Dear Colleague,

Included below are examples of plagiarism and other research misconduct by LaVar Charleston and also (from number 35 on) more examples of plagiarism by LaVar Charleston’s coauthor, Harvard’s Sherri Charleston.

PLAGIARISM

1)

LaVar Charleston. EXAMINING KEY FACTORS THAT CONTRIBUTE TO AFRICAN AMERICANS' PURSUIT OF COMPUTING SCIENCE DEGREES: IMPLICATIONS FOR CULTIVATING CAREER CHOICE AND ASPIRATION by LaVar Jovan Charleston. A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy (Educational Leadership and Policy Analysis) at the UNIVERSITY OF WISCONSIN-MADISON 2010, 28-29

Self-Efficacy Theory and Occupational Choice

Bandura (1977) posited that outcome expectation derives from an individual's confidence that a particular behavior will afford a specific outcome, while an efficacy expectation embodies the idea that a task can be successfully performed given the behavior needed to produce the desired outcome. These ideas are at the core of self-efficacy theory. Specifically, self-efficacy theory involves the belief that a specific task can be successfully performed. In other words, self-efficacy is associated with one's belief about their capabilities (Bandura, 1977). Outcome expectations are an aspect of self-efficacy theory that embodies one's beliefs concerning the consequences of a particular performance. As such, incentives are another variable within the theory that serves to justify whether a behavior will be initiated (Bandura, 1986).

PROFILES OF PERSISTENCE: A QUALITATIVE STUDY OF

UNDERGRADUATE WOMEN IN ENGINEERING by Leslie Pendleton Graham. Dissertation submitted to the Faculty of Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of DOCTOR OF PHILOSOPHY in Counselor Education. April, 1997 Blacksburg, Virginia, 13

2.1.2. Self-Efficacy Theory

Self-efficacy theory is concerned with one’s beliefs that a given task or behavior can be successfully performed; that is, self-efficacy is concerned with one’s beliefs about his or her own capabilities (Bandura, 1977). Self-efficacy expectations vary on three dimensions: (1) level, (2) strength, and (3) generality (Bandura, 1986). While self-efficacy refers to beliefs about the ability to perform a behavior, outcome expectations refer to the individual’s beliefs about the consequences of performance (Bandura, 1986). Another variable that influences whether behavior will be initiated are incentives (Bandura, 1986).

2)

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Bandura (1986) identified four sources of information that have been shown to have an effect on self-efficacy and the development and modification of efficacy beliefs. These sources are: (a) performance accomplishments; (b) vicarious experiences; (c) verbal persuasion or encouragement from others; and (d) physiological or emotional arousal (i.e., anxiety).

Development and Modification of Efficacy Beliefs

Research studies (e.g., Maddux & Stanley, 1986) have demonstrated that performance accomplishments have played the most integral role in influencing self-efficacy. Accordingly, vicarious learning is influenced by the perceived similarity between the observer and the model, and is the second strongest influencer on self-efficacy. The variety of models and perceived power of models enhances self-efficacy as the observer relates to their role in relationship with the models (Maddox & Stanley, 1986). Maddux and Stanley (1986) posited that encouragement and support, the third most powerful influencer, are affected by the perceived expertness, attractiveness, and trustworthiness of the source. Though the degree to which emotional arousal effects self-efficacy depends upon the individual's appraisal of the source of arousal, it is perceived self-inefficacy that leads to fearful expectations and avoidance behavior (Bandura, 1986).

Graham 1997, 13

In regard to the development and modification of efficacy beliefs, Bandura (1986) identified four sources of information: (1) performance accomplishments, (2) vicarious experiences, (3) verbal persuasion or encouragement from others, and (4) physiological or emotional arousal, for example, anxiety.

Performance accomplishments have been shown to have the most powerful influence on self- efficacy (Maddux and Stanley, 1986). Vicarious learning appears to be the second most powerful influencer on self-efficacy and is influenced by the perceived similarity between the model and the observer, the number and variety of models, and the perceived power of the models (Maddux and Stanley, 1986). Encouragement and support, the third most powerful influencer, are influenced by the perceived expertness, trustworthiness and attractiveness of the source (Maddux and Stanley, 1986). Perceived self-efficacy causes an individual to approach that particular task or behavior with anxiety, and this emotional arousal may perpetuate a sense of self-inefficacy (Bandura, 1986). The degree to which self-efficacy is affected by emotional arousal depends on the individual’s appraisal of the source of arousal, the level of arousal, and the circumstances under which the arousal is elicited, and the personal experiences of how arousal affects the individual’s performance. It is perceived self-inefficacy for coping with these aversive events that leads to fearful expectations and avoidance behavior, for example, math anxiety (Bandura, 1986).

3)

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Ultimately, perceived efficacy and mechanisms that foster self-evaluation facilitates the growth of intrinsic interests enabling individuals to persist in activities that promote feelings of satisfaction and efficacy (Bandura, 1986).

Lent, Brown, and Larkin (1986) found that while vocational interests alone did not serve as a significant predictor of persistence in a career field, self-efficacy and interest contributed to unique variances with regard to occupational considerations. The researchers found that technical and scientific self-efficacy were predictive of the range of career options considered, grades in technical courses, as well as persistence in a technical major (Lent, Brown, & Larkin, 1986). Additionally, Post-Kammer and Smith (1986) found that interest and self-efficacy were strong predictors of math and nonmath-related occupational considerations for economically disadvantaged women, but only interests among economically disadvantaged men.

Graham 1997, 14

Bandura (1986) posited that perceived efficacy and self-evaluative mechanisms foster the growth of intrinsic interests, with people exhibiting enduring interest in activities that engage their feelings of personal efficacy and satisfaction.

Graham 1997, 28

The same authors utilized a sample of economically disadvantaged students between the ages of 16-24 (Post- Kammer and Smith, 1986). They found that females had extremely low self-efficacy for engineering and drafting courses (Post-Kammer and Smith, 1986). Furthermore, both interests and self-efficacy were significant predictors of math- and nonmath-related occupational considerations for women, but only interests were predictive for men (Post-Kammer and Smith, 1986).

Although vocational interest was not a significant predictor of persistence in a career field, both self-efficacy and interest added unique variance in predicting occupational consideration (Lent, Brown and Larkin, 1986). Technical and scientific self-efficacy was predictive of grades in technical courses, persistence in a technical major and range of career options considered (Lent, Brown and Larkin, 1986). Comparing male-dominated with female-dominated occupations. Rotbert, Brown and Ware (1987) found that self-efficacy was a significant predictor of range of options for male-dominated but not for female-dominated occupations.

4)

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In a study that measured mathematics self-efficacy, math anxiety, and sex role orientation among undergraduates, Betz and Hackett (1983) found that students with stronger mathematics self-efficacy expectations were more likely to choose science-based majors than students with lower mathematics self-efficacy expectations. Another study found that differential gender effects, as it relates to self-efficacy and mathematics, were a result of differences in efficacy- building experiences between males and females in past performances (Lent, Lopez & Bieschke, 1991). One particular study, using a path analysis methodology, determined high school math preparation, past math achievement, gender, as well as gender role socialization all influenced mathematics self-efficacy (Hackett, 1985). The study further posited that gender, years of high school math, ACT math scores, as well as math anxiety were all less significant a predictor of choosing a math-related college major than was mathematics self-efficacy (Hackett, 1985).

Graham 1997, 28-29

Self-efficacy and its relationship to mathematics achievement has also been a topic of research. Betz and Hackett (1983) developed a measure for mathematics self-efficacy and administered the measure, along with a measure of math anxiety and sex role orientation, to undergraduates enrolled in Introductory Psychology courses. Students reporting stronger mathematics self-efficacy expectations were more likely to select science-based college majors than were students reporting weaker mathematics self-efficacy expectations (Betz and Hackett, 1983). Lent, Lopez and Bieschke (1991) found that women had lower mathematics self-efficacy and Math ACT scores than men. They concluded that the “effects of gender on self-efficacy are mediated by differential efficacy-building experiences for the two sexes, particularly differences in past performances” (p. 427).

…

Hackett (1985) utilized self-report inventories to study the effect of various measures on mathematics self-efficacy. Path analysis methodology revealed that gender, gender role socialization, high school math preparation, and past math achievement influence mathematics self-efficacy (Hackett, 1985). In turn, mathematics self-efficacy was a significant predictor of math-relatedness of college major career choice more significantly than gender, years of high school math, ACT math scores, or math anxiety (Hackett, 1985).

5)

Charleston 2010, 47-48

After reviewing the actual audio recordings several times, as well as reviewing the physical transcriptions and notes taken from the individual interviews, the researcher employed the basic qualitative analysis process outlined by Miles & Huberman (1994): (a) applying several word codes to the transcribed interview in the left-hand margins; (b) making notes of reflections and other relative remarks in the right hand margins; (c) sorting through the data to identify and record similar phrases, patterns, commonalities, and differences; (d) isolating these patterns and processes to take to the next wave of data collection; (e) gradually expanding a small set of generalizations that address the consistencies within the database; and (f) confronting these generalizations with an informed body of knowledge that forms theories. Employing this six-step process was necessary in an effort to reduce the collected data presented in word form, to formalized thematic categories.

Graham 1997, 49

Following the listenings of interview and focus group interview transcripts, the basic qualitative analysis process included steps outlined by Miles & Huberman (1994) including: (1) affixing one to several word codes to the interview and focus group interview transcripts in the left- hand margins; (2) noting reflections and other remarks in the right hand margins; (3) sorting and sifting through these materials to identify similar phrases, relationships between variables, patterns, themes, distinct differences between subgroups, and common sequences; (4) isolating these patterns and processes, commalities and differences and taking them out to the field in the next wave of data collection; (5) gradually elaborating a small set of generalizations that cover the consistences discerned in the database; and (6) confronting these generalizations with a formalized body of knowledge in the form of constructs or theories. Since qualitative analysis implies that the data are in the form of words as opposed to numbers, this six step process facilitated the reduction of data into themes or categories and the interpretation of those themes and categories.

6)

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Coding was an integral part of analysis within this study. Through first level coding, data was extracted and placed into many themes and meaning categories, which enabled the researcher to summarize portions of data (Strauss & Corbin, 1990). Additionally, analyzing the data through codes achieved the goal of dissecting the interview data in á meaningful way, which in turn helped the researcher maintain the relationships of thematic representations (Miles & Huberman, 1994). Through the coding process, the emergence of categories and their theoretical underpinnings began to align and make sense. The theoretical implications that gradually formed from the categories that created meaning formed relative patterns. Strauss and Corbin (1990) posits that pattern coding enables the placement of first level coding into more concise themes. Likewise, the patterns and thematic representations that emerge embody grounded theory (Glaser & Strauss, 1967). When all the incidents were readily classified and the categories were saturated as represented through the emergence of much regularity, the researcher concluded the data collection and analysis portion of the study (Lincoln & Guba, 1985; Strauss, 1987).

Graham 1997, 49-50

Strauss and Corbin (1990), utilizing an inductive technique called a constant comparative method (Glaser & Strauss, 1967), provided a model for this process of analysis. Data were collected, written up, and reviewed line by line, typically within a paragraph. Codes were written in the left-hand margins while reflective remarks were written in the right-hand margins. Coding is analysis; therefore, data were first systematically coded into as many themes and meaning categories as possible through first level coding which provided a device for summarizing segments of data (Strauss & Corbin, 1990). The goal of coding is to review a set of field notes, transcribed or synthesized, and to dissect them meaningfully, while keeping the relations between the parts intact (Miles & Huberman, 1994). As the categories emerged, the relationships between those categories and their theoretical implications began to make sense. Gradually the theoretical properties of the meaning categories crystallized and formed a pattern. Pattern coding is a way of grouping first level coding summaries into a smaller number of sets, themes, or constructs (Strauss & Corbin, 1990). The patterns that emerge are sometimes called “grounded theory” (Glaser & Strauss, 1967).

Graham 1997, 51

Strauss (1987) and Lincoln and Guba (1985) suggest that coding and recoding are over when the analysis itself appears to have run its course, that is, when all of the incidents can be readily classified, categories are “saturated,” and sufficient numbers of “regularities” emerge. This rule of thumb was also used as a guideline for ending the data collection and analysis phases of the study.

7)

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In an effort to address reliability and validity of the qualitative inquiry within this study, the researcher employed a naturalistic approach. While traditional empirical research addresses validity in terms of reliability, internal validity, and external validity of measures and procedures, the corresponding terms in naturalistic inquiry include audibility, credibility, and fittingness (Guba & Lincoln, 1981). Reliability in qualitative research involves the ability to replicate the study given a similar set of circumstances. Through naturalistic inquiry, the raw data ascertained by the researcher is coded in a manner whereby the contrived themes and theories are not only understood by another individual, but that individual is able to arrive at a similar conclusion through the consistencies of the coded raw data.

Graham 1997, 51

3.7. Addressing Reliability and Validity in Qualitative Inquiry

In traditional empirical research the importance of reliability, internal validity, and external validity of measures and procedures are of utmost importance. Qualitative inquiry should also address the issues of reliability and validity; however, when traditional definitions of reliability and validity are applied to qualitative research, problems emerge. The corresponding terms in naturalistic inquiry are “auditability,” “credibility,”, and “fittingness” (Guba & Lincoln, 1981).

Reliability concerns the replication of the study under similar circumstances. The naturalistic investigator derives consistency through coding the raw data in ways so that another person could understand the themes and arrive at similar conclusions.

8)

Charleston 2010, 49-51

Credibility within this study, in concert with naturalistic inquiry, was achieved by corroborating the structures that made up the study. More plainly, corroboration was ascertained by spending ample time with study participants to check for distortions, which facilitated prolonged engagement with study participants. Likewise, the participants' experiences were explored in sufficient detail which exemplified persistent observation. Additionally, multiple data sources were checked through comparing various forms of data such as digital audio recordings, physical transcriptions, consultation with other investigators, as well as researcher notes. The aforementioned processes of prolonged engagement, persistent observations, and checking multiple data sources embody the process of triangulation. Rüdestem and Newton (1992) asserts that peer debriefing, revising working hypotheses throughout the data collection

process, clarifying preliminary findings with study participants, and audio/video taping the interviews in an effort to compare to other means of data collected are customarily the procedures necessary to insure the credibility of a study. Through the current study's primary method of individual interviews, triangulation occurred through corroborating persistent observations, checking multiple sources of data through an in-depth literature review, recording field notes, and the clarification of categories and narrative stories among study participants. These process fostered structural corroboration of the study.

In an effort to address validity among the current study, the researcher attempted to

address Wolcott's (1990) nine points to satisfy the correctness or credibility of this qualitative study:

1)  Talk a little, listen a lot: The researcher attempted to facilitate a social visit whereby the

subject felt comfortable and the researcher was attentive, speaking when necessary and listening when necessary.

2)  Record accurately: The researcher attempted to record precise words when necessary in a timely fashion to avoid misinterpretation of words and behaviors.

3)  Begin writing early: The researcher aimed to begin the writing process early in an effort to expedite the process of recognizing holes in the data collected or its processes.

4)  Let readers see for themselves: The researcher purposed to let others provide input on primary data in an effort to expand the focus of what the researcher observed and

interpreted.

5) Report fully: While the researcher did not report every discrepant detail, the researcher aimed to entertain possible discrepancies and the possible significance of its interpretations.

6) Be candid: The researcher attempted to be subjective throughout the qualitative approach of the study.

7)  Seek feedback: The researcher sought feedback throughout the process in an effort to avoid over-embellishment or under-development of concepts within the study.

8)  Try to achieve balance: The researcher attempted to balance the events recorded in an effort to avoid disproportionate attention given to outliers within the study.

9)  Write accurately: The researcher attempted to check for coherence and internal consistencies throughout the crafting of the written study.

In attempting to address these nine points, the researcher aspired to provide validity and credibility through the research process and specifically in the recording and reporting of results.

Graham 1997, 51-52

In naturalistic inquiry credibility or truth is ascertained through structural corroboration. Such corroboration might be accomplished by spending sufficient time with subjects to check for distortions (prolonged engagement), exploring the participants’ experience in sufficient detail (persistent observation), and checking multiple sources of data such as other investigators, written records, diaries, field notes, and so on. This is the process of triangulation. Peer debriefing, revising working hypotheses as more data become available, clarifying tentative findings with the participants, and videotaping interviews for comparisons with the recorded data are typical procedures for adding to the credibility of the study (Rudestam & Newton, 1992, pp. 38-39). The present study utilized two corroborative methods of data collection (interviews and focus group interviews). The following methods of triangulation were also utilized: persistent observation, checking multiple sources of data through a comprehensive literature review, recording field notes, and clarification of categories and narrative stories with the participants as techniques of structural corroboration.

Wolcott (1990) presented nine points to satisfy the validity (correctness or credibility) question of qualitative studies:

(1) Talk a little, listen a lot -- A sociable “sit and visit” situation should exist where the subject feels comfortable discussing topics with the researcher. The researcher must be attentive and responsive without talking too much and hearing too little.

(2) Record accurately -- The researcher should make every attempt to record precise words of the participants. Words should be recorded as soon as possible to prevent the reinterpreting of behavior before it has been recorded.

(3) Begin writing early -- The intent of writing early is to record what one suspects and to identify holes in the information.

(4) Let readers “see” for themselves -- It is a good idea to include primary data in the final report. This allows the researcher to let the expressed thoughts of others become a point of focus rather than focus only upon what the researcher observed and interpreted.

(5) Report fully -- Every discrepant detail is not reported; however, if an issue is not fully resolved the inclusion of such discrepancies may lead to possible intrepretations every bit as valid as the researcher’s.

(6) Be candid - Subjectivity is seen as a strength of qualitative approaches.

(7) Seek feedback -- Having a continual source of feedback checks for accuracy and completeness. Feedback also provides a reality check where the reporting or the interpretation of the event needs to be more developed or is overblown and needs to be brought back to reality.

(8) Try to achieve balance -- Achieving a balance between events that occurred or statements made is warranted in order to avoid a disproportionate amount of attention being given to outlying, yet more provocative, data.

(9) Write accurately -- this process checks for coherence and internal consistency as well as for style and grammar (pp. 128-134).

Wolcott’s nine points aided in a strive for a valid study and valid reporting of results.

9)

Charleston 2010, 53

The present study was designed to examine this issue qualitatively and explore the following question through the stories of African Americans who have persisted or are persisting in computing sciences majors through or toward Bachelors, Masters, and Ph.D. degree attainment:

Graham 1997, 53

The present study was designed to examine the topic qualitatively and explore the following questions through the stories of women who have either persisted or failed to persist in engineering majors:

10)

Charleston 2010, 54

Reflections on the Qualitative Process

Though the process of qualitative inquiry was daunting and tedious throughout, this study merited a qualitative approach in an effort to address the novelty of this phenomenon (Glaser & Strauss, 1967). The method of individual interviews enabled the researcher to ascertain an in- depth understanding of the experiences related to computing that the participants contributed, as well as the meanings the participants actually gave to their stories. The novelty and scarcity of this demographic group as it relates to computing did not suggest the use of quantitative methods to explore this phenomena in detail as a quantitative method would not get at the heart of the phenomena under study (Glaser & Straus, 1967).

Graham 1997, 53

4.2. Reflections on the Qualitative Process

While the processes of qualitative data collection and analysis were often overwhelming, frustrating, and tedious, a qualitative approach provided the most appropriate framework for an in- depth study of a phenomenon which had previously been examined through quantitative studies only. Through interviews and small group conversations, the meanings participants gave to their experiences as undergraduate women engineering students contributed to a more in-depth understanding of the reasons these former and current women engineering students left or remained in their engineering majors. The use of both quantitative and qualitative methods to study complex phenomena such as persistence is recommended.

11)

Charleston 2010, 34

Chapter three presents a description and review of this study's methods as well as theoretical foundation. This study's theoretical perspective was aligned with and has its roots in grounded theory, which encompasses an inductive qualitative inquiry which facilitates the development of theory through theoretical sampling, systematic collection, coding, and analysis of date (Glaser & Strauss, 1967; Boglan & Biklen, 1998). Additionally, this chapter will review the research design, description of study participants, setting, and data collection and analysis procedures as they corresponded to the study.

Annenberg Rural Challenge Ten Years Later: Looking for a Place for Mathematics in a Rural Appalachia Place-based Curriculum. Craig Alan Green. Dissertation. University of TN, Knoxville. 2008, 27

This study used a grounded theory methodology, which is an inductive qualitative

research methodology that develops theory through theoretical sampling, systematic collection,

coding, and analysis of data (Glaser & Strauss, 1967; Boglan & Biklen, 1998).

12)

Charleston 2010, 34

Grounded theory embodies the process of collecting and analyzing data simultaneously. This simultaneous data collection process allows for developing theoretical and thematic explanation, which then serves to explain, compare, and trace the development of the researched phenomena (Glaser & Straus, 1967; Mason, 1996). The constant comparative method in data analysis enables the researcher to keep analysis and theory generation secured within the data. Therefore, the constant comparative method is essential to grounded theory methodology (Glaser & Strauss, 1967). Additionally, this process involved the following steps: a) comparing the data applicable to each conceptual category; b) integrating the categories and their properties; c) delimiting the emergent theory; and d) writing up the theory (Jorgensen, 1989).

Green 2008, 45 … 27

The grounded theory approach (Glaser & Strauss, 1967; Lincoln & Guba, 1985; Mason, 1996; Scott, 1995) refers to collecting and analyzing data simultaneously for the purposes of developing theoretical and thematic explanations, in turn, to explain, compare, and trace the development of the researched phenomena. Grounded theory offers a set of flexible strategies, not rigid prescriptions (Charmaz, 1995). The process involves the following steps: “(a) comparing the data applicable to each conceptual category; (b) integrating the categories and their properties; (c) delimiting the emergent theory; and (d) writing up the theory” (Jorgensen, 1989, p. 113).

…

Central to grounded theory methodology is the use of the constant comparative method in data analysis to keep analysis and theory generation anchored in the data (Glaser and Strauss 1967).

13)

Charleston 2010, 47

This study primarily employed a grounded theory approach to analyzing the data as it was necessary to use the constant comparative method in an effort to enable the researcher to focus and shape the study as it progressed (Glesne & Peshkin, 1992). Grounded theory involved collecting and analyzing the data concurrently, enabling the researcher to develop theoretical explanations for the perceived phenomena (Glaser & Straus, 1967). Likewise, the use of grounded theory enabled the researcher to not only provide comparisons of the researched phenomena, but also enabled the researcher to trace the development of the research findings. By making use of the constant comparative method, the researcher was able to continuously interrogate the data in an effort to illuminate patterns of themes and develop meaning of those themes (Miles & Huberman, 1994).

Green 2008, 37

Grounded theory methodology is an iterative, concurrent process of data collection and

analysis. Grounded theory data analysis employs the constant comparative method, which allows the researcher "to focus and shape the study as it proceeds" (Glesne & Peshkin, 1992, p. 127). The constant comparative method "continuously interrogates" the data to highlight recurring patterns of meaning and themes (Miles & Huberman, 1994). In this type of research the findings are a distillation of the essential concepts in the grounded theory.

14)

Charleston 2010, 34-35

Conrad (1993) asserted four overlapping, iterative stages as it relates to the description of grounded theory. Through this stage process, research is initiated by the collecting and coding of data into as many categories of analysis as the data will allow. These categories parallel the concepts obtained by the researcher through the constant comparison of the data collected. However, this first stage precipitates the researcher's consideration of the theoretical properties of these developing concepts from the start of the study. As gaps within the developing theory are discovered by the researcher, the second iterative stage involves theoretical sampling, which is employed to further guide the data collection process. Next, the development of a rudimentary theory is accomplished through additional refinement of the concepts and their relationships, illuminating the third overlapping, iterative stage. It is within this stage that the researcher attempts to discover data that supports or rejects key concepts and theoretical propositions. Likewise, this process enables the researcher to eliminate or modify concepts according to the depth of support that can be pulled from the data. Following the process of the first three stages, theoretical saturation is accomplished and illuminated by the emergence of an integrated theory, the fourth and final stage of grounded theory (Conrad, 1993).

Grounded theory enables the constant interrogation of the data which serves to further develop the study based on emergent themes and concepts. Additionally, grounded theory informs the observer of the intricate details and concerns among study participants that ultimately reveal access variables that allow for incremental change (Glaser, 1999). The flexibility fostered through grounded theory and the constant comparative method serves to circumvent diversions that could undermine the study. Ultimately, grounded theory provides a process into qualitative inquiry that promotes the trustworthiness of the study at hand.

Green 2008, 27-28

Conrad (1993) described the grounded theory methodology as consisting of four overlapping, iterative stages. Research begins with the collection and coding of data into as many categories of analysis as possible. These categories represent concepts, which are abstracted through the

constant comparison of data. From the beginning of the study the researcher considers the

theoretical properties of these developing concepts. As the researcher discovers gaps in the

developing theory, theoretical sampling is used to guide further data collection. The

methodology moves into the third stage with further refinement of the concepts and their relationships, which leads to the development of a rudimentary theory. At this stage the

researcher makes a concerted effort to find data to support or reject key concepts and theoretical propositions. Concepts may be eliminated or modified depending on the level of support found in the data. The final stage of grounded theory is the emergence of an integrated theory that meets the requirements of theoretical saturation.

"Grounded theory tells us what is going on, tells us how to account for the participants' main concerns, and reveals access variables that allow for incremental change. " (Glaser 1999, p. 840)

Glaser stated that as a research methodology grounded theory "is no better or worse than

other methods" (1999, p.837). Why then, choose grounded theory? Grounded theory provides a flexible and realistic approach to research and the constant comparative method allows for

reorienting the study based on emerging concepts. Also grounded theory's emphasis on the

constant "interrogation of the data" acts as a safeguard to prevent diversions that could subvert

the study. Finally, I appreciate Glaser's practical perspective on the impact of research on

practice as reflected in the preceding quote.

15)

Charleston 2010, 11

Today, despite gallant efforts by some programs (e.g., Financial Aid and Affirmative Action), there has not been a dramatic increase in college attendance, retention, and graduation for low-income and minority youth as compared to their share in the population (Hagedorn & Tierney, 2002). Affirmative action was implemented into American society in an attempt to provide a corrective measure that would deter governmental and social injustices against demographic groups, such as women and minorities, who have traditionally been discriminated against in areas relative to employment and education. It was derived from a series of legislative acts whose aim was to counteract past, present, and future discrimination to provide for a balance of societal power that would reflect the demographics of society as a whole, ultimately creating an equal society.

Consequently, while the missions of universities today usually include diversifying the campus environment, first generation African American, Hispanic, and Native American youth still lag behind the college going rates of their White and Asian counterparts (Hagedorn & Tierney, 2002).

Introduction, Cultural Capital and the Struggle for Educational Equity, LINDA SERRA HAGEDORN AND WILLIAM G. TIERNEY. In Hagedorn, L. S. & Tierney, W. G. (2002). Increasing access to college: Extending possibilities for all students, Albany: State University of New York Press.

Hagedorn and Tierney 2002, 1

Despite what might be termed “gallant efforts” by some programs there has not been a dramatic increase in college attendance, retention, and graduation for low income and minority youth. First generation African American, Hispanic, and Native American youth still lag behind the college-going rates of their white and Asian American counterparts. Present practices have neither ameliorated nor quashed the academic divide. Although the status quo is unacceptable on many levels, we find it especially objectionable for the following reasons:

16)

Charleston 2010, 12

However, the majority of literature about pre-college programs is no more than a decade and a half old and has resulted from a resurging interest in the study of pre-college programs. College preparation programs have taken on increased national importance in light of the elimination of Affirmative Action programs that have led to a precipitous drop in minority student enrollment. Policy makers have wondered what other actions might be taken to enable access to college; the proliferation of pre-college programs offered one such remedy (Tierney, 2002).

Tierney, W. G. (2002). Reflective evaluation: Improving practice in college preparation programs. In L. S. Hagedorn & W. G. Tierney (Eds.), Increasing access to college: Extending possibilities for all students (pp. 217-230). Albany: State University of New York Press, 217

Throughout this book we have argued that college preparation programs, otherwise known as “enhancement programs,” have taken on increased national importance for a variety of reasons. As Yonezawa and her colleagues pointed out, in California, the elimination of affirmative action led to a pre-cipitous drop in minority student enrollment to the University of California system; policy makers wondered what other actions they might take to enable access to college and their chapter offered one such remedy. Oakes and her colleagues discussed a second possible remedy.

Tierney 2002, 219

The vast majority of literature about college preparation programs is no more than a decade old, and most simply tries to make sense of the multiple kinds of programs that exist.

17)

Charleston 2010, 14

Though the federal government has intervened at the postsecondary level of education, the focus is primarily on reducing economic barriers to higher education and ensuring that no student that is academically qualified is denied access to college because of financial constraints (Swail & Perna, 2002). While $43.6 billion in financial aid was awarded to students by the federal government in 1998-1999, the gaps in college enrollment and degree completion suggest that a more inclusive approach is necessary to ensure college success and completion (The College Board, 1999). This approach should encompass the variety of factors that influence college enrollment behavior such as educational expectations and plans, academic ability and

preparation, availability of financial aid, as well as support from family, teachers, counselors, and peers (Swail & Perna, 2002).

Perna, L. W. & Swail W. S. (2002). Pre-college outreach programs: A national perspective. In L. S. Hagedorn & W. G. Tierney (Eds.), Increasing access to college: Extending possibilities for all students (pp. 15-34). Albany: State University of New York Press, 17-18

Historically, federal intervention at the postsecondary level has focused primarily on reducing economic barriers to higher education to ensure that no academically qualified citizen is denied access to college for financial reasons. In 1998–1999, $43.6 billion of the $64 billion in financial aid awarded to students from all sources was from the federal government and represents about two-thirds of all federal on-budget outlays for postsecondary education (The College Board, 1999; Hoffman, 1997).

The continued gaps in college enrollment and degree completion despite the dedication of such large amounts of resources suggest that a more comprehensive approach to college access and success is needed. Merely making financial aid available for students to attend college is not enough to ensure that all students have equal access to the benefits associated with earning a college degree (Gladieux & Swail, 1998). A variety of factors influence college enrollment behavior, including educational expectations and plans, aca- demic ability and preparation, information about college options, availability of financial aid, and support from teachers, counselors, family members, and peers (see for example Perna, 2000).

18)

Charleston 2010, 14

However, the government has also recognized the necessity of pre-college programs with a socioeconomic criterion and has implemented some of these types of programs. Some of these programs include TRIO, in which two-thirds of participating students must come from household incomes of less than $24,000. Upward Bound, which was authorized in 1964 by Congress as part of the Educational Opportunity Act, Talent Search, and Student Support Services formed the core of TRIO during the Higher Education Act of 1965. The funding for these programs totaled $600 million in 1998. Research shows that the majority of funding for pre-college programs comes from government-funded programs like the programs previously mentioned (Swail & Perna, 2002).

Swail and Perna 2002, 17-18

As mandated by Congress, two-thirds of the students served by TRIO programs must come from families with incomes below $24,000. Upward Bound, authorized by Congress in 1964 as part of the Educational Opportunity Act, provides students with academic instruction on college campuses after school, on Saturdays, and during the summer. Over 700 Upward Bound programs are operating around the country. One-third of all TRIO funding in 1998 ($600 million) was dedicated to Upward Bound ($220 million) and Upward Bound Mathematics and Science ($20.1 million).

Talent Search and the Student Support Services programs were added to Upward Bound to form the core of the TRIO programs during the authorization of the Higher Education Act of 1965.

19)

Charleston 2010, 15-16

A study by the Educational Testing Service concluded that using computers to employ higher-order thinking skills was positively related to increased school performance in the area of mathematics by fourth and eighth graders (Wenglinsky, 1998). Likewise, a review of research on computer use and cognitive skills revealed that computer use enhanced cognitive competencies such as visual intelligence skills (Subrahmanyam et. al., 2000).

Other studies in the area of technology and learning linked the relationship of the presence of computers as an educational resource in the home, to academic success. The National Center for Educational Statistics (2000) found that having a computer in the home is a strong predictor of academic success in mathematics and science. Moreover, several studies reveal that even after controlling for family income and other variants related to reading test scores, the possession of a computer in the home has been coupled with higher test scores in reading (Atwell, 2000; Jackson et. al., 2006).

Linda A. Jackson, Alexander von Eye, Frank A. Biocca, Gretchen Barbatsis, Yong Zhao, and Hiram E. Fitzgerald. Children’s Home Internet Use. Antecedents and Psychological, Social, and Academic Consequences. In Computers, Phones, and the Internet: Domesticating Information Technology. Robert Kraut Malcolm Brynin Sara Kiesler, Editors. OXFORD UNIVERSITY PRESS, 2006, 154

Other findings point to a relationship between IT use and academic performance, although causal relationships have yet to be established (Rocheleau, 1995; Cole, 1996; Blanton, Moorman, Hayes, & Warner, 1997). Several studies have shown that the presence of educational resources in the home, including computers, is a strong predictor of academic success in math and science. For example, one study found that having a home computer was associated with higher test scores in reading, even after controlling for family income and other factors related to reading performance (Atwell, 2000).

…

For example, a study by the Educational Testing Service found that the use of computers to actively engage higher-order thinking skills was related to better academic performance in math among fourth and eight graders (Wenglinsky, 1998).

…

Subrahmanyam and colleagues also reviewed the research on computer use and cognitive skills, focusing on a broad array of competencies—particularly visual intelligence skills (e.g., spatial skills, iconic and image representation skills; Subrahmanyam et al., 2000, 2001). They concluded that computer use does contribute to cognitive development, at least in terms of visual skills.

20)

Journal of Diversity in Higher Education 2014, Vol. 7, No. 3, 166–176. Navigating Underrepresented STEM Spaces: Experiences of Black Women in U.S. Computing Science Higher Education Programs Who Actualize Success. LaVar J. Charleston, Phillis L. George, Jerlando F. L. Jackson, Jonathan Berhanu, and Mauriell H. Amechi, 167

Accordingly, researchers also found that students who do not adopt a field-specific identity circumscribed by faculty expectations (e.g., mastery of implicit knowledge and dominant discourses in the field) may be deemed incompetent in that particular field (Etzkowitz et al., 2000; Herzig, 2004).

Review of Educational Research Summer 2004, Vol. 74, No. 2, pp. 171–214. Becoming Mathematicians: Women and Students of Color Choosing and Leaving Doctoral Mathematics. Abbe H. Herzig, 177

Thus, a doctoral student also needs to adopt the identity of a mathematician, or at least of a mathematics graduate student. Students who do not fit faculty expectations for graduate students in a given field—those who do not master the tacit knowledge and dominant discourses of the field—may not be judged to be competent in that field (Etzkowitz et al., 2000).

21)

PREPARING THE NEXT GENERATION OF AFRICAN AMERICAN COMPUTING SCIENCE FACULTY: A RESPONSE TO THE OBAMA ADMINISTRATION’S SCIENTIFIC WORKFORCE PRIORITIES. LaVar J. Charleston, Jerlando F. L. Jackson and Juan E. Gilbert. The Obama Administration and Educational Reform Advances in Education in Diverse Communities: Research, Policy and Praxis, Volume 10, 2014, 208

Though several disciplines have researched the benefits and rewards of mentoring African Americans, the most notable are business and education (e.g., Davidson & Foster- Johnson, 2001; Dreher & Cox, 1996; Green-Powell, 2007; Levinson, 1978; Thomas, 1990; Zey, 1984)

THE ROLE OF MENTORING IN THE DEVELOPMENT OF AFRICAN AMERICAN NURSE LEADERS A Dissertation Submitted to the Graduate Faculty of the Louisiana State University and Agricultural and Mechanical College in partial fulfillment of the requirements for the degree of Doctor of Philosophy By Jacqueline J. Hill 2004, 19

Several disciplines have researched the benefits of mentoring of African Americans. Most notably are the areas of business and education (Davidson & FosterJohnson, 2002; Dreher & Cox, 1996; Lee, 1999; Levinson, 1978; Thomas, 1990; Zey, 1984).

22)

Journal of Diversity in Higher Education 2014, Vol. 7, No. 3, 166–176. Navigating Underrepresented STEM Spaces: Experiences of Black Women in U.S. Computing Science Higher Education Programs Who Actualize Success. LaVar J. Charleston, Phillis L. George, Jerlando F. L. Jackson, Jonathan Berhanu, and Mauriell H. Amechi, 168

Tinto (1993) asserted three stages of persistence toward the doctoral degree. The first stage in- volves students’ adjustment to academic and social communities within their home departments. It is within this initial stage that students make judgments about the relevance of their program of study as it relates to their career goals (for the purposes of this study, computing sciences). However, it is within the second stage that students develop the knowledge base and skills necessary for doctoral research, wherein their competence is assessed through comprehensive exams and other requirements that demonstrate a mastery of the field’s literature and practices. Though the third stage involves the completion of the dissertation, it is within the first two stages that student persistence reflects the tenor of social interactions be- tween faculty and students alike (Tinto, 1993). Ultimately, these interactions significantly affect the development of competence within the students themselves, as well as the judgments faculty and peers make toward the knowledge and skills the individual has developed. Those judgments are also, in turn, shaped by social circumstances outside of classroom interactions (Herzig, 2004; Tinto, 1993).

A sociocultural perspective of education dictates that the process of learning occurs, and is inseparable from, students’ participation in the communities of practice available to them within their individual graduate programs (Boaler, 2002; Herzig, 2004; Rogoff, 1994). This intertwining of scholarship and community that is required for learning comes in a variety of forms, such as collaborating with peers to solve problems, attending seminars, observing lectures, teaching and grading assignments, conducting research, as well as studying. These activities represent learning opportunities; participation in a community of practice is not simply a distinct educational activity, but a lens for analyzing the broader environment in which students engage (Herzig, 2004). Therefore, it is helpful to focus on learning as participation, as opposed to simply a process of acquiring or transmitting knowledge (Herzig, 2004; Rogoff, 1994). As such, evaluating the structure of doctoral education requires examining the specific

activities and practices in which students participate, the nature of their participation, as well as the knowledge students gain as a result of their participation (Herzig, 2004).

Review of Educational Research Summer 2004, Vol. 74, No. 2, pp. 171–214. Becoming Mathematicians: Women and Students of Color Choosing and Leaving Doctoral Mathematics. Abbe H. Herzig, 177-78

Tinto (1993) discussed three stages of persistence toward a doctoral degree. In the first stage, students adjust to the academic and social communities within graduate school and make judgments about the relevance of the program to their career goals and the desirability of membership in the community. In the second stage, students develop the knowledge and skills, or “competence,” deemed necessary for doctoral research, culminating in comprehensive exams. The third stage of persistence is completion of a dissertation. According to Tinto, student persistence through the first two stages reflects not only individual characteristics but also interactions between students and faculty in the department and program. These interactions play a role in developing competence and affect the judgments others make about these competencies; faculty judgments of student competence within the classroom also are shaped by social judgments arising from interactions outside of the classroom.

23)

Journal of Diversity in Higher Education 2014, Vol. 7, No. 3, 166–176. Navigating Underrepresented STEM Spaces: Experiences of Black Women in U.S. Computing Science Higher Education Programs Who Actualize Success. LaVar J. Charleston, Phillis L. George, Jerlando F. L. Jackson, Jonathan Berhanu, and Mauriell H. Amechi, 169

CRF theory emerged from critical race theory, and was inspired by the exclusion of racial and/or ethnic legal women scholars by their male peers and White feminist legal scholars (Few, 2007). Contrary to some critical race theorists, CRF rejects essentialist arguments and generalizations concerning all minorities. As articulated by Adrien K. Wing, “our antiessentialist premise is that identity is not additive. In other words, Black women are not white women plus color, or Black men, plus gender” (Few, 2007, p. 456).

Integrating Black Consciousness and Critical Race Feminism Into Family Studies Research. April L. Few. Journal of Family Issues, Volume 28 Number 4 April 2007,

Critical race feminist theory emerged from critical race theory as a result of racial and/or ethnic legal women scholars feeling excluded by their male peers and White feminist legal scholars. It should be noted that critical race feminists depart from some critical race theorists by rejecting blanket essentialization of all minorities (Wing, 2000). As Wing stated, “our anti-essentialist premise is that identity is not additive. In other words, Black women are not white women plus color, or Black men, plus gender” (p. 7). They are antiessentialists in that they recognize the multiple locations and identities that women inhabit (DeReus et al., 2005; Wing, 2000).

24)

Journal of Diversity in Higher Education 2014, Vol. 7, No. 3, 166–176. Navigating Underrepresented STEM Spaces: Experiences of Black Women in U.S. Computing Science Higher Education Programs Who Actualize Success. LaVar J. Charleston, Phillis L. George, Jerlando F. L. Jackson, Jonathan Berhanu, and Mauriell H. Amechi, 169

Although the concepts of CRF and BFT have been well-developed by a cadre of scholars (Collins, 1986; Crenshaw, 2003; Wing, 1997), empirical assessments employing these frameworks have been more limited. Critics of feminism and critical theory have generally presented two claims: (a) “it is difficult to measure feminist concepts,” and (b) “such theories cannot help re- searchers to predict individual or group behavior” (Few, 2007, p. 464). Although these theories cannot be used to predict behavioral outcomes for targeted groups, CRF and BFT are critical tools that provide a context for examining how women come to understand themselves through the development of Black female subjectivities—those identities that are most significant to an individual in various social contexts (Few, 2007). Likewise, both theories assert that identity politics and the politics of location are predicated on differences that can at times either marginalize or empower groups or individuals (Few, 2007). Ultimately, CRF and BFT provide the necessary critical lens that takes into account the sociohistorical context

of a specific group or community when examining behavior—in this case, the African American woman in computing sciences in higher education.

Few 2007, 464

Criticisms lodged against feminist and critical theory consist of two general claims: (a) it is difficult to measure feminist concepts and (b) such theories cannot help researchers to predict individual or group behavior.

Few 2007, 466

Critics may ask whether Black feminism and critical race feminism can predict behavioral outcomes for targeted groups. Cause and effect of specific individual behaviors cannot be predicted by these theories;

Few 2007, 454

First, as social scientists, we must examine how Black women come to understand themselves through the development of Black female subjectivities, as can be articulated through Black feminism and critical race feminism. Subjectivities are those identities that become most salient to an individual in different social contexts (hooks, 1984).

Few 2007, 457

Both theories emphasize that identity politics and the politics of location are contingent on difference and that differences can have strategic value to empower or marginalize individuals and groups.

Few 2007, 458

Both theories offer critical lenses that place not only behavior under scrutiny but also the sociohistorical context of a specified group or community.

25)

Lavar J. Charleston. Factors that Impact College Matriculation for African American Students: Implications for Policy and Praxis. ANNUALS OF THE NEXT GENERATION. Volume 2, No. 1, Fall 2009, 18

After a seven-year battle through several lower courts, on June 23, 2003, the U.S. Supreme Court held in Grutter v. Bollinger et al. that diversity is an imperative component within higher education, and that race, along with several other factors, is of great significance and should be taken into account in an effort to afford the educational benefits of a student body that is diverse. The court upheld the University of Michigan's law school's admissions criteria, while rejecting part of the undergraduate admissions policy. The Court held that while race is one of a number of factors that can be considered in undergraduate admissions, automatically assigning twenty (20) points to students from underrepresented minority groups did not meet the goal of narrowly tailoring its policy for admissions.

Summary of Supreme Court Decisions in Admissions Cases, U.S. Supreme Court — June 23, 2003 by Jonathan Alger, University of Michigan Assistant General Counsel

On June 23, 2003, the U.S. Supreme Court held in *Grutter v. Bollinger et al.* that diversity is a compelling interest in higher education, and that race is one of a number of factors that can be taken into account to achieve the educational benefits of a diverse student body. The Court found that the individualized, whole-file review used in the University of Michigan Law School’s admissions process is narrowly tailored to achieve the educational benefits of diversity. The Court also held that the Law School’s goal of attaining a critical mass of underrepresented minority students does not transform its program into a quota. In *Gratz et al. v. Bollinger et al.,* the Court held that while race is one of a number of factors that can be considered in undergraduate admissions, the automatic distribution of twenty (20) points to students from underrepresented minority groups is not narrowly tailored.

26)

Charleston 2009, 18

Justice Sandra Day O'Connor (joined by Justices Stevens, Souter, Ginsburg, and Breyer) delivered the opinion of the court. The Court's opinion upheld Justice Powell's view ni The Regents of the University of California v. Bakke (1978) case, and found that diversity within the student body is a significant state interest that can validate the use of race in university admissions. As Jonathan Alger, the Assistant General Counsel for the University of Michigan noted in his description of the decision:

The Court cited social science research showing that 'student body diversity promotes learning outcomes, . . . better prepares students for an increasingly diverse workforce and society, and better prepare them as professionals.' It acknowledged that 'major American businesses have made clear that the skills needed ni today's increasingly global marketplace can only be developed through exposure ot widely diverse people, cultures, ideas, and viewpoints,' and that high-ranking former military leaders have asserted that ' a highly qualified, racially diverse officer corps' is essential ot national security. Finaly, the Court noted that diversity is particularly important in the law school context because law schools 'represent the training ground for a large number of our Nation's leaders' The Court concluded that 'effective participation by members of al racial and ethnic groups in the civic life of our Nation is essential fi the dream of one Nation, indivisible, is to be realized.' (Alger, 2003, p. 2)

Summary of Supreme Court Decisions in Admissions Cases, U.S. Supreme Court — June 23, 2003 by Jonathan Alger, University of Michigan Assistant General Counsel

In an opinion by Justice O’Connor (joined by Justices Stevens, Souter, Ginsburg, and Breyer), the Court explicitly adopted Justice Powell’s view from *Regents of the University of California v. Bakke* (1978), finding that “student body diversity is a compelling state interest that can justify the use of race in university admissions.” It noted that public and private universities across the nation have modeled their admissions programs on the views articulated by Justice Powell in *Bakke,* and it reiterated that race “’is only one element in a range of factors a university properly may consider in attaining the goal of a heterogeneous student body.’”

…

The Court cited social science research showing that “student body diversity promotes learning outcomes, … better prepares students for an increasingly diverse workforce and society, and better prepares them as professionals.” It acknowledged that “major American businesses have made clear that the skills needed in today’s increasingly global marketplace can only be developed through exposure to widely diverse people, cultures, ideas, and viewpoints,” and that high-ranking former military leaders have asserted that “a highly qualified, racially diverse officer corps” is essential to national security. Finally, the Court noted that diversity is particularly important in the law school context because law schools "represent the training ground for a large number of our Nation's leaders." The Court concluded that “[e]ffective participation by members of all racial and ethnic groups in the civic life of our Nation is essential if the dream of one Nation, indivisible, is to be realized.”

27)

Charleston 2009, 10

Critics of affirmative action make the following arguments: (a) affirmative action represents reverse discrimination and lessens the opportunity of admission for better qualified White students; (b) affirmative action fosters a disparity between the skills of the student and the abilities necessary to succeed at selective universities; and (c) affirmative action stigmatizes members of the target population as unqualified (Herrnstein &Murray, 1994; Sowell, 2004; Themstrom &Thernstrom, 1999). However, a 2006 study on The Effects of Affirmative Action in Higher Education found that "Affirmative action as currently practiced carries a clear benefit for minority students and that the potential to achieve even greater benefits ni the future is considerable" (Fischer & Massey, 2007, .p 547).

Social Science Research 36 (2007). The effects of affirmative action in higher education. Mary Fischer, Douglas Massey, 532

Critics of affirmative action have made three principal arguments: (1) affirmative action constitutes reverse discrimination that lowers the odds of admission for ‘better’ qualiWed white students; (2) affirmative action creates a mismatch between the skills of the student and the abilities required for success at selective universities, thereby setting up beneWcia- ries for failure; (3) affirmative action stigmatizes all members the target group as unquali- Wed, which results in demoralization and substandard performance regardless of individual qualiWcations.

Although vocal critics of affirmative action have made the foregoing arguments (Herrnstein and Murray, 1994; Sowell, 2004; Thernstrom and Thernstrom, 1999a,b),

28)

PREPARING THE NEXT GENERATION OF AFRICAN AMERICAN COMPUTING SCIENCE FACULTY: A RESPONSE TO THE OBAMA ADMINISTRATION’S SCIENTIFIC WORKFORCE PRIORITIES. LaVar J. Charleston, Jerlando F. L. Jackson and Juan E. Gilbert. The Obama Administration and Educational Reform Advances in Education in Diverse Communities: Research, Policy and Praxis, Volume 10, 2014, 209

Although higher education is one of the few sectors of the U.S. economy that has been praised for its innovative approaches to integrating cultural diversity, African Americans unfortunately remain highly underrepresented in doctoral programs (Davidson & Foster-Johnson, 2001). This problem appears even worse when considering STEM fields in particular, and worse still with respect to computing sciences (Charleston & Jackson, 2011; Jackson et al., 2009). While some studies cite the high costs of graduate education, limited financial support, and availability of more lucrative opportunities outside of academia as reasons for the low enrollment of African Americans in PhD programs (e.g., Boykin, Franklin, & Yates, 1979; Brazziel, 1988), other researchers (e.g., Adams, 1992; Charleston et al., 2014; Davidson & Foster-Johnson, 2001; Phillip, 1993) have high-lighted the importance of mentoring relationships between graduate students and their professors as a determinant of successful completion of graduate programs and the career trajectories of students as professionals.

Mentoring in the Preparation of Graduate Researchers of Color. Martin N. Davidson and Lynn Foster-Johnson. Review of Educational Research, Winter, 2001, Vol. 71, No. 4, 549

The growing proportion of people of color in the U.S. population (Grieco & Cassidy, 2001) challenges many institutions and industries to work effectively with the emerging dynamics of cultural diversity. One sector that has often been lauded for its innovative approaches to integrating cultural diversity is higher education. It is ironic, then, that doctoral level education is an area in which there has been woeful underrepresentation of populations of color. Many explanations are posited for the relatively small numbers of students of color entering PhD programs: today's sluggish market for college instructors, the high costs of graduate education, limited financial support, and more lucrative opportunities in other professional fields (Boykin, Franklin, & Yates, 1979; Brazziel, 1988). However, we argue that the cultivation of developmental or mentoring relationships between graduate students and their professors is a critical factor in determining the successful completion of graduate programs (Adams, 1992; Phillip 1993).

MORE PLAGIARISM

Much of LaVar’s scholarly work since the dissertation lifts language from the dissertation verbatim. But the dissertation is full of plagiarism. So Lavar’s peer-reviewed work has plagiarism throughout. For example

29)

LaVar J. Charleston. Journal of Diversity in Higher Education 2012 Vol. 5, No. 4. A Qualitative Investigation of African Americans Decision to Pursue Computing Science Degrees: Implications for Cultivating Career Choice and Aspiration, 224

Grounded theory embodies the process of collecting and analyzing data simultaneously. This type of data collection process allows for developing theoretical and thematic explana- tions, which then serve to explain, compare, and trace the development of researched phenomena (Glaser & Straus, 1967; Mason, 1996). This constant, comparative form of data analysis is essential to grounded theory methodology because it allows researchers to keep analysis and theory generation secured within the data (Glaser & Strauss, 1967). The process involves the following steps: (a) comparing the data appli- cable to each conceptual category, (b) integrat- ing the categories and their properties, (c) de- limiting the emergent theory, and (d) writing theory (Jorgensen, 1989).

Green 2008, 45 … 27

The grounded theory approach (Glaser & Strauss, 1967; Lincoln & Guba, 1985; Mason, 1996; Scott, 1995) refers to collecting and analyzing data simultaneously for the purposes of developing theoretical and thematic explanations, in turn, to explain, compare, and trace the development of the researched phenomena. Grounded theory offers a set of flexible strategies, not rigid prescriptions (Charmaz, 1995). The process involves the following steps: “(a) comparing the data applicable to each conceptual category; (b) integrating the categories and their properties; (c) delimiting the emergent theory; and (d) writing up the theory” (Jorgensen, 1989, p. 113).

…

Central to grounded theory methodology is the use of the constant comparative method in data analysis to keep analysis and theory generation anchored in the data (Glaser and Strauss 1967).

30)

Charleston 2012, 224

Conrad, Neumann, Haworth, and Scott (1993) assert four overlapping, iterative stages as they relate to grounded theory. Through this stage process, research is initiated by collecting and coding data into as many categories of analysis as the data allow. These categories parallel those concepts identified by the re- searcher through the constant comparison of the collected data. This first stage precipitates the researcher’s consideration of the theoretical properties of these developing concepts from the start of the study. As the researcher discov- ers gaps within the developing theory, the sec- ond iterative stage involves theoretical sam- pling, which further guides the data collection process. The third overlapping, iterative stage consists of developing a rudimentary theory, accomplished through additional refinement of pertinent concepts and their relationships. It is in this stage that the researcher attempts to discover data that support or reject key concepts and theoretical propositions. Likewise, this pro- cess enables the elimination or modification of concepts in accordance with the depth of sup- port that can be pulled from the data. Following the first three stages, theoretical saturation is accomplished by the emergence of an integrated theory, the fourth and final stage of grounded theory (Conrad et al., 1993).

Grounded theory enables the constant exam- ination of data, which serves to further develop the study, based on emergent themes and concepts. In addition, it informs its observers of intricate details and concerns among study participants, ones that ultimately reveal access variables that allow for incremental change (Glaser, 1999).

Green 2008, 27-28

Conrad (1993) described the grounded theory methodology as consisting of four overlapping, iterative stages. Research begins with the collection and coding of data into as many categories of analysis as possible. These categories represent concepts, which are abstracted through the

constant comparison of data. From the beginning of the study the researcher considers the

theoretical properties of these developing concepts. As the researcher discovers gaps in the

developing theory, theoretical sampling is used to guide further data collection. The

methodology moves into the third stage with further refinement of the concepts and their relationships, which leads to the development of a rudimentary theory. At this stage the

researcher makes a concerted effort to find data to support or reject key concepts and theoretical propositions. Concepts may be eliminated or modified depending on the level of support found in the data. The final stage of grounded theory is the emergence of an integrated theory that meets the requirements of theoretical saturation.

"Grounded theory tells us what is going on, tells us how to account for the participants' main concerns, and reveals access variables that allow for incremental change. " (Glaser 1999, p. 840)

31)

Charleston 2012, 226

Credibility in this study, in concert with naturalistic inquiry, was achieved by corroborating the structures that made up the study. More plainly, corroboration was ascertained by spending ample time with study participants to check for distortions, which facilitated pro- longed engagement with study participants. Likewise, the participants’ experiences were ex- plored in sufficient detail, which exemplified persistent observation. In addition, multiple data sources were checked by comparing vari- ous forms of data such as digital audio record- ings, physical transcriptions, and consultation with other investigators, as well as researcher notes. The aforementioned processes of prolonged engagement, persistent observations, and checking multiple data sources embody the process of triangulation. Rudestam and Newton (1992) assert that peer debriefing, revising working hypotheses throughout the data collec- tion process, clarifying preliminary findings with study participants, and audio-/videotaping the interviews in an effort to compare with other means of data collected are customarily the procedures necessary to ensure the credibility of a study. Through the current study’s primary method of individual interviews, triangulation occurred through corroborating persistent ob- servations, checking multiple sources of data through an in-depth literature review, recording field notes, and clarifying categories and narra- tives among study participants. These processes fostered structural corroboration of the study.

In an effort to address validity among the current study, I attempted to address Wolcott’s (1990) nine points to satisfy the correctness or credibility of this qualitative study:

1. Talk a little, listen a lot. I attempted to facilitate a social visit whereby the subject felt comfortable and I was attentive, speaking when necessary and listening when necessary.

1. Record accurately. I attempted to record precise words when necessary in a timely fashion to avoid misinterpretation of words and behaviors.
2. Begin writing early. I began writing early in an effort to expedite the process of recognizing holes in the data collected or its processes.
3. Let readers see for themselves. I purposed to let others provide input on primary data in an effort to expand the focus of what I observed and interpreted.
4. Report fully. Although I do not report every discrepant detail, I aimed to enter- tain possible discrepancies and the possi- ble significance of their interpretations.
5. Be candid. I attempted to be subjective throughout the qualitative approach of the study.
6. Seek feedback. I sought feedback throughout the process in an effort to avoid overembellishment or underdevel- opment of concepts in the study.
7. Try to achieve balance. I attempted to bal- ance the events recorded in an effort to avoid disproportionate attention given to outliers in the study.
8. Write accurately. I attempted to check for coherence and internal consistencies throughout the crafting of the written study.

In attempting to address these nine points, I aspired to provide validity and credibility through the research process and specifically in the recording and reporting of results.

Graham 1997, 51-52

In naturalistic inquiry credibility or truth is ascertained through structural corroboration. Such corroboration might be accomplished by spending sufficient time with subjects to check for distortions (prolonged engagement), exploring the participants’ experience in sufficient detail (persistent observation), and checking multiple sources of data such as other investigators, written records, diaries, field notes, and so on. This is the process of triangulation. Peer debriefing, revising working hypotheses as more data become available, clarifying tentative findings with the participants, and videotaping interviews for comparisons with the recorded data are typical procedures for adding to the credibility of the study (Rudestam & Newton, 1992, pp. 38-39). The present study utilized two corroborative methods of data collection (interviews and focus group interviews). The following methods of triangulation were also utilized: persistent observation, checking multiple sources of data through a comprehensive literature review, recording field notes, and clarification of categories and narrative stories with the participants as techniques of structural corroboration.

Wolcott (1990) presented nine points to satisfy the validity (correctness or credibility) question of qualitative studies:

(1) Talk a little, listen a lot -- A sociable “sit and visit” situation should exist where the subject feels comfortable discussing topics with the researcher. The researcher must be attentive and responsive without talking too much and hearing too little.

(2) Record accurately -- The researcher should make every attempt to record precise words of the participants. Words should be recorded as soon as possible to prevent the reinterpreting of behavior before it has been recorded.

(3) Begin writing early -- The intent of writing early is to record what one suspects and to identify holes in the information.

(4) Let readers “see” for themselves -- It is a good idea to include primary data in the final report. This allows the researcher to let the expressed thoughts of others become a point of focus rather than focus only upon what the researcher observed and interpreted.

(5) Report fully -- Every discrepant detail is not reported; however, if an issue is not fully resolved the inclusion of such discrepancies may lead to possible intrepretations every bit as valid as the researcher’s.

(6) Be candid - Subjectivity is seen as a strength of qualitative approaches.

(7) Seek feedback -- Having a continual source of feedback checks for accuracy and completeness. Feedback also provides a reality check where the reporting or the interpretation of the event needs to be more developed or is overblown and needs to be brought back to reality.

(8) Try to achieve balance -- Achieving a balance between events that occurred or statements made is warranted in order to avoid a disproportionate amount of attention being given to outlying, yet more provocative, data.

(9) Write accurately -- this process checks for coherence and internal consistency as well as for style and grammar (pp. 128-134).

Wolcott’s nine points aided in a strive for a valid study and valid reporting of results.

32)

Charleston 2012, 226

Validity and Trustworthiness

In an effort to address reliability and validity of the qualitative inquiry within this study, I employed a naturalistic approach. Whereas traditional empirical research addresses validity in terms of reliability, internal validity, and exter- nal validity of measures and procedures, the corresponding terms in naturalistic inquiry in- clude audibility, credibility, and fittingness (Guba & Lincoln, 1981). Reliability in qualita- tive research involves the ability to replicate the study given a similar set of circumstances. Through naturalistic inquiry, I coded the raw data in a manner whereby the contrived themes and theories are not only understood by another individual, but that the individual is able to arrive at a similar conclusion through the con- sistencies of the coded raw data.

Graham 1997, 51

3.7. Addressing Reliability and Validity in Qualitative Inquiry

In traditional empirical research the importance of reliability, internal validity, and external validity of measures and procedures are of utmost importance. Qualitative inquiry should also address the issues of reliability and validity; however, when traditional definitions of reliability and validity are applied to qualitative research, problems emerge. The corresponding terms in naturalistic inquiry are “auditability,” “credibility,”, and “fittingness” (Guba & Lincoln, 1981).

Reliability concerns the replication of the study under similar circumstances. The naturalistic investigator derives consistency through coding the raw data in ways so that another person could understand the themes and arrive at similar conclusions.

33)

Charleston 2012, 225-226

Open coding was an integral part of analysis in this study. Through first-level coding, I ex- tracted data and placed them in many themes and meaning categories, which enabled me to summarize portions of the data (A. C. Strauss & Corbin, 1990). In addition, analyzing the data through codes achieved the goal of dissecting the interview data in a meaningful way, which in turn helped maintain the relationships of the- matic representations (Miles & Huberman, 1994). Through the coding process, the emer- gence of categories and their theoretical underpinnings began to align and make sense. The theoretical implications that gradually came from the categories that created meaning formed relative patterns. A. C. Strauss and Corbin (1990) posit that pattern coding enables the placement of first-level coding into more concise themes. Likewise, the patterns and the- matic representations that emerge embody grounded theory (Glaser & Strauss, 1967). When all the incidents were readily classified and the categories were saturated as represented through the emergence of much regularity, I concluded the data collection and analysis por- tion of the study (Lincoln & Guba, 1985; A. L. Strauss, 1987).

Graham 1997, 49-50

Strauss and Corbin (1990), utilizing an inductive technique called a constant comparative method (Glaser & Strauss, 1967), provided a model for this process of analysis. Data were collected, written up, and reviewed line by line, typically within a paragraph. Codes were written in the left-hand margins while reflective remarks were written in the right-hand margins. Coding is analysis; therefore, data were first systematically coded into as many themes and meaning categories as possible through first level coding which provided a device for summarizing segments of data (Strauss & Corbin, 1990). The goal of coding is to review a set of field notes, transcribed or synthesized, and to dissect them meaningfully, while keeping the relations between the parts intact (Miles & Huberman, 1994). As the categories emerged, the relationships between those categories and their theoretical implications began to make sense. Gradually the theoretical properties of the meaning categories crystallized and formed a pattern. Pattern coding is a way of grouping first level coding summaries into a smaller number of sets, themes, or constructs (Strauss & Corbin, 1990). The patterns that emerge are sometimes called “grounded theory” (Glaser & Strauss, 1967).

Graham 1997, 51

Strauss (1987) and Lincoln and Guba (1985) suggest that coding and recoding are over when the analysis itself appears to have run its course, that is, when all of the incidents can be readily classified, categories are “saturated,” and sufficient numbers of “regularities” emerge. This rule of thumb was also used as a guideline for ending the data collection and analysis phases of the study.

34)

Charleston 2012, 225

After reviewing the study’s audio recordings, transcripts, and notes, I employed a basic qual- itative analysis process (Miles & Huberman, 1994). I completed the following steps: (a) ap- plying several word codes to the transcribed interviews; (b) noting reflections and other rel- ative remarks in the right-hand margins; (c) sorting through the data to identify and record similar phrases, patterns, commonalities, and differences; (d) isolating these patterns and pro- cesses for the next wave of data collection; (e) gradually expanding a small set of generaliza- tions that address consistencies in the database; and (f) confronting said generalizations with a theory-forming body of knowledge. This six- step process was integral in distilling the col- lected data into words to form thematic catego- ries.

Graham 1997, 49

Following the listenings of interview and focus group interview transcripts, the basic qualitative analysis process included steps outlined by Miles & Huberman (1994) including: (1) affixing one to several word codes to the interview and focus group interview transcripts in the left- hand margins; (2) noting reflections and other remarks in the right hand margins; (3) sorting and sifting through these materials to identify similar phrases, relationships between variables, patterns, themes, distinct differences between subgroups, and common sequences; (4) isolating these patterns and processes, commalities and differences and taking them out to the field in the next wave of data collection; (5) gradually elaborating a small set of generalizations that cover the consistences discerned in the database; and (6) confronting these generalizations with a formalized body of knowledge in the form of constructs or theories. Since qualitative analysis implies that the data are in the form of words as opposed to numbers, this six step process facilitated the reduction of data into themes or categories and the interpretation of those themes and categories.

35)

Sherri Ann Charleston, LaVar J. Charleston, Jerlando Jackson. “Using Culturally Responsive Practices to Broaden Participation in the Educational Pipeline: Addressing the Unfinished Business of Brown in the Field of Computing Sciences” Journal of Negro Education, Volume 83, Number 3, 2014, 407

Coding was an integral part of analysis within this study. Through first-level coding, data were extracted and placed into many themes and meaning categories, which enabled the researcher to summarize portions of data (Strauss & Corbin, 1990). Additionally, analyzing the data through codes achieved the goal of dissecting the interview data in a meaningful way, which in turn helped the researcher maintain the relationships of thematic representations (Miles & Huberman, 1994). Through the coding process, the emergence of categories and their theoretical underpinnings began to align and make sense. The theoretical implications that gradually formed from the categories that created meaning formed relative patterns. Strauss and Corbin (1990) posited that pattern coding enables the placement of first-level coding into more concise themes. Similarly, the patterns and thematic representations that emerge embody grounded theory (Glaser & Strauss, 1967). When all the incidents were readily classified and the categories were saturated as represented through the emergence of much regularity, the researcher concluded the data collection and analysis portion of the study (Lincoln & Guba, 1985).

Graham 1997, 49-50

Strauss and Corbin (1990), utilizing an inductive technique called a constant comparative method (Glaser & Strauss, 1967), provided a model for this process of analysis. Data were collected, written up, and reviewed line by line, typically within a paragraph. Codes were written in the left-hand margins while reflective remarks were written in the right-hand margins. Coding is analysis; therefore, data were first systematically coded into as many themes and meaning categories as possible through first level coding which provided a device for summarizing segments of data (Strauss & Corbin, 1990). The goal of coding is to review a set of field notes, transcribed or synthesized, and to dissect them meaningfully, while keeping the relations between the parts intact (Miles & Huberman, 1994). As the categories emerged, the relationships between those categories and their theoretical implications began to make sense. Gradually the theoretical properties of the meaning categories crystallized and formed a pattern. Pattern coding is a way of grouping first level coding summaries into a smaller number of sets, themes, or constructs (Strauss & Corbin, 1990). The patterns that emerge are sometimes called “grounded theory” (Glaser & Strauss, 1967).

Graham 1997, 51

Strauss (1987) and Lincoln and Guba (1985) suggest that coding and recoding are over when the analysis itself appears to have run its course, that is, when all of the incidents can be readily classified, categories are “saturated,” and sufficient numbers of “regularities” emerge. This rule of thumb was also used as a guideline for ending the data collection and analysis phases of the study.

36)

Charleston et al 2014, 407-8

*Validity*

In an effort to address reliability and validity of the qualitative inquiry within this study, the researchers employed a naturalistic approach. While traditional empirical research addresses validity in terms of reliability, internal validity, and external validity of measures and procedures, the corresponding terms in naturalistic inquiry include audibility, credibility, and fittingness (Guba & Lincoln, 1981). Reliability in qualitative research involves the ability to replicate the study given a similar set of circumstances. Through naturalistic inquiry, the raw data ascertained by the researcher were coded in a manner whereby the contrived themes and theories are not only understood by another individual, but that individual is also able to arrive at a similar conclusion through the consistencies of the coded raw data.

Graham 1997, 51

3.7. Addressing Reliability and Validity in Qualitative Inquiry

In traditional empirical research the importance of reliability, internal validity, and external validity of measures and procedures are of utmost importance. Qualitative inquiry should also address the issues of reliability and validity; however, when traditional definitions of reliability and validity are applied to qualitative research, problems emerge. The corresponding terms in naturalistic inquiry are “auditability,” “credibility,”, and “fittingness” (Guba & Lincoln, 1981).

Reliability concerns the replication of the study under similar circumstances. The naturalistic investigator derives consistency through coding the raw data in ways so that another person could understand the themes and arrive at similar conclusions.

37)

Charleston et al 2014, 408

Credibility within this study, in concert with naturalistic inquiry, was achieved by corroborating the structures that made up the study. More plainly, corroboration was ascertained by spending ample time with study participants to check for distortions, which facilitated prolonged engagement with study participants. Consequently, the participants’ experiences were explored in sufficient detail that exemplified persistent observation. Additionally, multiple data sources were checked through comparing various forms of data such as digital audio recordings, physical transcriptions, consultation with other investigators, as well as researcher notes. The aforementioned processes of prolonged engagement, persistent observations, and checking multiple data sources embody the process of triangulation. Rudestam and Newton (1992) asserted that peer debriefing, revising working hypotheses throughout the data collection process, clarifying preliminary findings with study participants, and audio-/videotaping the interviews in an effort to compare to other means of data collected are customarily the procedures used to ensure the credibility of a study. Through the current study’s primary method of individual interviews, triangulation occurred through corroborating persistent observations, checking multiple sources of data through an in-depth literature review, recording field notes, and the clarification of categories and narrative stories among study participants. These processes fostered structural corroboration of the study.

Graham 1997, 51-52

In naturalistic inquiry credibility or truth is ascertained through structural corroboration. Such corroboration might be accomplished by spending sufficient time with subjects to check for distortions (prolonged engagement), exploring the participants’ experience in sufficient detail (persistent observation), and checking multiple sources of data such as other investigators, written records, diaries, field notes, and so on. This is the process of triangulation. Peer debriefing, revising working hypotheses as more data become available, clarifying tentative findings with the participants, and videotaping interviews for comparisons with the recorded data are typical procedures for adding to the credibility of the study (Rudestam & Newton, 1992, pp. 38-39). The present study utilized two corroborative methods of data collection (interviews and focus group interviews). The following methods of triangulation were also utilized: persistent observation, checking multiple sources of data through a comprehensive literature review, recording field notes, and clarification of categories and narrative stories with the participants as techniques of structural corroboration.

38)

Journal of Progressive Policy & Practice Volume 2 – Issue 3 Fall 2014 – “Intersectionality and STEM: The Role of Race and Gender in the Academic Pursuits of African American Women in STEM.” LaVar J. Charleston, Nicole M. Lang, Ryan P. Adserias, Jerlando F. L. Jackson, 280

Validity

Prolonged engagement, persistent observations, field notes and the analysis of multiple data sources helped to establish credibility based on triangulating these multiple data sources. Through spending ample time with study participants to check for distortions during the data collection process, both corroboration and prolonged engagement with study participants were simultaneously achieved. Due to the allotted length of the focus group (90 minutes), the participants’ experiences were explored in sufficient detail, enabling persistent observation to occur. The significant number of open-ended (and follow-up) questions enabled the researcher to more effectively comprehend the nature of the participants’ assertions. Additionally, the multiple sources of data were attended to through the process of comparing digital audio recordings, field notes as well as physical transcriptions. The aforementioned comparisons of multiple forms of data enabled the in-depth assertions from participants to be captured by the researchers, and was illustrative of the collective the collective and individual voices of African American women’s experiences in the STEM educational pipeline. The collaboration of the researchers, along with the interaction with study participants, assists with the credibility of this study through the process of peer debriefing, revising working hypotheses throughout the data collection process, clarifying preliminary findings with study participants, and audio/video taping the interviews in an effort to compare to other means of data collected, which Rudestem and Newton (1992) asserts are necessary procedures to ensure the credibility of a study.

Graham 1997, 51-52

In naturalistic inquiry credibility or truth is ascertained through structural corroboration. Such corroboration might be accomplished by spending sufficient time with subjects to check for distortions (prolonged engagement), exploring the participants’ experience in sufficient detail (persistent observation), and checking multiple sources of data such as other investigators, written records, diaries, field notes, and so on. This is the process of triangulation. Peer debriefing, revising working hypotheses as more data become available, clarifying tentative findings with the participants, and videotaping interviews for comparisons with the recorded data are typical procedures for adding to the credibility of the study (Rudestam & Newton, 1992, pp. 38-39). The present study utilized two corroborative methods of data collection (interviews and focus group interviews).

39)

Texas Education Review Arizona’s Rising STEM Occupational Demands and Declining Participation in the Scientific Workforce: An Examination of Attitudes among African Americans toward STEM College Majors and Careers. Jerlando F. L. Jackson, LaVar J. Charleston, Chance W. Lewis, Juan E. Gilbert, Walter P. Parrish III. Volume 5, Issue 2, pp. 91-111 (2017) Available online at [www.txedrev.org](http://www.txedrev.org), 97

Ultimately, perceived efficacy and mechanisms that foster self-evaluation facilitate the growth of intrinsic interests, enabling individuals to persist in activities that promote feelings of satisfaction and efficacy (Bandura, 1986). As such, these interests serve to explain participants’ self-efficacy and their subsequent likelihoods of thriving and persisting in STEM fields throughout their educational and occupational careers. These earlier studies were instrumental in relating self-efficacy and career trajectories.

Lent, Brown, and Larkin (1984) reported that while vocational interests alone were not significant predictors of persistence in career fields, self-efficacy and interest both contribute to unique variance in occupational considerations. The researchers found that technical and scientific self-efficacy is predictive of both grades in technical courses and the range of considered career options, as well as persistence in technical majors. Additionally, PostKammer and Smith (1986) found that interest and self-efficacy are strong predictors of math and non-math-related occupational considerations among economically disadvantaged women, and that interest alone was a strong predictor of the aforementioned occupational considerations among economically disadvantaged men.

Graham 1997, 14

Bandura (1986) posited that perceived efficacy and self-evaluative mechanisms foster the growth of intrinsic interests, with people exhibiting enduring interest in activities that engage their feelings of personal efficacy and satisfaction.

Graham 1997, 28

The same authors utilized a sample of economically disadvantaged students between the ages of 16-24 (Post- Kammer and Smith, 1986). They found that females had extremely low self-efficacy for engineering and drafting courses (Post-Kammer and Smith, 1986). Furthermore, both interests and self-efficacy were significant predictors of math- and nonmath-related occupational considerations for women, but only interests were predictive for men (Post-Kammer and Smith, 1986).

Although vocational interest was not a significant predictor of persistence in a career field, both self-efficacy and interest added unique variance in predicting occupational consideration (Lent, Brown and Larkin, 1986). Technical and scientific self-efficacy was predictive of grades in technical courses, persistence in a technical major and range of career options considered (Lent, Brown and Larkin, 1986). Comparing male-dominated with female-dominated occupations. Rotbert, Brown and Ware (1987) found that self-efficacy was a significant predictor of range of options for male-dominated but not for female-dominated occupations.

40)

Charleston et al 2017, 97

Prior research has applied self-efficacy theory to the process of occupational choice (e.g., Hackett & Betz, 1981; Hackett & Campbell, 1987; Lent & Hackett, 1987) and has established the relevance of performance accomplishments or successes as avenues that lead to increases in self-efficacy. These studies have also demonstrated that ability ratings, interest, and attributions are all influenced by performance (Hackett & Campbell, 1987). This body of research posits that self-efficacy beliefs predict significant indices to career-entry behavior (i.e., college choice and academic performance) within particular fields (Lent & Hackett, 1987). This research also shows that self-efficacy ratings among college students decrease upon failing tasks, further illuminating the relationship between performance accomplishment and self-efficacy (Hackett & Campbell, 1987). Ultimately, perceived efficacy and mechanisms that foster self-evaluation facilitate the growth of intrinsic interests, enabling individuals to persist in activities that promote feelings of satisfaction and efficacy (Bandura, 1986).

Graham 13-14

Other studies have extended Hackett and Betz’ (1981) early work of applying self-efficacy theory to the career choice process. Campbell and Hackett (1985) and Hackett and Campbell (1985) (as cited in Betz and Hackett, 1986) found that performance accomplishments (success) led to an increase in self-efficacy, while failure resulted in a decrease in level and strength of self- efficacy. Performance also influenced ability ratings, interest, and attributions (whether success was attributed to luck or a lack of ability).

Several studies on the topic were published in 1987. Lent and Hackett (1987) found that self- efficacy beliefs are predictive of important indices of career-entry behavior, such as college major choices and academic performance in certain fields. Because career self-efficacy and other measures of self-esteem and career indecision were not significantly correlated, their work provided support for the idea that self-efficacy is a unique construct (Lent and Hackett, 1987). Hackett and Campbell (1987) found that college students’ self-efficacy ratings and task interest decreased as a result of failing a task. Women in a “success” condition were more likely than men to attribute their performance to luck while women in the “failure” condition were more likely than men to attribute their performance to a lack of ability (Hackett and Campbell, 1987). These authors concluded that a lack of past performance accomplishments may be more detrimental to women’s self-efficacy than men’s (Hackett and Campbell, 1987). Lent, Brown and Larkin (1987) found that self-efficacy was a more useful predictor of perceived options than Holland’s (1985) theory of person-environment congruence.

Bandura (1986) posited that perceived efficacy and self-evaluative mechanisms foster the growth of intrinsic interests, with people exhibiting enduring interest in activities that engage their feelings of personal efficacy and satisfaction.

41)

Charleston 2010, 30

Prior research studies have applied self-efficacy theory to the process of occupational choice (e.g., Hacket & Betz, 1981; Hackett & Campbell, 1987; Lent & Hackett, 1987) and have established the relevance of performance accomplishments or success as an avenue that led to an increase in self-efficacy. Likewise, these studies demonstrated that ability ratings, interest, and attributions were influenced by performance (Hackett & Campbell, 1985). Additionally, this body of research posited that self-efficacy beliefs predict significant indices related to career- entry behavior (i.e., college choice and academic performance) within particular fields (Lent & Hackett, 1987). This research also posits that self-efficacy ratings among college students decreased upon failing a task, further illuminating the relationship of performance accomplishments to self-efficacy (Hackett & Campbell, 1987). Ultimately, perceived efficacy and mechanisms that foster self-evaluation facilitates the growth of intrinsic interests enabling individuals to persist in activities that promote feelings of satisfaction and efficacy (Bandura, 1986).

Graham 13-14

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Bandura (1986) posited that perceived efficacy and self-evaluative mechanisms foster the growth of intrinsic interests, with people exhibiting enduring interest in activities that engage their feelings of personal efficacy and satisfaction.

TEXT RECYCLING (AND OTHER DISCREPANCIES) 1

It was shown before that LaVar et al recycled LaVar’s 2012 solo-authored study in 2014: <https://freebeacon.com/wp-content/uploads/2024/01/Charleston_complaint.pdf>. But it was not yet shown that LaVar recycled the 2012 study not only in 2014 but also in 2016 and again in 2022.

The studies are

1. LaVar J. Charleston. Journal of Diversity in Higher Education 2012 Vol. 5, No. 4. A Qualitative Investigation of African Americans Decision to Pursue Computing Science Degrees: Implications for Cultivating Career Choice and Aspiration
2. Sherri Ann Charleston, LaVar J. Charleston, Jerlando Jackson. “Using Culturally Responsive Practices to Broaden Participation in the Educational Pipeline: Addressing the Unfinished Business of Brown in the Field of Computing Sciences” Journal of Negro Education, Volume 83, Number 3, 2014
3. Constructing self-efficacy in STEM graduate education. LaVar Charleston and Raul Leon. Journal for Multicultural Education. Vol. 10 No. 2, 2016.
4. STEMFLUENCES: THE ROLE OF SOCIAL INTERACTION AND SCIENTIFIC IDENTITY FORMATION IN THE SUCCESSFUL MATRICULATION OF AFRICAN AMERICAN MALES IN STEM. LaVar J. Charleston. Young, Gifted and Missing. Diversity in Higher Education, Volume 25, 53–72, 2022.

The 2012, 2014, 2016, and 2022 studies reproduce much of the same “data.” The “data” was interview testimony recorded by LaVar Charleston for his 2010 dissertation. See Appendix below. (That LaVar is regurgitating old “data,” over a decade old by the time of his 2022 study, is not always disclosed.)

The participants in the 2012 were described as follows (225):

* “A total of 37 individual interviews were conducted”
* Interviews “ranged from 30 to 45 min”
* “22% of interviewees were undergraduate students”
* “48% were graduate students”
* “30% were PhD-minted professors or researchers”
* “50% of all participants either attended or were in the process of attending predominantly White institutions”
* “42% attended historically Black colleges and universities”
* “8% attended predominantly Black institutions”
* “The average participant age was 28.5 years”

The participants in the 2014 were described as follows (406):

* “Thirty-seven computing sciences aspirants and practitioners were interviewed”
* “Interviews ranged from 30 to 45 minutes”
* “22 percent were undergraduate students”
* “48 percent were graduate students”
* “30 percent were PhD-minted professors or researchers.”
* “50 percent of all participants either attended or were in the process of attending predominantly White institutions”
* “42 percent attended historically Black colleges and universities (HBCUs)”
* “8 percent attended predominantly Black institutions.”
* “The average participant age was 29 years.”

The participants in the 2022 study were described as follows (58):

* “Thirty-seven computing sciences aspirants and practitioners were interviewed”
* “Interviews averaged 45 minutes”
* “22% of interviewees were undergraduate students” (8 people)
* “48% were graduate students” (17.76 people?)
* “30% were PhD-minted professors or researchers” (11.1 people?)
* “50% of all participants either attended or were in the process of attending PWIs” (18.5 people?)
* “42% attended historically Black colleges and universities” (15.54 people?)
* “8% attended predominantly Black institutions” (2.96 people?)
* “The average participant age was 29 years”

The participants in the 2016 study were described as follows (155):

* “A total of 23 interviews were conducted”
* “The interviews averaged a half hour to forty-five minutes”
* “13 graduate students (10 female, 3 male)”
* “10 PhD-minted professors and researchers (4 female, 6 male)”
* “13 participants attended or were attending a predominantly White institution (PWI)”
* “10 attended a historically Black college and university (HBCU)”
* “The average age of the participants was 29 years”

So in the 2016 study LaVar arbitrarily removed 14 participants from the 2022, 2014, 2012 studies, including the 8 undergrads. The average age of participants doesn’t compute unless the undergrads were non-traditional students, closer to 30 years old, not 20. LaVar does not say that they were non-traditional students.

BUT LaVar’s “data” was first reported in his dissertation, this we know because he reports overlapping long-form testimonies across all his papers and the dissertation (see Appendix below), and there he reports numbers inconsistent with all of the above studies. For example

In the dissertation LaVar reports (44):

* Female undergraduate students: 2 (7%)
* Male undergraduate students: 4 (15%)
* Female graduate students: 10 (37%)
* Male graduate students: 3 (11%)
* Female professors/researchers: 3 (11%)
* Male professors/researchers: 5 (11%)
* Total: 27 (100%)

The original study included only 27 interviewees. So the 37 participants reported in 2012, 2014, and 2022 is discrepant.

2012, 2014, and 2022 report 8 undergrads. But this is discrepant. The dissertation reports 6.

2012, 2014, and 2022 report 10 professors/researchers. But the original study had only 8.

Among other discrepancies, the 2016 study claims 10 professors/researchers, 4 female, 6 male. The original study reports only 8, 3 female, 5 male.

Maybe LaVar made basic counting errors. But it must be investigated given the above discrepancies in reporting whether any interviews ever actually took place and whether the audio recordings are consistent with LaVar’s reports of them in his repeatedly recycled study.

There are more discrepancies. For example the 2016 study is supposed to be about the testimony of graduate students and professors only (p 55). But it reports as “data” testimony coded in the dissertation as belonging to **undergraduates**:

* I saw my dad time after time, when he wanted to add extra memory, he just did it himself. He would take the computer apart and didn’t even take it to the shop and that just intrigued me said a male student participant
* A lot of my friends were taking computer classes and everyone suggested that I do computers. My family didn't really know what it was but they said I should do it.
* I tried to surround myself around people who knew what they were doing. Doing online research on my own and hanging with older folks who knew what they were doing. . . One of the guys I grew up early childhood with, sophomore year, said he went to Georgia Tech, after Georgia Southern and said he was a computer scientist and told me about the stuff he was doing and that sparked me.

If LaVar’s coding in the dissertation was correct, this would undermine the article which would have to be retracted for this reason alone.

TEXT RECYCLING 2

LaVar and his coauthors also recycled additional studies.

For example compare

Journal of Progressive Policy & Practice Volume 2 – Issue 3 Fall 2014 – “Intersectionality and STEM: The Role of Race and Gender in the Academic Pursuits of African American Women in STEM.” LaVar J. Charleston, Nicole M. Lang, Ryan P. Adserias, Jerlando F. L. Jackson

With

Journal of Diversity in Higher Education 2014, Vol. 7, No. 3, 166–176. Navigating Underrepresented STEM Spaces: Experiences of Black Women in U.S. Computing Science Higher Education Programs Who Actualize Success. LaVar J. Charleston, Phillis L. George, Jerlando F. L. Jackson, Jonathan Berhanu, and Mauriell H. Amechi

The two studies are largely identical. I include some selections of LaVar’s verbatim copy and paste:

JDHE 169

Method

The researchers conducted a qualitative inquiry into the lives of African American women in the computing sciences, as we attempted to understand and describe the participant’s lived experiences (Creswell, 2002). A phenomenological design was well-suited to the study because the aim of our inquiry was understanding a common experience of a group of people, allowing the researcher to use data from participants to develop foundational knowledge about the phenomenon (Moustakas, 1994; Shank, 2002). In this context, the goal of the inquiry was to explore African American women’s perspectives on their participation in the historically White, male-dominated field of computing science. Conducted by an African American woman, the focus group lasted approximately 60 to 90 min in duration. Informed consent was given orally, and participants were made aware of their right to suspend the session at any time. The focus group session was video- taped, and upon completion of the session, the tape was transcribed and filed for possible future use as a promotional or professional aid (depend- ing upon the consent of the participants). The session was comprised of a series of closed and open-ended questions designed to gather informa- tion relative to the participants’ experiences, with specific attention to the role gender and race plays within the computing sciences (see Appendix).

JP3 279

METHOD

…

A phenomenological design was well-suited to the study because our inquiry aims to understand a common experience of a group of people, allowing the researchers to use data from participants to develop foundational knowledge about the phenomenon (Moustakas, 1994; Shank, 2002). A focus group was conducted lasting approximately 90 minutes in duration and moderated by an African American woman. Participants provided consent orally and were made aware of their right to suspend the session at any time. The focus group session was recorded and the tape was transcribed and filed for possible future use as a promotional/professional aid (based on the consent of the participants). The session was comprised of a series of closed and open- ended questions designed to gather information relative to the participants’ experiences, with specific attention to the roles gender and race play within their academic trajectories within the computing sciences.

JDHE 169-70

Characteristics of Focus Group Participants

Purposeful sampling techniques were employed to ensure that all participants met the fol- lowing criteria (Lincoln & Guba, 1986): (a) identify as “African American” or “Black” women, (b) are enrolled full time or were recently (in the last 3 years), and (c) are between the ages of 18 and 35 years. All 15 of the focus group participants were African American females and were recruited from the 2007 African American Researchers in Computing Sciences (AARCS) Conference. All of the focus group participants had either majored or were majoring in an area within or related to computing as an undergraduate or graduate stuent. Moreover, at the time of the study, two participants had already obtained a PhD in com- puting sciences, 12 were current graduate students (PhD aspirants), and one participant was complet- ing her baccalaureate degree. All undergraduate student participants were attending a historically Black college and university, and all graduate students and current PhD-holder participants were receiving or had received their graduate degrees from a predominantly White institution (PWI).

JP3 279

Characteristics of Focus Group Participants

This study employed purposeful sampling techniques (Lincoln & Guba, 1986), wherein all participants identified as “African American” or “Black” women, were enrolled full-time or were recently (in the last three years) in an academic computing program, and were no younger than 18 years of age and no older than 35 years of age. Fifteen African American women participants from a 2007 conference dedicated to African Americans in STEM were recruited and took part in this study. Each participant either majored in or were majoring in a computing- science related area of study as an undergraduate or graduate student. While all participants attended colleges within the continental United States, their schools were geographically dispersed. Likewise, at the time of the study, two participants had already obtained a PhD in computing sciences, 12 were current graduate students (PhD aspirants), and one participant was completing her baccalaureate degree. The undergraduate student participant was attending an HBCU, and all graduate students and current PhD holder participants were receiving or had received their graduate degrees from a PWI.

JDHE 170

Validity

In an effort to address reliability and validity of the qualitative inquiry within this study, the researcher employed a naturalistic approach. As prescribed by Lincoln and Guba (1986), this approach to qualitative research addresses validity in terms of credibility and fittingness. Reliability in qualitative research involves the ability to replicate the study, given a similar set of circumstances. Through naturalistic inquiry, the researchers coded data in a manner in which emerging themes and theories are replicable.

Credibility was brought to this study using tri- angulation techniques: prolonged engagement, persistent observations, field notes, and the analysis of multiple data sources. First, corroboration was ascertained by spending ample time with study participants to check for distortions, which facilitated prolonged engagement with study participants. As noted earlier, focus groups lasted an average of 60 to 90 min. Second, the participants’ experiences were explored in sufficient detail, which exemplified persistent observation. This is evidenced from the interview protocol, which included a significant number of open-ended ques- tions to understand and capture the essence of participants’ experiences. Third, multiple data sources were checked through comparing various forms of data such as digital audio recordings and physical transcriptions. For instance, the inclusion of information-rich responses from participants also enhanced our ability to capture and illustrate the collective and individual voices of African American women in STEM. Moreover, credibility was brought to the study via consultation with other investigators. Rudestem and Newton (1992) asserts that peer debriefing, revising working hypotheses throughout the data collection process, clarifying preliminary findings with study participants, and audio- and videotaping the interviews in an effort to compare with other means of data collected are customarily the procedures necessary to insure the credibility of a study.

JP3 280

Validity

The researchers employed a naturalistic approach to address reliability and validity of the qualitative inquiry within this study. Validity in terms of credibility and fittingness were the main goals of this qualitative approach as prescribed by Lincoln & Guba (1986). More clearly, special care was taken to create a research design that could be replicated if so desired contingent upon a similar set of circumstance in an effort to establish reliability. Moreover, in the tradition of naturalistic inquiry, data were coded based upon replicable themes and theories that emerged from the data.

Prolonged engagement, persistent observations, field notes and the analysis of multiple data sources helped to establish credibility based on triangulating these multiple data sources. Through spending ample time with study participants to check for distortions during the data collection process, both corroboration and prolonged engagement with study participants were simultaneously achieved. Due to the allotted length of the focus group (90 minutes), the participants’ experiences were explored in sufficient detail, enabling persistent observation to occur. The significant number of open-ended (and follow-up) questions enabled the researcher to more effectively comprehend the nature of the participants’ assertions. Additionally, the multiple sources of data were attended to through the process of comparing digital audio recordings, field notes as well as physical transcriptions. The aforementioned comparisons of multiple forms of data enabled the in-depth assertions from participants to be captured by the researchers, and was illustrative of the collective the collective and individual voices of African American women’s experiences in the STEM educational pipeline. The collaboration of the researchers, along with the interaction with study participants, assists with the credibility of this study through the process of peer debriefing, revising working hypotheses throughout the data collection process, clarifying preliminary findings with study participants, and audio/video taping the interviews in an effort to compare to other means of data collected, which Rudestem and Newton (1992) asserts are necessary procedures to ensure the credibility of a study.

JDHE 170

Positionality

As cultural outsiders, this study was approached not only with sensitivity but also with a desire to uplift the voices and experiential realities of African American women in STEM fields. As such, the team of researchers reflected on their own positionality, and the impact of their own complex identities with regard to interactions with participants and the interpretation of the results. Throughout the research analysis process, the authors debriefed about their interpretations to be reflective, address potential assumption and biases, and to ensure consistency with phenomenology. Although some members were not involved in every step of the research (e.g., some were involved in coding but not interviews), the presence of multiple researchers allowed us to function as auditors of the overall process (Creswell, 1997). Multiple members of the research team transcribed and coded the focus group recording, which allowed for peer debriefing and the inclusion of thick-rich descriptions in the findings. Moreover, the use of inductive data strategies al- lowed the data to serve as the foundation of understanding, wherein the findings are acutely descriptive and conveyed through direct quotes and thematic analyses.

JP3 280-81

Positionality

As cultural outsiders as it relates to race, gender, and/or educational foci, this study was approached with both sensitivity and a strong desire to uplift the voices and experiential realities of African American women in STEM fields. In order to do so, the team of investigators sought to be reflective of our own positionality and how our multiple identities might interplay with the data collection process and analysis. As such, the researchers regularly interrogated their interpretations to be reflective, addressed potential assumptions and biases, and attempted to ensure consistency with phenomenology. While the investigators had varying roles throughout the research process (e.g., some were involved in analyses but not focus group interviews), having multiple team members enabled each team member to serve as an auditor of the research study as a whole (Creswell, 1997). Multiple members of the research team transcribed and coded the focus group recording, which allowed for peer debriefing and the inclusion of thick-rich descriptions in the findings. Moreover, the use of inductive data strategies allowed the data to serve as the foundation of understanding wherein the findings are acutely descriptive and conveyed through direct quotes and thematic analyses.

JDHE 171

Discussion

The findings within this study fostered several thematic representations relating to the participants’ experiences in the field of computing science. The following themes arose from the data: (a) the challenges of being a Black woman in the computing sciences, (b) commonality of isolation and subordination, and (c) sacrifices related to computing science pursuance. It is also important to note that some of the data collected did not fit easily in a singular category. As such, there are places in this inquiry in which various themes emerged in more than one category.

JP3 281

FINDINGS AND DISCUSSION

Utilizing the guidance of the intersectionality framework, this study explored the role that race and gender play in the academic pursuits of African American women in the STEM field of computing sciences. Two main themes emerged from the data: (a) racial and gender challenges related to the computing sciences educational trajectory; and (b) a shared sense of isolation.

JDHE 171

The Challenges of Being a Black Woman in the Computing Sciences

In accordance with the tenets of BFT and CRF, participants in this study grappled with their self- identity as women of color in racially and sexually exclusive academic spaces. Although participants described their experiences with regard to being a woman of color in the field of computing sciences in a variety of ways, the group’s consensus can be summarized in the simple exclamation of one participant: “It’s tough.” Depending on the situational context, they noted that they identified as either “Black” or “a woman,” or, in some cases, both. As one participant stated, “At different times, different identifications come to the fore- front.”

Although some participants described the difficulty they felt in determining whether they were being treated a certain way because they were Black or a woman, other participants self- identified as being Black, first and foremost. As one participant shared, “My belief is that the perception is that I am seen as a Black person first.” Others expressed an inability to entirely separate their identities as Black and a woman. Consider this example: “At the end of the day, I am who I am. I am a Black woman, and there’s no middle ground.” The majority of participants were at- tuned to societal stereotypes about being a Black woman in the field. As one focus group participant expressed, “There are often assumptions that I am supposed to act a certain way because I am a Black woman.” She continued to describe how she felt that others expected her to get upset or defiant when events would occur that were not particularly in her favor. Collectively, all 15 participants expressed how the computer science culture in their respective departments was not very welcoming to women, and even less so to African American women.

Participants also recognized that misperceptions and stereotypes about their academic and intellectual abilities were driven by their identity as Black women. One participant described an instance in which a White male classmate who was assigned as her partner blatantly questioned her academic competence. She explain how this partner made decisions without her input, such as submitting components of the group assignment and attempting to fully dictate how it would be carried out. “Maybe there was the perception that I was female, I was Black, and I was incompetent. His perception was I was going to pull him down,” she added. Another participant went on to share a similar story: “I get to XXX and the first question someone asked was if I was someone’s secretary . . . because I’m Black? A woman? I can’t tease those things apart.” The aforementioned example illustrates the complexities and intersections of race and gender for Black women in computer science.

JP3 281-82

Racial and Gender Challenges Related to the Computing Sciences Educational Trajectory

Conflicts and integrations of racial, gender, and academic identities arose repeatedly as participants reported grappling with their self-identities as women of color in race- and gender- exclusive academic spaces. Although participants described their experiences as women of color in computing sciences in a variety of ways, the group’s consensus was that it is exceptionally challenging and difficult. One participant simply and directly exclaimed, “It’s tough.” Participants’ racial and gendered identities were proclaimed largely depending upon the situation context. In other words, their primary identities varied based upon the social space within a particular educational environment. One participant relays this sentiment like this: “At different times, different identifications come to the forefront,” demonstrating a set of unique—although previously-documented—challenges facing Black women at the intersections of race, gender, and science identities.

Many participants indicated that ascertaining the root of maltreatment proved difficult, wondering whether this treatment was based upon either their racial or gendered identities (e.g., a result of being a woman or a result of being Black). Several participants emphasized that their skin color was the initial focus of identity that dictated how others would treat them. “My belief is that the perception is that I am seen as a Black person first,” expressed one participant. However, other participants indicated that their intersections of race and gender were inseparable. “At the end of the day, I am who I am. I am a Black woman, and there’s no middle ground,” exclaimed one participant. The stereotype regarding being a Black woman in a STEM field was an area of confluence among all study participants. One participant described it like this: “There are often assumptions that I am supposed to act a certain way because I am a Black woman,” continuing that it was clear that others expected her to act angry or attitudinal when challenges or conflicts would occur. … Collectively, and against the backdrop of perceived stereotypes associated with their intersectional identities as Black women, all 15 participants expressed how the computer science culture in their respective departments was clearly unwelcoming to women, and even more ostracizing to African American women.

Among participants, identifying as a Black woman conjured a wealth of misperceptions and stereotypes regarding their academic identity as well as their intellectual capacity. Like similar stories told by many of the participants, one participant described an encounter with a White male peer who blatantly questioned her academic abilities when they were paired on a team assignment. This participant explained how her teammate would submit components of the group assignment, making all of the decisions for the group, fully dictating how the project would be carried out without her input. “Maybe there was the perception that I was female, I was Black, and I was incompetent. His perception was I was going to pull him down,” she shared. Another participant added, “I get to [University] and the first question someone asked was if I was someone’s secretary... because I’m Black? A woman? I can’t tease those things apart.” These aforementioned examples illustrate the complexities and intersections of race and gender in computer science and support previous scholarship documenting the broader challenges associated with establishing oneself and gaining legitimacy as a Black woman academic (Brewer, 1999).

JDHE 171-72

Commonality of Isolation and Subordination

Participants in this study also described how they experienced feelings of isolation and subor- dination to varying degrees during their computing science pursuits. Participants reported in- stances in which there was limited, if any, social interaction with peers in their graduate program. It took “a good 6 weeks before people were finally opening up to me,” one participant shared. Given the virtual absence of institutional and faculty support within and outside of their respective pro- gram, several participants began to reevaluate whether they had chosen the best discipline for graduate studies. In response to the sexist nature of some conditional stimulus (CS) departments, one participant asserted the following: “This isn’t seen as a discipline for women.” Some participants elaborated on the nexus between race, gender, and erroneous assumptions of incompetence. “Why are you still in school?” and “Why aren’t you married and taking care of somebody?” were common expressions of surprise among their White colleagues during their initial interactions. The anecdotes highlighted here shed light on the inseparability and confluence of race and gender for Black women in CS departments. These findings support this article’s theoretical constructs of BFT and CRF.

Given that most CS departments are skewed, primarily White-male dominated spaces, partici- pants expressed feelings of cultural isolation and subordination through exclusion. Although feelings of cultural isolation may be associated with acclimating to environments in which Black women are underrepresented, participants elaborated in detail how race and gender were intersect- ing factors that negatively affected their academic experience. In the next example, one participant shares her challenges in obtaining lab partners for course assignments: “[As] the only Black [stu- dent], no one wants to partner with you and you have to do all the experiments by yourself.” Like- wise, participants reported that favoritism would often develop, in which other classmates “no lon- ger want to work with you,” creating tension among students and putting them in an inequitable position with the professor. The confluence of race and gender for Black women in CS departments is also illustrative in the following example: “Just having other females there just doesn’t cut it be- cause there’s no one there that has your experi- ence . . . there are no common threads that connect you.” Others cited similar examples that empha- size divisions along race and gender, which reflect the significance of BFT and CRF in the academic experiences of participants.

Participants also cited computing science professors as central contributors to their sense of isolation. One participant described the reaction of a faculty member when an Asian friend, who was well-liked by the professor, confronted the profes- sor about his concern that the African American student was being mistreated. The faculty member replied,

I don’t think she has talent. I think White professors gave her grades because of her race and they felt bad about slavery. I don’t think there are any real computer scientists who are Black, and maybe she can be the first.

Women in this study were also cognizant that their isolation in academic spaces was parallel to the isolation they experienced in everyday life as a result of being a part of the Black race. Moreover, it should be noted that isolation for Blacks varied according to gender. For exam- ple, despite sharing similar racial experiences, participants noted how Black men and women were not always valuable sources for social support or camaraderie. As one participant elab- orated, “Just cause there’s another Black brother [in class] doesn’t mean they want to work with you either.” In sum, participants felt that Black men placed a strong emphasis on developing relationships with White males, whereas Black women were less inclined to do so.

JP3 282-83

A Shared Sense of Isolation

Feelings of isolation were salient findings among the participants in this study. Social interaction with peers proved limited among study participants throughout their STEM education trajectories, particularly in STEM graduate degree programs. One participant remarked how “it took a good six weeks before people were finally opening up to me.” The inundated consistency of isolation, precipitated by the lack of support from faculty and their respective institution alike, was a critical factor in participant’s considerations to withdraw from their programs and reconsider their choice in majoring in their computing-related discipline. Participants also indicated that the field of computing as a whole is very sexist in nature and indicated that based on their experiences, computing “isn’t seen as a discipline for women.” Additionally, participants posited comments they would receive from their White counterparts that they felt were directly resultant of their race, gender, and thoughts about their inability to achieve in STEM: “Why are you still in school?” and “Why aren’t you married and taking care of somebody?” were common expressions of astonishment among their White colleagues during their initial interactions.

These stories highlight the confluence of race and gender for Black women in CS departments …

Given that most CS departments are heavily populated by White males, cultural isolation and was highly prevalent throughout participants’ educational experiences related to STEM. While feelings of cultural isolation are commonly associated with acclimating to highly technological environments, wherein Black women are typically an anomaly, the intersection of race and gender were factors that proved salient in the negative experiences recounted in-depth by study participants. As many projects at the graduate level are collaborative in nature, the intersectionality of race and gender in these spaces facilitated consistent challenges to study participants. One participant explained it like this: “[As] the only Black [student], no one wants to partner with you and you have to do all the experiments by yourself.” Additionally, this sort of discrimination, particularly if facilitated by the professor was contagious in that classmates “no longer want to work with you,” as one participant recounted. As other students attempt to look favorable in the eyes of the professor, pairing with a Black woman in class was seen as detrimental to the academic progress of other students. In other words, participants felt that their experiences were definitively unique, even as it related to the subject of gender. “Just having other females there just doesn’t cut it because there’s no one there that has your experience... there are no common threads that connect you,” asserted one participant. Participants consistently echoed each other in the context of the focus group that illuminated the unique divisions and experiences as a result of the intersections of race and gender identities.

Computing science and other STEM faculty were particularly instrumental in creating an environment characterized by isolation and ostracization for this study’s participants. One participant tells a story of a fellow (Asian) graduate student who intervened to address the professor on her behalf after recognizing maltreatment. This Asian student had a good working relationship with the faculty professor and upon the Asian student’s inquiry, the professor said:

I don’t think she has talent. I think White professors gave her grades because of her race and they felt bad about slavery. I don’t think there are any real computer scientists who are Black, and maybe she can be the first.

What was also salient among participants was their recognition of many similarities between being Black in highly technological domains, and being Black in broader society. They indicated that much of the isolation they experience in their academic department mirrors the isolation of the Black race in broader societal terms. However, the added intersection of the women gender on to the Black race also illuminated differential gender experiences among Black men and Black women in STEM educational spaces. More clearly, the isolation Black women experience could be remarkably different for Black men in the same space. Participants indicated that though many experiences are familiar due to issues germane to Blackness and the Black race, another peer who is of the same race is not always a valuable source of support or collegiality. Gender, as well as the isolating and competitive nature of STEM fields themselves, promote and entirely new element. One participant summarized this sentiment like so: “Just cause there’s another Black brother [in class] doesn’t mean they want to work with you either.” Participants posited that because White males were often seen in a favorable light, particularly from professors, Black men were more likely to establish relationships with them than their other Black women counterparts.

JDHE 173-74

Conclusions

Findings from this investigation contribute to the existing literature in at least three major ways. First, unlike prior research in this area, which has sought to identify factors that facilitate recruit- ment, retention, and advancement in STEM (Han- son, 2004; Jackson & Charleston, 2012; Jackson et al., 2009; Museus et al., 2011), the current inquiry shed light on the inseparability and confluence of race and gender in the lives of Black female aspirants in the field of computing. Specifically, the self-reports given expose the academic, social, and institutional barriers Black women face in a field of study that remains virtually exclusive in terms of racial and gender demographics. Despite their hardships, it is important to note that many participants had already persisted success- fully1 toward undergraduate and graduate degree attainment. These particular participants were (re)affirmed in their abilities through educational and academic gains, despite the many hindrances. From a BFT and CRF lens, participants’ responses suggest a collective understanding of the chal- lenges in the field of STEM as women of color.

…

The last contribution of this study is that it reinforces the notion that institutional culture is a significant consideration in the study of underrep- resented and underserved populations (Museus et al., 2011). In this study, BFT and CRF were useful in exposing how differently African American women experience computer science cultures. The inhospitable nature of computing at PWIs, as de- scribed by our participants, may be especially detrimental to the participation rates of minority women for which STEM degree attainment at the master’s and doctoral levels consistently lag be- hind the attainment rates of their White female counterparts (National Science Foundation, 2011). Although findings from this study are not representative of all women of color, they suggest that more concentrated efforts are required to ensure equitable and inclusive learning environments.

Several implications for practice can be derived from this study. First and foremost, in order to create more inclusive learning spaces for Black women in computing, faculty in the computing field should more critically examine their own prejudices and biases toward both racial-ethnic minorities and women (Museus et al., 2011). As evidenced from the findings, students and faculty were both complicit in the subjugation of Black women in computing, which led participants in this study to question the fit between their aca- demic and professional goals. Also requisite for improving the learning environment in STEM- related fields is the implementation of student support groups, or “safe spaces” in which women of color can reflect on negative experiences, prac- tice self-care, and develop healthy responses.

Findings from the present study also reiterate national calls for greater parity in representation among faculty and students of color in computing programs and industry (American Council on Ed- ucation, 2006; National Science Board, 2012). Broadening diversity and participation among fac- ulty in computing may help mitigate the educa- tional climate, which our participants described as isolating and insensitive to their needs. For in- stance, improving the recruitment of women of color to the academy may help strengthen the pipeline for youth who aspire to enter the computing field but lack same-race and/or gender role models. Lastly, such efforts may increase opportunities for mentor- ing and advising Black women in the computing field. Collectively, these efforts may positively con- tribute to the retention and completion rates among Black female aspirants in computing.

As the United States and key governmental entities (e.g., National Science Foundation, Na- tional Institutes of Health) continue to support programs to improve participation rates in com- puting, institutional leaders must pay close atten- tion to the varying needs of African American females in order to improve representation in the sciences of women, in general, and women of color, in particular. Addressing gender- and race- specific nuances is likely to benefit the computing sciences workforce overall by enhancing the ef- fectiveness of current and future intervention pro- grams. Findings from this study might be ex- tended by investigating African American women who did not meet success (e.g., those who do not persist) in computing sciences. Lastly, future re- search might assess the particular ways in which existing programs that encourage broader STEM involvement may enhance or impede participation by gender, and these results can be used to im- prove current and future intervention programs.

JP3 284-86

CONCLUSION

…

The uniquely-situated Black woman identity described by study participants defines what is meant by intersectional identities and speaks to the basis upon which Crenshaw (1989) first outlined intersectionality as both a form of identity, and a theoretical framework for understanding how identities interact with and inform one another. Originating from her critique of the American justice system's treatment of Black women’s experience of workplace discrimination, Crenshaw's (1989) original intersectionality framework sought to illustrate how Black women experienced systematic erasure not only within the justice system, but within feminist theory and social justice political organizing and broader identity politics. As a departure from other research studies that aimed to explicate factors that increase recruitment, advancement, and retention in STEM fields among African American women (e.g., Charleston, 2012; Jackson & Charleston, 2012), the data from this investigation illuminates the inseparability and confluence of race and gender in the lives of Black women aspirants in the field of computing. Crenshaw (1989) further wrote, “Because the intersectional experience is greater than the sum of racism and sexism, any analysis that does not take intersectionality into account cannot sufficiently address the particular manner in which Black women are subordinated” (p. 140). Through the theoretical lens of intersectionality, the analysis from the data provided by participants’ own stories within this study exposed academic, social, and institutional barriers that are unique to this population, particularly within the STEM educational trajectory that remains virtually cordoned off in terms of racial and gender demographics.

…

More concentrated and specific efforts are needed to ensure equitable and inclusive STEM education environments in order to reverse the trend of lagging attainment of master’s and doctoral degrees among women of color (National Science Foundation, 2011).

Implications

... These may include developing and implementing student/faculty support groups or other efforts intended to create safe spaces where women of color can reflect on negative experiences, practice self-care, develop healthy responses to adversity, and develop a scientific identity that overcomes the negative external influences due to the intersection of race and gender.

In concert with the American Council on Education (2006) and the National Science Board (2012), the present study echoes the national call for broader participation and greater parity of representation among faculty and students of color in the computing sciences and other STEM fields, both within the academy and industry alike. Scholar Mary Howard-Hamilton (2003) suggested research concerning African American women in higher education is well suited for critical race theories and Black feminist thought theoretical frameworks—within and among which intersectionality is widely employed (Collins, 2000; Crenshaw, 1989, 1991). The utilization of these sorts of frameworks for research may help to illuminate ways to create more diverse faculty in scientific fields like computing, which may in turn promote a healthier educational climate that may serve to mitigate the isolating and insensitive culture of these fields, particularly toward women of color. Improving the recruitment and retention of women faculty of color serves to strengthen the pipeline for students who might aspire to enter STEM fields but lack same-race and/or same-gender role models. Broader representation among faculty may increase the likelihood for culturally specific mentoring and advising experiences for Black women that may result in increased entry and persistence in these fields.

The scientific leadership within the United States continues to support efforts to broaden STEM participation. Therefore, it is increasingly important that industry and institutional leaders address the varying needs of the diverse populations whose contributions are necessary in an effort to maintain a strong scientific workforce that enables the United States to remain globally competitive. The viability and effectiveness of current and future intervention programs will be greatly enhanced by recognizing and adequately addressing racial and gender issues affecting matriculation rates into computing science and other STEM-related programs. The merits of this study might be broadened by investigating African American women who did not persist in computing sciences and other STEM fields. Additionally, future research might investigate existing interventions and how they enhance or impede STEM participation by gender and race.

2022, 57

Study Design

The complex nature of this study merited the qualitative methodology of indi- vidual interviews. In other words, the primary sources of data stemmed from one-on-one interviews with African American male computing sciences pur- suants. This method of data collection aimed to enable the researcher to review and analyze a variety of factors that influenced the persistence within and matriculation through the STEM field of computing sciences. Interviews enabled the participants to respond to the research questions in their own words and in a manner that was comfortable and devoid of preconceived notions imposed by the researcher (Creswell, 2007). Applying this method of inquiry within the quali- tative research design strengthened it by not only providing various contexts for inquiry and discovery, but also enabling the researcher to triangulate the data across interviews (e.g. researcher notes, transcriptions, digital audio recordings). This triangulation served to validate the research findings (Creswell, 2007).

2014, 406

STUDY DESIGN

The complex nature of this topic led to the pursuit of a research design that employs qualitative methods, gathering data primarily through one-on-one interviews with African American students pursuing computing science degrees. This method of data collection aimed to enable the researchers to review and analyze a variety of factors that influenced persistence in and matriculation through the STEM field of computing sciences. Interviews enabled the participants to respond to the research questions in their own words and in a manner that was comfortable and devoid of preconceived notions imposed by the researchers (Creswell, 2007). Applying this method of inquiry within the qualitative research design strengthened it by not only providing various contexts for inquiry and discovery, but also enabling the researchers to triangulate the data across interviews (e.g., researcher notes, transcriptions, digital audio recordings). This triangulation served to validate the research findings (Creswell, 2007).

2022, 57-58

Participant Selection

Due to the nature of this study, the researcher needed to gain the participation of African American computing sciences pursuants. This is a scarce population. For example, based on data collected by the Computing Research Association’s (CRA) Taulbee survey, the foremost source of data for the computing commu- nity within the United States, there were only 17 (1.1%) of African American PhD recipients in 2014 (Zweben & Bizot, 2014). Additionally, of the newly hired computing sciences faculty in 2014, only 14 (2.1%) African Americans were hired in a tenure track, researcher, postdoc, or teaching faculty position (Zweben & Bizot, 2014). Therefore, the researcher used purposive sampling (Bogdan & Biklen, 2007) to strategically target said population. The data under review came from conference participants of a computing sciences conference targeting Afri- can Americans that took place in the Pacific Northwest. This conference was a research and skill building conference for undergraduate and graduate students, and included a networking and mentoring component composed of computing scientists at all levels (i.e., undergraduates, master’s level practitioners, tenure track faculty PhDs, as well as research scientists and analysts). The conference averaged a yearly attendance rate of about 50 African American computing scientists and computing science aspirants, with nearly half of attendees being African American males, thus making the conference an ideal location to gather qualitative data due to this relatively large sample size as compared to any other concentration of practicing and aspiring African American computing scientists within the United States and abroad.

Thirty-seven computing sciences aspirants and practitioners were interviewed based on their individual time constraints and willingness to be participants in this study (55% female, 45% male). Seventeen of these interviewees, wherein data were extracted, were African American males. Interviews averaged 45 minutes in duration for each individual in the sample. From a percentage standpoint, 22% of interviewees were undergraduate students, 48% were graduate students, and 30% were PhD-minted professors or researchers. In addition, 50% of all participants either attended or were in the process of attending PWIs, 42% attended histori- cally Black colleges and universities, and 8% attended predominantly Black institutions. All participants were African American males and had majored in or were majoring in a computing science-related field, and the average participant age was 29 years. Participants had family socioeconomic status backgrounds that ranged across the spectrum of categories. Most participants, however, were from middle-income, dual-parent households. In addition, the majority did not have a parent involved in computing sciences. The educational backgrounds of those participants with dual-parent households were similar insofar as they all attained similar levels of educational accomplishment, regardless of socioeconomic status. The individual interviews occurred on location at the conference. The host site was a major computing industry company located in the northwestern region of the United States. Likewise, the interviewing occurred in a conference room-type set-up. Additionally, study participants were from various regions of the United States ranging from the Southwest to the Northeast.

2016, 406-7

Participant Selection

Due to the nature of this study, the researchers needed to gain the participation of African American students pursing computing sciences degrees. This is a scarce population. For example, based on data collected by the Computing Research Association’s (CRA ) Taulbee survey, the foremost source of data for the computing community within the U.S., there were only 22 African American PhD recipients in 2008—amounting to just 2% of all computing science doctoral degrees granted that year (Zweben, 2010). Of those 22 PhD recipients, only 12 were hired in a tenure track, researcher, post doc, or teaching faculty position. Therefore, this study used purposive sampling (Bogdan & Biklen, 2007) to strategically target this unique population. The data under review came from conference participants of the 2009 African American Researchers in Computing Sciences (AARCS) program. While the AARCS program in its entirety consisted of three components: (a) targeted presentations, (b) future faculty/researcher mentoring, and (c) an annual AARCS conference, this study dealt with and extracted information solely from AARCS conference participants. Although the AARCS conference was a research and skill-building conference for undergraduate and graduate students, it also included a networking and mentoring component comprised of computing scientists at all levels (i.e., undergraduates, master’s level practitioners, tenure-track faculty PhDs, as well as research scientists and analysts). The AARCS conference averaged a yearly attendance rate of about 50 African American computing scientists and computing science aspirants, thereby making the conference an ideal location to gather qualitative data due to a larger sample size when compared to any other concentration of practicing and aspiring African American computing scientists within the United States and abroad.

Thirty-seven computing sciences aspirants and practitioners were interviewed based on their individual time constraints and willingness to be participants in this study (55 percent female, 45 percent male). Interviews ranged from 30 to 45 minutes, one for each individual in the sample. Participants varied across educational levels: 22 percent were undergraduate students, 48 percent were graduate students, and 30 percent were PhD-minted professors or researchers. In addition, 50 percent of all participants either attended or were in the process of attending predominantly White institutions (PWIs), while 42 percent attended historically Black colleges and universities (HBCUs) and 8 percent attended predominantly Black institutions. All participants resided in various regions of the United States ranging from the Southwest to the Northeast, and all were African American and had majored in or were majoring in a computing science-related field. The average participant age was 29 years. Participants had family socioeconomic status backgrounds across the spectrum of income categories. Most interviewees, however, were from middle-income, dual-parent households. In addition, the majority did not have a parent involved in computing sciences. The educational backgrounds of those participants with dual-parent households were similar insofar as they all attained similar levels of educational accomplishment, regardless of socioeconomic status. The individual interviews were conducted in a meeting room at the conference host site, a major computing industry company located in the northwestern region of the United States.

2022, 58-59

Data Collection

An interview protocol was used to guide the qualitative inquiry, utilizing open-ended questions that facilitated the recollection of experiences related to the educational and social experiences in collegiate STEM spaces. As Creswell (2007) dictates, the interview protocol served to: (1) provide structure and organization to ensure that all areas of inquiry were covered in the same order for each participant, (2) establish a guide for the range of the discourse, and (3) ensure and protect the broader purpose and objectives of the interview. The interview pro- tocol was a predetermined set of questions established to invoke conversational discourse with the participants in the study.

In addition to the open-ended questions within the interview protocol, the researcher exercised the freedom to follow-up with sub-questions, both present and not present on the protocol, in an effort to gain clarity of responses (Miles & Huberman, 1994). The open-ended questions developed for the protocol were non-directive in nature, but the follow-up questions were specificity seeking questions. The interview protocol questions were developed by the researchers in accordance with the primary research question, the objectives of the study, as well as previously researched literature that guided the study.

2014, 407

Data Collection

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2022, 59

Data Analysis

Using Strauss’ (1995) constant comparison method, emergent themes were analyzed after all data were collected through participant interviews. Themes of particular interest to the researcher were those associated with elucidating the research question for this study. These themes were labeled and described by the researcher. These themes and their descriptions were then cross-verified, re-labeled, and defined. The researcher then re-examined the original tran- scripts for separate verification of the presence of the emergent themes. Partici- pant quotes from the interview transcripts were extracted as supportive evidence for the existence of each theme. The researcher combined findings from the analyses (transcriptions, researcher notes, audio recordings of each interview) to produce a final description of each theme, along with their properties and dimensions.

Coding was an integral part of analysis within this study. Through first level coding, data was extracted and placed into many themes and meaning categories, which enabled the researcher to summarize portions of data (Strauss & Corbin, 1990). Additionally, analyzing the data through codes achieved the goal of dis- secting the interview data in a meaningful way, which in turn helped the researcher maintain the relationships of thematic representations (Miles & Huberman, 1994). Through the coding process, the emergence of categories and their theoretical underpinnings began to align and make sense. Strauss and Corbin (1990) posit that pattern coding enables the placement of first level coding into more concise themes. Likewise, the patterns and thematic representations that emerge embody grounded theory (Glaser & Strauss, 1967). When all the incidents were readily classified and the categories were saturated as represented through the emergence of much regularity, the researcher concluded the data collection and analysis portion of the study (Lincoln & Guba, 1985).

2014, 407

Data Analysis

Using Strauss’ (1995) constant comparison method, emergent themes were analyzed after all data were collected through participant interviews. Themes of particular interest to the researchers were those associated with elucidating the research question for this study. The themes were labeled and described independently by two researchers. These themes and their descriptions were cross- verified by the researchers together, re-labeled, and defined. Each researcher then re-examined the original transcripts for separate verification of the presence of the emergent themes. Original transcripts from these data were extracted as supportive evidence for the existence of each theme. The researchers combined findings from the separate analyses to produce a final description of each theme, along with their properties and dimensions.

Coding was an integral part of analysis within this study. Through first-level coding, data were extracted and placed into many themes and meaning categories, which enabled the researcher to summarize portions of data (Strauss & Corbin, 1990). Additionally, analyzing the data through codes achieved the goal of dissecting the interview data in a meaningful way, which in turn helped the researcher maintain the relationships of thematic representations (Miles & Huberman, 1994). Through the coding process, the emergence of categories and their theoretical underpinnings began to align and make sense. The theoretical implications that gradually formed from the categories that created meaning formed relative patterns. Strauss and Corbin (1990) posited that pattern coding enables the placement of first-level coding into more concise themes. Similarly, the patterns and thematic representations that emerge embody grounded theory (Glaser & Strauss, 1967). When all the incidents were readily classified and the categories were saturated as represented through the emergence of much regularity, the researcher concluded the data collection and analysis portion of the study (Lincoln & Guba, 1985).

2022, 60

Validity

In an effort to address reliability and validity of the qualitative inquiry within this study, the researcher employed a naturalistic approach. While traditional empirical research addresses validity in terms of reliability, internal validity, and external validity of measures and procedures, the corresponding terms in natu- ralistic inquiry include audibility, credibility, and fittingness (Guba & Lincoln, 1981). Reliability in qualitative research involves the ability to replicate the study given a similar set of circumstances. Through naturalistic inquiry, the raw data ascertained by the researcher are coded in a manner whereby the contrived themes and theories are not only understood by another individual but that individual is able to arrive at a similar conclusion through the consistencies of the coded raw data.

In concert with naturalistic inquiry, credibility within this study was achieved by corroborating the structures that bolstered the utilized methodologies. More plainly, corroboration was ascertained by spending ample time with study par- ticipants to check for distortions, which facilitated prolonged engagement with study participants. Likewise, the participants’ experiences were explored in suf- ficient detail which exemplified persistent observation. Additionally, multiple data sources were checked through comparing various forms of data such as digital audio recordings, physical transcriptions, consultation with other inves- tigators, as well as researcher notes. The aforementioned processes of prolonged engagement, persistent observations, and checking multiple data sources embody the process of triangulation. Rudestam and Newton (1992) asserts that peer debriefing, revising working hypotheses throughout the data collection process, clarifying preliminary findings with study participants, and audio/video taping the interviews in an effort to compare to other means of data collected are customarily the procedures necessary to insure the credibility of a study. Through the current study’s primary method of individual interviews, triangulation occurred through corroborating persistent observations, checking multiple sources of data through an in-depth literature review, recording field notes, and the clarification of categories and narrative stories among study participants. These processes fostered structural corroboration of the study.

2014, 407-8

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Credibility within this study, in concert with naturalistic inquiry, was achieved by corroborating the structures that made up the study. More plainly, corroboration was ascertained by spending ample time with study participants to check for distortions, which facilitated prolonged engagement with study participants. Consequently, the participants’ experiences were explored in sufficient detail that exemplified persistent observation. Additionally, multiple data sources were checked through comparing various forms of data such as digital audio recordings, physical transcriptions, consultation with other investigators, as well as researcher notes. The aforementioned processes of prolonged engagement, persistent observations, and checking multiple data sources embody the process of triangulation. Rudestam and Newton (1992) asserted that peer debriefing, revising working hypotheses throughout the data collection process, clarifying preliminary findings with study participants, and audio-/videotaping the interviews in an effort to compare to other means of data collected are customarily the procedures used to ensure the credibility of a study. Through the current study’s primary method of individual interviews, triangulation occurred through corroborating persistent observations, checking multiple sources of data through an in-depth literature review, recording field notes, and the clarification of categories and narrative stories among study participants. These processes fostered structural corroboration of the study.

2022, 60

POSITIONALITY

This study was designed in an attempt to make meaning of African American male participants’ experiences throughout the course of their STEM education trajectory. As such, I repeatedly reflected on my own positionality and the impact of my own complex racial, gender, and socioeconomic status, as well as educa- tional identity with regard to interactions with participants and the interpretation of the resultant data. Moreover, I employed inductive data strategies, allowing the data to serve as the foundation of understanding wherein the findings are acutely descriptive and conveyed through direct quotes and thematic analyses.

2022, 408

Positionality

This study was designed in an attempt to make meaning of African American participants’ experiences throughout the course of their STEM education trajectory. As such, the authors repeatedly reflected on their own positionality and the impact of their complex racial, gender, and socioeconomic status, as well as educational identity of the interactions with participants and the interpretation of the resultant data. Moreover, inductive data strategies were employed, allowing the data to serve as the foundation of understanding while the findings are acutely descriptive and conveyed through direct quotes and thematic analyses.

2022, 61

RESULTS

The participants cited a number of incidents when some aspect of positive social interaction was instrumental in their decisions to pursue the computing sciences. Although other research regarding persistence in STEM has illuminated negative social influences that deter underrepresented populations from persisting (e.g., ACT, 2006; Charleston, 2012; Moore, 2006), the participants within this study relayed mostly positive social interactions that aided them throughout their studies. The participants under study were those who had gained measurable success in computing, which may be reflective of the positive iterations regarding their social experiences and scientific identity formation related to computing. This is not to say that there were not barriers related to their academic social- ization experiences; however, these iterations generally came in the form of retrospective considerations about computing, as well aspects about computing they least liked.

Though some participants cited their own intrigue and curiosity as large contributors to their increased search for knowledge surrounding the area of computing, most of the participants credited their parents, professors, advisors, teachers, and friends who either majored in computing sciences, or encouraged, supported, and in some cases, sponsored them to do so for their increased intrigue, introduction to the field, as well as sustained involvement in and related to computing. The thematic representations of these sentiments emerged in the form of social interactions that promoted socialization, STEM identity, confi- dence or self-efficacy, and success in computing sciences through STEM-related influences (STEMfluences) which formed three major sub-themes: (1) positive peer interactions and modeling, (2) parental and familial nurturing, and (3) multifaceted mentorship.

2014, 408-9

FINDINGS

Study participants cited a number of experiences throughout their educational trajectories in which aspects of culturally relevant interactions were instrumental in their decisions to pursue the computing sciences. While other research regarding persistence in STEM has illuminated negative social influences that deter underrepresented populations from persisting (e.g., Moore, 2006), the participants within this study expressed mostly positive social interactions that aided them throughout their trajectories. The participants under study were those who had gained measurable success in computing, which may be reflective of the positive iterations regarding their social experiences relating to computing. This is not to say that there were not sociocultural barriers experienced by the participants; however, these participants overcame these negative experiences—namely, with positive ones.

Although some participants cited their own interest and curiosity as a contributor to their information-seeking and knowledge-attainment surrounding computing careers, most of the participants credited their parents, professors, advisors, teachers, and friends who either majored in computing sciences, or encouraged and supported them throughout their trajectory as their primary reason for obtaining educational and occupational success. The thematic representations of these sentiments emerged in the form of culturally situated experiences that formed three major sub- themes: (a) peer and community modeling; (b) positive familial cultivation; and (c) multi-faceted mentorship. These three themes conjoin to encompass the participants’ support structures where there is recognition—whether by parent, teacher, or mentor—that given the cultural, social, or racialized barriers to degree attainment by African Americans, the participants required direction, support, or assistance in overcoming these obstacles. Participants did not explicitly describe their support structures and communities as consciously adopting CRPT practices. Nevertheless, in so much as supporters recognized cultural, social, or political barriers to educational achievement and enacted culturally specific strategies to surmount them, they were implicitly adopting strategies theorized by CRPT.

2022, 61-63

Positive Peer Interactions and Modeling

Though parental and familial nurturing were essential social influences and interactions relayed by participants, particularly earlier in the educational trajectory, many participants’ parents or surrogates were not knowledgeable about the field of computing which limited the parental and familial nurturing with regards to specific aspects of the field (i.e., coursework). In those cases, positive peer interactions and modeling was extremely salient among study participants with regard to pursuing and persisting in computing. Peer modeling provided STEM-related social interactions that facilitated the socialization to computing among the participants. More plainly, it was this socialization process that often time introduced the participants to computing sciences, introduced the concepts and constructs surrounding computing, and provided a sense of navigating the computing educational pipeline and landscape, ultimately sparking sustained interest among the participants. Engagement with a cohort of some sort sur- rounding computing was significantly instrumental throughout the participants’ educational trajectories toward and through degree attainment. For instance, several participants shared narratives about having a supportive network of peers who significantly influenced their trajectory into computing science. This was best illustrated in the following participant’s comments about having friends who shared similar interests in computing. For instance, he shared:

I had friends that had computers too so I would watch them and we would do programming... Small group of friends and we would look at what each other had done or what programs each other had written. That’s how interests got bigger. Seeing things being done and being exposed to friends’ projects then going home to try to replicate it. Being exposed to different things as your friends did them...I have a PhD in computer science because there was an upperclassman who mentored me who was in graduate school.

Similar to the narrative shared above, the next participant clarified how peer support weighed heavily in the decision to pursue graduate studies in the computing sciences. When asked about influences and motivations for pursuing higher education, the response was:

Actually I became really good friends, well it was like five of us (all African Americans), and we actually started finding more things to do, there used to be like different tweaks that you could put or even like in operating systems, like there’s a lot of different tweaks that you could do, like our own extra stuff... I actually have one of my friends who I met freshman year as well...We always had this competition about our computers like...What new specs are we gonna buy...so it’s kind of like a competitive and feeding type thing at the same time.

Whereas the quote above elucidated the importance of developing and sus- taining social groups in the computing sciences, the next example demonstrates how positive communities of practice can enhance one’s ambitions:

My cohort, all of us decided to go get a PhD. It was six of us and we went together. I wanted to go with people who had a similar aptitude. It would have been a lot harder on me mentally if I went by myself.

In addition to social groups and positive communities of practice (community dynamics) being influential to participants’ pursuit of computing, often times the participants cited individual friends who encouraged them to pursue computing. In many cases, these friends were involved in more advanced computing and had social relationships with the participants. It was often the influence of these friends (peer modeling and socialization) that persuaded the participants to change their major to computing – usually from a related area like mathematics. In most cases, friends were academically or occupationally more senior than the participants they influenced. To be sure, participants explained how they were initially exposed to computer programming via friends, which subsequently fostered scientific identity formation as well as intellectual and professional desires to pursue computing science as a career. The next participant shed light on the intentionality behind his approach to gaining knowledge about the field and building meaningful connections with professionals. Consider the next example that demonstrates the socialization process toward a STEM (computing) identity:

I tried to surround myself around people who knew what they were doing. Doing online research on my own and hanging with older folks who knew what they were doing...One of the guys I grew up early childhood with, sophomore year, said he went to Georgia Tech, after Georgia Southern and said he was a computer scientist and told me about the stuff he was doing and that sparked me.

While some participants received inspiration from older role models, others shared insights on the encouragement and guidance they received from peers, which allowed them to overcome academic challenges:

My friend in undergrad told me I was good and I should take more classes. At first I was like this is hard, I want to quit. I had one friend quit and I said I cannot quit and my (other) friend took his time to help me through the class and after that I was good. He already had a masters...He said it’s not that hard and he said let me help you out and then I got it.

As evidenced from the example above, several participants shared how they developed interests and persisted in computing science given support and encouragement from peers that helped to socialize them to the field.

2014, 409-10

Peer and Community Modeling

While parental and familial encouragement was deemed an essential cultural factor affecting participants’ success, many stated that their parents or surrogates were not knowledgeable about the field of computing, which limited their direct contributions to specific academic aspects of the field (i.e., coursework). However, positive peer interactions and community modeling were extremely salient in influencing participants' effective pursuit of and persistence in computing. Peer modeling promoted positive relationships that facilitated the socialization to computing among the participants. More plainly, it was this socialization process that often introduced participants to computing sciences, along with the concepts and constructs surrounding computing. These experiences provided a roadmap for navigating the computing educational pipeline and landscape, ultimately sparking sustained interest among the participants. Engagement with a peer cohort in computing was significantly instrumental throughout the participants’ educational paths toward and through degree attainment. For instance, several participants shared narratives about having a supportive community of peers who significantly influenced their trajectory in computing science. This sentiment was best illustrated in the following participant’s comments about having friends who shared similar interests in computing:

I had friends that had computers too so I would watch them and we would do programming . . . Small group of friends and we would look at what each other had done or what programs each other had written. That’s how interests got bigger. Seeing things being done and being exposed to friends’ projects then going home to try to replicate it. Being exposed to different things as your friends did them . . . I have a PhD in computer science because there was an upperclassman who mentored me who was in graduate school.

Similar to the narrative shared above, another participant clarified how peer support weighed heavily in her decision to pursue graduate studies in the computing sciences. When asked about her influences and motivations for pursuing higher education, she responded:

Actually I became really good friends, well it was like five of us (all African Americans), and we actually started finding more things to do like, there used to be like different tweaks that you could put or even like in operating systems like 95 and 98, there’s a lot of different tweaks that you could do, like our own extra stuff... I actually have one of my friends who I met freshman year as well . . . We always had this competition about our computers like . . . What new specs are we gonna buy?! So it's kind of like a competitive and feeding type thing at the same time.

Whereas the quote above elucidated the importance of developing and sustaining social groups and community in the computing sciences, the next example demonstrates how positive cultural interactions and relationships can enhance ones’ ambitions:

My cohort, all of us, decided to go get a PhD. It was six of us and we went together. I wanted to go with people who have a similar aptitude. It would have been a lot harder on me mentally if I went by myself.

In addition to positive social groups, peers, and community dynamics being influential to participants’ pursuit of computing, often the participants cited individual friends who encouraged them to pursue computing. In many cases, these friends were involved in more advanced computing and had social relationships with the participants. The encouragement of these friends (community modeling) frequently persuaded participants to change their major to computing from a related area, such as mathematics. In most cases, friends were academically or occupationally more senior than the participants they influenced. Consider the next example:

One of my friends started teaching me about programming C++. The next semester I took an intro to programming . . . As an undergrad, I was an applied mathematics person. My friend told me to join the Olympiad (Computing and Robotics) team. I went to the CS [Computer Science] professor and expressed my interests . . . she was computer science and I was math and I would just sit there and watch her do programming. She was creating stuff that I didn’t know was there. And when I got to the computer science class, I said ok, I might actually want to do this.

The participant in this example explains how she was initially exposed to computer programming through a friend, which subsequently fostered her intellectual and professional desires to pursue computing science as a career. The next participant sheds light on the intentionality behind his approach for gaining knowledge about the field and building meaningful connections with professionals:

I tried to surround myself around people who knew what they were doing. Doing online research on my own and hanging with older folks who knew what they were doing . . . One of the guys I grew up early childhood with, sophomore year, said he went to Georgia Tech, after Georgia Southern and said he was a computer scientist and told me about the stuff he was doing and that sparked me.

While some participants received inspiration from older role models, others shared insights on the encouragement and guidance they received from peers, which allowed them to overcome academic challenges:

My friend in undergrad told me I was good and I should take more classes. At first I was like: this is hard, I want to quit. I had one friend quit and I said I cannot quit and my (other) friend took his time to help me through the class and after that I was good. He already had a master’s . . . He said it’s not that hard and he said let me help you out and then I got it.

As evidenced from the example, several participants shared how they developed interests and persisted in computing science through establishing a community of peers providing support and encouragement around the discipline of computing.

2022, 65-68

DISCUSSION

The results of this study suggest that the factors that lead to matriculation and persistence within the STEM field of computing sciences is largely attributed to factors that were mainly socially constructed among the African American male participants. To be sure, many participants indeed demonstrated significant levels of aptitude, ambition, and self-initiative; however, these findings were not salient factors contributing to their persistence and matriculation in Computer Science. What proved more salient were the positive social influences, interpersonal relationships, and community dynamics that often times were the catalyst for not only the introduction to computing sciences among the participants but also the underlying rationale for successful matriculation and persistence in their STEM area through degree completion.

Overwhelmingly, the literature that addresses African American males and vocation is centered on cultural differences that contribute to perceptions about particular careers and occupational attainment (Byars-Winston, 2010). Contrarily, little attention is attributed to cultural variables that account for observed differences. In many cases, the African American male participants within this study were not privy to the fact that computing sciences was an educational or occupational field until they were already well into college. These data corroborate other studies (e.g., Byars-Winston, 2010, 2006; Charleston, 2012; Cheatham, 1990; Parham & Austin, 1994) that illuminate the unique cir- cumstances regarding the restriction of occupational opportunity confined within minority group status, and further stresses the need for interventions that are culturally situated around career development patterns.

According to most career development theories, by the time students reach college-age, they will have already discerned which occupations are viable ones to match their skills, abilities, and specific interest. Furthermore, they have already passed critical stages of their development that may have necessitated the acquisition of skills and abilities that may or may not have been available to them, thus eliminating STEM fields like computing sciences due to either lack of knowledge that the field exists, or lack of prerequisite skills or community identity necessary to sustain the pursuit thereof. While the literature related to race/ ethnicity and career choice has indicated that race or ethnicity does not seem to contribute greatly to variations in career aspirations and decision-making, perceptions of barriers and career opportunities vary among different racial and ethnic groups (Charleston, 2012; Fouad & Byars-Winston, 2005). As such, even if students indeed possessed the skills and abilities to achieve with regard to computing or other STEM fields, their desire or decision-making toward these fields could be stifled as a result of believing that it is simply not for them. Therefore, the findings within this study could aid African American males in creating an identity characterized by self-efficacy and self-concept (ability) in STEM that could circumvent inadequate preparation from earlier in the educa- tional pipeline.

Parental nurturing was very instrumental in the trajectories of the study participants. Parental support in the form of verbal and moral encouragement, educational encouragement and opportunity seeking (e.g., science and computer clubs), as well as financial support (e.g., computer purchasing) has an integral effect on the student’s disposition toward mathematics, sciences, and computing. It is the support of parents that motivate young African American males to succeed in the computing sciences. Even where parental predisposition was not geared toward computing, positive encouragement proved to enable the partici- pants, fostering their aspirations in computing. The purchase of computers and computer-related products for use in the home benefits young African American males and enhances the likelihood of computing aspirations. However, where finances do not permit, verbal and moral encouragement serves as a technological incubator, if the individual has access to computers elsewhere. Essentially, access to technology is significant to said population. While the home serves as the first line of technological incubation, schools can and do play a significant role in nurturing African American males toward science, technology, and computing related interests. The participants within this study often cited schools as their first introduction to computers. As such, the school is an ideal place to begin the trajectory toward STEM related fields and disciplines. To be sure, schools must reach beyond facilitating remedial engagement with computers (simply consuming information as opposed to creating it), and move toward encouraging and facilitating advanced engagement. When teachers encourage and facilitate technology use in the classroom, it not only has the ability to enhance the learning outcomes of young Black males, but it also exposes them to technology and its variety of uses, which has the propensity to spark an interest in computing sciences and other STEM fields. When teachers facilitate the creation of infor- mation and knowledge, African American male students become exposed to computing – thus sparking their interest in the field.

Computing sciences is a field that requires socialization (Charleston & Jackson, 2011). That is, it is a field wherein to be successful it is necessary to become indoctrinated with the social and technical aspects of the field. This is most effectively achieved through the formulation of communities containing individ- uals of comparable skill level who can navigate through computing together. In these circles (e.g., mandated computing laboratory work, group projects, special programs), African American male students feed off each other and work together on problems related to computing. In a cohort model, community dynamics are established that facilitate teamwork wherein activities, projects, and assignments are completed collaboratively. Likewise, the use of a cohort aids in navigating computing sciences programs and facilitates degree completion.

Computing sciences is a White male dominated field and as such, encompasses many constructs that are foreign to African American life. These constructs range from technical application methods to social construction. As such, the best chance for persistence among African American males is to make use of peers as academic and social resources. The positive community dynamics minimizes alienation and isolation within the field of computing sciences. Likewise, the development of interpersonal relationships contributes to the prospect of degree attainment as there is a sense of accountability that is built among African Americans.

The field of computing sciences is associated with a variety of myths concerning the field. Many of these myths serve as deterrents for potential African American male contributors. Some of these myths include the idea that computing sciences is for nerds, only for White people, only for geniuses, or that in order to participate in computing, it is necessary to be isolated and buried at a cubicle. Therefore, the anomaly of participating in advanced level computing demands a robust support network. Add the social isolation that comes with being an anomaly (African American male) in an already analogous field (computing sciences or other STEM fields), and the necessity of communities of practice or cohort models become more apparent. The participation in a cohort is often the deciding factor of persistence in challenging domains like computing sciences. As such, cohort building and participation in a community of practice is a central implication from the results of this study.

African Americans who participate in the field of computing sciences are an anomaly; which in turn necessitates the need to socialize aspirants into the field. This socialization process occurs through mentorship. Mentorship is imperative throughout the educational and occupational trajectory. Multifaceted mentorship in computing serves to: (1) assist in the academic preparation of African Amer- ican male students (STEM identity), (2) provide social contacts (community) to enhance experiences through the educational trajectory (e.g., computing orga- nizations), (3) provide educational and occupational career advice, (4) provide apprenticeship opportunities, (5) acquire or refer sources of funding, and (6) assist in job search and acquisition (Charleston et al., 2014). Though these mentorship responsibilities are vast and in-depth, the field of computing sciences necessitates these measures as it is an elite field with few African American male participants.

The participants in this study identified mentorship as a significant contribu- tion to their degree attainment. The mentors played an active role in their aca- demic and social development as it related to computing, and the socialization of the field thereof. They served as motivators, encouragers, and in many cases empowered their mentees to persist. As such, mentors not only provide social, moral, and physical support, they also serve as conduits and models for achieving a STEM identity among the participants.

2014, 412, 414, 414-15, 415, 416

**CONCLUSION AND IMPLICATIONS**

The results of this study suggest that the factors leading to the pursuit and persistence of the STEM field of computing sciences are largely attributed to culturally responsive practices whereby social construction trumps academic outlook among African Americans. Many participants demonstrated levels of aptitude, ambition, and self-initiative; however, these findings were not salient factors contributing to their pursuit and persistence in STEM. What proved more salient were the positive social influences, community building, and sense of belonging, which developed self-efficacy and relevant self-concepts. These factors were often the catalyst for not only the introduction to computing sciences among the participants, but also the underlying rationale for successful matriculation and persistence in their STEM area through degree completion.

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In many cases, the African American participants within this study were not privy to the fact that computing science was an educational or occupational field until they were already well into college. These data corroborate other studies (e.g., Byars-Winston, 2006, 2010; Charleston, 2012; Cheatham, 1990; Parham & Austin, 1994) that illuminate the unique circumstances regarding the restriction of occupational opportunity confined within minority group status; and further stresses the need for interventions culturally situated around career development patterns.

According to most career development theories, by the time students reach college-age, they will have already discerned which occupations are viable to match their skills, abilities, and specific interest. Furthermore, they have already passed critical stages of their development that may have necessitated the acquisition of skills and abilities that may or may not have been available to them; thereby eliminating STEM fields such as computing sciences due to either lack of knowledge that the field exists, or lack of prerequisite skills or community identity which would facilitate its pursuit. While the literature related to race/ethnicity and career choice has indicated that race or ethnicity does not seem to contribute greatly to variations in career aspirations and decision-making, perceptions of barriers and career opportunities vary among different racial and ethnic groups (Charleston, 2012; Fouad & Byars-Winston, 2005). As such, even if students possessed the skills and abilities to achieve in computing or other STEM fields, their desire or decision-making toward these fields could be stifled as a result of believing that it is simply not for them. Therefore, these findings surrounding culturally relevant practices could assist this student population in creating a STEM identity characterized by self-efficacy and self- concept (ability) in STEM that could circumvent inadequate K-12 preparation.

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Familial cultivation and encouragement was very instrumental in the trajectories of the study participants. Parental support in the form of verbal and moral encouragement, educational encouragement, and opportunity-seeking (e.g., science and computer clubs), as well as financial support (e.g., computer purchasing) has an integral effect on students’ disposition toward mathematics, sciences, and computing. It is the support of parents and surrogate parents that motivate young African Americans to succeed in the computing sciences. Even where parental predispositions were not geared toward computing, positive encouragement proved to enable the participants and foster their aspirations in computing. The purchase of computers and computer- related products for use in the home benefits young African Americans and enhances the likelihood of computing aspirations. However, where finances do not permit, verbal and moral encouragement serve as a technological incubator, if the individual has access to computers elsewhere. Essentially, access to technology is a significant factor for generating interest in and facility with computers. While the home serves as the first line of technological incubation, schools can and do play a significant role in nurturing African Americans toward science, technology, and computing-related interests. The participants within this study often cited schools as their first introduction to computers. As such, the school is an ideal place to begin the trajectory toward STEM-related fields and disciplines. Schools must reach beyond facilitating remedial engagement with computers (simply consuming information as oppose to creating it), and move toward encouraging and facilitating advanced engagement. Teachers shape children’s lives and often serve as role models. When teachers encourage and facilitate technology use in the class room, it not only has the ability to enhance the learning outcomes of students, it also exposes them to technology and its variety of uses, which has the potential to spark an interest in computing sciences and other STEM fields. When teachers facilitate the creation of information and knowledge, African American students become exposed to computing, thereby sparking their interest in the field.

…

Computing sciences is a field that requires socialization (e.g., Charleston & Jackson, 2011) it is a field in which to be successful it is necessary to become acculturated with the social and technical aspects of the field. This is most effectively achieved through the formulation of communities containing individuals who are culturally adept and of a comparable skill level who can navigate through computing with the students. In these circles (i.e., mandated computing laboratory work, group projects, special programs), African American students feed off of each other and work together on problems related to computing. In a cohort/community-based, living- learning model, community dynamics are established that facilitate teamwork where activities, projects, and assignments are completed collaboratively. Similarly, the use of a culturally responsive community in navigating computing sciences programs facilitates degree completion.

Computing sciences is a White, male-dominated field that encompasses many constructs that are foreign to African American life. These constructs range from technical application methods to social construction. As such, the best chance of persistence among African Americans is to make use of peers as academic and social resources. Positive community building and culturally relevant practices through the educational trajectory minimizes alienation and isolation within the field. The development of a sense of belonging and community improves prospects of degree attainment, cultivating a sense of accountability among African American students.

The field of computing sciences is associated with a variety of stigmas, which serve as deterrents for potential African American contributors. Some of these stigmas include the idea that computing sciences is for nerds, only for White people, only for geniuses, or that in order to participate in computing, it is necessary to be isolated in a cubicle and buried under work. Therefore, the anomaly of participating in advanced level computing demands a robust support network. Add the social isolation that comes with being an anomaly (African American) in an already isolated field (computing sciences or other STEM fields), and the necessity of culturally relevant practices and pedagogy becomes more apparent. Participation in a community around computing is often the deciding factor determining persistence in challenging domains such as computing sciences. As such, cohort-building and participation in a community of practice or a living-learning community is an essential recommendation stemming from results of this investigation and its implications.

The participants in this study identified mentorship as a significant factor contributing to their degree attainment. The mentors played active roles in their academic and social development in computing, and their socialization in the field. They served as motivators, encouragers, and in many cases empowered their mentees to persist. Subsequently, mentors not only provide social, moral, and physical support, they also serve as conduits and models for achieving a STEM identity among the participants.

APPENDIX

2012 = LaVar J. Charleston. Journal of Diversity in Higher Education 2012 Vol. 5, No. 4. A Qualitative Investigation of African Americans Decision to Pursue Computing Science Degrees: Implications for Cultivating Career Choice and Aspiration

2014 = Sherri Ann Charleston, LaVar J. Charleston, Jerlando Jackson. “Using Culturally Responsive Practices to Broaden Participation in the Educational Pipeline: Addressing the Unfinished Business of Brown in the Field of Computing Sciences” Journal of Negro Education, Volume 83, Number 3, 2014

2016 = Constructing self-efficacy in STEM graduate education. LaVar Charleston and Raul Leon. Journal for Multicultural Education. Vol. 10 No. 2, 2016.

2022 = STEMFLUENCES: THE ROLE OF SOCIAL INTERACTION AND SCIENTIFIC IDENTITY FORMATION IN THE SUCCESSFUL MATRICULATION OF AFRICAN AMERICAN MALES IN STEM. LaVar J. Charleston. Young, Gifted and Missing. Diversity in Higher Education, Volume 25, 53–72, 2022.

Overlapping “data”

* 2014-1, 2016-6, 2022-1
* 2014-1, 2016-8, 2022-2
* 2012-4, 2014-2, 2022-3
* 2014-3, 2016-15, 2022-4
* 2012-5, 2014-4, 2016-10
* 2012-6, 20126b, 2014-10
* 2012-11, 2016-16
* 2014-5, 2016-9, 2022-5
* 2014-6, 2016-11, 2022-6
* 2014-7, 2016-3, 2022-7
* 2014-8, 2016-1
* 2014-9, 2022-8
* 2014-11, 2022-9

2012

1. Elementary school, it was an old computer; the gifted students were allowed to use the computers. It was a select group. . . . It was a gap, I saw and didn’t think much of it [a computer] until my dad bought one, and we were hooked.
2. We got a Gateway desktop when I was in 7th–8th grade. I didn’t really use it a lot but when I used it, I typed up papers. It was a one-time thing until I got to high school and I had to type papers, do PowerPoint, and so forth. . . . Actual work on it.
3. In middle school, it was like three hours every other week and we were doing math programs on the coputer. We did problems and exercises on the computer and that’s it. My mom got a computer at home a little later but my interactions were still limited.
4. Actually, I became really good friends, well it was like five of us, and we actually started finding more things to do, like, different, um, there used to be, like, differ- ent tweaks that you could put or even, like, in operating systems like [Windows ’95 and ’98], like there’s a lot of different tweaks that you could probably do, like, our own extra stuff. . . . I actually have one of my friends who, um, I met freshman year as well. . . . We always had this, like, competition about our computers like. . . . What new specs are we gonna buy, so it’s kinda like a competitive and feeding-type thing at the same time.
5. One of my friends started teaching me about programming C++. The next semester, I took an intro to programming. . . . As an undergrad, I was an applied mathematics person. My friend told me to join the [Computing and Robotics] Olympiad team. I went to the conditional stimulus professor and expressed my interests. . . . She was computer science, and I was math, and I would just sit there and watch her do programming. She was, like, creating stuff that I didn’t know was there. And when I got to the computer science class, I said “OK, I might actually want to do this.”
6. My boss realized someone was getting into these [com- puter] systems. He asked me if I had been to school. He said, “Keep trying to get in [the computer systems] and tell me when I can’t.” He gave me books and encour- aged me to go to school [for computing sciences] and told me he could not tell them that some kid had hacked the system. He was my first mentor. . . . He [my graduate advisor and mentor] made sure I had funding and had tokens for transportation. He made sure I was able to be present and do what I had to do. Occasion- ally, he had to push back on people outside of the department, but he was awesome.
7. I guess the thing is that I can try anything. I can figure out what that “it” is. How can I turn what I like into a career? By having an advance degree in a science. . . . It’s hard to define because it’s so fundamental to so many other areas that you can pretty much do anything and find a niche and really enjoy computing.
8. You have so much diversity in what you can do. There’s always room to learn, and I think us as PhDs or aspiring PhDs, even graduate students, we strive to learn. We love to learn. We love to continue to learn. And in this field, as compared to a lot of other fields, you’re able to grow. Not only . . . you know as fast or as slow as you want ’cause there’s always a different aspect of it [computing science] that’s either coming out or something that’s already out that you haven’t, you know, had a chance to get to know. So it’s like, it’s a, it’s a whole world that’s, kinda like, you have access to.
9. I really loved physics. Solving problems with these formulas and theorems. . . . Computing sciences has this problem-solving aspect, and coding is the tool that you use. So marrying solving a problem with building something and tinkering with it and debugging it and finally making it work . . . I think that’s what I liked best. And the sheer fact I still loved computers.
10. If you can figure out a way to use it [computation] to physically change or affect something, that’s the way I like to use it . . . so it can physically change, for example, kids’ learning experiences. Or [it] can phys- ically change the living conditions of people. . . . It’s [computing sciences] always challenging you. Seeing how far you can push.
11. I got a PhD because I wanted to teach. I was a part of the Inroads program and did an internship. It did not light a hard fire though. I thought about my professors at Howard and it seemed like they had a good life. [The professors] had fun doing what they were doing, fun environment, very energetic, cool problems. . . . They were helping students get to their potential and I fig- ured the only way to do that was to get a PhD. They had the personal and professional lifestyles that I wanted.
12. I got a PhD because I wanted to teach computer sci- ence. My dad said that computer thing may work out but if you get a degree in education, you can always teach. Sometime the market can be hostile and can really crush a dream. Down turning and downsizing. . . . I needed to inflation proof myself. I said, “If I get a PhD, I can always teach.”

2014

1. I had friends that had computers too so I would watch them and we would do programming . . . Small group of friends and we would look at what each other had done or what programs each other had written. That’s how interests got bigger. Seeing things being done and being exposed to friends’ projects then going home to try to replicate it. Being exposed to different things as your friends did them . . . I have a PhD in computer science because there was an upperclassman who mentored me who was in graduate school.
2. Actually I became really good friends, well it was like five of us (all African Americans), and we actually started finding more things to do like, there used to be like different tweaks that you could put or even like in operating systems like 95 and 98, there’s a lot of different tweaks that you could do, like our own extra stuff... I actually have one of my friends who I met freshman year as well . . . We always had this competition about our computers like . . . What new specs are we gonna buy?! So it's kind of like a competitive and feeding type thing at the same time.
3. My cohort, all of us, decided to go get a PhD. It was six of us and we went together. I wanted to go with people who have a similar aptitude. It would have been a lot harder on me mentally if I went by myself.
4. One of my friends started teaching me about programming C++. The next semester I took an intro to programming . . . As an undergrad, I was an applied mathematics person. My friend told me to join the Olympiad (Computing and Robotics) team. I went to the CS [Computer Science] professor and expressed my interests . . . she was computer science and I was math and I would just sit there and watch her do programming. She was creating stuff that I didn’t know was there. And when I got to the computer science class, I said ok, I might actually want to do this.
5. I tried to surround myself around people who knew what they were doing. Doing online research on my own and hanging with older folks who knew what they were doing . . . One of the guys I grew up early childhood with, sophomore year, said he went to Georgia Tech, after Georgia Southern and said he was a computer scientist and told me about the stuff he was doing and that sparked me.
6. My friend in undergrad told me I was good and I should take more classes. At first I was like: this is hard, I want to quit. I had one friend quit and I said I cannot quit and my (other) friend took his time to help me through the class and after that I was good. He already had a master’s . . . He said it’s not that hard and he said let me help you out and then I got it.
7. My mom’s a math teacher, and she’s really into computers so we had a Macintosh . . . My mom was the biggest influence so far as computers. In junior high, she got me in the science club, so I was kinda nerdy. It got me in the door then I went into NSBE (National Society of Black Engineers) as a junior in high school. I actually went to undergrad for computer engineering . . . She (mother) opened my eyes up to meeting people in the field and they all nurtured me. My mom was very techy.
8. My dad was into science . . . but I probably saw a computer at 11-12. We had the Atari Trask 80. . . We had the very first home computer . . . Whenever stuff came out, we got it! My parents always bought computing type games, summer enrichment programs, summer exposures, (2 as an undergrad) internships at companies. It nurtured me to wanting to stay in the field . . . I would say who introduce me to science was my family having an interest in science. We had to go to science camps in the summer and through these experiences I found out about computing science . . . My parents are educators so I was pretty much on the right track.
9. In 6th grade my parents enrolled me in a summer computer camp so I learned how to program. I took programming in 7th and 8th grade at another school and Savannah State college—All away from my school. It was really a computer simulation type thing. My parents really fed into it. When they saw that I liked computers, they supported that interest . . . My dad set the bar high for me.
10. My boss realized someone was getting into these (computer) systems. He asked me if I had been to school. He said keep trying to get in (the computer systems) and tell me when I can’t. He gave me books and encouraged me to go to school (for computing sciences) and told me he could not tell them that some kid had hacked the system. He was my first mentor . . . He (graduate advisor and mentor) made sure I had funding and had tokens for transportation. He made sure I was able to be present and do what I had to do. Occasionally he had to push back on people outside of the department but he was awesome.
11. At first I was not very optimistic about it. I really struggled at the beginning. Then one of my professors was looking for a student to hire for the summer. She took me on board and was a very good mentor. She pretty much tutored me. She answered the most stupid questions and that’s what gave me confidence that I could do it.
12. In the course of doing research for education [previous degree], my advisor was a computer scientist who moved over to education and told me [that] for what I wanted to do, I needed a PhD. I found a paper by Dr. X (prominent African American computer scientist) and he sucked me into computer science.

2016

1. My parents always bought computing type games, summer enrichment programs, summer exposures, (2 as an undergrad) internships at companies. It nurtured me to wanting to stay in the field [...]. I would say who introduce me to science was my family having an interest in science. We had to go to science camps in the summer and through these experiences I found out about computing science [...]. My parents are educators so I was pretty much on the right track.
2. I saw my dad time after time, when he wanted to add extra memory, he just did it himself. He would take the computer apart and didn’t even take it to the shop and that just intrigued me said a male student participant
3. My mom’s a math teacher and she’s really into computers so we had a Macintosh [...]. My mom was the biggest influence so far as computers. In junior high, she got me in the science club, so I was kina nerdy. It got me in the door then I went into NSBE (Engineering program) as a junior in high school. I actually went to undergrad for computer engineering [...]. She (mother) opened my eyes up to meeting people in the field and they all nurtured me. My mom was very techy.
4. My mom got me a computer early and made sure I had software for it, she bought scanners, joysticks, and different things for it. I realize when I was choosing a major, I liked computers and I liked law. But my family consensus was that I did computer science.
5. A lot of my friends were taking computer classes and everyone suggested that I do computers. My family didn’t really know what it was but they said I should do it.
6. I had friends that had computers too so I’d watch them and we’d do programming [...]. Small group of friends and we’d look at what each other had done or what programs each other had written. That’s how interests got bigger.
7. By that time (sophomore year in college), I built my own computer because one of the guys on my cross-country team built his and he told me it was fairly easy. I bought the pieces and put it together.
8. Seeing things being done and being exposed to friends’ projects then going home to try to replicate it; Being exposed to different things as your friends did them [...]. I have a PhD in computer science because there was an upperclassman who mentored me who was in graduate school.
9. I tried to surround myself around people who knew what they were doing. Doing online research on my own and hanging with older folks who knew what they were doing [...]. One of the guys I grew up early childhood with, sophomore year, said he went to Georgia Tech, after Georgia Southern and said he was a computer scientist and told me about the stuff he was doing and that sparked me.
10. One of my friends started teaching me about programming C++. The next semester I took an intro to programming [...]. As an undergrad, I was an applied mathematics person. My friend told me to join the Olympiad (Computing and Robotics) team. I went to the computer science professor and expressed my interests [...] she was computer science and I was math and I would just sit there and watch her do programming. She was like, creating stuff that I didn’t know was there. And when I got to the computer science class, I said ok, I might actually want to do this.
11. My friend in undergrad told me I was good and I should take more classes. At first I was like this is hard, I wanna quit. I had one friend quit and I said I cannot quit and my (other) friend took his time to help me through the class and after that I was good. He already had a masters [...]. He said it’s not that hard and he said let me help you out, and then I got it.
12. He (a college professor) asked me what I needed to do to graduate. I said I needed an advisor. He said it wasn’t his area but he would do whatever it takes to get me graduated. And since then he was my champion.
13. I went to a black school that didn’t have anybody that looked like me with a PhD. There was no one I could call doctor in computing sciences. And I didn’t know why. I just knew that everybody I talked to that looked like me, we called them Miss, and everybody else we called them doctor and I just didn’t understand why. If you wanna change something, you gotta do it yourself.
14. I got a PhD because I wanted to go back and teach. I never saw anybody that looked like me in the classroom. It’s always been a male-dominated field. I wanted to do research and I wanted to teach. I’m representative of broadening participation in computing sciences. I’m representative of national science.
15. [...] And my cohort all of us decided to go get a PhD. It was 6 of us and we went together. I wanted to go with people who have a similar aptitude. It would have been a lot harder on me mentally if I went by myself.
16. I got a PhD because I wanted to teach. I was a part of the Inroads program and did an internship. It did not light a hard fire though. I thought about my professors at Howard and it seemed like they had a good life. They had fun doing what they were doing, fun environment, very energetic, cool problems [...]. They were helping students get to their potential and I figured the only way to do that was to get a PhD They (the professors) had the personal and professional lifestyles that I wanted.
17. I am a PhD student. I was exposed to the idea as an undergraduate [...] that it would be a career choice that I would be good in. After listening to the pros and cons, I made the decision. Flexible work hours, salary, having tenure and job security, being flexible to work in different locations, the academic freedom, ability to make extra money via grants.
18. Because I went to a HBCU as an undergrad and I have a love for black people, my people. I’m about service and I’m about giving back. And I wanna help somebody so that don’t make the mistakes that I made. A lot of times African Americans don’t have role models who worked in corporate America or even professors. So I want to be that role model for that student or any student because of the lack of role models they have in their everyday lives. That’s a part of my community service that’s beyond the classroom and this is computer science at work.

2022

1. I had friends that had computers too so I would watch them and we would do programming... Small group of friends and we would look at what each other had done or what programs each other had written. That’s how interests got bigger.
2. Seeing things being done and being exposed to friends’ projects then going home to try to replicate it. Being exposed to different things as your friends did them...I have a PhD in computer science because there was an upperclassman who mentored me who was in graduate school.
3. Actually I became really good friends, well it was like five of us (all African Americans), and we actually started finding more things to do, there used to be like different tweaks that you could put or even like in operating systems, like there’s a lot of different tweaks that you could do, like our own extra stuff... I actually have one of my friends who I met freshman year as well...We always had this competition about our computers like...What new specs are we gonna buy...so it’s kind of like a competitive and feeding type thing at the same time.
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8. In sixth grade my parents enrolled me in a summer computer camp so I learned how to program. I took programming in seventh and eighth grade at another school and Savannah State college – All away from my school. It was really a computer simulation type thing. My parents really fed into it. When they saw that I liked computers, they supported that interest... My dad set the bar high for me.
9. At first, I was not very optimistic about it. I really struggled at the beginning. Then one of my professors was looking for a student to hire for the summer. She took me on board and was a very good mentor. She pretty much tutored me. She answered the most stupid questions and that’s what gave me confidence that I could do it.

Dissertation

1. Elementary school, it was an old computer, the gifted students were allowed to use the computers. It was a select group. . .It was a gap, I saw and didn't think much of it (computers) until my dad bought one and we were hooked. [FGl]
2. The only thing we did on it was like word processing and playing a game. [FP1]
3. We got a gateway desktop when I was in 7?-8? grade. I didn't really use it a lot but when I used it, I typed up papers. It was a one-time thing until I got to high school and I had to type papers, do PowerPoint, etc. . .Actual work on it. [FG2]
4. In middle school, it was like three hours every other week and we were doing math programs on the computer. We did problems and exercises on the computer and that's it. My mom got a computer at home a little later but my interactions were still limited. [FG3]
5. We played computer games in the library. Ever since then, we used computers in school. We did games, the learning games, word processing, and that was it. [MGl]
6. In elementary school, we had 5 computers and a computer lab session. We used the computers for typing, speed, and education type games. Every other day we had lab time and during our free time in class, we'd switch on and off the computer in class and played games. [MUl]
7. (In 3rd or 4th grade) We had two versions (of computers). We had a Texas Instrument computer you hook up to the TV. . .and we had what resembles a modern day PC we got from Radio Shack. I played games number one, graphic programs, paint programs, and tutorial programs on the world of computing like what's a ram?. ..what's a harddrive?. ..But mostly games and drawing. [MP2]
8. I was 8 or 9 years old [when first exposed to a computer] cause my mom majored in computer science and the first application I played with was Paint (Microsoft Paint). I continued (to interact with the computer) and I played video games, learning games, and I learned how to get on the internet. [FUl]
9. In third grade, we played Macintosh games. The teacher rewarded us with a day in the lab to play games. . .1 got a computer at home in the 8th grade I used it for internet, chatting websites, and I liked hardware. My step-dad wanted a C drive put into it and figured I could do it so I took the computer apart. [MU2]
10. In elementary, ist-2nd grade, we went to the computer lab and played Oregon Trail  
    and I fell in love from an early age. I would go to Radio Shack and just try to play with computers. Any chance I could get to someone's computer, I'd fix them, take them apart, anything. ..[FG5]
11. My oldest brother was into electronics so he would tell me this is what enables the computer to work. So I used to get in trouble because when he wasn't home, I would take his resistors and pull them apart cause I wanted to figure out how these little itty bitty things got this big ole computer to do what it needed to do. The hardware is what I could visualize. So that sparked my interest. If these little wires control this computer, I wonder what controls this TV, I wonder what controls this VCR, and I was tearing everything up in my parent's house out of curiosity. [FGl]
12. I saw my first computer at 5 years old. My father was into electronics so he had a Commodore 64. Probably around first grade I was engaged with computers. I did Hooked On Phonics with it and played some text-based games. At around 9 or 10, 1 knew how to unhook it and set it up. At 13 I knew how to write a program on it. [MG2]
13. In 4the grade at about 10 years old...My dad bought an Apple IIe and I played two games on it. I started programming in the 5th grade. [MPl]
14. In 6 grade my parents enrolled me in a summer computer camp so I learned how to program. I took programming in 7th and 8th grade at another school [not his school] and Savanah State college. . .all away from my school. It was really a computer simulation- type thing. My parents really fed into it. When they saw that I liked computers, they supported that interest. [MPl]
15. I was in 5 grade and a father of a classmate offered to teach a programming course on a Saturday and I signed up and from that point on, I was always trying to program machines. My parents saw I was getting into it and they bought me a commodore, I couldn't program it so they took it back and got me an Apple lie which was the same I was using at that program. I had friends that had computers too so I'd watch them and we'd do programming. It was a small group of friends and we'd look at what each other had done or what programs each other had written. That's how interests got bigger. Seeing things being done and being exposed to friends' projects, then going home to try to replicate it. Being exposed to different things as your friends did them. [MP3]
16. I did as much as I could to take any class I could... They only offered two classes in high school, learning how to type and basic. My mom did whatever she could, she got me online and everything she could because she knew it was my passion. [FG5]
17. For 8 grade, science fair it was a major part of your grade and I ended up getting a robotics kit and I programmed the robotics kit from the computer. It made me want to go into CS, and in 1 1 grade I went to this new school that was built. And I went into the Information Sciences part of the program. That's when I kina picked up on programming. I thought it was interesting. [MG2]
18. My mom was the biggest influence so far as computers. In junior high, she got me in the science club, so I was kina nerdy. It got me in the door then I went into NSBE (National Society of Black Engineers Club) as a junior in high school. [FG6]
19. I was also able to major in it in my school. I was a CS major in high school so I got a heads up on programming, computer principals, and (computer) classes even before I step foot in college. So I had a head start even before I step foot in college. [MP2]
20. (I owned my own computer) freshman year of high school and used it for class projects and took programming classes in high school and did that at the house too. I went to a magnet school for science, technology, and math and took a visual basics class my freshmen year. What push me even more was to see my friend freshmen year (high school) develop a program using this visual basic and the program he created, I was like wow! . . .this dude, he took this time that we spent in this class, made a game, then made it available for everyone in the class to play! [MUl]
21. I was a CS major in high school. The last two years of high school I did programming. Did computers at home, at school all the time. [MG3]
22. When I was in the 9th grade, my uncle rebuilt a computer for my family and that's the first time we owned one. We didn't have internet so I just looked in every file to figure out how it actually worked. I saw my uncle upgrade the computer but I just wanted to know how it worked. In high school we had a science and technology program. I pick the engineering because it had a computing sciences component in the 1 1th and 12th grade. [FG5]
23. . . .1 liked computers so I went to a pre-freshman program for computer science right before college. The program started before I graduated (high school). . .We did some old language programming. [FG4]
24. The summer that I was getting ready to go to college I worked at the college I was going to in their IT department (work study) and it really really opened my eyes... like I never really looked at the inside of a computer and I was just fascinated, like completely fascinated by all the different things that you could do... And that job really opened the door for me because there was two majors I was considering going into... Either computer science or pre-law and I pretty much chose computer science because I figured that well first of all, I could tell that I was interested immediately from working with them. [FPl]
25. Freshmen year of college, even 10th, 1 1th, 12th grade was more or less just for (computer) use. . .getting my projects and class assignments done. College was the  
    first time I was interested in computing. When I got to MSU they were doing this whole email thing. . .That's when they started really implementing projects and homework assignments that were actually on the computer so that's what really got me interested then. I didn't get my first computer until junior year but I got interested freshmen year but I didn't really have the money. . .[MP4]
26. I did not have an interest in computer science before undergrad because I wasn't programming anything. It was strictly graphics and video editing. I wanted to go to HU and do computer science. My interest in computer science, beyond just seeing the course description as "computer and science" together, was sparked after I started building software in the program. I picked the right major! [MP2]
27. I didn't really know what I wanted to major in. They had very few computer classes more than keyboarding. I went to a summer science enrichment program and almost everyone during that time went into computer science. [FP2]
28. I started liking it (computing) junior year of college when I took an intro to programming class. Visual logic. Not actual code but shapes and stuff. I liked it and then did an internship that did data mining. One of my friends started teaching me about programming C++. The next semester I took an intro to programming class. [FG2]
29. I didn't know what computer science really was until sophomore year. Going into my junior year, I figured that this is what computer science does and this is what computer science has to offer. [MU2]
30. I didn't know much about computer science before I left high school but I was fluent with the computer. [MGl]
31. My freshman (college) year I took a intro to programming course, I thought it was easy and I had a little fun making little java programs and such. And that's what continued my interest. This is gonna be big, and I want to be in it. [MG4]
32. At first I wanted to go into medicine, but I got into mathematics my freshmen year in college and I also took one computer class. I took one more (computer) class and after that second class, I had strong interests in computer science. [MU3]
33. Actually I became really good friends, well it was like five of us (all African Americans), and we actually started finding more things to do like different urn, there used to be like different tweaks that you could put or even like in operating systems like 95 and 98, like there's a lot of different tweaks that you could, probably do like our own extra stuff. . . I actually have one of my friends who urn I met freshman year as well. . .We always had this like competition about our computers like. . .What new specs are we gonna buy so its kina like a competitive and feeding type thing at the same time. [FPl]
34. . . .And my cohort all ofus decided to go get a PhD. It was 6 ofus and we went together. I wanted to go with people who have a similar aptitude. It would have been a lot harder on me mentally if I went by myself. [FP2]
35. I had friends that had computers too so I'd watch them and we'd do programming. . .Small group of friends and we'd look at what each other had done or what programs each other had written. That's how interests got bigger. Seeing things being done and being exposed to friends projects then going home to try to replicate it. Being exposed to different things as your friends did them. . .1 have a Ph.D. in computer science because there was an upperclassman who mentored me who was in graduate school. [MP3]
36. A lot of my friends were taking computer classes and everyone suggested that I do computers. My family didn't really know what it was but they said I should do it. [FU2]
37. One of my friends started teaching me about programming C++. The next semester I took an intra to programming. . .As an undergrad, I was an applied mathematics person. My friend told me to join the Olympiad (Computing and Robotics) team. I went to the CS professor and expressed my interests. . .she was computer science and I was math and I would just sit there and watch her do programming. She was like, creating stuff that I didn't know was there. And when I got to the computer science class, I said ok, I might actually want to do this. [FG2]
38. My friend in undergrad told me I was good and I should take more classes. At first I was like this is hard, I wanna quit. I had one friend quit and I said I cannot quit and my (other) friend took his time to help me through the class and after that I was good. He already had a masters. . .He said it's not that hard and he said let me help you out and then I got it. [FG3]
39. . . . And seeing other grad students and peers was kinda encouraging. . .to see people going through the same struggle and having similar stories. [MP2]
40. I tried to surround myself around people who knew what they were doing. Doing online research on my own and hanging with older folks who knew what they were doing. . . One of the guys I grew up early childhood with, sophomore year, said he went to Georgia Tech, after Georgia Southern and said he was a computer scientist and told me about the stuff he was doing and that sparked me. [MUl]
41. I catered for a sister who was a Ph.D. and she had a group of Ph.D.s talking about Ph.Ds. I'm doing this event. . .And I told her she's really got me thinking about this Ph.D. [FP3]
42. By that time (Sophomore year in college), I built my own computer because one of the guys on my cross-country team built his and he told me it was fairly easy. I bought the pieces and put it together. [MG4]
43. With any extra money or for a Christmas gift we would just buy new software or try to buy a better graphics program. My parents bought an ink jet printer instead of a dot matrix at the time. To. . .you know, print out stuff I was creating. [MP2]
44. My dad was into science. . .but I probably saw a computer at 1 1-12. We had the Atari Trask 80. . .We had the very first home computer. . .Whenever stuff came out, we got it!... My parents always bought computing type games, summer enrichment programs, summer exposures, (2 as an undergrad) internships at companies. It nurtured me to wanting to stay in the field. . . I would say who introduce me to science was my family having an interest in science. We had to go to science camps in the summer and through these experiences I found out about computing science. . .My parents are educators so I was pretty much on the right track. [FP2]
45. . . .Seeing what my mom could do with them (computers). My mom was a programmer and I wanted to do what she could do. I wanted to be just like her. [FUl]
46. My mom got me a computer early and made sure I had software for it, she bought scanners, joysticks, and different things for it. I realize when I was choosing a major, I liked computers and I liked law. But my family consensus was that I did computer science. [MGl]
47. My mom did whatever she could. She got me online and everything she could cause she knew it was my passion. [FG5]
48. My mom's a math teacher and she's really into computers, so we had a Macintosh... My mom was the biggest influence so far as computers. In junior high, she got me in the science club, so I was kinda nerdy. It got me in the door then I went into NSBE (Engineering program) as a junior in high school. I actually went to undergrad for computer engineering... She (mother) opened my eyes up to meeting people in the field and they all nurtured me. My mom was very techy. [FG6]
49. In 6th grade my parents enrolled me in a summer computer camp so I learned how to program. I took programming in 7th and 8th grade at another school and Savannah State college — all away from my school. It was really a computer simulation type thing. My parents really fed into it. When they saw that I liked computers, they supported that interest... My dad set the bar high for me. [MP1]
50. My family was great in terms of spoiling me with toys, gadgets, and robots. [MP2]
51. I saw my dad time after time, when he wanted to add extra memory, he just did it himself. He would take the computer apart and didn't even take it to the shop and that just intrigued me. [MU1]
52. I excelled in math in high school, took AP courses, and my mom was like you can go into math but if you wanna make some money, you need to go into computers. [MG4]
53. My parents saw I was getting into it and they bought me a commodore, I couldn't program it so they took it back and got me an Apple He which was the same I was using at their program. [MP3]
54. At 12 yrs, I was learning to use the computer back then for word processing. It wasn't in school but it was a guy my parents knew and he was just helping me. [MU3]
55. My boss realized someone was getting into these (computer) systems. He asked me if I had been to school. He said keep trying to get in (the computer systems) and tell me when I can't. He gave me books and encouraged me to go to school (for computing sciences) and told me he could not tell them that some kid had hacked the system. He was my first mentor. . .He (graduate advisor and mentor) made sure I had funding and had tokens for transportation. He made sure I was able to be present and do what I had to do. Occasionally he had to push back on people outside of the department but he was awesome. [FP3]
56. In the course of doing research for Education (previous degree), my advisor was a computer scientist who moved over to education and told me for what I wanted to do, I needed a Ph.D. I found a paper by Dr. Gilbert (prominent African American Computer Scientist) and he sucked me into computer science. [FGl]
57. I was a math major in the early 80's and computer science was a thing of the future and my advisor encouraged me to do that. I entered the major and that was the first time I was exposed as well as engaged with the computer. [FG8]
58. What pushed me further was a master's student who graduated a couple years ago and I got under her belt. I got back to my programming. [MUl]
59. He (a college professor) asked me what I needed to do to graduate. I said I needed an advisor. He said it wasn't his area but he would do whatever it takes to get me
60. graduated. And since then he was my champion. [FP3]
61. At first I was not very optimistic about it. I really struggled at the beginning. Then one of my professors was looking for a student to hire for the summer. She took me on board and was a very good mentor. She pretty much tutored me. She answered the most stupid questions and that's what gave me confidence that I could do it. [MU3]
62. In class, I lost an entire program, met with the professor; she set me up in her office to work. And since then, she helped me. [FU2]
63. I guess the thing is that I can try anything. I can figure out what that "it" is. How can I turn what I like into a career? By having an advance degree in a science. . .Its hard to define because its so fundamental to so many other areas that you can pretty much do anything and find a niche and really enjoy computing. [FP2]
64. . . .It's a pretty open field. You can do anything with the computer and I just find that amazing. [FG7]
65. Its flexibility interests me the most. Almost every field, every career path crosses paths with what we do. Almost everyone has to come in some contact with the work that we do or we have to come in contact with everyone else. So we're never really limited as to always looking at the same problem or always doing the same thing because in every field there's some underlying tone that ties it back to the computing sciences. [FGl]
66. The interdisciplinary aspect is what interests me the most. Computers are involved in every aspect of our lives. How you can make certain things easier by having a computer. [FP3]
67. . . .You have so much diversity in what you can do. There's always room to learn and I think us as Ph.D.s or aspiring Ph.D.s, even graduate students, we strive to learn. We love to learn. We love to continue to learn. And in this field, as compared to a lot of other fields, you're able to grow. Not only. . .you know as fast or as slow as you want cause there's always a different aspect of it (computer science) that's either coming out or something that's already out that you haven't, you know, had a chance to get to know. So it's like, it's a, it's a whole world that's kina like you have access to. [FPl]
68. It's always changing. If you get bored in one field like networking, I just moved to programming, found that boring, moved to human-computer interaction. [MG2]
69. Computing sciences research is pure. I like building things—New applications and testing them out. I like speaking about it, showing new applications, I like the research the discovery, the training and speaking. Commercializing, selling the tools so I can build new ones. Setting new directions and training on the approaches that are there. How they affect social issues etc. and developing new innovation. [MPl]
70. Things have changed since the early 80's. The face of CS has totally changed. It's almost like me starting over. Technology is ever-changing. It's not constant. The things you can do with technology. . .But you have to have enough patience to keep learning new things. [FG8]
71. . . .Liking to solve problems. . . I really loved physics. Solving problems with these formulas and theorems. . .computing sciences has this problem-solving aspect and coding is the tool that you use. So marrying solving a problem with building something and tinkering with it and debugging it and finally making it work. . .I think that's what I liked best. And the sheer fact I still loved computers. [MP2]
72. I like the research aspect of it. . .Being able to brainstorm ideas that we can answer technically. I like seeing some problem that the world says we cannot solve and then apply computers to it. It keeps evolving and changing I love that we can do so much with computers. [FG4]
73. I like Artificial Intelligence. I want to write intelligence code, code that can simulate what the brain does. I like problem-solving and I'm feeling comfortable with it. [MU3]
74. I like a lot of applications of computing sciences. How we can use things that are relatively simple to solve big problems. Thinking of new things that computers can do that humans don't have to. [FG5]
75. If you can figure out a way to use it (computation) to physically change or affect something, that's the way I like to use it... so it can physically change, for example, kids' learning experiences. Or it can physically change the living conditions of people... Observable impact... If something is not working, it's something that I haven't figured out yet. It's (computing sciences) always challenging you, seeing how far you can push. [FP3]
76. . . .I want to say the fact that you can create something from nothing. You put something together and then boom you have a product that someone can actually use. [FG2]
77. . . . Usability (computing sciences). Creating something that is useful to someone else. Making things easier for other people. . . [MU2]
78. Enjoy seeing the way people interact with robots and computers. There are so many uses for robotics. Artificial Intelligence, life and visualization, and the new sources and funneling all that information in a way to get the most out of it. [MP2]
79. The usability of computing sciences interests me the most. It's not computer science that interests me; it's the fact that you can improve every aspect of life by using it. [MG4]
80. The interaction between computers and people interests me the most about computing. Computers are everywhere. How to help them maximize their ability to understand all this data we have around us. I'm not interested in experts but I'm interested in the everyday user. [MP3]
81. Finding a way to have computing sciences help people is what I like about most about computing. Once removed is the quality between computing and helping people. To see the way a product is affecting people's lives is what interests me the most. [FU2]
82. In order for me to achieve my goals later on, I need PhD, in order to start my research company. I need some credibility behind my name. [MG2]
83. I got a Ph.D. because I wanted to teach. I was a part of the Inroads program and did an internship. It did not light a hard fire though. I thought about my professors at Howard and it seemed like they had a good life. They had fun doing what they were doing, fun environment, very energetic, cool problems... They were helping students get to their potential and I figured the only way to do that was to get a Ph.D. They (the professors) had the personal and professional lifestyles that I wanted. [MP2]
84. I am a Ph.D. student. I was exposed to the idea as an undergraduate. . .that it would be a career choice that I would be good in. After listening to the pros and cons, I made the decision. Flexible work hours, salary, having tenure and job security, being flexible to work in different locations, the academic freedom, ability to make extra money via grants. [MGl]
85. A PhD. is means to an end. I was really interested in the problem at hand and I like to solve things that bug me and the only way I could get there was to further my education. It gives me the flexibility that I can pick and choose the problems that I want to solve and I have that freedom. I just like the power of my own thinking. [FGl]
86. I got a Ph.D. because I wanted to teach computer science. My dad said that computer thing may work out but if you get a degree in education, you can always teach. Sometime the market can be hostile and can really crush a dream. Down turning and downsizing. . .1 needed to inflation proof myself. I said if I get a Ph.D., I can always teach. [FP2]
87. My mom never finished middle school and I know she wanted her kids to go higher ed. My brother got into art so I figured I had to go do that (get the Ph.D.). I felt like I needed to do that and I got my bachelors and wanted to do more. I wanted to get a master's but they (the department) told me I should do a Ph.D. and they switched my application. I thought a Ph.D. would look good. It gives you more opportunity. [MG3]
88. Ph.D. because I can. I didn't know anyone else who looked like me with a Ph.D. and I want to show my little cousins that they can do it. It is an option. I want to do whatever I want, my own ideas, and I want to express myself instead of some else's ideas. [FG5]
89. I want to be a professor because I want to help. My mom's a teacher so I wanted to be a teacher. My mom said don't be a teacher because they don't make any money. I heard about tenure and was like, You can't get fired?! I think I wanna do this! [FG6]
90. I went to a black school that didn't have anybody that looked like me with a PhD. There was no one I could call doctor in computing sciences. And I didn't know why. I just knew that everybody I talked to that looked like me, we called them Miss, and everybody else we called them doctor and I just didn't understand why. If you want to change something, you gotta do it yourself. [FG4]
91. I am a Ph.D.—Researcher, Professor. First generation. My dad has 7 brothers with 2-3 kids and I'm the first in the family to get a degree and I just wanted to raise the bar high. And it made sense... I grew up in the south, cognizant of race matters and I figured if I wanted to be the best consultant in the software field, then I needed to have the highest degree. My dad set the bar high for me. [MPl]
92. The ultimate goal is to be a HBCU president. Because I went to an HBCU as an undergrad and I have a love for black people, my people. I'm about service and I'm about giving back. And I want to help somebody so that they don't make the mistakes that I made. A lot of times African Americans don't have role models who worked in corporate America or even professors. So I want to be that role model for that student or any student because of the lack of role models they have in their everyday lives. I feel like I'm that voice that's saying hey, these are the things that you need to do or these are the places where we can go. If you're not exposed to stuff, you don't know what your options are, you don't know what your choices are. That's a part of my community service that's beyond the classroom and this is computer science at work. [FG8]
93. I wanna one day come back and teach the next generation the things that I have missed and get them interested in learning about computer science, math, and technology. It's (computer science) really pushing me to turn around and give back. [MUl]
94. I got a Ph.D. because I wanted to go back and teach. I never saw anybody that looked like me in the classroom. It's always been a male-dominated field. I wanted to do research and I wanted to teach. I'm representative of broadening participation in computing sciences. I'm representative of national science. [FP3]