review includes details of the AAMs falling behind in school. Fashola (2005) states, “The reality is that even when controlling for socioeconomic
status, African-American males still lag behind their Caucasian counterparts academically.”

In this study, the subjects provided background information such as parents’ education and occupation. Although income data was not collected, it can be said that the subjects in this study were of the same socioeconomic status.

Fashola (2005) study involved AA males and Caucasian males. This study involved AA males attending predominately AA schools and AA males attending racially mixed school. Fashola (2005) used academic performance, while this study use self-efficacy.

Taking these differences into account, this study does provide a result that somewhat relates to Fashola’s statement that AAMs lag behind academically. In this study, it was the confidence in computer skills, ability to solve a problem and skills in mathematics and science where AAMs attending the predominately AA schools scored low.

Providing a Nurturing and Supportive Atmosphere

Sholnick and Currie (1994) explains that many African-American males, in their study, feel that their teachers do not support and/or care about their academic success. The authors call for schools to become more nurturing and supportive. They feel students would be more likely to perceive schools as a source or help.

In this study, two statements in the self-efficacy assessment address the issue of nurturing and support: 1) “No one cares if I do well in school and 2) “My teacher thinks
“I am smart”. The results reveal that all the subjects in the study have a firm belief that “someone” cares if they do well in school and their teacher thinks they are smart.

During the qualitative data collection, there was no evidence of a lack of support or care for academic success. The author of this study would conclude, based on interviews and observations, that the overwhelming majority of the students in this study would agree that there is a nurturing and supportive atmosphere in their school.

**Athletics, Academics and African-American Males**

Braddock (2005) addressed the matter of African-American males in athletics. Braddock concluded that more often than not, athletics play a positive role in a student-athletes life. Braddock called for educators to capitalize on student athletic investments by creating sport-related opportunities that entail simultaneous academic investments and help students to apply the skills developed in athletic competition toward the academic arena.

Students in this study confirmed Braddock’s (2005) assertion that AAMs have a great affection for sports. The majority of the students at both elementary schools, in this study, had aspiration of becoming professional athletes. A considerable amount of students who were attending the predominately African-American middle and high schools, held on to the goal of becoming a professional athlete.

Considering Braddock’s (2005) request for the creation of sport-related academic assignments and student’s dual liking of social networking websites, a computer related assignment presents itself. A software development environment, such as Alice, which allows the user to use programming skills to create simulated representations of them
playing their favorite sport, may serve as a positive learning experience. Placing the final creation on their social networking web page is an added benefit.

**Elements of Intervention**

This study discovered new findings, such as dis-awareness. The study also reaffirms and supports some of the calls from previous literature. Longstanding issues such as mentoring, early intervention and retention were present. The following are some suggested elements of intervention, based on the results of this study.

*Introduce Computer Programming, Concepts and Information*

College students suggest introducing computer programming in middle school or at least in the first year of high school. At the elementary school level, computer concepts and information should be taught. Elementary school students are using the computer, but are not taught the basic terminology.

*Help with the “gatekeeper courses” in college*

College subjects, who admitted to wanting to change their major, spoke of the positive results after forming study groups in computer programming and mathematic courses. Other support systems need to be explored to assist students while in programming and mathematic courses and better prepare students before enrolling in such courses.
Embrace the social networking websites

African-American males, in this study, are on the computer. They are on social networking websites such as MySpace and Facebook. The term “Trojan horse” may apply here. Software that works within the confines of a social networking website, but exposes the user to skills needed for a computing discipline would be ideal.

Such software, the researcher has coined: “Trojan Horse Educational Software” (T.H.E. Software). Future work could be done in “T.H.E. Software Lab”. “T.H.E. Software for Elementary/Middle/High” could address making software fun, while teaching appropriate areas of computing by academic level.

For example, middle school students may be interested in manipulated the programming code on their personalized ‘MySpace’ webpage with pictures, animation and more. Since the study reiterates the attraction to sports that elementary school students posses, this younger age group might be attracted to programming a cartoon representation of themselves playing their favorite sport on their MySpace page.

Making a presence

African-American males need to interact with African-American males who work in a computing discipline. More employers need to take time out and mentor. More employers could institute “Bring your Child to Work Day”. As one subject pointed out, it was one visit to a corporation that motivated him to pursue a career in a computing discipline. Colleges, secondary and primary schools need to invite more AAMs to career day.
African-American males majoring in a computing discipline need to visit primary and secondary schools. One visit to speak can make a positive difference. A regularly scheduled visit to teach computer concepts and/or skills is better.

**Future Studies**

*African-American males at PWI*

African-American males at a predominately white institution were not included in this study. A similar study to address this group would enrich the data in this area of study.

*Programming with mentors*

The college students in the study spoke about the benefits of having a mentor assist them while enrolled in a computer programming course. Thus, a study to track the progress of students who are currently enrolled in a computer programming course and meets with their mentor on a scheduled basis may provide valuable feedback.

*Students who changed their major*

Students who changed their major from a computing discipline would serve as interesting subjects for a study. This study revealed a few students who thought of changing their major. The goal to collect data and examine the relationship between African-American males and majoring in a computing discipline would be greatly served with a study addressing students who changed their major from a computing area.
Private and Inner City Schools

A similar study at private and/or inner city schools could serve as a future study. Subjects in this study were attending a suburban school, thus obtaining data from subjects attending a private or inner city school would only provide a clearer understanding.

Disidentification Prevention

This study revealed that AAMs attending the racially mixed schools were more confident with the computer skills, then AAMs attending the predominately African-American school. Furthermore, AAMs at the racially mixed schools were less likely to agree with disidentification, while AAMs at the predominately African-American schools, specifically the High School, agreed it exist.

These schools are located in the same county, thus not separated far geographically. They are separated on confidence with computing skills and thoughts on disidentification. Further investigation into this separation among AAMs, located in the same county, is needed. Preventing disidentification is the goal.

Other Stakeholders

The student holds the only voice in this study. The final suggested study would elicit feedback from other stakeholders who play a role in the African-American males in Computing. Possible stakeholders include: primary school teachers and administrators, parents, college professors and administrators and employers.

A detailed program and/or study to look at teacher self-efficacy at the racially-mixed versus predominately AA schools are highly suggested. Teachers spend many
hours with students, thus a thorough (Quantitative and Qualitative) study of teachers may serve as the next step.
References


Ford, B. K. (2003). Social cognitive career theory and racial composition of the college campus: Predicting graduate school consideration for undergraduate Black males. DAI, 64(5A), 1538.


Books.


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Appendix A
Instrumentation – Self-Efficacy Questionnaire

Background Information

1. Age __________

2. How many computers do you have in your home (0, 1, 2, 3 or more)? _____

3. How many video game systems are in your house (0, 1, 2, 3 or more)? _____

4. What is your favorite subject in school? ___________

5. Check ALL the activities you are involved with:
   ____ Cub/Boy Scouts   ____ Attend Church
   ____ Play a sport     ____ Band
   ____ Chores (Clean House) ____ Visit Library Regularly

Please list any others - ________________________________

6. Mother’s Job _______________________

7. Level of Mother’s Education (please check one)
   ____ did not finish high school   ____ finished high school
   ____ some college           ____ finished college

8. Father’s Job _______________________

9. Level of Father’s Education (please check one)
   ____ did not finish high school   ____ finished high school
   ____ some college           ____ finished college

10. How often do you use the Internet? (circle one)
    A lot   sometimes   very little   never
Below you will find 30 statements concerning how you feel about going to college and learning about Computer Science. Please indicate the strength of your agreement or disagreement with the statements using the six point scale where 1 = strong disagreement and 6 = strong agreement with a particular statement. Please circle the number that most closely represents how much you agree or disagree with the statement – there are no correct answers!

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>1 2 3 4 5 6 7</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I find working with Computers very easy.</td>
<td>Strongly disagree</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>2. Computers frighten me</td>
<td>Strongly disagree</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>3. I seem to have difficulties most of the times I use the computer.</td>
<td>Strongly disagree</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>4. If I get stuck on the computer, I can get it working again</td>
<td>Strongly disagree</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>5. I learn lots of new things on the computer</td>
<td>Strongly disagree</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>6. I am very good with computers</td>
<td>Strongly disagree</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>7. I work hard in school</td>
<td>Strongly disagree</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>8. I can get the best grades if I try.</td>
<td>Strongly disagree</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>9. Most of my classmates like math because it is easy</td>
<td>Strongly disagree</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>10. I am a good math student</td>
<td>Strongly disagree</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>11. I am a good science student</td>
<td>Strongly disagree</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>12. I will graduate from High School</td>
<td>Strongly disagree</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>13. I will graduate from college</td>
<td>Strongly disagree</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>Statement</td>
<td>Strongly disagree</td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>-------------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>14. I will study Computer Science in College</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>15. I can get a job working with computers</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>16. Studying computers in college is hard</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>17. I can become a rapper or a Singer</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>18. I can become a Pro Football, Basketball, Baseball or other sports player</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>19. Adults who have good jobs probably were good students when they were kids</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>20. I am one of the best students in class</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>21. No one cares if I do well in school</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>22. My teacher thinks I am smart</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>23. It is important to go to College</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>24. I know a lot of people who work with computers</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>25. I know a lot of black men who work with computers</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>26. I will keep trying until I get it right</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>27. I will quit school as soon as I can</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>28. Being smart is cool</td>
<td>1 2 3 4 5 6 7</td>
<td>Strongly agree</td>
<td></td>
</tr>
</tbody>
</table>
29. I am good at video games  Strongly disagree  1 2 3 4 5 6 7  Strongly agree
30. I use the Internet  Strongly disagree  1 2 3 4 5 6 7  Strongly agree
Qualitative Questions – Discussion Groups

College Students

1. What are your earliest memories of having an interest in computer science?
2. Why did you continue (major) in computer science?
3. Did people in your life influence your participation in computer science?
4. Did schools influence your interest in computer science (teachers, classes, stay-in-school job, organizations, clubs, etc…)?
5. Prior to college, did you have an African-American Male serve as a role model in Computer Science?
6. What would you tell K-12 students about computer science?
7. What would you advise your former schools (K-12) to do, in order to get their students ready for majoring in Computer Science?
8. What, if anything, does it mean to be an African-American Male in Computer Science?
9. Any questions for me?

High/Middle/Elementary Students

1. What do you think about college?
2. What do you think about majoring in Computer Science?
3. Do you feel you are prepared to major in Computer Science?
4. Does your school influence an interest in Computer Science (teachers, classes, Internet access, Computer organization or clubs, etc…)?
5. Do you know any African-American Males in Computer Science?
6. Any questions for me?
Appendix B

Protocol Summary

African-American Males in Computer Science – Examining the Pipeline for Clogs

Purpose of the study
The purpose of this study is to ascertain the self-efficacy of African-American Males in regards to the area of Computers, obtaining a Computer related college degree and working in the area of Computers.

Methodology
The researcher will distribute a survey to ascertain “computer science” self-efficacy. Participants will also participate in a discussion on computers, obtaining a computer science degree and working in the computer area. The discussions will be video taped.

Study Population
The researcher will collect surveys from a sample population of African-American Males in the fourth, eighth and eleventh grades in Prince Georges County Maryland. In addition, African-American males majoring in Computer Science at Bowie State University will participate in this study.

Risks That May Be Involved
Risks associated with this study are no greater than what the subjects would experience in every day life.

Uses of data
The data will be used in completing a dissertation in the department of Computer Science.

Subject Recruitment
The researcher will seek permission from the school Principals of the 6 Prince Georges County schools, in order to obtain subjects for the study. Once permission is obtained, the researcher will meet with each of the class teachers. The researcher will explain the study and ask each teacher to assist with recruitment, collection of parental consent forms and set up a time to conduct the study.

Justification of Sample Size
This is by no means a longitudinal study, but it is the researchers attempt to (as the dissertation title states) “examine the pipeline”. Thus a sample from each “level of the pipeline” will be studied. I am recruiting 20 subjects at each elementary, middle and high school. At Bowie State University, I am recruiting 20 Freshman/Sophomore level and 20 Junior/Senior level students who are majoring in Computer Science.

Confidentiality and privacy for the subjects
No names will be taken at the time of the interviews. All records will be stored in a password protected Microsoft Excel file, only accessible to the researcher. Aggregate data will be reported. Any specific data will be attributed to “Subject #” and NOT the subject name. Subject # may be used when relating a “story” or “experience” that a subject may share during the discussion.
Appendix C

Parent Informed Consent Form
African-American Males in Computer Science
IRB # 070550

Daryl Stone
301-860-3973
Dr. Rachelle Heller, Dissertation Advisor
202-994-5906

I. INTRODUCTION
Your child is invited to take part in a research study. Before you decide to allow your child to be a part of this study, you need to understand the risks and benefits. This consent form provides information about the research study. If you agree to allow your child to take part in the research study, you will be asked to sign this consent form. This process is known as informed consent.

Your decision to allow your child to take part in the study is voluntary. You are free to choose whether or not you will allow your child to take part in the study.

II. PURPOSE
The Department of Computer Science of The George Washington University is carrying out a research study to find out African American Males interest in Computer Science. The investigator (person in charge of this research study) is Daryl Stone. This study serves as my dissertation research towards completing a Ph.D. in Computer Science.

III. PROCEDURES
The research will be conducted at your child’s school. Your child will be asked to spend about 10-15 minutes answering a questionnaire about computers. After which, your child will be asked to participate in an open group discussion about computers, obtaining a computer science degree and working in the area of computers.

IV. POSSIBLE RISKS
To the best of our knowledge, the things you will be doing have no more risk of harm than you would experience in everyday life. Although we have made every effort to minimize this, you may find some questions we ask you (or some procedures we ask you to do) to be upsetting or stressful. If so, we can tell you about some people who may be able to help you with these feelings.
VI. POSSIBLE BENEFITS
Your child will not get any personal benefit from taking part in this study.

VII. COSTS
There are no costs associated with taking part in this study.

VIII. COMPENSATION
You will not receive compensation for participating in this study.

IX. RIGHT TO WITHDRAW FROM THE STUDY
Your child’s participation in this research study is voluntary. Your child may decide not to begin or to stop this study at any time. Your child’s participation or non-participation will not affect your child’s grades.

X. CONFIDENTIALITY OF RESEARCH RECORDS
Your child’s records will be confidential. Your child will not be identified (e.g., name, social security number) in any reports or publications of this study. It is possible that representatives of regulatory agencies and from the study’s sponsor may come to GWU to review your information. In that situation, copies of the relevant parts of your child’s records will be released with all identifying information removed. Except for these entities, research study records will be kept confidential unless you authorize their release or if the records are required by law (i.e. court subpoena).

XI. QUESTIONS
If you have questions about the procedures of this research study, please contact Daryl Stone by telephoning (301) 860-3973 during the workday. If you have questions about the informed consent process or any other rights as a research subject, please contact Kim Filbert, Director, in The George Washington University Office of Human Research at (202) 994-2715. Ms. Filbert is your representative.

XII. SIGNATURES
By signing this consent form, you affirm that you have read this informed consent form; the study has been explained to you, your questions have been answered, and you agree to allow your child to take part in this study. You do not give up any of your child’s legal rights by signing this informed consent form. You will receive a copy of this consent form.

Participant / Child’s Name (Print Name)

__________________________
Parent Name (Print Name)
XIII. INVESTIGATOR STATEMENT
I certify that the research study has been explained to the above individual by me or my research staff including the purpose, the procedures, the possible risks and the potential benefits associated with participation in this research study. Any questions raised have been answered to the individual's satisfaction.

_Daryl Stone___________
Investigator (Print or type name)

____________________________
Signature

____________
Date
Appendix D

Fourth, Eighth and Twelfth Grade
Assent to Participate in a Research Study

Thank you for agreeing to allow your child to participate in this study about African-American Males in Computers.

After answering the questionnaire, you will be asked to participate in an open group discussion about computers, obtaining a computer science degree and working in the area of computers. The discussion will be video taped.

The risks to the participants in this project are no greater than daily life.

Please understand that:

- Your participation is voluntary
- All information is confidential (your information will only be used by the researcher, for this project)
- Your identity will not be revealed.
- You are under no obligation to go through with the experiment.
- You can leave the experiment at any time.

George Washington University and the researchers named below have responsibility for making sure that participants in research projects conducted under the University support are safeguarded from injury or harm resulting from such participation.

On the basis of the above statement, I agree to participate in this project.

_________________________________________  _____________________
Subject’s Signature      Date

_________________________________________
Child’s Name (please print)
Daryl Stone, Ph.D. Candidate (profstone@hotmail.com)
Dr. Rachelle Heller, Dean, Faculty Member and Ph.D. Advisor (sheller@gwu.edu)
Appendix E

University Student Informed Consent Form
African-American Males in Computer Science
IRB # 070550

Daryl Stone
301-860-3973
Dr. Rachelle Heller, Dissertation Advisor
202-994-5906

I. INTRODUCTION
You are invited to take part in a research study. Before you decide to be a part of this study, you need to understand the risks and benefits. This consent form provides information about the research study. A staff member of the research study will be available to answer your questions and provide further explanations. If you agree to take part in the research study, you will be asked to sign this consent form. This process is known as informed consent.

Your decision to take part in the study is voluntary. You are free to choose whether or not you will take part in the study.

II. PURPOSE
The Department of Computer Science of The George Washington University is carrying out a research study to find out African American Males interest in Computer Science. The investigator (person in charge of this research study) is Daryl Stone. This study serves as my dissertation research towards completing a Ph.D. in Computer Science.

III. PROCEDURES
The research will be conducted at Bowie State University. You will be asked to spend about 10-15 minutes answering a questionnaire about computers. After which, you will be asked to participate in an open group discussion about computers, obtaining a computer science degree and working in the area of computers.

IV. POSSIBLE RISKS
To the best of our knowledge, the things you will be doing have no more risk of harm than you would experience in everyday life. Although we have made every effort to minimize this, you may find some questions we ask you (or some procedures we ask you to do) to be upsetting or stressful. If so, we can tell you about some people who may be able to help you with these feelings.
VI. POSSIBLE BENEFITS
You will not get any personal benefit from taking part in this study.

VII. COSTS
There are no costs associated with taking part in this study.

VIII. COMPENSATION
You will not receive compensation for participating in this study.

IX. RIGHT TO WITHDRAW FROM THE STUDY
Your participation in this research study is voluntary. You may decide not to begin or to stop this study at any time. Your participation or non-participation will not affect your grades.

X. CONFIDENTIALITY OF RESEARCH RECORDS
Your records will be confidential. You will not be identified (e.g., name, social security number) in any reports or publications of this study. It is possible that representatives of regulatory agencies and from the study’s sponsor may come to GWU to review your information. In that situation, copies of the relevant parts of your records will be released with all identifying information removed. Except for these entities, research study records will be kept confidential unless you authorize their release or if the records are required by law (i.e. court subpoena).

XI. QUESTIONS
If you have questions about the procedures of this research study, please contact Daryl Stone by telephoning (301) 860-3973 during the workday. If you have questions about the informed consent process or any other rights as a research subject, please contact Kim Filbert, Director, in The George Washington University Office of Human Research at (202) 994-2715. Ms. Filbert is your representative.

XII. SIGNATURES
By signing this consent form, you affirm that you have read this informed consent form, the study has been explained to you, your questions have been answered, and you agree to take part in this study. You do not give up any of your legal rights by signing this informed consent form. You will receive a copy of this consent form.

__________________________
Participant (Print Name)

__________________________
Signature
XIII. INVESTIGATOR STATEMENT
I certify that the research study has been explained to the above individual by me or my research staff including the purpose, the procedures, the possible risks and the potential benefits associated with participation in this research study. Any questions raised have been answered to the individual's satisfaction.

Daryl Stone
Investigator (Print or type name)

____________________________
Signature

________
Date
Appendix F

Audio/Video Release Form
(Non-University Subjects)

I hereby authorize __Daryl Stone, Ph.D. Candidate____ to use my (child's) video recording in his video for the project entitled, *African-American Males in Computer Science*.

The video will NOT be shown in any presentation. The video will allow the researcher to review and capture any information he may have missed while conducting the discussion.

I understand that by signing this form, I am releasing all recordings to him for this expressed purpose. I will not receive any compensation for this now or at any time in the future.

_________________________________________  _____________________
Parent’s Signature      Date

_________________________________________
Child’s Name (please print)

Investigator’s initials _____________
 Appendix G

Audio/Video Release Form
(University Student Subjects)

I hereby authorize __Daryl Stone, Ph.D. Candidate___ to use my video recording in his video for the project entitled, *African-American Males in Computer Science*.

The video will NOT be shown in any presentation. The video will allow the researcher to review and capture any information he may have missed while conducting the discussion.

I understand that by signing this form, I am releasing all recordings to him for this expressed purpose. I will not receive any compensation for this now or at any time in the future. I further certify that I am over the age of 18 years.

Name (Print): ________________________________

Signature: ____________________________________________________________________

Date: _______________________________________________________________________

Investigator’s initials ____________
Appendix H

Transcripts from Interviews

Predominately African-American Elementary School (PA-ES)

Interviewer: My first question is a question you probably get all the time and that is what do you want to be when you grow up? I’ll start over here and just go around.

Students: A business worker, a professional piano player, a car salesman, an astronaut, a lawyer, a football player, a football player, a professional basketball player, a professional basketball player.

Interviewer: Alright we have a whole team here.

Students: A boxer.

Interviewer: Alright, what do you think about college? What comes to mind when you think about college?

Student: Kind of great.

Interviewer: OK. Kind of great.

Student: It’s important to go to college if you want to find a job.

Interviewer: It’s important to go.

Student: Will it be hard?

Interviewer: Will it be hard?

Student: It will be hard. Some subjects.

Interviewer: It will be hard in some subjects. OK.

Student: I might get good.

Interviewer: Might get good . . . . What do you mean, good what?

Student: I might get better.

Interviewer: Oh you might better yourself.
Student: Will I get a degree?
Interviewer: OK. Will you get a degree?

Student: You learn more stuff in college
Interviewer: Learn more stuff in college

Student: It’s hard.
Interviewer: It’s hard.

Student: You can get a master’s in a major
Interviewer: You can get a master’s in a major

Student: It’s hard in some subjects.
Interviewer: It’s going to be hard in some subjects.

Interviewer: OK. What do you think about the possibility of majoring in computers or studying computers when you go to college?

Student: Kind of difficult
Interviewer: It’s going to be difficult

Student: Kind of fun to work with.
Interviewer: It would be fun to work with

Student: It might be easy.
Interviewer: It might be easy.

Student: Understanding the computer.
Interviewer: OK. Understanding the computer.

Student: It’s going to be hard.
Interviewer: OK. It’s going to be hard.

Student: It’s going to be hard but at the same time fun.
Interviewer: It’s going to be hard but at the same time fun. OK.

Student: They can be difficult but at the same time fun.

Interviewer: Difficult but fun.

Student: Easy

Interviewer: Easy, It’s going to be easy.

Student: It’s easy.

Interviewer: Easy

Student: Easy to do.

Interviewer: Easy to do.

Student: It might be.

Interviewer: It might be easy to do.

Interviewer: What would get you interested in computers? What things would get you interested in computers?

Student: Games

Interviewer: Games

Student: How to work the computer.

Interviewer: How do you work the computer?

Student: Electrics.

Interviewer: Electrics.

Student: How to do different things on the internet.

Interviewer: OK. How to do different things on the internet?

Student: Electronics

Interviewer: Electronics

Student: Different subjects.
Interviewer: Different subjects on the computer

Student: Learning stuff that’s on the computer and remembering your password

Interviewer: OK

Student: Subjects that you learn

Interviewer: Subjects that you need to learn

Student: My space

Interviewer: My space. OK.

Student: My space.

Interviewer: My space.

Student: Hotmail

Interviewer: Hotmail. Email.

Student: Bibo

Interviewer: Bibo. OK, that’s like myspace right?

Interviewer: What do you if anything it could be no, what do you do in school with computers? What type of things do you do?

Student: History

Interviewer: History projects

Student: Type up projects

Interviewer: Type up projects

Student: Read

Interviewer: Read on the computer

Student: Projects

Interviewer: Projects

Student: Learn different ancient things
Interviewer: Ancient things

Student: Projects

Interviewer: Projects. Typing up projects
Student: Typing up poems

Interviewer: Poems, yeah.

Student: Challenge 24

Interviewer: Challenge 24? What’s Challenge 24?
Student: Multiplication and division

Interviewer: OK. Mathematics, you can practice math on the computer.

Student: Do you homework on the computer.

Interviewer: You do homework on the computer?
Student: Math

Interviewer: OK. Math

Interviewer: Is there a computer club here?

Students: No

Interviewer: No computer club.

Student: We have computers in our room.

Interviewer: But there are computers in the room? Now how does that work does everybody use the computer?

Students: No

Student: If you have research to do

Interviewer: O.k.

Interviewer: So if you have to do some work you have to ask the teacher, can I use the computer.

Student: Yes
Interviewer: So there is no computer time?

Student: No

Interviewer: OK

Interviewer: Let’s say a person goes to college and they learn computers and they go out and get a job. What would you say that they do; Computer Technologist, Computer Scientist. What do you say they do at work, like right now today what do you think they are doing?

Student: The network

Interviewer: Network

Student: Maybe an accountant

Interviewer: OK

Student: Maybe that person is looking to see how they can make a new car.

Interviewer: OK, how to make a new car.

Student: Working for the bank

Interviewer: OK they could be working for the bank

Student: Watching kids

Interviewer: OK watching kids

Student: Network

Student: A cashier

Interviewer: A cashier

Student: Maybe fixing computers

Interviewer: Fixing computers

Student: Being a bookworm

Interviewer: Being a bookworm
Student: A computer scientist
Interviewer: A computer scientist. What would they do? What do you think they would be doing?

Student: Reading, history

Interviewer: Reading, history OK.

Student: Mechanics

Interviewer: Mechanics, ok looking up mechanics information, OK. Do you feel you are being prepared to major in computers like to go to college and major in computers?

Student: No.

Student: I think so.

Interviewer: You think so.

Student: They could get me interested

Interviewer: They could get you interested.

Student: Yes

Interviewer: Yes

Student: Maybe

Interviewer: Maybe. OK

Student: Yes

Interviewer: Yes

Student: Might

Interviewer: Might they might.

Student: Yes

Student: Might

Interviewer: OK who said no a little earlier?
Student: Me
Interviewer: Changed your mind?

Student: Maybe

Interviewer: Changed to maybe, ok that is fine.

Student: Maybe

Interviewer: You said maybe. OK. Alright. Does your school have . . . well I asked you about computer organizations or classes. You got computers. You have fundraisers to get computers?

Students: Yes

Students: Step team

Interviewer: Step team, what’s a step team?

Students: *Demonstrating stepping*

Interviewer: Oh. Do you know besides me because I already told you I do computers but, do you know any African American males in computers? Any uncles, your father, cousins, maybe an older brother, anyone besides me, a black male, a guy an African American male that works in computers? What do they do?

Student: My uncle.

Interviewer: Your uncle? Do you know what he does on the computer? You just know he works on computers?

Student: Taxes

Interviewer: He does taxes.

Student: My dad

Interviewer: Your dad. What does he do on the computer?

Student: He works for this law firm.

Interviewer: OK.

Student: My uncle
Interviewer: OK
Student: My mom

Interviewer: Your mom
Student: She’s a legal secretary.

Interviewer: OK
Student: I know a man that works on a computer.

Interviewer: He does eBay stuff on the computer.
Student: My uncle works on computers fixing them.

Interviewer: OK fixing the computers.
Student: I know somebody that makes like myspace and stuff like that.

Interviewer: OK
Student: They put Verizon on the computer.

Interviewer: They put Verizon on the computer. You know someone who does that?
Student: Yes

Interviewer: Let me ask you question, it has something to do with the term “disidentification”. Through some of the studies that I have been reading, it discusses whether it’s cool to be smart. I’m not in the fourth anymore as you can see. How is it nowadays? If somebody is real, real, real smart do they get talked about? Are they not considered to be cool? How does that work nowadays in fourth grade at this school?

Student: Kind of

Interviewer: Kind of what if you are smart . . .
Student: If you are smart, they may make jokes.

Interviewer: OK. People make jokes about the ones who are smart?
Students: Yes
Interviewer: OK

Student: One of my buddies is smart.

Interviewer: One of your buddies is smart?

Student: Two of them.

Interviewer: Two of them. OK at least two of them. OK. Did you want to answer that also?

Student: Sometimes people make fun of people that are smart.

Student: Sometimes they make fun of like last names and middle names.

Interviewer: Sometimes you make fun of the names.

Student: Sometimes if someone is smart, we may make fun.

Interviewer: Sometimes you make fun of someone smart or they make fun of you because you are smart.

Student: All the time

Interviewer: All the time? So all the time people make fun of you because you are smart? Or you make fun of them?

Student: I make fun of them.

Interviewer: Oh

Student: Some people

Interviewer: Some people, some people. Sometimes. So that does go on? OK. Someone mentioned . . . we are getting close to the end now. Just a few more questions. Someone mentioned earlier about myspace. That is actually one of my questions. I wanted to know, how much time do you spend on myspace and if you don’t have a myspace you can say that also. I’ll start over here this time.

Student: I got bibo.

Interviewer: You got bibo.

Student: About 2 hours.
Interviewer: About 2 hours a day. OK

Student: I’ll stay on for about 3 minutes

Interviewer: 3 minutes. Real quick.

Student: Forever

Interviewer: Forever. Always on there.

Student: 5 hours

Interviewer: 5 hours a day

Student: 3 hours

Interviewer: 3 hours

Student: 4 hours

Interviewer: 4 hours

Student: About 2 hours

Interviewer: About 2 hours

Student: About 5 minutes

Interviewer: About 5 minutes. Ok at this table

Students: I don’t have one

Interviewer: You don’t have one? OK nobody at this table has one. Alright so some folks spend a lot of time. Some of you spend a lot of time on it. OK what about video games?

Students: Ohhhhhhh

Interviewer: Everybody got one of those. A lot of time?

Student: 21 hours

Interviewer: 21 hours a day

Student: 6 hours
Interviewer: 6 hours a day
Student: 9 hours
Interviewer: 9 hours
Student: 7 hours
Interviewer: 7 hours a day
Student: Like 4 hours
Interviewer: 4 hours
Student: 6 hours
Interviewer: 6 hours
Student: 10 hours
Interviewer: About 10 hours
Student: All day until I got to leave
Interviewer: All day until you have to get off
Student: 3 hours
Interviewer: 3 hours
Student: 24/7
Interviewer: 24/7
Student: 4 hours
Interviewer: OK
Student: 12 hours
Interviewer: 12 hours. This is the group who didn’t have myspace but the video games they do. What type of video games?
Student: Play station 3
Interviewer: Like which one, adventure games, sports
Student: Basketball
Interviewer: Basketball
Student: Football
Student: Sports
Student: Wrestling
Interviewer: Mostly sports
Student: Fight night round 3
Interviewer: Fight night round 3
Student: Hockey
Interviewer: Hockey, so mainly sports
Student: NHL 08
Interviewer: NHL 08, OK. What about how much time do you spend on homework?
Student: Oh just about one minute.
Interviewer: One minute
Student: Like 5 hours
Interviewer: 5 hours
Student: 30 seconds
Interviewer: 30 seconds
Student: 20 seconds
Interviewer: 20 seconds
Student: 1 hour and a half
Interviewer: Hour and a half
Student: About an hour and 30 minutes
Interviewer: And hour and 30 minutes

Student: Two hours

Interviewer: Two hours. Great!

Student: 2 minutes

Interviewer: 2 minutes

Student: 3 minutes

Interviewer: 3 minutes

Student: 2 hours

Interviewer: 2 hours. OK. So out of the three homework, video, myspace or bibo which one do you spend the most time on?

Students: Speaking all at once

Interviewer: Video games, video games, video games, do you do your homework first and then video games?

Students: Speaking all at once, some no’s and some yes’s

Interviewer: Most of you

Student: I do it.

Interviewer: OK get your homework out the way.

Student: Stay on myspace the most

Interviewer: You say stay on myspace the most. OK those are all of the questions that I have at this point are there any questions that you have for me that have to do with computers? Anything?

Student: You graduated from Apple Grove in 1998?

Interviewer: ‘82 a long time ago.

Student: When you studying computer science what did you do?
Interviewer: When I studied . . . ok listen we are almost done. The question is when I studied computer science what did I do? Primarily what is called computer programming meaning write a program to solve some type of problem? It could be ‘what is the sum of two numbers.’ I type in two numbers, like type in your first number and then type in the second number and then my program that wrote would give you the answer. Those are small programs that we start out with and then we get tougher and tougher programs that take it little longer to do but they solve bigger problems. Like when someone goes to the ATM and push in $20 and the $20 comes out, that is a computer program that is doing that. It has to subtract money out your account that is a computer program. So a lot of what we do is computer programming and a lot of reading. Actually when I did my study for this like what I’m doing here at your school, I also did it at Bowie State University. That is where I teach and when I did it there the students there said . . . I had a question for them. I said, “When I go back to the elementary schools what should I tell them to do to get ready for college and they said read, read, read.” See a lot of them came to college and didn’t like to do a lot of reading and they found out they have to do a lot of reading. So how many of you like to read.

Students: Speaking all at once, sometimes, not a lot

Interviewer: Sometimes, little bit ok. Did you have a question?

Student: What type of technology do you deal with?

Interviewer: What type of technology do I deal with? At Bowie State one of the classes I teach had to do with programming and I told you about that. And I also have internet programming class where we actually learn how to, I teach them make web pages. It’s somewhat similar to myspace but they are able to do things like interact with database. Being to have data that sits in a computer and we present the data. Someone mentioned eBay earlier, eBay has a large database. All those things that you see on sale sit in a database. So that when you type I want to look for play station 3 and see how much it cost. It goes back and searches that database and it pulls up all the play station 3 that are on sale in eBay.

Student: What was your last school?

Interviewer: My last school . . . I am at George Washington University right now. That is what I’m doing this study for. When I finish this I will be Dr. Stone.

Student: The last school takes a lot of time to finish?

Interviewer: Yeah I had to take classes and then after you take the classes you have to do what is called a dissertation and that is when you go out and do a study
like I’m doing here and you put that in writing like a book. It’s pretty much a book.

Student: What do you do on computers?

Interviewer: What do I do on computers? I keep my students grades on computer. I do a lot of test programs that I have to give out to my students and before I can give it out I write the program and make sure it works. I create web pages. That’s one of the things I’ve done. I actually worked a job for about two years where we created web pages.

Student: You said eBay can tell you how much the cost do they tell you where they are?

Interviewer: Yes that is part of the database. It has what start it is located in. It may say this person is selling a play station 3 and they live in New York. Someone else may be selling one and they live in California. So what that means is you may have to pay less for shipping to get it to your house if they are closer to you. If they live far away it’s going to cost you more money to have the mailman bring it to you.

Student: Have you ever put anything on eBay?

Interviewer: Have I ever put anything on eBay. I’ve bought some things off eBay but I haven’t put anything to sell on eBay.

Student: Did you choose to go to George Washington?

Interviewer: Did I choose to go . . . yes my teacher at Bowling Green . . . OK let’s go back. I went to Apple Grove. I left there I went to Isaac Gourdine and I went to Friendly High School. I went to Bowie State where I now work and I got my Bachelor’s degree that’s BS. Then when I left there I went to Ohio to a school called Bowling Green State University and I left there and went to George Washington. I’m working on my Ph.D. That’s a lot of schools right. My professor at Bowling Green pointed me in the direction and help me get into George Washington University.

Student: Do you know this lady named Monica?

Interviewer: Monica, where at Bowie State? What is her last name?

Student: Mack

Interviewer: Mack sounds familiar. Does she work there?

Student: She used to go there.
Interviewer: No name sounds familiar. I know a Lisa Mack but that was from a long time ago.

Student: When you are out and you decide you are not coming to work, do you have a replacement?


Student: Like in football they have a substitute, so are you liked the most experienced person to do the job.

Interviewer: Well I have been working there about 10 years.

Student: So are you the most experience person?

Interviewer: Oh no there have been other people from the department that have been there longer. They were there and they taught me.

Student: Do you like school?

Interviewer: Do I like school? Oh yeah, I love school.

Student: When you say Dr. Stone are you going to be a doctor?

Interviewer: Not a medical doctor. A medical doctor works at the hospital. Then you have other doctors that have their PhD’s that they have chosen something other then the area of medicine and then they went on to the highest that they can go and learned that topic. So he should be a specialist in that area.

Student: So after you get your Bachelor’s and . . .

Interviewer: Master’s

Student: Master’s and then your PhD is there anything after that?

Interviewer: You can go to what is called a post doctorate and get another Ph.D.

Student: A higher degree

Interviewer: No it’s just getting another one.

Student: What have you mastered so far?
Interviewer: What have I mastered? My area is software engineering and multimedia and educational software. Those are the areas that I am strong in. In computers there are so many different areas, networks and graphics and all that good stuff. It’s hard to master any one thing. You just take as many classes and learn as much as much as you can on that area.

Student: Are you a like a professor.

Interviewer: Yes at school my student call me, Professor Stone.

Student: Oh your last name is Stone?

Interviewer: Stone, yes. Any other questions? Ok.
Racially Mixed Elementary School (RM-ES)

Interviewer: My first is I just want to get an idea of what everyone wants to be when they grow up? What do you want to be when you grow up? What are you thinking about?

Student: A sport player

Interviewer: A sport player

Student: A football player

Interviewer: A football player

Student: A general in the army

Interviewer: A general in the army. OK.

Student: A soccer player

Student: Tennis player

Student: A football player

Student: Police

Interviewer: OK

Student: Police

Student: Football player

Interviewer: Football player

Student: Football player

Student: Football player

Student: A mechanic

Student: A policeman

Interviewer: A policeman. Everyone over here already answered?

Student: I didn’t. Football
Interviewer: Football OK. Alright now my second question is, I want to know what do you think about going to college?

Student: I think that it is going to be good for me so I can get education and work somewhere that I get a lot of money.

Interviewer: OK. Very good.

Student: I think that going to college will help me learn more.

Interviewer: OK

Student: I think that going to college will help me get a major in science because science is my favorite subject.

Interviewer: OK. Does anybody else have any comments?

Student: I want to go to college cause it will push me to my limit and I will get good jobs that I like and get a lot of money.

Interviewer: OK

Student: I think going to college will be a good challenge for me.

Interviewer: Good challenge. OK

Student: I think that it will help me be a success so I can go ahead and play football and get my degree.

Interviewer: OK Very good.

Student: I think that it would be good cause I can get the education.

Interviewer: Good education. Very good. Anyone at this table?

Student: I’m going to go to college to have fun.

Interviewer: Go to college and have fun. Alright.

Student: Get a good education.

Interviewer: College helps you get a good education. My next question is how many of you are interested in computers? Computer science or computers?

Student: I think they are going to be fun because you can discover new stuff on the web.
Interviewer: OK on the web
Student: I think it will be fun because you get to play games and make them.
Interviewer: OK play games and make games
Student: You can look up stuff that you don’t know about.
Interviewer: On the internet.
Student: Yes
Interviewer: OK
Student: I think I’m really interested in computers because it welcomed me to a lot of games that I didn’t know like solitaire and spider solitaire.
Interviewer: OK
Student: I think the computer interesting because you actually find job applications on it.
Interviewer: OK. Very good. How about this table? Anything about computers? Interested in computers what do you like or dislike about computers?
Student: The things that I like about computers is you can locate a lot of games on them.
Interviewer: OK
Student: I like online games and what I dislike is pop-ups.
Interviewer: Pop-ups OK. What do you think a computer scientist or a computer technologist, what do you think they do at work?
Student: They go on the internet to discover historical stuff.
Interviewer: OK
Student: Make things for the computer.
Interviewer: They make things for the computer.
Student: They find out new things on the computer that some people don’t know about.

Interviewer: OK. What do you think the computer technologist does at work?

Student: I think the computer technologist should help you a lot and finding things over the internet.

Interviewer: Alright

Student: Get into new websites.

Interviewer: OK

Student: I think they try to help fix more computers every time.

Interviewer: Fix computers. OK Anybody over here. Any idea what a computer scientist or computer technologist does at work.

Student: They work on the computers.

Interviewer: Work on the computer.

Student: Program computers

Student: They work on the computer to find and make technology better.

Interviewer: Make technology better.
Interviewer: Does your school do anything as far as computers? What do you do with computers in the school?

Student: We work on projects.

Interviewer: You were going to say the same thing?

Student: We go to sites that can help us in subjects like math. It’s a website called, “First in Math” that help you learn more about math.

Interviewer: OK.

Student: We learn how to learn about the computer and do many things that we can do with it.

Interviewer: OK. Anything else? Anything else that you do with computers in school?

Student: We get First in Math.

Interviewer: You get what?

Student: First in Math and we do our literacy circles. We type them on the computer.

Interviewer: OK

Student: Sometimes we go on websites to help us with our social studies homework sometimes.

Interviewer: OK

Student: And math

Interviewer: And math. One more question do you know any African American males that are in computers? Any uncles, friends. Who do you know and what do they do?

Student: My uncle he works in, like if there is a virus on your computer, he helps fix it.

Interviewer: OK

Student: My grandfather is a computer specialist. He like fixed computers if there are like really broken.
Interviewer: He fixed computers. OK.

Student: My mom works in Georgetown and she helps works on a computer.

Interviewer: OK and what about any males, any guys, men that . . . OK. Alright so your mom does.

Student: My dad friend, if you’re pop-up keeps staying up there for a long time he can help get it off.

Interviewer: Alright before we stop were there any questions for me about computers?

Student: Have you worked on computers?

Interviewer: The question is do I work on computers? Yes I actually teach computers at Bowie State University not far down the street. OK any other questions?

Student: Who inspired you to do computers?

Interviewer: Who inspired me to do computers? My college professor. When I went to school for business in accounting and I took one computer class and my computer professor said that I was doing so great that I had to change my major and major in computer science. That’s who inspired me.

Student: Do you get us some basketball game tickets?

Interviewer: Some basketball game tickets to game at Bowie State?

Student: No

Interviewer: Where at GW?

Student: Yeah

Interviewer: I’ll see if I can work on that. I can’t make a promise though. Any other computer questions?

Student: When you were little did you like computers?

Interviewer: When I was little I liked playing video games but I really didn’t know everything else that the computer did. All I knew was playing video games with computers, when I was your age.
Interviewer: The first question is what do you want to be when you grow up? I know you hear this all the time. I need to get an idea.

Student: A football player

Interviewer: A football player

Student: I don’t know.

Interviewer: You don’t know.

Student: An engineer

Interviewer: An engineer

Student: I want to play basketball but I’m looking for another job too.

Interviewer: Football or another job too.

Student: A Basketball player

Interviewer: Basketball player

Student: Engineer

Interviewer: Engineer

Student: Engineer

Interviewer: Another engineer

Student: Architect

Interviewer: Architect

Student: Police officer

Interviewer: Police officer

Student: Don’t know

Interviewer: Don’t know yet.

Student: Computer engineer
Interviewer: Computer engineer
Student: Basketball player
Interviewer: Basketball player
Student: FBI agent
Interviewer: FBI agent
Student: Baseball or lawyer
Interviewer: OK
Student: Rapper
Interviewer: Rapper. Alright first rapper.
Student: Football or lawyer
Interviewer: Say it again
Student: Football or lawyer
Interviewer: Football or lawyer, OK.
Student: Don’t know yet.
Interviewer: Don’t know yet.
Student: Pro skater
Interviewer: Pro skater
Student: Don’t know yet
Interviewer: Don’t know yet
Student: Scientist or psychologist
Interviewer: Say it again
Student: Scientist or psychologist
Interviewer: OK
Student: Football player
Interviewer: Football player
Student: Doctor
Interviewer: Doctor
Student: I want to be a computer technician
Interviewer: Computer technician
Student: A club owner
Interviewer: Club owner
Student: Football
Interviewer: Football
Student: A computer engineer
Interviewer: A computer engineer
Student: Architect
Interviewer: An architect
Student: I don’t know
Interviewer: Don’t know
Student: A business manager
Interviewer: Business manager
Student: A baseball player
Interviewer: Baseball player, alright. What are your opinions about going to college? Anybody have any thoughts on going to college?
Student: I think that going to college would be the best choice I make because I could expand my education, my brain. It will be when I try to get a job because they will see that I went to college and they will think I have learned a lot and I have good skills.
Interviewer: Very good. Anybody else want to answer that?

Student: I want to go to college.

Interviewer: You want to go to college? OK any other thoughts?

Student: I do want to go to college.

Interviewer: You do want to go to college.

Student: I want master’s degree.

Interviewer: A master’s degree. OK.

Student: I want to go to college and play football.

Interviewer: OK go to college and play football.

Student: I want to go to college so I can become better at baseball so I can get drafted.

Interviewer: OK

Student: You can drafted and go to the NBA.

Interviewer: OK go to college and drafted into the NBA

Student: I want to go to college so I can learn to protect myself.

Interviewer: Protect yourself

Student: Yeah because you know that event that happened

Interviewer: Oh. OK. Any other thoughts? Is there anybody in here thinking about majoring in computers?

Interviewer: Computers that one. You thinking about majoring in computers?

Student: Yes

Interviewer: That’s two.

Student: I want to be a computer technician.

Interviewer: A computer technician, right?
Student: Yeah

Interviewer: OK Alright. Computers? Thinking about majoring in computers? So there’s one back there OK. Computers? OK. Alright. You are going to make a better internet? OK. What’s wrong with the internet now? What don’t you like about the internet?

Student: It breaks down to easily. Too many viruses.

Interviewer: Too many viruses. OK. Same thing you want to go into computers. OK

Student: Design software for computers.

Interviewer: Design software

Student: For Microsoft

Interviewer: For Microsoft. OK. I have a question about, what do you think someone in computers what do you think are some of the things they do? Someone who works in computers, what do you think the do?

Student: They build computers.

Interviewer: They build computers. OK.

Student: Reconstruct computers

Interviewer: Reconstruct computers

Student: Fix computers

Interviewer: Fix computers

Student: Try to see what else we can do with computers

Interviewer: Try to see what else they can do with computers

Student: Transport people to other countries

Interviewer: Transport . . .

Student: People to other countries

Interviewer: OK
Student: Take care of people’s stock and financial and stuff
Interviewer: Taking care of peoples stock and financial stuff
Student: Try to build better computers
Interviewer: Try to build better computers
Student: Program computers
Interviewer: Program computers
Student: Develop websites
Interviewer: Developing and making websites. OK anyone else? Oh I’m sorry.
Student: Design hardware for computers
Interviewer: Design hardware for computers. OK. Alright. Are there any programs or anything that you do either here at school or outside of school that involve computers? What do you use the computer for either at school or out of school?
Student: To help me with my homework.
Interviewer: Alright. Help with homework.
Student: Games
Interviewer: Games
Interviewer: Question was what do you do with computers in school and out of school? We heard homework, video games . . . anything else?
Student: Myspace
Interviewer: Myspace
Student: Research
Interviewer: Research. OK. He got it, research. OK
Student: Myspace
Interviewer: Myspace, OK.
Student: Facebook
Interviewer: Facebook
Student: Wikopedia to expand knowledge
Interviewer: Wikopedia to expand knowledge. That’s good.
Student: Shop
Interviewer: Shop. Do some shopping.
Student: Check your emails.
Interviewer: Checking emails.
Student: Shoes
Shoes. Did you want to add something?
Student: Travel plans
Interviewer: Travel
Student: Travel plans
Interviewer: Travel plans
Student: Shop
Interviewer: Shop on the computer. OK. For those that have been on Facebook or
myspace, how many hours a day do you think or do you think you spend a
lot of time on there a little bit, give me some type of answer for that.
Student: 10 minutes
Interviewer: Just 10 minutes a day. OK anybody else myspace, facebook.
Student: About a hour
Interviewer: About a hour a day
Student: 30 minutes to an hour
Interviewer: 30 minutes to an hour. Ok over here.
Student: 10 minutes
Interviewer: 10 minutes
Student: 6 hours
Interviewer: 6 hours
Student: 30 minutes
Interviewer: 30 minutes OK
Student: 4 hours
Interviewer: 4 hours OK. Does anybody in here think they spend more time on myspace or facebook then they do on homework? Anyone want to admit to that? About 80%. Ok just wanted to get an idea on that one. Do you know of any African American males in computers and what do they do?
Student: My uncle and two at my mother’s office. They do taxes and my uncle repairs computers.
Interviewer: Repairs computers. OK.
Student: My mother works for the EPA . . .
Interviewer: No males, I’m sorry. African American males, men.
Student: A friend at my mother’s job, he does IT technician.
Interviewer: IT technician a friend at your mother’s job. OK.
Student: My uncle write grants
Interviewer: Write grants using the computer. You have one also?
Student: My uncle
Interviewer: Oh using the computer. Perfect OK. One more over here.
Student: My uncle works at Dell.
Interviewer: Works at Dell OK. Out of those young men that answered yes to that, do they talk to you about working with computers? Do they show you, introduce you to computers?
Student: Not really

Interviewer: Not really. Some say yes. You say yes. OK I have one last question for you then I will ask if you have any questions for me. Give me an idea of some the classes that you would consider hard for you. If any, if you don’t think there are any, say I don’t think there are any that are hard.

Student: History

Interviewer: History is a hard class

Student: Math

Interviewer: Math

Student: Spanish

Interviewer: Spanish

Student: Science

Interviewer: Science

Student: US History

Interviewer: US History

Student: Algebra

Interviewer: Algebra

Student: US History

Interviewer: US History

Student: Science

Interviewer: Science

Student: Algebra

Interviewer: Algebra

Student: Algebra, Trigonometry, Geometry

Interviewer: OK
Student: US History

Interviewer: US History. Do we have anyone?

Student: Math

Interviewer: Math. Anything

Student: Math

Interviewer: Math

Student: US History

Interviewer: US History and Math. Language Arts. OK. Alright. One last thing, actually I am finished with my questions. I would like to thank for participating but I wanted to ask you are there any questions that you had of me?

Student: What do you do?

Interviewer: What do I do? I teach at Bowie State University. I teach computer programming. Right now the language that we use is C++ and we learn how to program computers so that when students graduate from my class they will be able to go out and write ATM programs. Like when you go and you get your money or you go online and you go to websites and you shop online. My students will be able to do that. Make video games. We teach them how to program in most of classes I teach. I also teach a couple of database courses and a couple of web development courses.

Student: At your job have you been to more than one school?

Interviewer: At my job . . . have I taught at more than just at Bowie . . .

Student: Came to more than one school.

Interviewer: Oh to do this? Well just yesterday I did my first school at Kenilworth Elementary and today I’m doing your school and I still have to do Friendly High School, Apple Grove Elementary. Those are the three schools that I went to. Apple Grove, Issac Gourdie and Friendly and then I have Kenilworth, Benjamin Tasker and Bowie High School and then also Bowie State University.

Student: Did you play in sports in high school and college?
Interviewer: Did I play any sports? Yeah I played in high school. I played baseball, track and football.

Student: What position did you play?

Interviewer: In football, I played wingback. Half half-back and half tight-end. I guess they call it H-back today.

Student: Do you make websites?

Interviewer: Do I make websites? Yes I can make websites and I have students that work for me on research projects. They get paid while they are in school do computer science websites. If you go to the internet and look up Bowie State University, computer science department that’s my website but my students do the majority of the work. I just help them to get it done.

Student: Do you like what you do?

Interviewer: I love what I do. I love teaching and I love computers and the two of them together I definitely love.

Student: Would you ever give your job up?

Interviewer: Would I give my job up? No I think even if I hit the lottery I would still want to teach at least one class at Bowie.

Student: How many years have you studied computer science?

Interviewer: How many years have I studied? Let’s see I went to Bowie State for 4 years. When I graduated from there that was with my bachelor’s degree. I left there and went to get my master’s at Bowling Green up in Ohio. Bowling Green State University and two more years worth of course work and then now I’m doing this. It adds up to about 9 years, 10 years. Not counting the couple of years I took off.

Student: Was that your first job that you wanted?

Interviewer: My first job, no. Actually when I was younger about your age I probably said the same thing, football player or baseball player. Then when I got to college I majored in accounting, business. Then I changed my major after I took one computer class. A programming class and my professor said this is real hard and you are doing real good. You need to think about changing your major and once I looked up and saw how much money they make, I changed my major.

Student: How much money do they make?
Interviewer: How much money do they make? Anywhere from $50,000 to $200,000. That’s a salary. You start your own business you can even make more.

Student: A year?

Interviewer: A year.

Student: Did you think about playing baseball in college?

Interviewer: Baseball? No I stopped playing baseball when I left Friendly High School. Any other questions? Alright if not I will stop the recording for now. Thank you.
Racially Mixed Middle School (RM-MS)

Interviewer: My first question is what do you want to be when you grow up?
Student: I plan to be a cook at a jazz restaurant.

Interviewer: A cook at a jazz restaurant.
Student: I’d like to be an engineer

Interviewer: Engineer
Student: Oncologist

Interviewer: Oncologist. OK.
Student: A computer hardware engineer

Interviewer: A computer hardware engineer
Student: I plan to be an architect when I grow up

Interviewer: An architect
Student: Someone who works in engineering and technology

Interviewer: Engineering and technology
Student: I want to work in an office or be an accountant

Interviewer: In an office or be an accountant
Student: I want to own my own business.

Interviewer: Own your own business. Any specific type of business? That’s a great job you want to own your own business.
Student: I want to be a lawyer

Interviewer: A lawyer. OK. Anyone else? Any thoughts about college what do you think about college? Anything what comes to mind?
Student: I want to go to (inaudible) University.

Interviewer: (inaudible) University. OK.
Student: I think a lot of work.

Interviewer: A lot of work

Student: I think of the teachers giving us a lot of work too.

Interviewer: Teachers giving a lot of work

Student: I think of being successful.

Interviewer: Being successful. OK.

Student: Having a good education and a good job.

Interviewer: Good education, good job.

Student: I think a lot benefits and freedom.

Interviewer: A lot of benefits and freedom. Anyone from this table any thoughts on college? Any other thoughts? What would you think about pursuing or majoring in computer technology or something that has to do with computers? Yes, no, maybe, never.

Student: Yes because computers can help you find many things.

Interviewer: Yes because computers can help you find many things.

Student: Yes I would if everything else fails, I would.

Interviewer: If everything else failed you would.

Student: I would if my other choice did not come through

Interviewer: OK maybe if first choice didn’t come through.

Student: I would probably do it because everything might be computerized by that time

Interviewer: Could be computerized by that time. OK.

Student: I would like to learn about computers

Interviewer: So you could learn about computers. OK.

Student: I would because I think that there is a lot of money in computers.
Interviewer: There’s a lot of money in computers.

Student: I would not because it’s not interesting.

Interviewer: Would not. OK got our first would not because it’s not interesting. OK and that’s fine remember I said answer honestly. I need to know all the information. Good or bad. Anyone else? OK. What would get you interested in computers? What would get you interested in computers anything about computers that get you interested?

Student: Making games. Everything is getting computerized.

Interviewer: OK, making games and everything is getting computerized.

Student: If someone were to talk about how interesting it is.

Interviewer: OK if someone was to come talk about how interesting it can be and they could convince you.

Student: If someone offered me a job making video games on computer.

Interviewer: OK a job making video games.

Student: In the future the technology was advanced.

Interviewer: OK. Technology advanced technology in the future.

Student: If I had a job and they would give me a raise for learning computers.

Interviewer: OK so the raise would be that incentive.

Student: Thinking about the future where technology would be

Interviewer: Thinking about the future, future technology. Tell me some of the things you think a computer scientist or computer technologist does like right now at work. Someone that went to school and graduated from college with a computer degree, what do you think they are doing at work right now?

Student: I think they find other ways to enhance the computer.

Interviewer: OK, finding new ways to enhance the computer.

Student: Design like different software

Interviewer: Designing different software
Student: Besides Windows
Interviewer: Besides Windows. OK
Student: Fixing peoples computers like their USB ports
Interviewer: OK fixing computers like USB ports
Student: Inventing new ideas on how to improve old ones
Interviewer: OK inventing new ideas and improving old ones
Student: Checking on people who have abused their computer rights
Interviewer: OK, checking on people who have abused their computer rights. OK anyone else. OK, all good answers. What do you guys do with the computer here at school? What type of classes, projects or assignments, homework . . . what type of things do you have to do where you have to get on the computer to help you out?
Student: I look up notes to give me information about something I'm doing or test.
Interviewer: OK
Student: I type my reports.
Interviewer: Type reports
Student: Check my grades
Interviewer: Checking grades online. Someone already said it? What was it?
Student: Checking grades
Interviewer: Checking grades. OK.
Student: Doing PowerPoint.
Interviewer: PowerPoint, OK so presentation. Some type of presentation. Someone already said it? PowerPoint.
Student: Researching for school projects.
Interviewer: OK, research for school projects. That was the same thing you were about to say? Ok same thing 3 people same thing.
Interviewer: Does the school influence your interest in computers? For example do you have teachers that talk about using the computer? What do they say? Are there certain computer classes that you have here in school? Is there a computer club here at school?

Student: There is no computer club but your teacher tells you to sign up for computer lab and then you have mobile laptops come to your class.

Interviewer: Mobile laptops come to the class but the teacher has to sign for them. And you said there is no computer club?

Student: My science teacher brings in laptops in case we need to look research.

Interviewer: OK

Student: I was going to say they don’t teach us about computer science.

Interviewer: So not on this level. Not middle school.

Student: no

Interviewer: Anyone else? We are getting close to the end just a few more questions. Do you know of any African American males in computers besides me? I already told you I teach Computer Science at Bowie State. Anyone? Family? friends?

Student: Yes my best friend’s father does something like that in computers.

Student: My father researches on the computer.

Student: My father’s friend and my neighbor work with computers. Geek squad.

Interviewer: Geek squad. OK.

Student: My aunt and my uncle they engineer in computers.

Interviewer: OK engineers.

Student: My mother knows someone that works with computers. Picks it up and do all the hi-tech stuff to it.

Interviewer: OK

Student: My aunt and uncle repair computers.
Interviewer: They repair computers. OK. Of those folks that answered that question yes, do they talk to you about computers? For instance tell you what they do and try to build your interest in computers?

Student: Yes my dad’s friend, we build like computers.

Interviewer: OK he taught you to build the computer.

Student: My uncle designs his own software.

Interviewer: OK computer programmer.

Student: My brother’s friend is a programmer and he has taught me how to program.

Interviewer: OK. Do you remember what language or what programmer environment you were in?

Student: no

Interviewer: OK. Let me tell you about a term that I read about when I was doing my paper to do this study. It’s called “disidentification” and basically what that means, people who say it’s not cool to be smart or to study a hard subject. Quote, unquote mathematics is hard and computers are hard so they just disidentify with it. And say that don’t want to be known to be that. I’m asking you if you think that way. If you do, let me know. Do you see that in school where people think it’s not cool being smart? Or they don’t want it to be known. Any comments?

Student: I do. I see it but I could careless cause it could help me in the long run.

Interviewer: As long as you are getting good grades, it doesn’t matter.

Student: Yeah I try.

Interviewer: Strive to be the best. That’s good. Anyone else?

Student: I think grades are very important and for the people that are laughing because they think I’m a genius, I just ignore them.

Interviewer: You just ignore them. OK. Anyone else? Any comments on disidentification?
Student: Why should people care if somebody else is getting good grades or if somebody else is doing their hardest in school? Shouldn’t they just try to be the best that they can be?

Interviewer: Yeah, that’s what we hope but doing some of the reading that I have been doing, they say a lot of folks, if they find out someone is doing well in school, they may talk about them, make jokes about them. I guess what I’m hearing here is that it doesn’t really happen at your school. OK we have two more people.

Student: I would like to be smart and be in Algebra and Geometry and stuff like that.

Interviewer: So it doesn’t matter what they say you are going to strive to get to that point.

Student: Yes.

Interviewer: Right.

Student: When you are getting good grades, people say that you are a nerd because you are doing better than they are because they are not applying there self.

Interviewer: Right. OK so some of that is being said and that is what I am finding out in most schools is exactly what you said. If someone is doing good and their not doing good, they start talking about oh you are just a nerd. OK. Any comments from this table? OK. Last thing is it Face book or Myspace?

Student: Myspace

Interviewer: Myspace. How much time would consider you, I mean you now how much time would you say you spend on facebook or myspace? A little bit, a lot, one hour, 3 hours, 20 hours?

Student: I don’t really get on it that much. I’ll spend about 10 or 15 minutes on it a day.

Interviewer: 10 or 15 minutes a day. OK you just check it.

Student: Cause I have a lot of homework.

Interviewer: You got a lot of homework. OK.

Student: I just check my messages and get off.
Interviewer: You just check your messages and get off. OK. How about in the beginning, was there a time where . . . that’s generally what I have been hearing from other students that in the beginning they spent a whole lot of time then after a while . . .

Student: It gets boring.

Interviewer: It gets boring. OK.

Student: You just go and check your messages.

Interviewer: You just go and check your messages after while, once you get everything set up.

Student: Yeah like in the beginning I’d be on for maybe about two hours just talking and stuff. Like now I just go on for like five minutes or so to check stuff.

Interviewer: OK. What about video games?

Students: *A positive response in unison.*

Interviewer: Have I hit something there? How much time on video games?

Student: During the week, I could usually play for an hour for the whole week but on the weekend I can play for over 8 hours. It matters if I have beaten the game or not.

Interviewer: OK

Student: Well I can only play video games on the weekend. When I do I play it until I beat it and then I delete that and then play it again.

Interviewer: So basically your parents are saying only on weekends. Or are you saying that?

Student: I say that.

Interviewer: OK

Student: I play a lot of computer games on the computer. I play for like 2 or 3 hours.

Interviewer: OK.
Student: I have plenty of game systems in my house but I don’t really play video games that much. At the most I play like sometimes like every two weeks, something like that. I don’t play video games that much.

Interviewer: OK. You don’t play that much at all.

Student: I play like 2 or 3 hours and then I go outside and chill.

Interviewer: OK 2 or 3 hours a day then you go outside and chill.

Student: I got 2 game systems but I don’t play them that much unless it’s like a whole lot of people come over and like we play together or something.

Interviewer: OK.

Student: I plan when I’m bored and I play for like an hour and stop.

Interviewer: OK.

Student: I only play games like if I just got a new game.

Interviewer: You get a new one then you like really . . .

Student: After a while it gets boring.

Interviewer: After a while that gets boring too? OK.

Student: I play a game like once a week but I play until my fingers hurt.

Interviewer: Oh ok until your fingers hurt? Alright so as a comparison sounds like myspace, video games and homework. Where is the ranking, how much time?

Student: Myspace comes first, the homework, then video games.

Interviewer: OK

Student: Homework then video games then myspace.

Interviewer: OK

Student: I spend like maybe 2 or 3 hours doing homework and then I get on myspace.

Interviewer: OK
Student: I do myspace because it takes the shortest time and then usually I do my homework at school.

Interviewer: OK. Myspace you get on there first but you only spend a couple minutes and then you back off. OK.

Student: I video games, homework then myspace.

Interviewer: OK.

Student: I do most of my homework in math class then when I get home I spend like 5 or 10 minutes on homework.

Interviewer: OK so most of math class is where you do you homework.

Student: I do my homework, then myspace, then my game.

Interviewer: OK.

Student: I do homework first, then myspace and then games.

Interviewer: OK

Student: I do my homework, and then I watch TV.

Interviewer: Homework then you watch TV. OK I have to ask this, it is the last question. We are sitting in the library one of things when I ask my students at Bowie State University is what would you tell elementary, middle or high school students to do that you didn’t do back when you were that age to get ready for college? They said tell them to learn to love to read. How much would you say you enjoy reading? You don’t like reading, you read all the time.

Student: On a scale of 1 to 10, I probably like to read about an 8.

Interviewer: OK

Student: I like to read so it’s probably going to be about a 7.

Interviewer: Anyone else? Any comments on reading?

Student: I like to read good books like mystery books and action.

Interviewer: Alright.
Student: I really don’t like to read but when I get bored I pick up a magazine or something to read.

Interviewer: OK. Nothing from this group so far you like to read?

Student: I read but if it’s a football game going on outside I won’t pass it up to read a book.

Interviewer: OK. Honest answer.

Student: I like to read mystery books but on a scale of 10, I read about 7.

Interviewer: OK

Student: I read a lot but if it’s a real interesting book I read the whole . . .

Interviewer: You just read it until you finish or as much as you can for that day. OK.

Student: I read a lot like you said if it’s a good book I’ll read it to the end.

Interviewer: OK. That’s definitely what folks up in college are saying.

Student: I like to read books that I can relate to.

Interviewer: OK.

Student: If there are books that I am really interested in I can read for a long time.

Interviewer: OK. That is the last question that I have for you guys. Are there any questions that you have for me?

Student: How did you get interested in computer science?

Interviewer: How did I get interested in computers science? I actually went to school at Bowie State University but I wanted to major in business. I wanted to be an accountant but we had to take a computer class and I took a computer programming class and about half way throughout the class, eight weeks after I started the teacher pulled me to the side and for a second there I thought I was in trouble and she said you are doing so good in this class and this one of the hardest on campus. You need to really think about changing your major to computers. I did some research, read some magazines and found out that people who major in computers make a lot of money so after I found that out I quickly changed my major to computers and my minor was still accounting. I graduated my major was in computer science and a minor in accounting.
Student: Do you work with Computers?

Interviewer: Right now I teach down at Bowie State University. I teach C++. I don’t know if you guys heard of that. It’s a programming language, part one and part two. I teach some database courses and I teach some web development classes which is how to create your webpage and make it do some nice stuff out on the internet.

Student: How many years did it take you in college?

Interviewer: How many years in college. I had four years to get my first degree, my undergraduate degree, my BS degree. Two years at Bowling Green State University in Ohio to get my master’s degree and PhD is supposed to take four years in total two years worth of classes and two years to do what I’m doing now which is to read up, get a topic, run your study, do the defense which is to present your results but I took a good little break in between the time I finished the classes and the time that I’m doing this now. So if you add up the work part, four years at Bowie, two years at Bowling Green and then it takes about four years more. So ten years. If you don’t take a break like me, then ten straight years.

Student: What math courses did you take in eighth grade?

Interviewer: In eighth grade? I doubt very seriously we were doing Algebra back then. We were doing just general mathematics. I have a daughter who goes to Isaac Gourdine, the math problems that you guys are doing we didn’t do until like 10th grade. So x2 and x = y, we didn’t do any other until about 10th grade. That’s going to help you out when you get to college because you will be seeing the information for like the second or third time when you take certain math classes, you would have stuff that you have already seen when you were 12 or 13 years old. You’ll be 18 or 19 years old seeing it for the second or third time. That should help you out.

Student: What was your favorite subject when you were in school?

Interviewer: When I was in school . . . gym. Recess in elementary school and gym in middle school and high school. I’m not going to lie that’s what it was and playing sports.

Student: What sport did you play?

Interviewer: I played football and a little bit of baseball. Basketball I was just on the team. Some of my buddies played football. They played basketball also so it was a chance for me to hang out with them. I didn’t play that much basketball and then I ran track in high school and I was pretty good in track.
Student: What event did you run?

Interviewer: Sprints. 60 yard dash indoors. 100 yard and 200 and then the relays for about 4 by 1 and 4 by 2. You run track?

Student: Yeah

Interviewer: OK. You run distance or sprint

Student: long distance

Interviewer: Oh you run long distance. Oh yeah, I don’t like running that long. OK any other questions?
Predominately African-American High School (PA-HS)

Interviewer: What do you want to be when you grow up?

Student: Engineer

Interviewer: Engineer

Student: Molecular Biologist

Interviewer: Molecular Biologist

Student: I’d like to be an architect

Interviewer: Architect

Student: Police Officer

Interviewer: OK

Student: Journalist

Interviewer: OK. I’m sorry thought you had your hand up.

Student: I’d like to be in real estate.

Student: Music Producer

Interviewer: Music Producer

Student: Video game designer

Interviewer: Video game designer

Student: Chef

Interviewer: A Chef

Student: Animation

Interviewer: Animation

Student: Pharmacist

Interviewer: Pharmacist. Alright.
Student: Computer engineer
Interviewer: Computer engineer
Student: Sports and entertainment lawyer
Interviewer: Sports and entertainment lawyer. OK. Oh you got one?
Student: A sport’s agent
Interviewer: A sport’s agent. OK.
Student: NFL
Interviewer: NFL? Oh NFL player. OK. Alright. What do you think about college at this point right? Any thoughts about college?
Student: It’s hard to get in.
Interviewer: Hard to get in.
Student: You don’t go you a loser.
Interviewer: You don’t go you a loser.
Student: Expensive
Interviewer: Expensive
Student: A necessity
Interviewer: A necessity
Student: I think when you do get in you should try your hardest.
Interviewer: When you do you do get in try your hardest. OK.
Student: It’s important.
Interviewer: It’s important. Anyone want to add to any of those?
Student: It can change your life.
Interviewer: It can change your life. OK. Anyone else?
Student: It helps.
Interviewer: It helps.

Student: In the long run.

Interviewer: In the long run it helps. Alright. What would you think about majoring in computer science or computer technology in college?

Student: You said who?

Interviewer: I said what do you think? What are your thoughts?

Student: You say you have to because of your interest. What’s you interest?

Student: Music production

Interviewer: Music production

Student: You got to do a lot of studying.

Interviewer: You got to do a lot of studying.

Student: It’s not a bad idea.

Interviewer: It’s not a bad idea to major in computers.

Student: I would because what I gonna do.

Interviewer: Because what you going to do, which is?

Student: Be a video game designer.

Interviewer: A video game designer.

Student: Useful knowledge

Interviewer: Useful knowledge

Student: It’s good to have because mostly everything evolves around computers nowadays.

Interviewer: OK. Anyone else? OK. What would get you interested in computer science or computer technology?

Student: Somebody talking to me about it.
Interviewer: Somebody talk to you about. OK.

Student: Seeing the wonders of it.

Interviewer: See the wonders of computers?

Student: I want to get more familiar with it.

Interviewer: You want to get more familiar with the computer.

Student: More classes about computers.

Interviewer: More classes.

Student: Meeting Bill Gates.

Interviewer: Meet Bill Gates.

Student: If someone could show me how I could use it in my field of study.

Interviewer: Show you how to use it in the field of study.

Student: If someone was to tell me it was a lot of money involved.

Interviewer: Tell you it’s a lot of money involved. Do you guys do anything as far as school related where you are actually on the computer and if so what do you do?

Student: Projects

Interviewer: Projects like?

Student: Powerpoint presentations

Interviewer: Powerpoint presentations

Student: Homework

Interviewer: Homework

Student: Reports and essays

Interviewer: Reports and essays

Student: Internet
Interviewer: Internet surfing the internet

Student: Computer graphics

Interviewer: Computer graphics

Student: Myspace

Interviewer: Myspace

Student: Fundraisers

Interviewer: Fundraisers. OK. Alright. Lab reports. In your mind what do computer scientist and computer technologist do?

Student: Make money

Interviewer: Make money

Student: Make movies

Interviewer: Make movies

Student: Dealing with science

Interviewer: Dealing with science

Student: Help make computers easy

Interviewer: Help make computers easy. Anyone else? You were about to say the same thing? Anything else that you think a computer scientist or computer technologist does at work?

Student: Sky is the limit as far as computers are involved. That’s what I think. They can do everything.

Interviewer: Sky is the limit. You can do everything with computers. OK.

Student: Create software.

Interviewer: Create software. OK. Alright. Do you feel you are prepared to major in computer science or computer technology?

Student: No
Interviewer: Alright so quite a few no’s. Give me some reasons and some thoughts on that.

Student: I think I need to be more familiar with computers.

Interviewer: OK. You need to get more familiar with computers.

Student: It’s because I have not taken any classes that help enhance my computer skills.

Interviewer: You have not taken any classes to help enhance computers.

Student: Not enough opportunities

Interviewer: Not enough opportunities

Student: Because I’m not interested

Interviewer: You are not interested in computer technology. OK.

Student: Our school does not provide that.

Interviewer: Our school doesn’t provide that . . . OK.

Student: We use computers in class as far as getting on the internet or typing papers. We don’t really research much about computers.

Interviewer: OK. You said normally you use computers to type research papers but that’s about it. OK and facebook. Anyone else? . . . alright. OK this one kind of plays into that one. Does your school influence an interest in computers? The teachers, classes, internet access? Are there computer organizations?

Student: Somewhat.

Interviewer: OK you have a technology class.

Student: A graphic design class

Interviewer: A graphic design class

Student: A computer graphics class

Interviewer: So you do have a computer graphics class.

Student: Type papers
Interviewer: OK. You got to type a paper. They require you to type a paper.

Student: You got to do research

Interviewer: Research. OK so internet access. OK. Do you know of any African American males in computers?

Student: My dad

Interviewer: Your dad. OK.

Student: My grandfather. He did the AOL joint.

Interviewer: Oh OK.

Students: *Laughter*

Student: My grandfather’s brother.

Interviewer: Your grandfather’s brother is in computers. Anyone else?

Student: A friend of the family.

Interviewer: A friend of the family.

Student: My aunt’s second cousin.

Interviewer: Your aunt’s second cousin and has any of them talked you about computers or maybe majoring in computer science?

Student: Yes

Interviewer: OK mostly no’s and one yes. Anyone else? OK one of the key terms that I learned when I was doing my research for this particular project is a term called “disidentification” and I needed to get your idea on that. Some authors talk about African American males disidentifying with anything that has to do with school. Doing good in school. Majoring in a science like Biology or computers or computer science. So that is the term disidentification and they say that is a real high issue and something that needs to be addressed. What do you think about that do you think that it is something that exist here at Friendly?

Student: It was made here at Friendly.

Interviewer: It was made here at Friendly.
Student: I think it does exist but we can change.

Interviewer: It does exist what we can change it.

Student: They are putting us in a group that says we are going to do anything life? Is that what they are saying? Is disidentification just a buttered up term?

Interviewer: That’s what I’m asking you is that what you think when you hear that term?

Student: Yeah that’s what I think. It’s stereotypical.

Interviewer: It’s stereotypical.

Student: Like people get mad at other people for being smart.

Student: You live up to it. That’s a stereotype right there.

Interviewer: That all African American will pursue certain fields. OK any other thoughts on that? Are there any classes there could one there could be more here in your high school career?

Student: Chemistry

Interviewer: Chemistry

Student: Students speaking all at once

Interviewer: Calculus, Algebra II. OK. Of those classes you are naming how do you approach those classes? What’s your strategy? What’s your thought process for those classes?

Student: I always make sure my tie is fixed and my shirt is tucked in.

Interviewer: The pacing guide? I said when you have those type classes what do you do in those tough classes? How do you approach those tough classes?

Student: Study a lot.

Interviewer: Study a lot. OK you say you study a lot especially for those classes.
Student: Make sure I get all my projects done.

Interviewer: Make sure you get all your projects done.

Student: Get in good with the teacher.

Interviewer: Get in good with the teacher.

Student: Take a lot of notes.

Interviewer: Take a lot of notes.

Student: Don’t be afraid to ask for help.

Interviewer: Don’t be afraid to ask for help. OK. Alright I think this is the last one unless you have any questions for me but I’m trying to get an idea at each level... elementary, middle, high school and Bowie State myspace and facebook usage. How much time? You don’t have to give me the number of hours unless you want to. A lot, a little bit

Student: I never used it.

Interviewer: You never used it. OK.

Student: An hour and 30 minutes.

Interviewer: About an hour and half a day.

Student: Students speaking all at once

Student: It’s addictive.

Interviewer: It’s addictive. Alright since I have been talking to students about that another one came up which is video games. How about the amount of time we spend on video games?

Student: I only spend like one hour a day.

Interviewer: OK. Three hours a day when you do get on it. Two hours with Madden. OK. Any other ideas? And the last thing is compare for me to homework. You spend more time on video games, facebook and myspace then homework? Zero to 15 minutes.

Student: Finish my homework first

Interviewer: Say it again.
Student: Finish my homework first.

Interviewer: Finish the homework first then play video games as long as you want. OK. Same thing. Finish homework then do whatever. OK that’s the last question I have do you guys have any questions of me?

Student: What do you think the influence of computer technology is?

Interviewer: Well of course I teach computer science up at Bowie State so like any other professor we think our topic is the most important one on the campus and I’m not different. I think if you can dedicate yourself, put a lot of time into computers the field is going to pay off not just financially but definitely financially also it will be a big reward all around.

Student: How do you go about persuading students to come to your class and your line of work?

Interviewer: Things such as this coming out going to the schools, talking to students. I do career day at different schools in the county and just in general talking to students.

Student: What interest you to pursue this field?

Interviewer: When I left here and went to Bowie I actually majored in accounting and I had to take a computer class and once I took that computer programming class and I was doing well and my teacher pulled me to the side and was like this is a very hard class and most people change their major right away from just taking this one class and you breezing through it so you need to think about changing your major. So I took about week, no it didn’t take that long, a few days to look at some magazines to see how much does an accountant make and how much somebody in computers make and when I saw that I changed my major real fast to computers.

Student: So is your career here at Bowie or are you going to pursue other fields?

Interviewer: I’ve worked at a company in Rockville producing websites and things like that and I left there and started teaching at Bowie and I like teaching at Bowie State much better. I’m staying there.

Student: What was like your greatest achievement in computer science?

Interviewer: Greatest achievement . . . working at Bowie is teaching and this time of the year when my students are graduating and a lot of them will come back at Homecoming and just to see students that came in and maybe they were doing as well and I’m the type of professor that if you don’t do so
well on the test I’ll pull you to the side and I’ll tell you I know you can do better, so seeing those type of students come back.

Student: Do you find that major a tough major or I won’t say fairly easy but is it tough?

Interviewer: I’ll tell you what the students at Bowie that I have been doing this study with. When I ask them what should I tell my high school students, what should they be doing to get ready to do what you doing majoring in computers. They say you should be doing a whole lot reading. They hated reading when they came to college. It’s a whole lot of reading and you have to stay on top of your class in computers because everything seems to go fast pace. You can’t take a week off or two weeks off because if you don’t pick up on something in the first two or three weeks it’s going to catch up with you. You can’t just jump in and say, “Hey son we got two weeks left, I need to jump up on this computer class”. It’s none of that you have got to stay up on top of it from the beginning. Unless it’s like quicksand. This what I would tell the students at Bowie and they sat in your seat two or three years ago. So according to them yeah it’s tough and it was tough when I was a student.

Student: Do you think with today’s society being real technology crazy, do you think that I could last without it?

Interviewer: Last without it? Yeah I guess so as humans we can deal with a lot. If we had to go back to living without computers, it would be some adjustment but . . .

Student: I mean without technology

Interviewer: Yes that’s what I’m saying. You talking about without ATM?

Student: I’m talking no playstation, no cell phone.

Interviewer: We could do it but it would be a big adjustment all around for a lot of folk. Anyone else? Any other questions?
Racially Mixed High School (RM-HS)

Interviewer: What would you like to be when you grow up and I know you are already grown up but where do you see yourself 10 years from now? No ideas?

Student: Preacher

Interviewer: Preacher

Student: Track and field or NFL

Interviewer: Track and field or NFL. OK.

Student: Accountant

Interviewer: Accountant

Student: Criminal Law

Student: Criminal Law. Alright

Student: Lawyer

Interviewer: Lawyer

Student: Engineer

Interviewer: Engineer

Student: Pharmacist

Interviewer: Pharmacist

Student: Football Coach

Interviewer: Football Coach

Student: Political Activist

Interviewer: Political Activist

Student: I am going to be a writer

Interviewer: A writer. OK

Student: Business Administration
Student: Business Administration OK. What are your thoughts about college? Any thoughts about college?

Interviewer: I think you have to have a college education nowadays.

Student: Got to have a college education nowadays.

Interviewer: A sense of maturity.

Student: A sense of maturity. That’s what you think of when you think of college.

Interviewer: Lays out your future.

Student: Lay out your future.

Interviewer: A lot of responsibility.

Student: A lot of responsibility. Ok anyone want to add to that?

Interviewer: Time management

Student: Time management. OK.

Interviewer: Sometimes college is a waste of time

Student: Sometimes college could be a waste of time. Alright a few chuckles over there.

Student: Expensive

Interviewer: Expensive. Anyone else want to add to it? Alright and I just letting you guys answer. I don’t have any comments. There will be at the very end a question and answer if you have any questions for me and I may have some comments also. What do you think about majoring in computer science or computer technology? What you consider it or what are your thoughts about it? Why wouldn’t you just any thoughts on that?

Student: I would consider majoring it.

Interviewer: You would consider it oh ok. Any other thoughts, opinions, no opinions?

Student: I wouldn’t really see myself majoring in it but it could help me so I might do it just to get some background in it.

Interviewer: OK. Maybe not majoring in but take a few courses in it. OK
Student: Like he said I might not major in it but I know some people who did, like my uncle majored in computer technology.

Interviewer: Ok and that leads into another question that I have also but I’ll come back to that. You would consider majoring in it?

Student: Going into that field

Interviewer: Going into the field

Student: I’ll consider it too. In the years to come there is going to be a lot of stuff with technology and stuff and computer so yeah it probably would be necessary.

Interviewer: OK.

Student: It will probably be helpful in the future.

Interviewer: Helpful in the future. OK. Do you want to add anything to that? Next question what do you think computer scientist or computer technologist do? You go to school you get the degree in computers then what. What are they doing right now as we speak at work?

Student: Probably one thing is fix computer

Interviewer: Fix computers

Student: Making video games probably

Interviewer: Making video games

Student: Engineering

Interviewer: Engineering

Student: Making new technology

Interviewer: Making new technology

Student: Creating new programs

Interviewer: Creating new programs

Student: Making new websites
Interviewer: Making new websites. OK

Student: Working on government jobs

Interviewer: OK government jobs working in the government. They need computer technologists also.

Student: Making old programs more efficient

Interviewer: Making old programs more efficient. OK

Student: Making more software

Interviewer: Making more software

Student: Tougher firewalls for homeland security

Interviewer: OK tougher firewalls for homeland security. OK all that is true. Do you field you will be prepared to major in a computer field?

Student: Yeah

Interviewer: OK yeah. Based on . . .

Student: I would because I got a lot of family that is in computer tech.

Interviewer: You got a lot of family in computer tech.

Student: Probably

Interviewer: Probably. OK. Anyone else? What do you do currently, school related? Do you have a computer tech club or do you do homework or assignments that require you to use the computer?

Student: Yeah.

Interviewer: Yeah? What classes? What are some of the classes or projects where you find yourself having to use the computer?

Student: I take engineering concepts.

Interviewer: Engineering concepts. OK

Student: I do research for like World History.

Interviewer: OK. You got to go out and do research on the internet. On the web. OK
Student: Writing reports

Interviewer: Writing reports for your English class. OK

Student: If possible I plan on taking like a computer technology class but it’s good because it can help you for the school year because you need computer skills to be able to manage computers and to be a technician.

Interviewer: OK. What about computer programming? Are any classes taking you down that path or avenue?

Student: We created a website?

Interviewer: You created a website. You used html you used a different tag? What type of software did you use?

Student: Publisher

Interviewer: Publisher. So it was more graphic with user interface you can just drag and drop. Ok just getting an idea. Next question does you school influence an interest in computer science or computer technology? Do your teachers, any classes, internet access, and computer clubs? You pretty much answered that one. I told you I would get back to this question. You said your uncle . . . do you know any African American males in computer science? You said your uncle.

Student: MIC

Interviewer: MIC OK local.

Student: In the Maryland area.

Interviewer: OK

Student: My dad

Interviewer: Oh your father works in the area of computers.

Student: My father

Interviewer: Your father also works in the area of computers? Same?

Student: Computer information systems
Interviewer: Computer information systems. You have a cousin, OK. Of those who answered yes do they talk to you about computers, kind of push you in that direction? About maybe going into computers?

Student: Yes

Interviewer: Say yes.

Student: Yes

Interviewer: Yes, a couple of no’s OK. Anyone else? Any comment on that? No not really. OK. Alright just a few more questions we are almost done. There is a term, I was doing a bunch of reading prior to me coming, and it was a topic, a reason for doing this study. The term that I came across is “disidentification” and what I take that term to mean and the way it was explained to me is that student more specifically African American males disidentify with doing well in school or even going into these sciences areas because they just don’t see themselves going into that area and that is pretty much the purpose of my study is to address this term disidentification. And they say it starts early, elementary and middle school where they start to disidentify. It’s a general term it’s not cool to smart or it’s not cool to be on the honor roll. What are you comments on that? I am not necessarily asking you, do you feel that way; you don’t want to be known as being smart. If you want to comment on that please do but here at your school do you kind of see that? Are the authors that wrote this are they speaking the truth? This a big term in my paper.

Student: I don’t think its right to say black men (inaudible) they might not say it but I think actions speak louder than words. You might be throwing on the best outfit but you still about school. You want to graduate because I know I don’t want to stay there forever.

Interviewer: Your group that you deal with . . .

Student: They don’t say it, it’s not cool to say but they do it.

Interviewer: Don’t want to say but actions speak louder than . . . OK I got you.

Student: I don’t think people are scared to be smart but it’s a lot of people that keep it underneath because maybe where they came from or their parents don’t want to help. I mean I don’t really know.

Interviewer: You got the gist of the answer out. I know what you saying.

Student: I think it used to be like that like it was cool to be smart. Now I think people try to get their grades straighten out.
Interviewer: OK so used to be that it was not cool to be smart but now . . .

Student: I feel like, like he said they rather not say it they are just action. People might be doing good but they keep underneath. They rather you see it then they tell you.

Interviewer: OK. Got you. That’s a good point. Anyone else

Student: I think it’s an image thing.

Interviewer: It’s an image.

Student: Because I know like mostly everybody listen to hip hop in general.

Interviewer: Right.

Student: My parents don’t say anything to me about that because they say as long as I do my work I can listen.

Interviewer: You said your parents said as long as you do your work then they are not going to complain or anything. OK. Anyone else? Alright my last question is actually kind of fun. I like to hear this it’s fun for me is Facebook and Myspace. How much time do you spend on Facebook and Myspace?

Student: Zero

Interviewer: Zero. So you are willing to say zero? Has it always been like that or have you.

Student: I never had it and never wanted to have it.

Interviewer: OK

Student: I don’t even have it.

Interviewer: Don’t even have it. OK.

Student: I have a myspace and facebook but I don’t get on it like I’m not a computer freak where I stay in house and do it. I get on the computer when I come home and the only reason I get on is to check my messages then I get right off.

Interviewer: OK
Student: I don’t just sit on there.

Interviewer: It’s not a lot of time. Anyone else comments or answers to that one.

Student: Yeah I used to get on it but my brother he came out the army and said you should do something productive and not stay on myspace all day so I don’t do much of myspace.

Interviewer: Oh OK.

Student: So I try to find something productive on the computer to do.

Interviewer: OK got one over there?

Student: If I have nothing else to do I’ll go on facebook.

Interviewer: Nothing else to do you’ll just on facebook. OK. What about? OK go ahead.

Student: I really don’t have much time at home so . . .

Interviewer: You just don’t have much time at home. You involved in a lot of activities, you’d rather go out. What about video games? Same thing, not too much time for video games or more time?

Student: As you get older it gets played out.

Interviewer: As you get older video games get played out?

Student: I mean when you get older video games get played out but when you get new systems. I don’t like video games like that either but when I played that new Xbox 360 make me like but the prices is crazy so I don’t . . .

Student: When you first get it you play it a lot more than you would play it after a month. See when you say games and computers see computers are used for more than one thing.

Interviewer: Right.

Student: Learn and to have fun but on a game. If all you do is play video games, you can’t learn on a video game.


Student: I think it’s a money issue. If I had the money to supply it, I would probably spend have my day playing and getting used to it. When I was
little I used to play a lot but right now it’s too much money and its gets boring after a while. I wouldn’t say game is just for playing because I know a lot of people who make their living off playing games. Like Madden tournaments and stuff like that. They make a lot of money just like playing video games. So I mean if you are good at it I wouldn’t say stop entirely.

Interviewer: It could turn into a career. OK.

Student: I think the older you get the less time you have for these video games. The more things you are involved in and people you need to talk to; you don’t really have time to sit in front of TV playing video games.

Interviewer: OK. Comment?

Student: Me personally I don’t do a lot of video games. I think that people spend way too much time on them. They spend almost like $300 a month on games when they could invest the money into something better instead of throwing it into a game. In like 2 to 3 weeks the game gets old and you are out looking for a new one. It’s hard to earn that money and then at the end of the week you spent that paycheck on something so useless when you could be saving that money for college tuition or something.

Interviewer: Good point. Alright that is the last question that I have. Were there any questions that you may have about me or computers, or my paper that I’m working on, my dissertation is what it’s called?

Student: What made you get into computers?

Interviewer: What made me get into computers? Actually I attended Bowie State also and I was actually in who said Business Administration earlier right. I was in Business Administration but they require you to take a computer class so I took a computer programming class and about mid way through the professor said this is one of the toughest classes on campus and you are just breezing through it you really need to consider changing your major to computer science and I went and did a little research and saw how much money they make and it didn’t take me long to say I’m a major in computer science and my minor is in accounting and that’s what I did. I thank that teacher almost everyday. Every time somebody ask me that question. That teacher played a major role.

Student: So your teacher told you to work with computer right, so how was it when you first started how much did you really do on the computer?

Interviewer: Like I said I was required to take a computer class and I took computer programming. We had computers, I went to Friendly High School and we
did have like one computer in the back on the classroom and it was a Macintosh.

Student: What year did you graduate?

Interviewer: I graduated in ’88.

Student: For real?

Interviewer: Yeah and there was one computer it was a Macintosh and I wasn’t even one of the people who was on that computer. Someone else would be on it doing whatever. I played video games a little bit but . . .

Student: That wasn’t the school where you learned?

Interviewer: No. I never knew until I took that class. I’m happy I did.

Student: So what’s your paper discussing?

Interviewer: My paper is African American males in Computer Science Examining the Pipeline for Clause. Some of my research, they make us do a lot of reading when you do your dissertation. It’s a lot of reading you get used to reading. Through my readings I found out that there’s a big, there’s a strong need for people to major in computers but what’s happening is that there are not too many African American males in computers. So I’m trying to find out and I’m trying to help do two things: One – fill that gap that’s needed. There is a strong gap. We have to have more people majoring in computers, black, white, red whatever but my thing is why not us. What I mean by that is African American males.

Student: Of all the schools you attended, which one helped you the most?

Interviewer: That’s a tough question plus you know my advisors are going to be reading this. My thesis advisor is on this committee. She’ll see this and at GW I have about 3 people that are on my committee that will review this. They say yes or no whether I graduate or not. Even with all that being said I would have to say Bowie State because I came just as we just talked about. I came in not knowing some skills that I already had and through being there for those four years they brought that out and there was a lot of stuff I learned not only in the classroom but outside of the classroom. So most people probably would say there undergraduate year and I’m not going to be any different. I would say most definitely my undergraduate year at Bowie State but after that point it’s really the advisors and the people that you meet. I do a lot of work with my committee members and I don’t know a lot about GW but I know that my committee members are No. #1. I’m glad I got them. So you really work more with professors
one on one as you move up the ladder versus when you are an undergraduate you give (inaudible) a lot of stuff from the school. I hope that answers your question.

Student: You took a class at Bowie State did they teach all the stuff for computers or did you have to have prerequisites like math skills and stuff like that?

Interviewer: Good question. They teach you a whole lot but it does require that you have those analytical thinking skills. That’s why mathematics is one of the requirements if you are a computer science major. Computer Tech and MIS major it’s a little less math. So there are alternatives. Let’s say you think I’m not strong in math I don’t want to do computers you can take other majors that have something to do with computers but not as much mathematics has to be taken and it’s different at each school as what that major could be but they teach you a lot and most cases right now students have graduated from Bowie and their out now in training. You are not going to learn everything about computers no matter what school you go to. When you get hired you are going to spend that summer going to training. I know because that’s what I did when I graduated. I went for a month or six to eight weeks I was in this training class and this training class. You still get paid but you can’t just jump right on a project. You got these four guys that’s working on a project for a year or two. You coming right out of college they going to send you to training to do specifically what they are working on. At Bowie or Howard or wherever you are going to learn the basics. You are going to learn what comes out the books but you need to go to training so you can learn exactly what’s going on in that project. Because when they get you they want you to do exactly that.

Student: I totally agree with you topic and all that but I see as me being an African American male, I see a lot of young kids active they like to do physical things. I’m not saying computers are boring but a lot of us don’t look that far or look in that direction a lot of young males look at sports and see stuff like that. They don’t actually look at computers and making a life out of computers. Not to be racial or anything but whites they like to do stuff like that I wish that African American would do stuff like that also but we have a different mindset. You see what I’m saying?

Interviewer: I have to go back to that statement we can’t say all whites or all African American males, not all. My thing is its more opportunity or more selection and more choice and let them know it’s not only . . . that you can be more. Let them no that no only can you be like LeBron or Kobe you also have an opportunity to make a good living and to get a house, car and you might end up at Yo MTV Cribs but I found what I got. It’s just to let you see the opportunities are out there.
Student: I think it’s different for me, I honestly see how a lot of African American males or black people in general are not into computers. I can say a lot of them aren’t into computers because from what older people told me black folk back in the day were more focused on education and more focused on wealth but a lot of people now I can’t really speak for this school but I was going to Flowers, I went to Flowers last year and the school was like brand new. They had brand new books, nice computers but it is a good school built good, but that doesn’t mean the students minds are good up here . . .

Interviewer: Make use of the technology that is in the building.

Student: You can give all the people the material but this school it’s a mix of race so when you have a mix of race you gonna see from one mentality you gonna see everybody else’s mentality. When I was going to Flowers, I was like you got all this stuff use it to it’s best advantage but they are thinking about that because a lot of them are born into poverty a lot of them that go to that school and live around that area are going into poverty and the reason why I say this school here is good because a lot of people nowadays they won’t say it they are going to hide that they are in poverty but the glorify poverty because they haven’t seen that other aspect. People that have gone that route and seen that route and they are given a different opportunity those are the people you see doing the wonderful things like instead of playing basketball you are the coach being white. I think that there aren’t a lot of African American males that aren’t doing computer science because doing computer science you aren’t the person that’s on MTV Cribs you are the person who’s directing and showing MTV Cribs. Showing all the animation stuff and things like that. They are not showing the person who’s behind the scenes. The person who’s behind the scenes is always the person in charge. The person who’s being shown is not the person in charge. Just like when you play basketball it’s like you are a slave at the same time because you are playing basketball and the coach is telling you dah, dah, go do this go do that, he’s telling you what to do. It’s the system made that way so you don’t be thinking in that type of term.

Interviewer: OK. A lot of good points in there? Any other questions or comments?
BSU Underclassmen

Interviewer: When did you first become interested in computers, computer technology and computer science?

Student: When I got hired at the National Security Agency in high school and I got introduced to various things that had to do with computers.

Interviewer: OK

Student: Well I got interested in the late ‘80’s with the Commodore 64.

Interviewer: Commodore 64. Anyone else? When did you first become interested in computer science?

Student: In computer science or computers?

Interviewer: In both.

Student: Well I’ll say computer science last semester because I was an electro-engineering student and then I switched to computer science because I thought this would be easier.

Interviewer: Same reason? You switched?

Student: I was going to say it’s the same hardness.

Interviewer: OK. Anyone else? When did you first become interested? Give me ages like middle school, elementary, high school.

Student: Elementary

Interviewer: Elementary

Student: Senior year

Interviewer: Senior year in high school.

Student: Middle school

Interviewer: Middle school

Student: College

Interviewer: College
Student: High school
Interviewer: High school
Student: On my job.
Interviewer: On the job. OK. This question I came up with from going to talk to elementary, middle school students. When you were in elementary and middle school what were you thinking about doing at that point?
Student: When I was in elementary school I wanted to be a rapper.
Interviewer: A rapper.
Student: Yeah
Interviewer: You don’t remember? Anyone remember?
Student: I wanted to be in sports.
Interviewer: Sports
Student: Electronics
Interviewer: Electronics
Student: I was thinking about taking a part stuff.
Interviewer: Taking apart stuff. Video games.
Student: Banking
Interviewer: Banking. Something in banking.
Student: Baseball
Interviewer: Baseball player. OK that’s pretty much the same answers that back in elementary and middle school. Why did you continue to major in computer science or computer technology?
Student: It was easy.
Interviewer: Because it’s easy. OK.
Student: Well before I was electro-engineering I was graphic communications I switched to this . . . no in high school it was graphic communications,
college it was electro-engineering. I switched to this because of more money.

Interviewer: More money?

Student: Yeah.

Interviewer: OK

Student: I agree.

Interviewer: What you say?

Student: I agree.

Interviewer: you agree more money.

Student: I joined this field because you can get paid more for what you know for less physical labor.

Interviewer: Less physical labor. OK. You can get paid for your knowledge. OK. Who were some of the people who influenced you to participate in this area?

Student: Bill Gates

Interviewer: Bill Gates

Student: My brother.

Interviewer: Your brother.

Student: Professor Stone.

Interviewer: OK. Professor Stone.

Student: Nobody really.

Interviewer: Nobody.

Student: My former boss.

Interviewer: Your former boss.

Student: It was some dude at my church who had this company and now he is a millionaire so I was like I want some of that.
Interviewer: OK.

Student: My older sister.

Interviewer: Older sister. OK. Out of these folks any of them African American males?

Student: Yeah

Interviewer: The guy you are talking about that started the business.

Student: Yeah him.

Student: Yeah my brother.

Interviewer: Your brother. OK. What about for some of you who work how many African American males on the job in computers? Your role models? Give me some numbers.

Student: I say two or three

Interviewer: Two or three in your department out of how many people in total.

Student: About 22.

Student: In my office it’s about 20 people and about 6 of them are black and work with computers.

Student: Out of 40 people I would 20 of them are black.

Interviewer: OK

Student: I work solo.

Interviewer: What would you advise your former school K-12 to do in order to get their students ready for this particular major?

Student: Learn as much math as you can.

Interviewer: As much math as they can learn.

Student: Think outside the box.

Interviewer: They must think outside the box.
Student: I’d tell them to do more critical thinking.

Interviewer: Critical thinking, more critical thinking.

Student: At least a beginning programming class because my school didn’t have a programming class.

Interviewer: You would recommend a beginning programming class. At what level? How far down? Elementary, middle school, high school?

Student: High school should at least have it.

Student: I had programming in high school.

Interviewer: You had programming in high school.

Student: We had quick basic.

Interviewer: You had quick basic in high school.

Student: We had java.

Interviewer: You had java in high school.

Student: We had C++. I didn’t take it.

Interviewer: You had C++. You said go back as far as elementary?

Student: Yeah.

Student: I got a niece and she is doing something real basic, simple programming in elementary right now.

Interviewer: How many of you have taken a programming class before you came to college? OK 4 out of the 13. OK what language if you don’t mind me asking? C, C, Java, C++. OK. Alright would you say any of the schools or things you did in school, teachers, classes, stay in school jobs, organizations, clubs . . . did any of this have any influence.

Student: No

Interviewer: You say no.

Student: My elementary programming class did. It taught logo.
Interviewer: OK elementary class taught logo. OK. Any others? OK. What does a computer scientist or computer technologist do just in general. What would you tell someone elementary school?

Student: What programmers do?

Interviewer: I didn’t say programmers. Computer scientist or computer technologist. What do they do?

Student: Computer scientist major uses technology to logically solve problems that they cannot solve normally with human tools and computer technology major is someone that specializes in developing the technology for computer scientist to use.

Interviewer: OK. No one wants to add anything to that one.

Student: I would say if you are computer scientist you just flat out program.

Interviewer: OK a computer scientist does more programming.

Student: And computer technologists are more software hands on type people.

Interviewer: OK. When I’m doing this study someone asked me what is the study about and I say African American males in computers some folks sort of make a suggestion like why. Like why are you doing this study? Do you think this study is at all important?

Student: I think it is very important because there are probably not a lot of African American males in computer science. There is probably more white or those of other ethnicities that are in computer science then us.

Interviewer: OK.

Student: I have to agree with Devin but adding the fact that the number of computer science majors attending college are on a deficit.

Interviewer: In general?

Yeah.

Interviewer: OK. Anyone else?

Student: Yeah I agree with them. I was talking with some guy over the weekend, he was like what’s you major and said computer science. He was like you are going to be the only chocolate chip in the whole cookie.
Interviewer: OK at any point did it get tough?

Student: Of course.

Student: Yes.

Student: Of course.

Interviewer: Any thoughts of quitting or changing your major. Walk me through the thought process. You never thought about. You thought about it but.

Student: I thought about it but I got too many credits towards this major. I’m not turning back.

Student: I thought about it but the place where I work would not accept it. You cannot be a music major and try not to work the computer. You got to go with what’s best.

Interviewer: OK.

Student: I work with computers my whole time why change now.

Interviewer: OK anybody else? There is a major term in my dissertation called disidentification. I’ve done some reading and they say that in different areas elementary, high school and middle. They say that African American males disidentify with computers. Meaning that they don’t want anything to do with computers or sciences because it’s hard. Not that they are disinterested. They just disidentify with it. They don’t think it’s cool. Speak to that.

Student: I think it’s cool to be smart.

Interviewer: OK

Student: It’s cool to have money. This is a field where you can make lots of it.

Interviewer: OK. Anyone else?

Student: Everybody can’t be a rapper. Everybody can’t be an adult football player or basketball player. So you got to work hard to get something and go for it.

Interviewer: OK. Now again I’m asking you to go back to elementary school, middle school when you back in elementary, middle school, high school and you started thinking as you got older to go into computers do you think you could refer back to this term disidentification?
Student: No. The fact of I’d rather be cool then to try to get good grades in school. I don’t want anyone to know. Is this a fad? Did you go through the fad?

Student: No it was instilled in me that it was cool to have good grades.

Interviewer: OK. Who instilled that?

Student: My parents.

Interviewer: Parents instilled that. OK. Anyone else? Last one had to deal with facebook and myspace. Let’s close out on that one. Last week I asked middle schoolers who spend more time on myspace then doing their homework. I asked you guys about facebook. Does anyone want to admit that they spend more time on facebook then they do on homework?

Student: Naw. Facebook you just check.

Interviewer: You just check it and log out.

Student: It’s a form of email.

Interviewer: It’s another form of email.

Student: I don’t spend that much time on that.

Interviewer: OK. What about video games?

Student: I don’t play.

Student: I don’t play video games no more.

Interviewer: No video games.

Student: When I got my PS3, man I was on it.

Interviewer: You spent a lot of time.

Student: I was on it. I spent a lot of time on it but then that fad burnt out.

Interviewer: So another fad video games. Anyone else video games?

Student: That’s my life.

Interviewer: That’s your life video games. So you finish your homework then get on it?
Student: No I finish the game then do homework.

Interviewer: Well that’s what we want honest answers. Alright any questions of me? I’m finished with the questions. Any questions, with regard to the study?

Student: What exactly is the percentage of African American males in computer science fields?

Interviewer: In computer science fields. I’m going off the top of my head. I don’t have this memorized yet. As far as majors we are at under 5%.

Student: For real?

Interviewer: Yeah. If you put everybody that is majoring in computer science only 5% would be African American males.

Student: We need more.

Interviewer: The need for more computer scientist and computer technologist is and you always hear the term will you find an African American male more likely to be dead or in jail. So we can get a certain percentage. We can’t get everybody. Like I said in my presentation to my own committee members, I’m not searching right now for the folks out on the corner selling drugs. I don’t I change them into computer science majors but can we catch them early enough, elementary, middle school get some of them interested. So they can be sitting in your seats. That is what this study is about. Taking a look to see what’s happening right now. It’s not going to solve anything I don’t think right now but at least we can see what the next study should be and you guys can follow up.

Student: The industry isn’t hurting from the lack of African American males not working is it? Because they just ship the work out to Asia and wherever else right?

Interviewer: There was a question brought up at a conference which I attended a few weeks ago and the speaker said that the company’s would rather hire if they had someone over in India and they charge $50,000 versus someone coming out of Bowie State, Harvard or Howard and they want $80,000, who do you think are going to hire? His answer was they are going to hire both. It’s so viable to have somebody that is that smart and knows computers, I’ll take both of you. That speaks to the fact that we need more and more. So you’re right companies are going overseas but they are finding out we need them plus the ones here. Another other questions?
BSU Upperclassmen

Interviewer: When did you first become interested in computers? Anyone?

Student: I became interested in high school.

Interviewer: High school.

Student: Middle school

Interviewer: Middle school

Student: I say right before high school.

Interviewer: Right before high school

Student: Middle school

Interviewer: Middle school

Student: Elementary

Interviewer: Elementary. OK.

Student: High school

Interviewer: High school

Student: Sophomore year in college

Interviewer: Sophomore year in college. OK we will touch more on that. Once you developed this interest what were some of the reasons why you continued on with this major?

Student: Just because I wanted to learn how to fix computers.

Interviewer: You wanted to learn how to fix the computers. Anyone else what was the motivation for this major?

Student: It’s a good field to know and it’s very lucrative.

Interviewer: OK good field to know. Very lucrative.

Student: Help people problems in helping them fix their computers.

Interviewer: OK help people solve their problems by fixing the computers.
Student: Open for a lot more job in the future. Computer based jobs.

Interviewer: Job opportunities is the motivation.

Student: The financial aspects.

Interviewer: The financial aspects. Alright who were some of the people who influenced you in your participation in this area?

Student: Bill Gates

Interviewer: Bill Gates. Anyone else?

Student: My mother.

Interviewer: Your mother. OK.

Student: My sister.

Interviewer: Sister.

Student: Uncle.

Interviewer: Your uncle. Anyone else any influences? Of those any African American males?

Student: My father.

Interviewer: Your father. OK. Same your father.

Student: My uncle.

Interviewer: Your uncle. OK. African American males who served as motivation or role models.

Student: Professors

Interviewer: OK professors as you got into Bowie. OK.

Student: My brother.

Interviewer: Your brother. You said brothers, how many?

Student: Two
Interviewer: Two. OK.

Student: My high school ROTC teacher.

Interviewer: Your high school ROTC teacher got you interested in this area. OK. What would you advise your former school, if you could go back to K-12 in order to give the students who are currently there get them ready to major in computer science or computer technology what would you say? How would you advise them?

Student: Read

Interviewer: Read. He second that.

Student: Read

Interviewer: Read

Student: Read

Interviewer: Read. He second that.

Student: And practice.

Interviewer: And practice, what are we practicing?

Student: Basic computer concepts.

Interviewer: Computer concepts.

Student: Crack open a C++ book right quick.

Interviewer: Crack open a C++ book. OK.

Student: Start right now.

Interviewer: And that was my next question how early, how soon would you say . . . ? High school, middle school

Student: Middle school and sixth grade.

Interviewer: Middle school.

Student: Sixth and up.

Interviewer: OK. Soon as they say they like computers. What do you recommend pull out the C++ book?

Student: I recommend just basic concepts.
Interviewer: Basic concepts

Student: Like the basics. Not actual programming. The basics of computer then work your way up.

Interviewer: Did you experience that, I’m asking you to think back.

Student: I took typing.

Interviewer: Typing and what was that high school?

Student: Middle school

Interviewer: Middle school. OK.

Student: There were no computers.

Interviewer: No computers at all in high school.

Student: If they were they weren’t working.

Interviewer: Oh they weren’t working. OK well now that you know how to fix you can go back and work them. Did the school’s influence your interest in computers, computer technology and computer science? Like teacher, classes, stay in school jobs? Did they organizations or clubs?

Student: I had a computer club in my high school?

Interviewer: Ok and you participated.

Student: Yeah

Interviewer: OK. So both they had one and you participated. Anyone else did they have them?

Student: I had a computer club in my high school as well.

Interviewer: And you participated?

Student: I participated.

Interviewer: OK.

Student: Any influence that I had really didn’t start for me until I got to college.
Interviewer: It really didn’t start until you got to college. OK in school influences didn’t start until the college level. OK couple other people. Three people shaking their heads. OK what would you tell a elementary student or middle school student that a computer scientist or computer technology does? What do we do? Or what are you going to do? If a seventh grader came up and said what does a computer technologist do? What’s your answer?

Student: That’s a broad subject. It’s a lot of things that go into that.

Interviewer: What are some of those things?

Student: We troubleshoot.

Interviewer: Troubleshoot.

Student: Networking


Student: Database

Interviewer: Some database.

Student: Web development

Interviewer: Web development

Student: Computer graphics

Interviewer: Computer graphics

Student: Writing computer code

Interviewer: Write computer code

Student: Building computers

Interviewer: Building computers. Sometimes when I’m asked what are doing your PhD on I tell them African American Males in Computers and sometimes I will get asked, “Why”? Is there really a problem? So I’m asking you what do you think about that?

Student: I think now you see a lot more African American males especially who have shown interest when they get out of high school and they tend to show more interest at the college level a lot more now than before.
Interviewer: OK you are saying you think they show interest . . .

Student: Most people who show interest in high school tend to pursue that in some form out of high school. Either in college or work.

Interviewer: I’m not trying to tell you what you saying . . . are you saying they don’t show that interest before high school.

Student: You see a bigger trend now then before.

Interviewer: OK. I got you.

Student: I think a lot of them have interest and then see that it is too hard and drop off.

Interviewer: OK. It’s hard so they drop off. Anything else? Let me ask you this of those of you that work how many African American males do you see at your job?

Student: Me and my co-worker.

Interviewer: OK so you have one co-worker.

Student: How many people in the office total?

Interviewer: About 15.

Student: So out of 15 there’s only 2.

Student: 3 out of 10.

Interviewer: OK so 3 total out of 10.

Student: It’s 7.

Interviewer: It’s 7 out of 15. OK. It’s high. OK at any point did it get tough? You guys are coming towards the end of this degree.

Student: Yes

Student: Yes

Student: Yes

Interviewer: Yes. Explain. You don’t have to name names but.
Student: Programming if you don’t want to do programming and you are CTECH major you have take programming because it’s part of the degree process. That’s tough! Classes like networking if you don’t want to network and you want to do something else like web development that’s what you want to do that’s your passion but you have to do it to finish your degree.

Interviewer: OK of you pretty much agree with that statement. OK did you ever think about quitting?

Student: Yes in unison

Interviewer: Can you walk me through that process because you are still here. Walk me through I thought about but I thought . . .

Student: Well I thought about it Junior year because it was getting to hard and then I thought about what I was going to after if I quit and I was like I should just stay in school and try to work it out.

Student: I thought about it and I say definitely around Junior year I was like a lot of this stuff is just not sticking and a lot of times as far as my work schedule and on top of going to school full-time and I thought about what I could pursue other than being in this field and definitely the opportunities are there but this is what I want to do. So I’ll be here until I get it done.

Interviewer: Anybody else? Thought about it then what did you do?

Student: I never thought about it.

Interviewer: Never thought about it.

Student: Sophomore year. Computer Science 113 – Programming. Nobody told me it wasn’t in my major. Everybody was like you going to have to do it so you might as well get rid of it. So I just didn’t want to do it anymore. I was about to become a Biology major but then I sat down with my advisor and she me this was my last programming class.

Interviewer: So while you were going through it for those years, you said your advisor was there someone that you could go to and talk to?

Student: Yeah there were plenty of people.

Interviewer: Plenty of people so it wasn’t a solo decision.

Student: Talking to the professors was a venting process. They said which ever way I decided to go they stood behind me either way.
Interviewer: OK. Alright. One of the major terms in my dissertation is disidentification. In simplistic terms it has to do with do you think getting good grades is cool? Do you think majoring in a science is cool? Some of the studies show that especially in elementary and middle school years that African American males disidentify and they don’t want any parts of being smart or any part of liking sciences. Did any of you encounter that growing up and at what level elementary, middle school?

Student: When I got to college, second year of college that’s when it all went down hill. I couldn’t keep up with the studies and stuff. So I just didn’t care.

Interviewer: So at that point you just didn’t care. So but early on there was no disidentification there?

Student: I wanted to be the smart one.

Interviewer: You wanted to be the smart one. OK anybody else can relate with disidentification?

Student: Big time

Interviewer: Big time, what in like elementary, middle

Student: It wasn’t as far as the education process. It was the simple fact that I would rather be playing outside and doing something else besides hitting the books hard and as I grew it was more of a forceful process when I was younger elementary and middle school even to up to my junior year in high school where my parents were literally like no you are going to come in the house and you are going to do this and I don’t care what you say like that whereas now its like now I understand there is nothing cool about being ignorant, stupid or dumb in the ways of the world.

Student: Mostly I was challenged when I was younger.

Interviewer: You were challenged when you were younger.

Student: To pursue higher grades.

Interviewer: OK anyone else on this side? When you were elementary and middle school what did you aspire to be when you grew up?

Student: A fireman

Interviewer: Fireman
Student: Soccer

Interviewer: Soccer player. OK.

Student: A cop

Interviewer: Cop

Student: An athlete all day.

Interviewer: Athlete

Student: Football

Interviewer: OK. Football.

Student: I wanted to be a martial artist something like that.

Interviewer: Martial artist. Basketball player.

Student: I wanted to be a boxer.

Interviewer: Boxer. OK and a lawyer. Athlete it’s still the same. Elementary and middle school they are pretty much still saying the same thing. OK last question I just want to know how much time is spent on facebook? Give me any quantify that you can per day.

Student: One hour a day maybe.

Interviewer: One hour a week one hour a day.

Student: About two or three hours per week.

Student: I don’t have time for none of that stuff.

Interviewer: From the beginning a couple of times a week.

Student: A couple of times per week.

Student: When it first started . . .

Interviewer: When it first started same thing with you. Myspace or facebook.

Student: At first it was like she look good then you keep on clicking and it’s like she look good she look good, I know her and you just keep going and keep going you can be on there for like six hours . . .
Interviewer: That was in the beginning. Did that affect your grade?

Student: Yeah for that semester.

Interviewer: For that semester. So facebook made your grades go down? I just want to go on record that somebody said it. Well I got to ask what about video games?

Student: Oh video games 24 hours a day.

Interviewer: 24 hours a day. Wait a minute I got to get this one.

Student: Whenever I was out of class and the four hours that used for sleep I was playing video games.

Interviewer: Video games

Student: Like four hours a day.

Student: Three or four hours a day.

Student: About four hours a week.

Interviewer: Four hours a week on video games.

Student: Two hours a week

Interviewer: Two hours a week

Student: All day

Interviewer: Alright that’s all the questions I have are there any questions of me?

Student: What made you go into computer science?

Interviewer: Let’s see when I came into Bowie State I was actually and accounting major and I had to take a computer programming class 112. I took 112 with Professor Dove and she just pulled me to the side towards the end of the class and said this is real tough and you are doing real good and you made it look easy so you should think about changing your major and I did sort of like some of you guys. I did some research and found out you can make a lot of money and I quickly changed my major. That’s what got me interested in computers. I was never really into the video games. I never got on the Macintosh at my high school. When I was in high school I was never the one to go over and do that. I would sit back and talk about
everybody else on the computer. I started teaching once I got to grad school. I substitute teach for a professor and once I did that first class that was it.

Student: Have you ever felt like you wanted to stop teaching or necessarily teaching at the college level?

Interviewer: While I was finishing my course work at GW for the PhD, I did work for about two years in Rockville. I do know what that is like I don’t necessarily want to go back. I’ll put 50 hours in a Bowie before I’ll do that. I’ve never really thought about not teaching here at Bowie. A lot of people ask what are you going to do when you finish. I’ll probably stay at Bowie and teach. Any other questions?
Interviewer: When did you first become interested in computer science?

Student: 10th grade

Student: For me since I was like in the 7th grade is when we got out first computer and I was also at Robert Goddard Middle School and our my teacher got some computers and he was like oh I need some help setting them up and I went over and I was able to put things in the right places and it felt natural. So I just fell in love with it.

Student: First it started I was interested in video games and that what got me interested in computers.

Interviewer: Playing video games.

Student: Not actually playing them but playing in one way but actually seeing how the fit together. Seeing how they use computers to animate.

Student: It was probably like 3rd or 4th grade. Back then computers weren’t all that hot.

Interviewer: But the interest was there.

Student: Right.

Student: For me it was just playing video games.

Interviewer: Playing, OK.

Student: I was about 13 or 14.

Interviewer: So 13 or 14 that’s about 7th grade. OK.

Student: Yeah I was kind of at the same age. I was around 14. I started working my first summer job at a law firm with the IT Director and kind of grew from there.

Interviewer: OK. Why did you continue on to major in a computer area?

Student: I continued because it was something that I was always interested and I wanted to pursue it somehow and at the same time I knew it was a lot of money out there in the computer science field and a lot of people made a lot of sacrifices for me. My uncle provided me with an internship job
working for a company doing some small computer stuff. My dad helped me get into the government. I now have a full-time government job doing IT work. Now I’m just pursuing what I like to do. I just fell in love with it.

Student: Well in my case my parents and my brother there are not a real technology family. They are not scared of computers but just don’t know how to use it and for me it was kind of a set back. I wanted to do it but since everyone around me didn’t want to do it, I really didn’t want to do it. So once I got to high school and college I wanted to do it more because I saw how all kinds of programs were being made. You know what you can do with C++ and I pretty much tried to bring that back home and show them. And then they come to me and ask me how you do this and that. So that is why I was so interested.

Interviewer: OK

Student: For me it’s something I like to do and if you like to do something that could be turned into a career you should and technology is all around so you have to get on board and try to make a good living out of it.

Student: I got an internship and realized it was a lot of money involved and it’s ever evolving so it definitely struck my interest and it is something that is going to be around for a long time.

Interviewer: OK. Who were some of the people who influenced you to stay on this track?

Student: My parents knew I was in love with computers and they really wanted me to take initiative and keep going on with my love for computers. First I really fell in love with graphic design when I was high school. I wanted to go to and I really just wanted to go to art school. My dad was telling me you need to be more well-rounded and that you should get a degree in computer technology and Bowie State was the most appealing. So my parents just kept the drive going but my uncle and my math teacher were just a couple of other people I was working with and they were saying if you good you might as well stick with it.

Interviewer: Which grade do you remember was the math teacher?

Student: The math teacher was 7th grade and when I got to high school I took my first graphic design class. That was 10th or 11th grade. It was 10th grade. That is when I really just started to fall in love with computers.

Student: For me I think the professors here at Bowie State actually helped me like Melchishua he is the art teacher over there and he pretty much pushes
everybody to be creative with their work and he will tell you things to add on to it things to take away from it pretty much keeping it simple.

Student: For me just everybody that I came into contact with that helped with a computer program. They were like you are good at this you should continue doing and especially if it’s something you like to do. That’s it for me.

Interviewer: OK.

Student: It’s more so my co-workers at the time that I work with just learning new experiences through them. Professors didn’t really start to help me until I came to college and my high school didn’t really focus on a lot of technology.

Interviewer: What would you advise the former schools, elementary, middle or high school looking back now as you guys are getting closer and closer to graduating. What would you advise if you could talk to some of the administrators back at your old schools to get students ready for computers and even science in general?

Student: I would tell some schools especially in PG County to carry some programming classes. Nothing too major. Just like small C++ stuff just like “hello world”. That could just really get kids going to know that everything you see on a computer you can do and build from scratch.

Student: Back when I was in high school we didn’t touch anything on the computers. I got all my love for computers in college if high school, middle school and elementary actually starting pushing computers, programming and stuff like that then we would probably have more computer programmers and technology majors.

Student: If you introduce that basic knowledge out there and you see something you like then you can take and run with it.

Student: I agree with the group. There should be some kind of basic introduction to technology more so hands on needs to be in place. They need to see real stuff that relates to them.

Interviewer: Did schools influence your interest in computer science, like teachers, classes, stay in school jobs, organizations, clubs, etc.

Student: If I didn’t have my stay in school job I would still get my degree but I wouldn’t be at my full-time job now. Soon as I heard about stay in school job like a minute and I just stay in it from where I started here I’m up to
here now just like my initiative just taking things that I know and showing people what I can do. So definitely stay in school job.

Student: Stay in school job was the big for you. Prior to college did you have any African American males serve as a role model?

Student: Yeah I had the opportunity at my first job, I was 14 my first summer job, the IT Director there was actually African American. So he kind of put the bug in my ear.

Student: My uncle for sure.

Interviewer: He’s in computers?

Student: Yeah. It’s funny because I didn’t even know him until my dad introduced me to him and when I first met him he gave me a Microsoft NT book and told me read this. So I just read it and that is how I was able to get that internship. Just pretty much doing some defragging but just from there I was like wow. I’m getting paid to do this and it’s so simple. He was definitely like the big computer role model for me. I spoke with him just the other day just to give him a quick update just to let him know that he inspired me by just giving me a book to read.

Interviewer: Do you have any other relatives that your uncle has influenced? Any cousins or siblings?

Student: Not too much relatives. He does do a lot of inner city things with computer technology. He was just telling me about that. He was just telling me to pay it forward. He was saying I basically help you so help someone else.

Interviewer: You said he told you just what I was going to tell you. Anyone else? Tomorrow I’m going to Kenilworth Elementary School what would you guys tell anyone K-12 about majoring in computers? What would you have to say?

Student: Keep reading.

Interviewer: Keep reading.

Student: Yeah.

Student: If you don’t like math you have to learn how to love it. It is definitely going to come into play.

Interviewer: What does it mean to be an African American male in computers?
Student: I have been working up in Baltimore for about three summers now and I worked this whole year as an intern. Today I just started as a full-time associate and I’m the only black person still in my department. There is definitely a shortage of black males as well as females in the IT world.

Interviewer: How many people are in that department?

Student: On my team about 25. I’m the only one under 25 and the only one black.

Student: In my office my team leader is actually African American. It’s only three African American males in my office.

Interviewer: How large is that office?

Student: For our main office it’s about 35 people. It’s three African American males and we are all on the information technology team. So just shows that we stick together I guess.

Interviewer: You want to add to it?

Student: The job I'm at now which is UPS I'm not in the IT or multimedia section. I look at it like a stepping stone and since they are like the only ones there. They are showing that it can obviously still be done regardless of race or ethnicity.

Student: My internship now that I think about it, I think I only seen one other black guy on the floor and he is like in my section but other than that. I don’t think I have seen anybody else other than the security office.

Interviewer: I was asked this question, why am I doing this study? Why African American males in computers? Do you guys see any reason why a study like this should be done? If so what kind of explanation could I give folks?

Student: This study should be done because it shows that anything can be done. A lot of people look down on African American male just from statistics and stereotype and things of that nature but it shows that just within us four we are a small population of the computer science department here at Bowie State but just within us four it shows that we actually love computer science and we are actually pursuing something that we love. It just really shows people that if you like computers just pursue it. Who cares what color you are or your background. Don’t let that be the thing that will stop you from pursuing your dreams.

Student: Yeah we can do more than just rap or play basketball.
Student: That’s true.

Interviewer: I agree. Anyone else? Ok at any point did it get real tough? Do you want to expand on that? How did you approach it? It can be at any point?

Student: For me it was definitely . . . it was real tough. I didn’t think I was going to get through but I had a group of friends who had taken like 3 or 4 courses together and we just put our heads together and stuck together. We just worked together as a team to get through it. It was definitely tough. If it wasn’t for Nick or Bill I don’t think I would have made it . . .

Student: We failed it and then we took it again together and passed it the second time.

Student: It was definitely tough. I would say Dr. Langdon is one person, she is a tough teacher but at the same time you are going to feel so good because you were able to accomplish because she doesn’t let you take the shortcut.

Student: She has no mercy.

Student: Yeah. You got to walk the road.

Interviewer: You guys concur with that?

Student: I just wanted to say that when you pass reading, reading, reading. Read to comprehend and understand. If you got to read it again, read it again.

Student: And don’t be afraid to ask for help.

Interviewer: So is that some of the same advice you would give someone just coming in to take 112 and they see you in the hallway? You guys about to graduate, what do I need to look for in this department?

Student: Read your book.

Student: Right.

Student: Definitely find someone in the class who you might just bond with. You can like help each other out. Don’t be afraid to go to the teacher because they are here for you. I stayed in Dr. Langdon’s office. I stayed in Professor Hughes office. I was almost sleeping in there at one point just to pass the class because I knew she was going to be there for me. That is the one thing don’t be afraid of the professor.
Interviewer: What errors are made along the way either by yourself or that you see other students? What are they . . . I have an idea but as a fellow classmate. This is what you need to be doing or not doing.

Student: Students loose focus.

Student: They just give up and you got to have that in you not to let yourself fail. Even if you fail don’t be afraid to try again.

Student: Procrastination. That kills a lot of students.

Student: That is something I don’t think you can learn in the classroom. That’s like a life lesson that you have to develop.

Student: I approached school like it was my job because I’m paying for school and I might as well treat it like a job once I’m done working there will be a payoff. So I might as well do my best. That is one thing I came into school doing really treating it like a job. One error that I made was I didn’t really read my books as much as I should have and I definitely regret it at some points and now I starting to learn that. So I’ve started reading my books again. Procrastination was really big for me especially coming toward the end of the semesters. You just get so relaxed. I know if I did my assignments when they were first issued to me I wouldn’t be stressing out. I definitely say when you get just do it. It will make your life a lot easier.

Interviewer: Do you think these issues pertain more to African American males, African American females, everybody the nature of computers?

Student: I think everyone deals with it at some point. Especially procrastination. I think that is just something that will have to deal with. I think as African Americans that is something we really have a problem with. I know speaking for myself I know sometimes I just don’t like to read but I know once I do read I get a lot accomplished out of it. So that is really one thing that should get pushed hard is to read. Turn the TV off, put down the video games and dedicate 15 to 30 minutes to reading a day. It can really change your life.

Interviewer: My final question is are there any questions for me?

Student: What was your thought? You said you had a thought for the reason things might be?

Interviewer: Why we needed the study?

Student: Yeah.
Interviewer: I’ve done a little more research so I know the number and the numbers are showing a large shortage of African American males I’m sorry a large shortage in general of people who major in computers and we need to fill that gap but at the same time it was said that there are more African American males in prison or dead than are in college. So my task is to get those numbers increased for not only going to college but also moving into computers. Not only trying to get you to come to college I’m trying to get you to major in computers. So I got two jobs. The big term I been reading about is called disidentification. Some studies have shown that the women are disinterested in computers but they have the knowledge. The can do it but that is different from disidentification. That’s the purpose for this study to find out if there is some disidentification down the pipeline. That is some of the focus that I have had.
**BSU Upperclassmen**

Interviewer: When did you first become interested in computers?

Student: Fifth grade

Interviewer: Fifth grade

Student: The teacher just made up like a couple of reward and if you did good you every week you could get on the computer.

Student: You mean as a career or just interested in computers?

Interviewer: Give me both.

Student: More like middle school in high school I like more like in the feel of it.

Interviewer: OK. Anyone else?

Student: In the sixth grade. I was in a computer club.

Interviewer: Computer club, OK.

Student: High school.

Interviewer: High school.

Student: I say eighth grade because I used to play chess a lot and used to play with people and nobody could give me a good challenge so then I started playing on the computer. Seeing what the computer was capable of. So that’s when I became interested in them.

Interviewer: OK. Once you got this interest, what was your motivation as far as majoring in computers in college?

Student: I’d have to say money.

Interviewer: Money.

Student: I didn’t want to be a statistic. My freshmen year I read that 78% of freshmen change their major their freshmen year and I said not me I’m not changing nothing.

Interviewer: OK.

Student: And most people got to think hard about it. That was my motivation.
Interviewer: OK.

Student: I like the way everything was technology driven.

Interviewer: OK

Student: So I just wanted to be a part of that. Like the older generation knows a lot about them.

Interviewer: OK

Student: Like if me and my mother was competing for a job even though she has been in the field longer I could still get a faster than she would because is based on my computer skills.

Interviewer: OK anybody else want to chime in on that one.

Student: My first computer class

Interviewer: OK.

Student: I would say being around computers has kept me motivated.

Interviewer: OK. Who were the people who influenced you?

Student: A lot.

Interviewer: A lot of people.

Student: Influence me to say in the field?

Interviewer: Yes either stay in or get in.

Student: Actually I was thinking about this dude, I can’t think of name to save my life but he was the head of the engineering department at (inaudible) out Hamilton. We took a field trip there when were like in the tenth grade and I said I wanted be just like him because he was young had a vicious wife, nice car and a whole lot of money. I was like dang he was only like 28. I’m trying to be like him. He is a baller. So I kind of looked up to that.

Student: People that influenced me were like a bad influence because they were like computer illiterate and I was like I don’t want to be like them.

Interviewer: OK. Reverse. OK anyone else? OK. If you could go back and advise anyone of your K-12 schools, advise them on what to do to get the
students ready for this type of major in computer technology, what type of
advice would you give them?

Student: Start programming.

Interviewer: Start programming earlier.

Student: Or at least learn the concepts of programming.

Student: Being persistent and staying open minded, staying outside the box.

Interviewer: OK. How far back would you try to implement these plans? Elementary, middle . . .

Student: I say high school start programming at freshmen year.

Interviewer: Programming at high school. You too agree.

Student: I say get into the computer environment in elementary school start learning the different operations and stuff like that.

Interviewer: OK. Let me back up for a minute, when you were in elementary and middle school what did you want to be when you grew up?

Student: Astronomist.

Interviewer: Astronomist.

Student: A professional basketball player.

Interviewer: A professional basketball player.

Student: A firefighter.
Interviewer: A firefighter.

Student: Until I found out that the <inaudible>

Interviewer: Yeah that is a good observation.

Student: I wanted to be a car designer because I always used to think about how to get everybody else’s money. So I figured everybody wants to get a car when they get older. So that all changed when I found out you have to draw all the pictures and I can’t draw nothing so.

Interviewer: OK.

Student: Back to the drawing board.

Interviewer: OK. Did your schools, I’m talking about elementary, middle and high school. Did your schools influence you into taking computers? For instance teachers, classes, stay in school jobs, organizations, clubs, etc.

Student: I think so because in elementary we just started getting computers in fifth grade and no fourth grade and so we started getting computers in the classes. So the teacher would say the person with the best grades would be able to use the computers for like 15 minutes while everybody else had to do something else.

Interviewer: OK.

Student: Yeah I can say I remember those days too. There was only one computer in the class and if you finished your work or something before anybody else you could use the computer. That probably was a lot of people.

Interviewer: You had a computer class in high school

Student: No it was a club actually.

Interviewer: Oh a club.

Student: So we would come in there after school and they basically kept up all the computers in the school.

Interviewer: OK.

Student: I had a desktop publishing class. I also had an internship fixing computers while I was still in high school.
Interviewer: In high school you had an internship to do that. OK.

Student: It was after school but I didn’t get paid nothing. The class was like and independent study. It was me and a couple of other guys. We would walk around and play with computers, show them how do certain things and I was always interested but I still wanted to be an astronomist but it wasn’t until I came to college that wanted to major in computer science.

Interviewer: OK. Prior to college did you have any African American males serve as role models for computer science and computer technology?

Student: No.

Interviewer: No, no, no. OK five no’s. What about work in computers? Did you have any uncles? OK. Alright if you had to tell a fifth, sixth, seventh grader what a computer scientist or computer technologist does, how would you explain that? If they ask you?

Student: The superman of computers.

Interviewer: Superman of computers.

Student: Computer scientist or computer technologist, which one?

Interviewer: Both

Student: Well as far as computer scientist you could develop software.

Interviewer: OK computer software, develop video games.

Student: A broad field though.

Interviewer: You would say that it is broad.

Student: Like at my job we got IT specialist but you still have different series of IT specialist. So you can be an IT specialist and be a webmaster or some other type of IT specialist. It’s real broad, I would say.

Student: I don’t even no where to start at.

Interviewer: OK. Lately I have been asked what does your dissertation have to deal with and I say African American Males in Computer Science sometimes not all the time I get asked why are doing that or is there a problem. So I want to ask you guys what do you think about that topic? Do you think there is a problem with African American males being in computers? Or is there not a problem?
Student: Do you make a lot of money in that field as an African American male with that type of knowledge? So I think it is a good subject to talk about. How to get young African American interested in.

Student: I don’t know if it’s because where I was raised from but just that type of choice. I don’t really remember and African American person really dealing with computers.

Interviewer: OK. That’s part of the study.

Student: If a person came in from a different area they would probably say it doesn’t look like a problem here because of course we are a HBCU and a lot the people that are in computer science are male but overall yeah. I mean a lot aren’t in school period. So then you wouldn’t even think about dealing with computers. They want to do something like psychology.

Student: Communications

Student: Oh yeah communications something easier and get out of school in like two and half years.

Interviewer: For those of you that have worked on internships or full-time, can you give me some numbers as far as African American males that work with computers?

Student: Two

Interviewer: OK that’s two out of like how many in the department? Starting to build our internet section. Is it two out of ten, two out of four?

Student: You can say ten.

Interviewer: So ten people in your group . . .

Student: Twelve

Interviewer: Twelve people in the group and two are African American.

Student: In my department there are like 24 people not department but like section of my department. It’s like 24 people and me I’m an intern and it’s another guy who’s a contractor. It’s some black females but everybody else is white or Chinese.

Interviewer: OK
Student: I would say at my job everybody has to work with computers but not a lot of people really know what they are doing, they come to say me for advice on how to fix problems. I mean everybody has to use computers to like look up something but they don’t know how to do it. Most of the time they just keep on asking.

Student: Go back to that question of computer scientist and computer technicians, how many do that part of it. You say they have to use the computer to look up stuff. What about fixing computers, developing websites, programming.

Student: I work security but there is data center that they have, they have the computer network technician. I basically can count about two black guys in there and the rest are white and Chinese and even when they have people to come and fix the servers, they are mostly white.

Interviewer: How many people would you say work in the data center?

Student: Probably around twelve.

Interviewer: Twelve employees. OK. So what does it mean to you? The African American male in computers? If anything. Kind of good and bad.

Student: Well I take advantage (inaudible) probably even better than me. I mean it’s good because there will be more opportunity for me.

Student: I think it’s pretty good because some of us that do get out will kind of be an influence for other people that are growing up.

Interviewer: OK. At any point did it get tough? That’s part one of the question.

Student: What!

Student: Computer Science 214.

Interviewer: So that’s data structures and algorithms.

Student: Algorithms and calculus.

Interviewer: Calculus.

Student: I haven’t taken cosc 214 (data structures) yet.

Student: What?
Student: I been beating around the bush but I have to but I did take 113 with Ms. Jackson

Student: I would say computer technologist programming will be the hardest part.

Student: I’m a computer science major so I had to take all the math.

Student: Yeah calculus. I switched my major because of calculus.

Student: Yeah I did too.

Interviewer: From computer science to computer technology.

Student: All because of calculus.

Interviewer: Because of math

Student: No I had Berg.

Student: Only thing about it at first where all the different acronyms and basic terminology. Learning the language. It was a little awkward at first but it’s kind of stuck with me now.

Interviewer: Part two of that question. Did anyone think of quitting? Obviously you didn’t because you still here but if you did think of it can you walk me through you process of I though about quitting when all of this happened but this happened or that but I thought about and I didn’t.

Student: When I was taking 214 I did think about quitting but I didn’t feel like starting all over. If I would have switched my major I would have had to start all over and it is going to set me back and that’s another tuition I’m going to have to pay. Knowing that it is coming out of my pocket. So I’m like let me just stick with it and fortunately I did pass.

Interviewer: Anyone else?

Student: I didn’t think about quitting I thought about other options like what I’m going to do if I don’t pass this class. I know if you like fail a class three times you have switch your major right? I heard if you fail a major class like three you have to switch your major. So I was trying to figure out what I was going to do.

Student: I thought about quitting then again I thought about the statistic and I didn’t want to be one so then I didn’t want to regret it later. If I had changed my major to something else and I was happy with what I was doing not making no money. So I stuck with computers.
Student: Like I’m going to grad school for computer science and I’m not going to give up this time like I did last time.

Interviewer: Ok grad school for computer science. OK two more topics. One is a term that I use that I read about in my dissertation is disidentification and let me explain what that is. I been reading books and it says that African American males elementary, middle school and on up we disidentify with academics, succeeding in academics and even the sciences. Can you relate to that? As you were growing up. It was talking about cool . . . was it cool to be smart, was it cool to know about computers? Did you want folks to know that you were getting good grades? Or not getting good grades because you didn’t want to be used as the term he’s a nerd. This whole term of disidentification. If he’s not doing good the African American male then he would just disidentify with it. Like man that’s not cool anyway. Why would I want be in school? Why would I want to do good in school?

Student: I would say I went to a majority white school so it was no competition for me. I was always trying to be better than the other white people. I went to school in Maryland up to the fifth grade then moved down to Charlottesville, VA with a bunch of white people and I couldn’t stand the way the talk and I was always trying to do better then all them and trying to do better than my sister. Everything was always a competition for me. I was always trying to get good grades.

Interviewer: OK. It was competition for you.

Student: It was kind of like that for me in middle school. Of course at home mom was not having bad grades but at school you still want to be cool. And at high school I had more of an excuse because it was like I don’t care you think what you want cause I’m trying to . . . cause I was playing on the basketball team and to be on the team you had to have good grades. So high school was the excuse of oh I gotta play ball.

Student: Well females used to say oh he is so smart but with the fellas they will make jokes but they like respected it. I think it’s a jealousy issue anyway but I would say it is a factor.

Interviewer: OK

Student: If you know what you doing they come to you, so that makes me feel good about myself. So if somebody need something done they will say oh just get Keith to do it.
Interviewer: OK. The last one has to do with myspace and facebook. I’m trying to get an idea of how much time you can give it to me in any kind of quantitative . . . per hour, per week, per day, per month. A lot, a little a day.

Student: (Volume goes down)

Student: I was the opposite I had accounts. I had an account on myspace for like 4 years now. I just stop going on it like 3 months ago. Now I’m on like everyday. If I get busy doing stuff I’m not tripping. People used to get on me and be like I sent you a myspace and I’m like oh alright. I didn’t even know my password for the longest.

Student: Facebook was like a new form of communication for everybody.

Interviewer: Now I have to ask why would you tell us not to let anybody know you don’t have myspace.

Student: It ain’t cool.

Interviewer: So if you don’t have a myspace or facebook . . .

Student: One of them

Student: It is kind of like that. It’s like what you don’t have facebook you don’t have myspace. That’s like not having email.

Interviewer: OK I just had to ask.

Everybody and their moms and their grandma got myspace. 89 and got myspace.

Student: Setting their page up and they got pictures of them in the club.

Student: You got a myspace page?

Interviewer: Yeah.

Student: Oh for real?

Interviewer: I don’t officially have one. I only have one because my daughter’s page is private so created a space for me so that I can go into hers.

Student: I left mine up in the computer and somebody got on it and said me and my girlfriend had broke up and all this other stuff. Five minutes everybody calling and sending text messages and I’m like no we didn’t break up.
Interviewer: So then general tone is that in the beginning it’s kind of addictive and you spend a lot time on it but after a while it fades out. OK. Let me throw this one into the mix and that’s video games.

(Volume goes down)

Student: I remember in high school it was like let’s play this and play that. Then everybody I used to play with like my friends or my cousins were working or in school out of state. So you don’t want to play with yourself all the time.

Interviewer: Anyone else.

Student: Mine is just collecting dust.

Student: I kind of go through a cycle like a new game I’ll play the heck out of it and then that’s it. Then a new game come out or my subscription run out or I ain’t got nobody to play with. I think I’m getting older and my interest is not going away from it but going in a different direction now. I hated reading books now I read books. I can’t believe it. I talk to my parents and they like reading a novel in your free time what’s wrong with you? Now I’m reading novels so video games is a lot less important but still fun.

Student: I used to play a lot with my cousins and they all got older and got jobs. They used to come get me. Wake me up and say let’s go play some video games.

Interviewer: OK. That’s the last question that I have. Do you have any questions for me? …as it relates to the study.

Student: Did you have any African American role models?

Interviewer: In computers . . . when I got here to Bowie State University yeah, Mr. Hughes who has passed away. That’s Mrs. Hughes husband was definitely one.

Student: He was African American.

Interviewer: Yeah.

Student: He passed away?

Interviewer: Yeah about nine years ago. But it wasn’t many. There was one gentleman that worked at IBM. I forget his name but I do remember that when I was working there. I talked with him and he brought me in for testing and
mock interviews and stuff like that but just like most of you stated there weren’t many. Most of the folks were Caucasian. I mean the professor that interested me in computers is Caucasian. Like when you said your story about you took a computer class and they said you were doing good, it was easy, you needed to stay in it. That was me. I came in majoring in accounting. I took a computer class Ms. Dove pulled me to the side. She said you got to think about changing your major because this is tough and you’re breezing through it. I went through 112 without a problem so once I looked it up and saw how much money could be made, I changed my major real quick. So pretty much same path.

Student: We handle a lot of graphic design stuff.

Interviewer: OK.

Student: But I like doing graphic design stuff on my free time. I look up photoshop or just reading about new technology that coming out.

Interviewer: Expanding your knowledge. OK any other questions?