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ABSTRACT

Employer Perceptions of Technology Graduates From

Historically Black Colleges and Universities: A Q Methodological Study

by

Terence Jackson

M.B.A., Webster University, 2002

B.B.A., North Carolina Central University, 1987

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of Doctor of Philosophy

Applied Management and Decision Sciences

Walden University
September 2007

ABSTRACT

Technology jobs are projected to double over the next five years. Historically Black Colleges and Universities (HBCU) technology graduates entering the workforce seek the same career opportunities as graduates from nonHBCUs; however, such equity remains clearly inadequate within the United States. This research investigated the lack of employment opportunities for technology graduates from Historically Black Colleges and Universities. A mixed-model approach, Q methodology, identified employer perceptions. Q methodology has a proven history of illuminating agreement and differences among individual and group perceptions. Six employers participated in this study. The research questions were developed to expose and identify employer perceptions. Correlation and factor analysis were used to analyze the data. The results of this study show participants in the study perceived HBCU technology graduates as intelligent, possessing the necessary skills to succeed in the workplace, and being recipients of high-quality educations from high-quality institutions. However, the results also indicate that HBCU technology graduates do not have the same employment opportunities as their peers at nonHBCUs. By exposing and identifying employer perceptions of HBCU technology graduates, this study increases the understanding of employer perceptions of HBCU technology graduates. Using the systems thinking approach, HBCUs and employers can collaborate to develop a recruiting process targeted at improving employment opportunities for these technology graduates. This research provides insight into how employers perceive HBCU technology graduates. HBCU career development centers can develop strategies to attract more employers to recruit at their campuses.

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DEDICATION

To GOD, the CREATOR, INFINITE INTELLIGENCE, INFINITE BEING for my purpose, faith, hope, and humility.

To my mother for her love, understanding, and patience.

To my friends for their unwavering support.

Last but not least to my wife, Deidre and daughter Krishelle, I thank you both for your patience and support. I cannot thank you enough.

ACKNOWLEDGEMENTS

"The ultimate human power is our mental power, our consciousness, our awareness."
Dr. Na'im Akbar

First, I would like to acknowledge GOD, the Supreme Being, and the Architect of the Universe for enabling me to take this journey. Second, I would like to acknowledge my dissertation committee for their mentoring, support, and advice during the dissertation process. I am forever grateful for their professionalism, knowledge, experience, and kindness. Thirdly, I would like to express my gratitude to Dr. Thomas, my confidant and mentor. Your coaching during this dissertation process ensured that X square + Y square = one.

To my lifelong friends Allen Faison and Darvin Greene, thanks for listening to my vision for this research and the potential impact it can have on society. Change will only occur when we take action and take our destiny into our own hands. I would also like to thank Gerald Spence for his encouraging words.

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CHAPTER 1: INTRODUCTION TO THE STUDY

During the early 1950s, racial segregation within public schools was the norm across the United States. Although the expectation was for all schools within any given district to offer parallel quality on various levels, in reality, schools serving African American student populations were measurably inferior to those with European Americans comprising their student bodies. The 1954 Kansas Supreme Court landmark decision in *Brown versus Board of Education* (Sum, P. E., Light, S. A., & King, R. F, 2004) resulted in favorable ruling for the plaintiffs, and declared that the separate education of young people according to race was contrary to the underlying values and best interests of a democratic society. The Court required the desegregation of schools across America. The identification of several primary functions of education resulted: cultural assimilation, preparation for participation in the political process, and training toward economic opportunity (Turnbull & Turnbull, 2000).

Given the importance of an education, the salient issue addressed by this court was how to ensure equal educational opportunity for all American students. Up until the landmark case, establishment of a number of colleges and universities was to provide education for young people denied admission to institutions of higher education due to classification of race. Ten years after the *Brown versus Board of Education* decision (Sum et al., 2004), 102 institutions serving primarily African Americans joined to form the organization known as Historically Black Colleges and Universities (HBCUs) to ensure that advanced education was possible for descendants of enslaved Africans in America (Lemelle, 2002).

According to the National Center for Educational Statistics (1996), a college degree can more than double the earning potential for men and triple earnings for women. Both African American and European American graduates of postsecondary educational institutions earn incomes more than 50% higher than individuals whose highest education level is high school. According to the U.S. Census Bureau, high school graduates earn an average of $1.2 million over the course of their working lives, while holders of a bachelor's degree earn approximately $2.1 million (Day & Newburger, 2002). A global survey conducted by Davies and Cline (2005) reported that MBA students during 2003 were expecting a 56% increase in income upon the completion of their degrees. The students surveyed also indicated that their median annual income prior to enrollment in the MBA program was $50,000; their expected median annual income upon program completion was $75,000.

The significant role HBCUs have played in providing higher education opportunities for African Americans within this country has not been appropriately recognized by society as a whole (Redd, 2000). These institutions have served as primary providers of postsecondary education for this population group throughout a social environment of racial discrimination. During 2002, HBCUs enrolled 14% of all African Americans attending college. Graduates from these institutions are prominent within medicine, education, government, the military, technology, business arts, law, and numerous other fields. They include a former Supreme Court justice, a medical doctor who discovered blood plasma, world-renowned spiritual leaders, a nationally influential television celebrity, a billionaire legal representative, a former United States ambassador, and countless others. Education is considered the single, most important equalizer of

social and economic opportunity. The organization of HBCUs, through its long service to African American students, has become central to the national commitment toward the provision of education for all citizens. HBCUs continue to ensure educational and economic opportunity to a large segment of the American population that may not otherwise be accessible to them.

The transition from the campus to the adult world is an issue of increasing interest for education, technology, and industry. Challenges such as finding a first job are no longer external to the mission of higher education. According to Redd (2000), it is important to know whether African Americans graduating from HBCUs are finding similar employment opportunities and income potential as European Americans. Related research is sparse. According to Pascarella and Terenzini (1991), literature on the unique expectations of these students is just as limited. Studies have focused on student attributes and persistence, but not on their college achievements or future career expectations. Even administrators of HBCUs have minimal information on how potential employers perceive HBCU graduates. College graduates expect a job market that will assess them on their preparation and ability, not their race or school. The proposed study will assess how employers perceive the quality and amount of preparation received by technology students of HBCUs.

Background of the Problem

For several decades, educators, researchers, and employers have expressed concern about the preparedness of business-technology graduates for work (Gordon & Howell, 1959; Kephart, McNulty, & McGrath, 1963; Pierson, 1959). Upon graduation, students do not have the adequate practical preparation needed, and in some instances,

required to ensure viable entry and sustainability in the present-day workforce. This expression of concern has become more frequent since the 1980s (American Association of University Professors, 1995; Bikson, 1996; Green & Seymour, 1991; Levenburg, 1996; Porter & Mckibbon, 1988; West & Aupperle, 1996). Related research (Carnevale, Gainer, & Meltzer, 1990; United States Department of Labor, 1991) supports the complaints delivered by employers that entry-level workers do not demonstrate proficiency in basic skills and the necessary competencies for superior workplace performance. In addition to technical-literacy skills, employers are dissatisfied with the insufficient ability of entry-level workers to think critically and creatively, to work effectively with others, to negotiate effectively, to take initiative when confronted with ambiguous situations, and to display professional and social responsibility (Candy & Crebert, 1991; Cappelli, 1992; Carnevale et al., 1990).

With the latest technological advancements, the organizational structure of many corporations has "flattened," allowing for greater decision making at the point of service. Consequently, the expectation that workers interact closely with others in highly team-oriented settings, invest large amounts of time on computers, and exhibit minimal need for reliance upon supervisory staff for guidance is at its highest level. For employees to be comfortable in such an environment, they must possess excellent interpersonal skills, good leadership skills, high self-esteem, and strong self-development skills (Amini, 1995; Carnevale et al., 1990; Green & Seymour, 1991).

The need is critical for entry-level employees to identify independently their inadequate skills and knowledge and take the necessary steps to reconcile the deficiency with expedience (Candy & Crebert, 1991, et al). If tertiary institutions are unable to

develop such skills in students, it is unlikely that other important workplace competencies will follow (i.e., social responsibility skills, interpersonal skills, cognitive thinking, and problem-solving skills). This presents major problems for industries that rely upon a college-educated workforce to provide the necessary competitive edge for effective competition within the global arena.

Education in America serves as the dividing line between those who will prosper in the current age of technology and information and those who will not. Many view the rapid increase in technology graduates as a reflection of the needs of the economy. As the global marketplace expands and new opportunities develop, technology graduates from HBCUs are prepared to assume roles within the corporate world.

Associations between African American culture and technology are not commonplace for discussion unless noting their incompatibility (Weheliye, 2005). According to Fields (1996), roughly 30% of all African Americans earning technology degrees graduate from HBCUs. Traditionally, HBCUs have concentrated on areas wherein their students had a chance for employment. Historically, a greater percentage of graduates from HBCUs received degrees other than business technology, but increasingly, these institutions have improved technology programs. While organizations are becoming increasingly aware of technology graduates from HBCUs, critics perceive these graduates as not having the same quality of academic preparation as students of non-HBCUs. This perception may adversely affect future employment opportunities for students of technology educated within HBCUs.

Problem Statement

The problem addressed in this study was the lack of employment opportunities for technology graduates from HBCUs. The researcher identified employer perceptions and determined how they impacted employment opportunities for that student population. Prior to this research there were no studies that identify employer perceptions of HBCU technology graduates and how those perceptions impact employability of HBCU technology graduates. The rate of joblessness among African Americans is increasing (Holzer, Offner, & Sorensen, 2005). The United States job market has a long-term reputation of bias against African American workers (Chima, 1999; Stroman & Seltzer, 1991). According to Bertrand (2003), the résumés of job applicants with typically European American names are 50% more likely than those displaying African American names to progress to an interview. In November 2000, a massive American beverage maker and distributor settled a charge of hiring discrimination against African Americans for a record $192.5 million (King & Spruell, 2001). Discriminatory hiring practices were once widespread and legally sanctioned.

Despite various signs of progress, there remain important forms of social and economic inequality that continue to differentiate the experiences of Black and White Americans (Holzer, Offner, & Sorensen, 2005). According to the National Council on Economic Education (2005), the unemployment rate for African Americans is 10.1% compared to 4.4% for European Americans. African Americans comprise 12.3% of the entire United States population. While discrimination has diminished, it remains an adverse force within the American workplace. It is possible that employer perceptions of

technology graduates from HBCUs are also biased. According to Cedrone (2003), employers frequently share the views of the dominant society.

Purpose of the Study

Recognizing the importance of education and the partnerships needed between institutions of higher learning and industry, the former governor of Virginia stated in an interview,

> The intrinsic value of education is something that has always been at the forefront of the African American family psyche. That is why it is important that we recognize that our youngsters, our schools, and the traditional bastions of support that existed in the neighborhoods and the communities will be refunded. (Jost, 2003, p. 43)

The purpose of the research was to determine employer perceptions of technology graduates from HBCUs, and how those perceptions impacted the employability of HBCU technology graduates. This topic has yet to receive thorough attention in the literature. While research considers bias and discrimination frequently and continuously, minimal research exists on discrimination against African Americans specifically within the field of technology.

The study should help employers to recognize inappropriate perceptions held of graduates from HBCUs, as well as to understand how the identified perceptions adversely affect recruitment and hiring practices. The research goals achieved were: (a) to provide a significant contribution to the existing body of knowledge on HBCUs, (b) investigated employer perceptions of HBCU graduates, (c) informed employers and students of any existing, related negative perceptions, and (d) assisted HBCUs and employers in developing a dialogue to recognize any negative perceptions and to make the appropriate adjustments where indicated. The study enabled corporations to review social

responsibility and diversity policies to render a parallel condition between these two factors, possibly increasing levels of recruitment at HBCUs.

Nature of the Study

Q methodology was used for this study. This research methodology enabled the researcher to measure the subjectivity of employer perceptions. A list of statements, known as the Q-sort, was ranked ordered by employers. Upon the completion of the rank ordering by the employer, the list was be entered into the PQMethod 2.11 software and analyzed. The results were grouped based on similar response to the statements. These clusters provided insight into how employers perceive technology graduates from HBCUs.

The research methodology (Q methodology) is a combination of qualitative and quantitative research techniques that revealed dimensions of subjective phenomena from a perspective intrinsic to an individual to determine what was statistically different about the dimensions, and identified characteristics of individuals that shared common viewpoints (Brown, 1996; Stephenson, 1953). There has been collection of these data type within the targeted population. The research solicited employers as participants. Data collection consisted of rank-order statements from a Q sample drawn from the concourse, or a Q set (i.e., the original set of statements provided by the student sample). Participants rank-ordered statements from agree to disagree with the assistance of a scoring scale and instructions for procedure. This Q sorting procedure resulted in rank ordering of the statements by the participants (Brown, 1999).

Analysis of the data was performed by PQMethod 2.11, a statistical program tailored to the requirements of Q studies, and enabled the researcher to enter the data

according to how the data are collected. The analysis computed inter-correlations among Q sorts. The Q sorts were then factor-analyzed with application of either the array or principal method. Upon selection of all of the relevant factors and flagging of the entries, the analysis step produced an extensive report with a variety of factor loadings, statement factor scores, as well as discriminating statements for each of the factors.

Q methodology allowed examination of the subjectivity involved in the research. This method of research examined the subjectivity of aesthetic judgment, poetic interpretation, perceptions of organizational roles, political attitudes, appraisals of health care, and bereavement perspectives on life and the cosmos (Brown, 1996, 1999a). The study presented a sample of statements related to employer perceptions of HBCU technology graduates, referred to as the *Q set* (van Exel & Graaf, 2005). Respondents referred to as the *P set* rank-ordered the statements according to their personal perceptions; a combination of preference, judgment, and feelings. This procedure followed a quasi-normal distribution. *Q sorting* allowed assignment of subjective meaning to participant statements, revealing viewpoints (Smith, 2001) or personal profiles (i.e.), perceptions (Brouwer, 1999).

Q methodology subjected individual rankings to factorial analysis, enabling the Q correlation of individuals rather than tests. According to Stephenson (1935), "Whereas previously a large number of people were given a small number of test[s], now we can give a small number of people a large number of test-items [*sic*]." Brown (1993a) postulated that correlations between personal profiles indicate similar viewpoints or segments of existing subjectivity. By correlating individuals, Q factor analysis provides information surrounding similarities and differences in viewpoints on a particular subject.

Stephenson argued that, if individuals have specific likes and/or dislikes, the profiles will not correlate. However, if significant clusters of correlations exist, factorial analysis may describe common viewpoints (e.g., taste, preferences, and/or typologies), and individuals may subsequently be measured with respect to them. The factors resulting from Q analysis thus represent clusters of subjectivity that are operant. Q factorial analysis represents functional, rather than merely logical, distinctions (Brown, 1993a; 2002b).

Research Questions

This research measured employer perceptions of HBCU technology graduates, Q methodology enabled measurement of related observations. Smith (2001) suggested, "Studies using surveys and questionnaires often use categories that the investigator imposes on the responses. Q methodology on the other hand, determines categories that are operant" (p. 122). A crucial premise of Q methodology is that subjectivity is communicable because only when subjectivity is communicated (i.e., expressed as operant) can it be systematically analyzed just as any other behavior (Stephenson, 1935, 1968).

The following research questions guided the proposed study:

1. What are the general perceptions of employers regarding technology graduates of HBCUs?

2. Why is it important to understand employer perceptions of HBCU technology graduates?

3. How can HBCUs influence employer perceptions of HBCU technology graduates to improve employment opportunities for this population?

Theoretical Framework

The theoretical framework for the research encompassed systems theory, sociotechnical systems theory, organizational-change theory, human-capital theory, cultural bias, prejudice, aversive-racism and social-cognitive theory (SCT). These theories were important to the framework of the study as they facilitated understanding of the complex issues at reference and they helped in the development of the researcher's theory. HBCUs need companies to hire graduates; conversely, companies need qualified employees. Producing highly qualified workers will enable HBCUs to use what is the "bottom line" of systems thinking to persuade employers to hire their graduates, thereby creating advantage. Advantage initiates the change process, which leads to enduring changes of increasing significance (Senge, 1994). By gaining a clearer understanding of employer perceptions, HBCUs will be able to leverage these relationships.

Many different disciplines can use systems theory and realize an interconnectedness of the sciences, rather than a continued isolation and specialization (Bertalanffy, 1968). Prior to systems theory, scientists commonly applied reductionism in their exploration efforts. This process was based upon a concept of linear causation and provided an understanding of the whole via an understanding all of parts (Norlin & Cress, 1997). The 20th century coupling of systems theory with organizational theory facilitated diagnosis of problems and the development of holistic solutions. According to Cummings (1980), the application of systems theory within organizations leads to the following list of general characteristics:

1. Organizations are composed of several components or parts that concurrently interact with one another as part of an identifiable whole,

2. Organizations with more or less permeable boundaries interact with an external environment from which they import energy/matter or formation to enable export of a product or service,

3. Organizations consist of a network of individuals, structures, and technical operations with the goal of transforming raw materials, such as energy or people, into a product or service desired by external users,

4. Organizations have feedback mechanisms that allow various elements or components to adjust to external needs. Similarly, the information flow between organizations and their external environments allows the organizations to adapt to and influence the environments they seek to serve, and

5. Entropy, or "running down the system," occurs according to the extent of interruptions to the import of energy, slowing the conversion into valued output, reinvestment, and progression to further development.

The essence of organizational change presents the institution with a contradiction. While it is normal and commonplace for an organization to strive for stability, at the same time the organization must go through various change processes in order to survive. Organizational-change research has indicated that organizations form to achieve purposes that individuals cannot achieve alone. Thus, organizations are social inventions designed to achieve specific purposes and fulfill the needs of members. The capacity of any organization to achieve its goals and fulfill such needs is a function of congruence, or fit, between people, processes, structures, and the respective external environment.

In the development of theory, it was imperative for the researcher to understand what theory. Theory is defined as a plausible or scientifically acceptable general principle

or body of principles offered to explain phenomena (Webster 2006). Theory is about the connections among phenomena, a story about why acts, events, structure, and thoughts occur (Kaplan, 1964 and Merton, 1967). Theory emphasizes the nature of causal relationships, identifying what comes first as well as the timing of such events. With this in mind, the researcher developed a theory explaining employer perception of technology graduates from HBCUs as presently understood.

Perceptions and stereotypes are formed subconsciously from information gathered from the environment. These perceptions and stereotypes influence the decision making process of individuals and organizations (Blasi, 2002). Unaware of these perceptions and stereotypes, biased decisions are often made by the employer during the hiring process. The researcher will introduce the HBCU Inferiority Perception Theory.

In developing the HBCU Inferiority Perception Theory, the researcher examined employer perceptions to determine how they impact employer-hiring decisions. Several variables were of interest to the researcher. The variables of interest in this research were skills, preparation, and quality of education received by HBCU technology graduates. Employers were asked to rank order thirty-two statements that solicit employer perceptions about the skills, preparation, and quality of education of HBCU technology graduates.

The thirty-two statements that employers were rank ordered were separated into four categories. The four categories were Individual, Corporate, Academic, and Society. The four categories had eight statements each and employers rank ordered the statements on a scale from + 4 for Strongly Agree to - 4 for Strongly Disagree. All statements solicited employer perceptions about the soft and hard skill sets of HBCU technology

graduates, quality of instructors at HBCUs, the quality of the curriculum at HBCUs, grade inflation, and is their a need for HBCUs in today's society. Employers rank ordered the statements from Individual, Corporate, Academic and Societal perspective. Theses responses provided their perceptions of this population of students.

After the participants completed the rank ordering of the thirty-two statements, the statements were be loaded into the PQMethod statistical program, which computed the intercorrelations among Q-sorts, which were then factor-analyzed with both the Centroid and Principal Component method (McKeown & Thomas, 1988). After this step was completed, the analysis step produced an extensive report with tables on factor loadings, statement factor scores, discriminating statements for each factor as well as consensus statements (McKeown & Thomas, 1988). These reports provided clusters of similar employer perceptions of technology graduates from HBCUs. These clusters provided insight into the subjectivity of employer perceptions of HBCU technology graduates.

Assumptions

According to Stephenson (as cited in Brown, 1999b), quantitative Q methodology is employed "to enable the person to represent his or her vantage point for purposes of holding it constant for inspection and comparison" (p. 9). This methodology accepted subjective responses from participants and assumed that such responses provided structure and significance to the research. In this study, probing of participants revealed individualized subjective insight and explanations as to their perceptions surrounding technology graduates from HBCUs. Rather than theoretically explicit in nature, the research applied a paradigm of abductive reasoning to expose perceptions that "resided

inside the minds" of employers (Sternberg, 1985, p. 608). Several assumptions governed this study.

1. Employers rank ordered the Q-sort statements.
2. Employers were aware of their biases and prejudices toward HBCU technology graduates.
3. HBCU technology graduates were aware of employer biases toward them.
4. Employers hired and recruited HBCU technology graduates

Scope, Delimitations and Limitations

The study investigated the effects of employer perceptions about the graduates of HBCUs regarding job opportunities for this student population. The employers selected for participation in this research were within the North Carolina in an area known as Research Triangle Park (RTP). The combination of HBCUs and international corporations, located in the RTP, provided the resources for this study. The study was limited to employers located in RTP. An advantage of Q methodology is the ability to fulfill research goals with a small population sample. Participants of the study were presented with thirty-two the statements that they rank ordered. The objective was to establish a study group representative of the research goals that focused on employer perceptions of technology graduates from HBCUs and the effects those perceptions had on employment opportunities for this population. Participants included employers within the RTP that recruit technology graduates from HBCUs.

The number of employers willing and available to participate determined the limits of the proposed study. The research was abductive in nature, and data collection

will reflect accuracy solely for the population sample. A limitation of Q-sorting was that it is time-consuming. In order to complete the Q-sort, the researcher explained the method and instructions to participants due to their unfamiliarity with the technique.

As quantitative study, Q methodology did not propose to provide a priori meaning (McKeown & Thomas, 1988), with the exception of participant self-reflection. The research methodology was also limited as standard statistical procedures to Q sort data, such as interpreting data by comparing individual score with the average score for a group (normative measure), cannot be used with Q methodology. This incompatibility was due to the ipsative nature of participant responses. However, some also argue that this is relatively unimportant, especially when the number of items is large (Polit & Hunger, 1999). The study was also limited to participants recruited from some organizations that are in close proximity to HBCUs.

Significance of the Study

The significance of this study was that it provided a better understanding of how employers perceive technology graduates from HBCUs. This understanding can enable HBCUs and employers to develop strategies to increase the recruitment of technology graduates from these universities. A better understanding of these perceptions will also enable employers to examine discriminatory hiring practices and diversity policies to determine if they are practicing diversity and inclusion. This research provided a basis for social change through increased communication and dialogue between HBCUs and employers.

The most important vehicle toward success in America is education. The expectations of technology graduates from HBCUs are the same as graduates from any

other institution of higher learning; employment that enables productive use of the academic degree earned, and to be payment commensurate with knowledge and ability to perform. Unless preparation of HBCU graduates is not equivalent to graduates of institutions with a longer tradition of successful technology graduates, equal opportunity for technology graduates of HBCUs must be the norm.

However, without employer perception of HBCU graduate preparation similar to that of graduates from other institutions these African Americans will not have equal access to economic and social success along with their European American counterparts. The resulting differences in compensation will continue to affect quality of life for this population. The research should make a significant contribution toward social change as it pertains to investigation and analyses of employer perceptions about HBCU technology graduates and determination of the effects of those perceptions on employment opportunities for this population. Q methodology should be used as a tool to assist employers in understanding how they perceive HBCU graduates and help in the development of recruitment strategies for HBCU technology graduates.

Definition of Terms

Definition of the following terms relates to purposes of the proposed research.

Composite statements array is the composite Q sort summarizing the viewpoint of all individuals loading on any one factor.

Concourse refers to the initial collection of statements regarding a particular topic of interest.

Condition of instruction is the set of instructions consistently used by all participants who are rank-ordering sets of statements.

Factor analysis is a type factor analysis that provides a series of viewpoints held by a group of people that share a common perspective related to the research topic under investigation.

P set is the group of individuals participating in a research study.

Q sort refers to the set of statements that are rank ordered by each participant.

Q sample refers to a representative sample of statements drawn from a collection of statements regarding a particular topic of interest.

Summary

Chapter 1 included the problem as conceptualized, explained the purpose of the study, and addressed the significance of the research. Chapter 2 encompassed the related literature and provided a review of systems theory, systems thinking, organizational-change theory, employer perceptions, and diversity. The theories served as the framework supporting the research. Chapter 2 also contains additional theories evaluated during the course of the research. Chapter 3 encompassed the methodology for the research, examined employer perceptions toward HBCU technology graduates, and explored the empirical relationship between employer perceptions and employment opportunities for HBCU technology graduates. Chapter 4 contains that results and analysis of the factors revealed through use of Q methodology. Chapter 5 contains the significance of the findings, draws conclusions based on the results, discusses the implications for the future, and offers recommendations for additional research. The study concludes with references and appendices.

CHAPTER 2: LITERATURE REVIEW

The purpose of the Q methodology research was to identify perceived employer discrimination against technology graduates from HBCUs and determine the impact of these perceptions on the employability of the graduates. This Chapter consisted of an overview of the literature related to the research problem, and a review of Q methodology.

The history of HBCUs and their significance within the realm of education is important to the research. Examination of the literature related to HBCUs, systems theory, sociotechnical systems theory, organizational-change theory, cultural bias and prejudice, employer perceptions, subjectivity, and diversity recruiting was included in the research process. Discussion addressed the characteristics of these topics, as they existed within organizations. Foci included employer perceptions of HBCU technology graduates, their entry into the workplace, and the types of skills needed to succeed. The study also presented skills most-valued by employers in brief overview.

Title Searches, Journal Articles, and Research Documents

The researcher used refereed journal articles, scholarly books, and research documents through Walden University Library Internet search engines EBSCOhost, ERIC, ProQuest Digital Dissertations, and ProQuest to conduct the proposed study. Research tools from several local university libraries complement the online research tools. These tools include Emerald, Journals and Ovis, as well as SAGE Full Text Collections.

Historically Black Colleges and Universities

Following the passage of Emancipation Proclamation, the federal government, African American churches, and individual supporters sponsored the creation of 24 private African American colleges across the United States (Sum, Light, & King, 2004). In 1890, the United States Congress passed the second Morrill Act of 1890 (Sum et al., 2004), appropriating existing public or private colleges or creating new land-grant institutions specifically for African Americans (Delauder, 1990; Kindred, 1995). HBCUs provided most of the opportunities for higher education for African Americans in the segregated South and were classified as separate from, but equal to, institutions with primarily European American student populations. It was not until the 1954 *Brown versus Board of Education* ruling (Sum et al., 2004) that the doctrine of separate but equal achieved unconstitutional status. Massive resistance to desegregation mandated a dual-track system of higher education that eventually gave method to the integrationist imperatives embodied within the Civil Rights Movement.

Many African Americans continue to prefer HBCUs for their advanced education. According to the United States Department of Education (2004), these institutions enroll approximately 400,000 students each year, or 16% of all African American college students. Even when offered the opportunity to attend institutions with predominately White student bodies, many Black students enroll in HBCUs. Although these institutions comprise a low 3% of all institutions of higher education within the United States, they have educated nearly 40% of all African American college graduates. At the professional level, HBCUs have educated 40% of all African American dentists; nearly 50% of all African American business executives, engineers, and attorneys; approximately 75% of

all African American PhDs, veterinarians, federal judges, and military officers; and 85% of all African American physicians (American Association of University Professors, 1995). Many African American students attending HBCUs come from lower socioeconomic backgrounds and traditionally score lower on the Scholastic Aptitude Test than their African American counterparts attending predominantly European American institutions. Their composite score on this test is 752 compared to 954 for African Americans attending predominantly White institutions. More than 52% of the undergraduates attending HBCUs come from families with annual incomes of less than $20,000 (Redd, 2000).

Theoretical Review

Systems Theory

A system is an organized, complex whole and assemblage or combination of parts forming a unit. Systems theory is a content-free, highly abstract set of assumptions and rules applicable to many fields of study (Potts & Hagan, 2000). It focuses on problems of relationships, structures, and interdependence, rather than on constant attributes of objects (Katz & Kahn, 1966). Systems theory has its roots in biology where it is used to describe how living systems function. The interaction of systems results in a synergy that binds the systems into a whole. Systems that interact with other systems may be a collection of systems. Examples include a classroom, university, community, city, or family.

The science of understanding how a system operates is systems thinking. Kauffman (1980) defined such thinking as a collection of parts that interact to function as a whole and further distinguished a *system* from a *heap* by defining a heap as comprised

of a number of parts with no specific arrangement or order. The ultimate goal of systems thinking within the realm of education is to create a learning organization, that Senge (1994) defined as a place where individuals are continually discovering how they create their own reality and how they change it. According to Cotter (1998), enough effort is focused on separate specialties that universities lose sight of how disciplines come together to create what is known as education. Cotter further asserted that students must wrestle alone with the critical job of creating connections and finding coherence. The organization of universities and colleges is the same as loose confederations of independent components. They disseminate power directly to expert workers (i.e., faculty), thus encouraging independence. This practice increases organizational flexibility while creating a heap. Thus, the appropriate framework for the proposed examination is systems thinking.

Senge (1994) indicated that 11 laws, a shift in thinking, archetypes, and an additional, separately recognized law of leverage-components characterize systems thinking. The 11 laws articulate the obstacles that prevent systems thinking within an organization and include:

1. Today's problems are yesterday's solutions.
2. The harder you push, the harder the system pushes back.
3. Behavior gets better before it gets worse.
4. The easy way out usually leads back in.
5. The cure can be worse than the disease.
6. Faster is slower.
7. Cause and effect do not closely relate in time and space.

8. Small changes can produce big results, but the areas of highest leverage are least obvious.

9. You can "have your cake and eat it, too," just not all at once.

10. Dividing an "elephant" in half does not produce two small elephants.

11. There is no blame.

For systems thinking to manifest within any organization, a paradigm shift must occur. This requires elimination of old manners of thinking to cultivate the new manner of thought. Linear thinking, as illustrated in Figure 1, is the predominant mode for most individuals. The existence of systems thinking in organizations requires that thinking in a dynamic, circular fashion as a process reflective of the interconnectedness of all parts of the system. Feedback loops are instrumental to systems thinking because they connect the parts by delivering feedback to each (see Figure 2). According to Senge (1994), feedback loops should perform a dual role: (a) illustrate how a structure creates a particular pattern of behavior, and (b) inform about influence to the pattern. Patterns developed by the feedback loop display how managers view the interrelationships between organizational parts, as well as their commonalities.

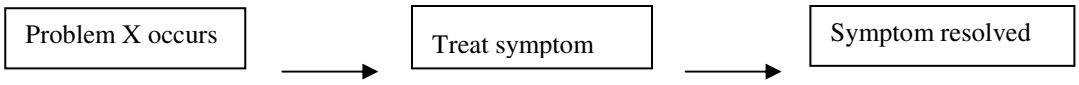

Figure 1. Linear thinking.

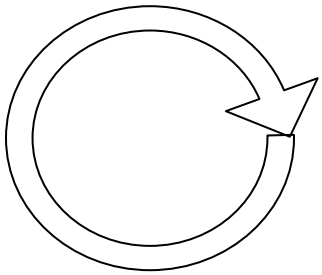

Figure 2. Feedback loop.

Following implementation of feedback loops, the next step in systems thinking is to apply archetypes. Archetypes enable managers to construct credible, consistent hypotheses surrounding the governing forces of their systems. Kim, Goodman, Roberts, and Kemeny (1994) defined archetypes as

> accessible tools used by managers to quickly construct credible and consistent hypothesis [*sic*] about the governing forces of their systems. Archetypes are also a natural vehicle for clarifying and testing models about these systems. They are powerful tools for coping with the astonishing number of details that frequently overwhelm beginning systems thinkers. (p. 121)

Senge (1994) postulated that the "greatest promise of the systems thinking perspective is the unification of knowledge across all fields - for these same archetypes recur in biology, psychology, and family therapy; in economics, political science, and ecology as well as in management" (p. 94). Kim and colleagues discussed and defined the following five archetypes:

> 1. Fixes that backfire: The inadvertent consequences of the fix are worse than the original symptoms.
> 2. Limits to growth: Some influence in the structure is limiting growth.
> 3. Shifting the burden: This archetype is similar to fixes that backfire. In this archetype, there is a symptom that needs to be fixed, and fixing the symptoms shifts the attention away from the real cause of the problem.
> 4. Tragedy of commons: A common resource initially relieves the structural problem, but then too many people use the resource, making it difficult to get or using it all up [*sic*].
> 5. Accidental adversaries: This archetype applies to the scenario when people who should be strategic partners with each other [and] are adversaries.

(p. 121)

Choosing the archetype to solve an organizational problem is a matter of guesswork. Kim and colleagues suggested that the purpose of an archetype is to "peel away" the layers of information to locate the systemic cause of the respective behavior. There is no "wrong" archetype because they all serve the same purpose. Organizations must find the archetype that "tells the best story."

The product of systems thinking is a tool to facilitate the creation of a learning organization. The result is an organization that can leverage its own structure and processes to analyze how specific actions or changes in that structure might provide significant and enduring improvements (Senge, Kleiner, Roberts, Ross, & Smith, 1994). In summarizing systems thinking, Senge described the benefits of the process in the following manner:

> Systems thinking finds it[s] greatest benefit in helping us distinguish high [*sic*] from low-level changes in highly complex situations. In effect, the art of systems thinking lies in seeing through complexity to the underlying structures generating change. Systems thinking does not mean ignoring complexity. Rather, it means organizing complexity into a coherent story that illuminates the causes of problems and how they [are] remedied in enduring ways. (p. 128)

There are several approaches to operationalizing systems thinking within any organization. According to Kim and colleagues (1994), examination must include four levels of an organization: (a) events within the organization, (b) patterns of behavior, (c) the systemic structure, and (d) the underlying mental models. Each of the four levels must include incremental instructions to operationalize systems thinking effectively.

Systems thinking are usable within the realm of education to improve organizational and student achievement. Thornton, Peltier, and Perreault (2004)

suggested that the 11 allegories of systems thinking may offer solutions for mistakes resulting from action void of systems thinking. Thornton and colleagues examined how schools can avoid such mistakes as they strive to improve student achievement. They posited that the allegories of systems thinking

> [may] assist educators [to] avoid underlying errors commonly made by non-systems thinkers. Because humans are [hard-wired] for narrative, we believe that leaders can best understand, recall, and apply principles of systems thinking if the common errors are associated with stories and examples. (pp. 222–223)

Systems thinking enables educators and other organizational leaders to recognize interconnectedness and points of influence toward improved student achievement and organizational performance.

Socio-technical Systems Theory

In the early 1950's, Trist, Bamforth, Emory, and others conceived Socio-Technical Systems Theory (STS) on the automation of coal mining in Britain (Leonard & Beer, 1994). STS purports the improvement of productivity by obtaining the best fit between social and technical considerations. Research in the British coalmines found that new machinery did not improve productivity; it lowered it. Further studies indicated that changes in work methods eliminated social interaction, support, and coordination necessary to improve productivity, and created the resulting need to find the best fit between people and technology.

According to Kuipers, Witte, and van der Zwann (2004), STS is more effective in production environments with lower volumes and increased customer specifications. It engages self-managing teams of workers in problem solving, scheduling, equipment maintenance, and quality inspections. Recent 21st century STS research extends social

and technical fit to administrative and environmental considerations. STS seeks to improve the quality of the work life for employees by placing emphasis on task identity and variety, and task significance and autonomy. This theory is in contrast to mechanistic or Taylorist view of management, to autocratic management styles, and the de-skilling of labor (Leonard & Beers, 1994).

Organizations can expect to gain greater productivity and adaptability through STS. However, they must be willing to commit to invest time and energy both in applying the analysis and in overcoming any resistance to change that may challenge the privileges and status of the present arrangements. Requirements for a high level of employee participation ensure successful implementation of STS. The process to implement STS includes five steps

1. Initial Scan Phase
2. Technical Analysis Phase
3. The Social Analysis Phase
4. Work Redesign Phase
5. Approval Phase

The organization examines its environment, and determines and documents the organizations major inputs, transformations, and outputs to achieve the Initial Scan Phase. In this phase the organization also prepares a profile of its philosophy, culture, values, and mission. Interviews and reviews of the organization's history and paper records are usually part of this last step. Two classes divide the environment. The first class is the "transactional environment" that includes all external factors and stakeholders influencing the organization and that the organization directly influences. The second

class is the “contextual environment” which includes all environmental factors that have a primary one-way influence with the organization such as market trends, regulators, business cycles, and political occurrences.

The Technical Analysis Phase establishes detailed technical information about each stage conversion process in each unit of the organization. This phase encompasses all tasks associated with the physical conversion of materials and those relating to the informational conversion of orders and invoices. Tagging of the key variances to indicate the location in the process where problems frequently occur applies for each process. Efforts track the variances to the source where occurred. Redesigning the process eliminates the variances. If the redesign does not eliminate the variances, they must be controlled at the point of the problem and by no means sent on to the next stage in the process.

Social Analysis is another step in the process. This phase describes the social networks and relationships in the organization. Articulation of the role of networks and interaction patterns among various units and the members happens with particular attention to internal boundaries and related crossing of information. Preparation of a work quality grid indicates the social ranking of the tasks according to identity, significance, variety, autonomy, and discretion, and the potential for learning and growth.

The fourth step in the process is Work Redesign Phase. In this phase, the restructuring of tasks and roles creates boundaries between units that allow completing an identifiable product or stage of the process, control of variances within the unit, and a high degree of self-management and decision-making. Design for the flow of information to a work unit provides the team with appropriate and timely feedback on its output.

Implementation of some design changes is immediate. Others, such as maintenance of machinery in a unit, may have to wait until team members acquire the necessary additional training.

The last step of STS is the Approval Phase and includes the implementation and enhancement of the work design. The work redesign in STS is continuous. Workers must have the opportunity to make suggestions that may improve the design. The design must also be adaptable to environmental changes (Leonard & Beer, 1994).

Organizational-Change Theory

Understanding and effectively leading institutional change are central to successful academic leadership in today's American society. Colleges and universities are competing within an environment that is changing at faster rates than ever before (Higdon, 2003). However, sustaining change in higher education is no small accomplishment (Curry, 1992; Levine, 1980; Marsick & Watkins, 1990; Rowley & Sherman, 2001). Suggestion maintains that attempting change within an academic institution is somewhat comparable to "moving a graveyard" (Austin, Ahearn, & English, 1997, p. 4). An institution of higher education is first, last, and always a highly political entity (Van Loon, 2001). A significant impediment to effective organizational change, including higher educational reform, is failure to recognize the extent of change process vulnerability to powerful cultural influences (Dooley, 1995).

The dynamics of change within institutions of higher education are complex, and generalizations regarding change processes risky (Kezar & Eckel, 2002). Attempts to explain organizational change within such academic environments is evident by six models. Some of these models have been more successful at explaining this process than

others. According to Kezar, the problem with any model is the temptation to apply it to all situations. However, it is not feasible to create a change model for every situation that manifests within higher education; nor can one static management model serve as the single foundation for the numerous changes presently underway within the external environment (Thor, Scarafiotti, & Helminish, 1998).

General change literature discusses the distinctions between models and explains which are the most prominent within institutions of higher education (Kezar & Eckel, 2002). The minimal use of the life cycle model or the developmental change model within higher education renders their viability difficult to assess. Cameron and Whetten (1983) suggested a model for the relationship between the organizational life cycle and institutional adaptation with focus on institutional response. The distinctive basis of response is upon the stage of organizational life cycle wherein a respective change occurs. Levin (1998) suggested that institutions of higher education collectively represent a mature industry, meaning that change is likely to occur in an exclusive manner, based upon the organizational life cycles involved. With a mature industry, change is likely to occur more slowly and less radically, whereas change within a young industry tends to manifest with rapidity. According to Kezar and Eckel, the findings of the life cycle theories relate to the concept of learning organizations wherein the critical element of change is learning or development among individuals within the organization.

Understanding all models is important, including those proven ineffective, as such knowledge can facilitate problem solutions and eliminate unexpected hurdles during change implementation. The six models of change recognized by most institutions of higher education are (a) evolution, (b) teleological, (c) dialectical/political, (d) social-

cognitive, (e) cultural, and (f) the multiple-model approach. Use of the cultural model of change within higher education has been sparing. Institutions of higher learning sometimes implement the multiple-model approach to address atypical internal challenges.

Evolution model. Research focused on the evolutionary change model indicates several important aspects of the overall change process. It provides: insight into (a) change trends manifesting during the differentiation and creation phases of change (Clark, 1983; Gumport, 2000), (b) the importance of the loosely coupled system toward understanding change (Clark, 1983; Rubin, 1979; Sporn, 1999), (c) the need for homeostasis and stability, (d) the limitations of traditional strategic planning (Chaffe, 1983; Keller, 1983; Mintzberg, 1994), (e) the need to negotiate competing forces, (f) the differential effects of environmental conditions on varying institutional types or administrative/academic units (Cameron, 1991; Rhoades & Slaughter, 1997), (g) the rapid change that usually results from resource dependency (St. John, 1991), (h) moderating internal forces to the external environment, and (i) responsive or entrepreneurial universities (Clark, 1998; Peterson, 1995). According to Kezar and Eckel (2002), these six models demonstrate that the higher education environment differs from other organizations. This environment is highly vulnerable to the characteristics of the external environment such as prevalent, rapid change, and atypical centralization and high coordination. Homeostasis, internal moderating forces, ongoing change within a loosely coupled system, and resiliency, rather than rapid, large-scale transformation are all themes reinforcing a system of midlevel environmental vulnerability (Clark, 1983; Smith, 1993).

Teleological model. Used to effect change in higher education, the teleological model has had mixed results (Kezar & Eckel, 2002). Mild success results from the concepts of vision and planning associated with this model. More popular concepts such as total quality management and reengineering have been successful in industry, but not within the educational realm. Birnbaum (2000) and Bess (1999) asserted that the poor outcomes of total quality management and reengineering models within higher education result from the inability of academic institutions to state clearly their missions and goals.

Birnbaum and Bess both postulated that extraordinary planning problems, inadequate centralized decision-making, short-term orientation of teleological models, and inertia of long-standing structures all contribute to the unsuccessful use of these models within educational settings. Ambiguity is also a fundamental trait. Planned-change models, with their emphasis on rationality, linearity, and clarity of process, are also unlikely to garner success within these environments (Kezar & Eckel, 2002). The major themes emerging from the implementation of teleological models are mission, vision, strategic planning, leadership focus, incentives, interrelationship among strategies, narrow efficiency and cost emphasis, and the limited success of change models.

Dialectical/political model. The dialectical/political model has been successful in explaining how change occurs within higher education. Several forms of this model have been implemented within colleges and demonstrate strategies for effective facilitation of change (Kezar & Eckel, 2002). The dialectical/political model has facilitated several key discoveries, resulting in its success within the higher-education environment. These discoveries are:

1. The importance of interest groups and their power within academic institutions toward creating change.

2. The influence of strategies of persuasion.

3. The significance of informal processes during change implementation such as "behind-the-scenes" conversations and negotiation.

4. The efficacy of persistence.

5. The role of mediation.

6. The manner in which politics prevent change.

Within the university setting, the dialectical/political model of change has proven to be effective. In studies that seek to illustrate the power of paradigms, culture, the environment, and planning, Gioia and Thomas (1996), and Simsek and Louis (1994) noted the surprising ability of the political process to create change. In 1996, Hearn asserted that most studies of change within higher education identified strategic positioning, the formation of interest groups, the establishment of alliances and coalitions, the effective application of "spin" on pivotal issues, and the manipulation of symbols as characteristics of this organizational setting and its overall change process. Simsek and Louis examined paradigm shifts and change through a cultural approach and found coalition building on the part of university leaders to be one of the most salient aspects leading to and characterizing successful change within academic settings.

Social-cognitive model. Implementation of social-cognition models is becoming popular among scholars within higher education (Kezar & Eckel, 2002), particularly those that emphasize organizational learning. This population prefers organizational learning models because they accommodate the ambiguous environment of higher

education. Kezar and Eckel postulated that such models place emphasis on the need to ensure understanding among campus employees of the proposed change and how the respective change affects or may affect the organization. This process of discussion, debate, reframing, and sense making is inherent to an ambiguous system and allows for creative and productive interaction (Weick, 1995).

Cognitive reorientation is important to the change process. Components of the cognitive process are single- and double-loop learning, mental models, constructive interaction, learning organizations, metaphors and language, sense making, image and isomorphism, and imitation or emulation (Kezar & Eckel, 2002). Within the social-cognition model, there are three distinct approaches: sense making, organizational learning, and reframing. Social-cognition components place an emphasis on the understanding of the change initiative by individual employees. The change initiative must be meaningful to the individual for change to manifest. The second approach within social cognition is institutional isomorphism, focusing on the manner in which norms and images guide the change process through imitation and emulation. In general, research within the social-cognition tradition has found the internal environment to be more significant in effecting change than external forces, with the exception of studies focused on institutional isomorphism (Weick, 1995).

Cultural model. One of the most effective change models used within academic settings is the cultural model. This model has been efficacious in explaining and creating a clear understanding of the change process. One of the themes supporting the cultural model is the role of history and tradition. Symbolism, as a strategy to create change, is also a theme supportive of the model. Deep transformation and paradigm shifts affect the

change process; however, infrequent implementation of this model is the case at most institutions (Kezar & Eckel, 2002).

Multiple-model approach. The multiple-model approach attempts to combine the most effective insights and principles from all of the major models to address unique issues within higher education. Birnbaum (1991) developed one of the most widely known combined models of change for use within higher education and referred to it as the cybernetic approach. Grounded in the evolutionary and social-cognition models, the multi-model approach is a loosely coupled open system accommodating simultaneous existence by variable degree of multiple organizational realities, such as collegiums, bureaucratic organization, organized anarchy, and the political system. The variable degree is dependent upon the institution. The cybernetic model encourages leaders to reframe the manner of situational assessment and decision-making. The integration of various perspectives using cybernetic controls as "self-correcting mechanisms that monitor organizational functions and provide attention cues or negative feedback to participants when things are not going well," is a pivotal component of the model (p. 179).

The multiple-model approach requires leaders to view institutions of higher education through the perspective of multiple models when framing a problem, a practice that provides a broader understanding of the impending challenge. Feedback loops play an integral role within this process of change. Monitoring systems enable leaders to make minor adjustments and intervene when necessary. As a result of the feedback loops, it is unnecessary for leaders to take immediate action when problems arise. Rather, they can focus on cues within the system. According to Morgan (1986), the feedback loops act as

organizational “thermostats” that are also features of evolutionary models. They reflect ways in which living systems are able to provide a response to unexpected challenges. Change agents examine the system rather than initiating an immediate response.

Human-Capital Theory

Human capital generates value through investment. One type of investment is in education. Human capital theorists have asserted that those who invest in themselves and in their careers through education, experience, and job training (i.e., collectively referred to as human capital) have more value for employers in terms of their productive capacity within the labor market. Workers that develop marketable skills are more likely to gain employment and receive higher wages than workers without such skills. Human capital is transient and does not belong to any one organization. Employees are in effect owners of human capital and govern the amount of human capital investment (Roos, Roos, Dragonetti, & Edvinsson, 1997). Individuals with a background of higher education achieve compensation with higher wages than the less educated. Earning an education is also a form of investment. According to Woodhall (2001), the notion of human capital is analogous to physical capital:

> [Human capital] implies that it is possible to measure the returns to investment in education, and apply cost benefit analysis to decisions about education expenditure, in the same way as rates of return are used to analyze the profitability of investment in conventional physical capital. (p. 6952)

Human capital theorists contend racial and gender minorities, particularly women and African Americans and Hispanics, do not have the education, skill, or experience levels of European American males, either due to an insufficient motivation or a decision to invest in other areas of their lives such as in their families. According to Polachek

(1979), many theorists believe that, because of the unwillingness of racial and gender minorities to invest in themselves, they are often unqualified or unwilling to compete for success with European American males for higher level, better-paying jobs.

This view of human capital is widely accepted among economists; however, sociologists have raised a number of questions concerning its utility for explaining race and gender inequality in employment outcomes. Tomaskovic-Devey (1993) conducted a study of North Carolina workers. Variance in human capital explained approximately 3% of the gap in salary compensation between women and men and roughly one-third of the gap between African Americans and European Americans. According to Bound and Johnson (1995), White men out-earned White women by 58%, Black men by 41%, and Black women by a staggering 68%. All comparisons were among populations with backgrounds of approximately the same educational levels. The largest inequalities appeared to be among individuals holding the highest-level jobs. The figuresbelow illustrate wage rates per hour for the skilled and unskilled labor market.

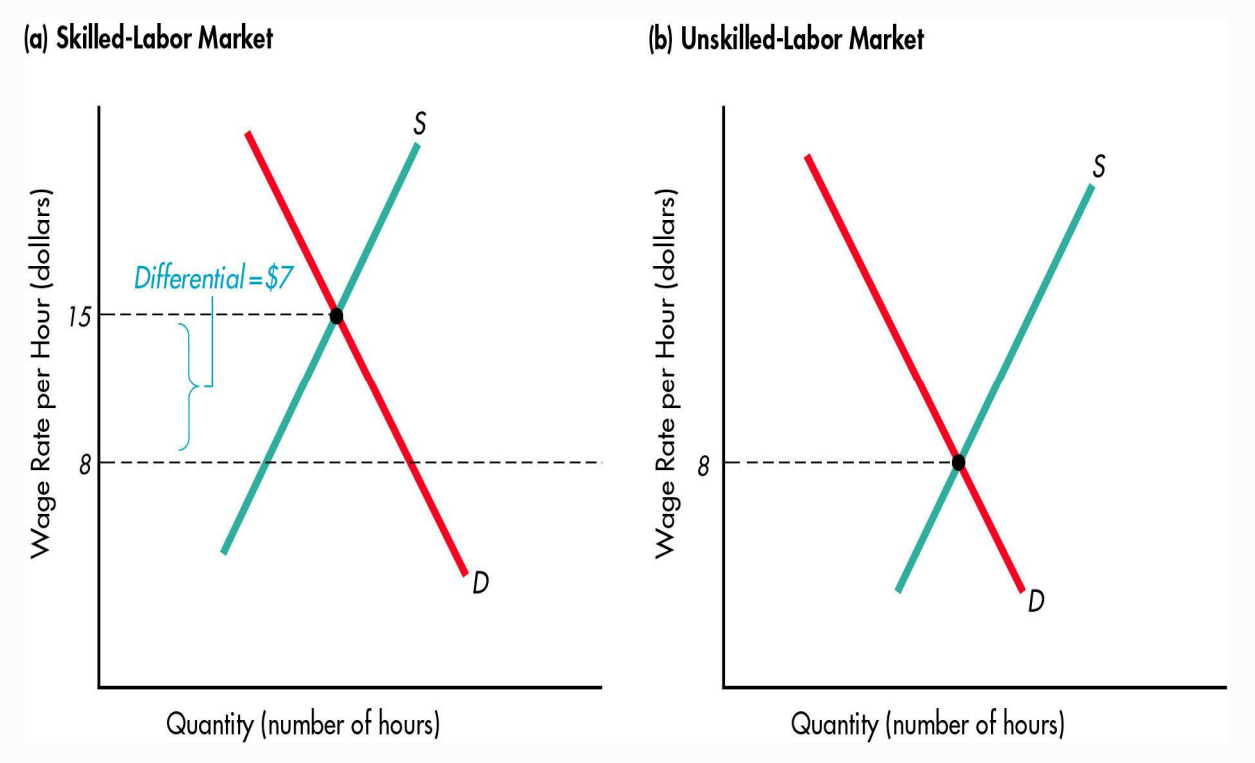

Figure 3 and 4

Social-Cognitive Theory

There are a substantial number of empirical and theoretical studies on SCT and perception. SCT states that all human beings develop perceptions and make decisions influenced by cognitive biases. These cognitive biases or perceptions develop within physical and social environments. Humans are unaware as stereotypes guide behaviors. According to Blasi (2002), the human mind relies upon categorization as a basic tool for interpreting perceptions and encoding those perceptions into memory. The mind makes both conscious and subconscious decisions based upon those perceptions and memories. Cognitive filters distort social perception, judgment, and decision-making. Decision makers are typically unaware of these perceptions and hence often make biased decisions without specific intent to favor members of any particular group. This subconscious

process contributes to perceptions in several ways. SCT illustrates the notion that perceptions cause human beings to perceive members of other groups as an "undifferentiated mass," meaning all individuals within the respective group appear and act the same (Krieger, 1995).

Minorities in the Workforce

Consistent with labor predictions, the workforce of the 21st century may represent increased number of women, minorities, ethic backgrounds, intergenerational workers, and different lifestyles (Lagdon, McMenamin, & Krolik, 2002). Moreover, organizations have realized that the extent of effective and efficient management of these demographic workforce changes will affect organizational functioning and competitiveness (Harvey, 1999; Kuczynski, 1999). As demonstrated by the more than 75% of Fortune 1000 companies that have instituted diversity initiatives (Daniels, 2001), the management of diversity and minorities has become an important business imperative. Despite a pervasive awareness that organizations must address the needs of minorities in the workforce, and other issues related to diversity, different approaches have been adopted (Roberson, 2006). Common perspectives on managing diversity focus on minority recruitment initiatives, education and training, career development, and mentoring programs to increase and retain workforce heterogeneity in organizations (Cox, 1993; Morrison, 1992).

Although literature on diversity and minorities in the workforce provides some insight into inclusion of minorities into the organization culture, only one study in the management literature has empirically investigated the construct of workplace inclusion (Roberson, 2006). Building on prior conceptualizations of inclusion of minorities in the

workplace as centrality or an individual's position within networks (O'Hara, Beehr, & Colarelli, 1994; Schein, 1971), Pelled and her colleagues (1999) defined inclusion as the degree to which a minority or employee is accepted and treated as an insider by others in the work system. Besides not being included in the hierarchies of most organizations, the literature indicated that minorities experience a considerable disadvantage in all aspects of the employment process (Roberson, 2006).

Aversive Racism, Cultural Bias, and Prejudice

While eradication of blatant prejudice and racism has not occurred, it has diminished in many segments of society. A more subtle form of racism often replaces it (Hite, 2006). This incarnation has been labeled aversive racism (Dovidio, 2001, p.834), "a subtle, often unintentional form of bias" often found in White individuals "who possess strong egalitarian values and who believe that they are nonprejudiced." According to Hite (2006), these individuals consciously endorse equity, however, they harbor negative belief systems based on racial and cultural differences. Hite posits that while these individuals espouse valuing equality, they discriminate, although often unintentionally, in situations where their actions can be justified on a non-racial basis. This covert bias is hard to identify and, therefore difficult to combat. However, it may play out as ambivalence about racial equity initiatives like affirmative action, through assertions of being "color-blind" and not seeing racial differences, or as well rationalized favoring of Whites over Blacks that allow individuals to maintain their egalitarian self-images (Dovidio, 1993).

White and all other racial identities produced a social construction of Whiteness over time by historical, social, political, and cultural means that does not refer in an

essential or biological way to human bodies (Omi & Winant, 1994). The social construction of Whiteness has been linked to relations of domination, race privilege, and cultural practices that are usually unmarked and unnamed (Frankenberg, 1993, 1997; Rodriguez, 2000). The privileges of Whiteness, the "invisible package of unearned assets" (McIntosh, 2002, p. 120) that gives Whites an advantage in a majority White society, often is difficult for majority group members to acknowledge. McIntosh (2002) indicates that for many Whites, the recognition of white privilege is challenging because it requires accepting that race, not just hard work, contributes to achievements.

In 1993, Stephan and Stephan indicated that the Integrated Threat Theory (ITT) focuses on the appraisal of threat as a key determinant of prejudice, defined as negative affect associated with an out-group. ITT posits that this negative affect is caused by the perception of four types of threats posed by an out-group: realistic threat, symbolic threat, intergroup anxiety, and negative stereotypes. Realistic threat refers to the political, economic, and physical well being of the in-group (Stephan & Stephan, 1996). Alternatively, symbolic threats are based on symbolic and modern racism research (Bobo, 1983; Kinder & Sears, 1981; McConahay, 1986; Sears 1988), defined as threats to the in-groups "way of life" or worldview. These threats arise when a salient out-group possesses different values, customs, standards, and beliefs (Stephan & Stephan, 1996), which either implicitly challenge in-group norms or are explicitly imposed on the in-group. Intergroup anxiety relates to personal experience of distress during social interaction with a member of the out-group (Stephan & Stephan, 1985). Finally, negative stereotypes inform expectations of an out-group member's behaviors, which may have negative consequences the perceiver (Stephan & Stephan, 1996).

Employer Perceptions

A review of related literature suggests that employers are not satisfied with the attributes and skills of present-day college graduates. Empirical research indicates the existence of a mismatch between the education delivered by institutions of higher education and the attributes and skills employers seek in potential employees (Burkey, 2002; Ferketich, 1998; Mardeusz, 1995; Shuayto, 2001). Employers perceive that present-day graduates do not possess necessary *soft skills* that the employers wish to see in addition to theoretical skills. Although attempts exist within the academic realm to add soft courses such as human-resource management and leadership to the technology-school curriculum, the quantitative nature of technology schools leaves minimal space for, or interest in such courses (Crainer & Dearlove, 1999; Eberhardt & Moser, 1997; Jenkins, Reizenstein, & Rodgers, 1984).

Criticism of business school curriculum began in the early 1900s after the first business schools were developed. Professors from more traditional academic fields criticized business programs as too trade oriented, resulting in more research-based curriculum as the years progressed (Cheit, 1985). The newest curriculum within such schools is more academically respected (Porter & Mckibbin, 1988), while criticism now turns its focus to suggest that business schools are too research oriented. Several management experts have indicated that today, business practitioners are discovering that business school professors know more about academic publishing than about problems in the workplace (Hughes, 2006). Hughes further postulates that many PhD programs require applicants to have already published two articles, but no business experience is required. Present-day employers seek job candidates who can transform theoretical

knowledge into practical application. According to Pfeffer and Fong (2002), the empirical evidence indicates that the effects of business school research are minimal. These researchers further postulated that this is also the case when comparing research produced by business and technology school professors with that conducted by investigators external to technology schools.

In summary, the literature indicated that employers are dissatisfied with the skills of present-day graduates. Companies in every industry are reporting serious difficulty in finding and retaining qualified employees (Kamal, 2005). For a company to stay agile and remain competitive businesses need to hire graduates who possess both hard and soft skills (Kamal, 2005). In addition, employers are looking for graduates who are creative, innovative, and have the mind-set to achieve business goals. This research may enable employers and HBCUs to develop strategies to develop the skills set need by graduates as well as hire them upon graduation.

Subjectivity

During the preceding 20 years, subjectivity has become a topic of interest within the field of social scientific research. The challenge among researchers is the number of meanings for subjectivity. Sabini and Silver (1982) listed eight senses of subjectivity, which included bias, emotion, vantage point, and illusion. Rosaldo (1994) contrasted subjectivity with detachment, equating it with passion. Pletsch (1985) referred to individuals who cultivate subjectivity individuals acting voluntarily in a manner that they might with effort. Ellis and Flaherty (1992) considered subjectivity dangerous to the rational-actor worldview of mainstream sociology, as if a rational worldview is other than a subjective position. Stephenson (1981) distinguished between two dictionary definitions

of subjectivity. He found the first to be categorical, defined as a consciousness of self-perceived states. The second, he found acceptable as long as "the mind" represents nothing more than a personal standpoint or situation. Stephenson retrieved the empirical that behaviorism had inadvertently discarded along with the non-empirical from within the introspective mix of mental processes and covert events: those self-reflections, assertions, and observations that fill most of daily life (as cited in Brown, 1999b).

Diversity

Diversity has become a topic of much interest for all types of organizations—corporate, political, legal, and educational. According to Allen, Dawson, Wheatley, and White (2004), many have embraced diversity, while others perceive it as merely compliance with various legal requirements. These researchers further asserted that, historically, firms have used diversity management to create a legally defensive position for protection against discrimination claims. Organizations frequently use corporate demographics to prove a workforce reflective of the general population.

Organizations are learning to improve management of diversity recruitment efforts and the hiring process. Tipper (2004) developed the following five-step plan to incorporate diversity into the recruitment process of an organization:

1. Know the respective market,
2. Build the business case,
3. Understand the channels to market,
4. Reward diversity in recruiting, and
5. Make diversity recruiting a corporate focus.

Employers must perceive diversity as valuable to organizational success to incorporate diversity effectively into the corporate culture. Understanding the available talent pool will enable employers to identify best candidates. Numerous large American firms perceive diversity recruiting and hiring as a competitive advantage. HBCUs are rich with business talent for all types of American organizations (Fraser, 2005).

Foundation of Q- Methodology

Psychologist and physicist William Stephenson proposed Q-methodology for the first time in a letter to the journal Nature in 1935. Stephenson used this letter to advocate the need for correlating persons instead of tests. Stephenson was interested in providing a way to reveal the subjectivity involved in any situation. Q methodology "combines the strengths of both qualitative and quantitative research traditions" (Dennis & Goldberg, 1996, p. 104) and in other aspects provides a bridge between the two (Sell & Brown, 1984). It is important to review the historical development to gain understanding of this research methodology. Published research about the use of Q methodology exists in political science, sociology, anthropology, medicine, business, food science, and other journals across a variety of disciplines and professions.

In the early 1930s measurable confusion concerning the relationship between Q and R as factor-analytic procedures arose due to the differing interpretations by Cyril Burt (Burt, 1937, 1940) and Stephenson (Stephenson, 1935b, 1953) for "correlating persons." The two researchers agreed to disagree (Burt & Stephenson, 1939). Burt posited that both factor systems have foundations in a single basic data matrix that typically contains scores from the objective test. Stephenson asserted that two separate

data matrices were at issue, the one containing objective measures (R) and the other containing data of a subjective type (Q).

Stephenson (1935) stated that R methodology refers to "a selected population of *n* individuals each of whom has been measured in *m* tests." Stephenson further posited that Q methodology referred to "a population of *n* different tests, each of which is measured or scaled by *m* individuals. Stephenson was aware that the study of subjectivity required a different way of thinking that moved far away from conventional factor analysis. The major difference between Burt and Stephenson was not based on the mechanics of factor analysis, but on what was to be measured and how (Brown, 1997).

Q-methodology has been referred to as "the best-developed paradigm for the investigation of human subjectivity" (Dryzek and Holmes, 2002 p. 20), and it provides a conceptual framework and systematic procedures for incorporating the perspectives of participants and placing them at the center of analysis. Q-methodology is applicable to the identification of employer preferences and values and contributes to the study of employer perceptions. This research application of Q methodology seeks to provide subjective views of employer perceptions and determine how they affect employment opportunities for HBCU graduates.

Research Methodology Review

In determining a research methodology to conduct this study the researcher examined both qualitative and quantitative methods. Qualitative research studies typically serve one or more purposes (Peshkin, 1993). The purposes are to describe or reveal the nature of situations, enable the researcher to gain insight about the nature of a particular phenomenon develop new concepts or theories. Other purposes include discovering new

problems, and allow the researcher to test the validity of an assumption or provide a means through which a researcher can judge the effectiveness of a particular policy practice or innovation (Leedy & Ormond, 2001).

Of the five common qualitative research designs, the researcher examined the case study and ethnography research methodologies for the study. Both methods enable the researcher to examine the culture of organizations and gather data about employer perceptions. Ethnographical research examines every day behaviors of a group in a natural setting for a lengthy period, whereas, case studies examine an individual, program, or event for a specific period of time (Ormond & Leedy, 2001). Both methods could be used to conduct this research; however, they would not quantify the data as does Q Methodology.

Descriptive quantitative research is the quantitative method reviewed by the research for this study. This methodology would identify the characteristics of an observed phenomenon or explore the possible correlations among two or more phenomenon (Leedy & Ormond, 2001). Specifically, the researcher examined survey research to gather employer perceptions of technology graduates from HBCUs. Survey research enables the researcher to gather data about employer perceptions, draw conclusions about the data at a particular time, and extrapolate those conclusions about the state of affairs over a long period of time (Leedy & Ormond, 2001).

Summary

Clear understanding of the problem under study was be facilitated by the theoretical framework. Examination of employer perceptions about HBCU technology graduates, and how these perceptions affect employability of these graduates, will benefit

from all theories addressed. Systems thinking within higher education will enable academic leaders to view their institutions as a whole rather than as a set of fragmented departments. Feedback loops within systems thinking will expose the root cause of the problem, enabling leaders to treat the problem rather than the symptom. Organizational change, coupled with systems thinking, represents an effective partnership toward solution.

The six typologies examined have had some success in effecting productive change within institutions of higher education. The multiple-model approach enables academic leaders to view institutional problems from multiple perspectives. These perspectives provide feedback allowing the leaders to address the problems rather than the symptoms. Human capital theory views education as an investment that produces future benefits. Highly educated individuals are typically more knowledgeable and often perform better than do those with limited education. Additionally, employment and promotional opportunities tend to increase with advanced education (Hitt, Bierman, Shimizu, & Kochhar, 2001; Wayne, Liden, Kraimer, & Graf, 1999). According to Lin and Huang (2005), employees weigh the advantages and disadvantages of investing in themselves, including the potential cost and rewards of such investments. Organizations reward those who possess a higher level of human capital.

Finally, the different research methodologies that were reviewed for this research were examined. Both, qualitative and quantitative research methods were examined before choosing Q Methodology to conduct this study. Of the five traditional qualitative methods the researcher reviewed the case study and ethnography approach. The descriptive quantitative research approached was examined as a research method.

CHAPTER 3: RESEARCH METHODOLOGY

This study looked at lack of employment opportunities for HBCU technology graduates and the impact of employer perceptions on the employability of these graduates. The research employed Q methodology to address the problem under study and answered the following research questions:

1. What are the general perceptions of employers regarding technology graduates of HBCUs?

2. What effect does employer perceptions about technology graduates of HBCUs have on the employment opportunities of this population?

3. How can HBCUs influence employer perceptions of HBCU technology graduates to improve employment opportunities for this population?

This chapter presented the theoretical rationale for the use of Q methodology. This chapter also described this methodology including concourse theory, the Q sample, the P sample, the process of the Q investigation, and the manner in which the data was analyzed. Q methodology is a pattern of analytic research devised by Stephenson (1935). It enabled participants to express their viewpoints via a technique known as Q sorting. This chapter concluded with the selection of the participants and administration of the research instrument. The researcher chose this methodology as it measures the subjectivity of perceptions.

Research Design

The Q methodological approach provided an understanding of employer perceptions about technology graduates from HBCUs and the influence of those perceptions on employment opportunities for this population. Introduced in 1935 by

Stephenson, Q methodology is a research method with a proven history of illuminating agreement and differences among individual and group perceptions (Brown, 2004). In the study, Q methodology facilitated (a) the identification, understanding, and categorization of individual perceptions and opinions; and (b) the clustering of individuals into groups based upon those perceptions and opinions (McKeown & Thomas, 1988). According to McKeown, Hinks, Stowell-Smith, Mercer, and Forster (1999), Q methodology measures perception as it enables respondents to communicate viewpoints on any issue of subjective importance without being unduly constrained by views held by the researcher. Analyzing respondent perceptions in this manner will enable examination of individual perceptions drawn from personal experience.

According to Brown (2004), the valid utility of Q lies in the uncovering of the clusters of opinions and perceptions. Brown further asserted that, once identified, researchers might target clusters for further study. The methodology is a mixed-model approach that enables identification of individuals sharing common opinions. The use of Q methodology appears often in the following functions (Steelman & Maguire, 2004).

1. Identifying important internal and external circumstances,
2. Defining participant viewpoints and perceptions,
3. Providing sharper insight into preferred management directions,
4. Identifying criteria that are important to clusters of individuals,
5. Examining areas of friction, consensus, and conflict, and
6. Isolating gaps in shared understanding.

The purpose of the research was to determine employer perceptions of HBCU technology graduates and the impact of these perceptions on the employability of these graduates.

The application of Q methodology was to identify these perceptions, which included the following steps: (a) definition of the concourse, (b) development of the Q sample, (c) selection of the P set, (d) Q sorting, and (e) analysis and interpretation (van Exel & Graaf, 2005).

The first step of Q methodology is the concourse. According to Brown (1993a), this refers to "the flow of communicability surrounding any topic [in] the ordinary conversation, commentary, and disclosure of everyday life" (p. 91). In Q Methodology, the term concourse refers to the running together of ideas into thought. According to Brown (1993), this notion of a concourse is the "very stuff of life" (p. 95). A concourse may range in context from the dialogue of two philosophers discussing the meaning of life, to a group of friends reminiscing about the past, to a person dreaming private thoughts of the future. Brown (1993) captured the essence of a concourse:

> From concourse, new meanings arise, bright ideas are hatched, and discoveries are made: it is the wellspring of creativity and identity formation in individuals, groups, organizations, and nations, and it is Q methodology's task to reveal the inherent structure of a concourse, the vectors of thought that sustain it and in which, in turn, are sustained by it. (p. 95)

Collection of the concourse may follow many methods. This research employed study interviews to compile a verbal concourse, with subsequent identification of a representative sample of statements from the concourse. The research instrument known as the Q sort is one of the unique aspects of Q methodology. The study sample of respondents used a Q sort to rank order a Q sample extracted from the concourse. As opposed to other ranking exercises, it is usually distributed in a simulated normal curve, forcing participants to determine statements that reflect stronger and weaker associations. According to McKeown and Thomas (1988), Q samples may be ready-made or

naturalistic and structured or unstructured. Statements taken from respondents, whether oral or in writing, are considered to be naturalistic. Those derived from other sources are ready-made.

The study used a sample of statements derived from the oral responses and personal observations of the respondents. Unstructured samples included items relevant to the area of study without a theoretical base for item construction and without claim that all possible issues are covered. This approach provided a reasonably accurate portrayal of expressed positions, or those expressions that are likely for a given issue. Structured samples are more systematic than unstructured as they allow for theoretical testing. The study employed an unstructured sampling technique.

In an effort to get participants for this study, the researcher mailed 75 invitations to potential participants in the RTP area. Seven days after the invitations were mailed the researcher called every organization that was mailed an invitation to ensure that the invitation was received. After the phone calls were made to the potential participants the researcher mailed additional invitations to all employers that indicated that they had not received an invitation. Five days after the second mailing of invitations the researcher called and emailed the potential participants to confirm the receipt of the invitations. The researcher confirmed that six employers were willing to participate in the study.

The six employers participating in this research served as the P set for this study. Brown (1993a, 1993b) noted that most studies using Q methodology use several respondents; even studies of public opinion use P sets that rarely exceed 50 individuals. This study utilized a P set of six employers which is sufficient for utilizing Q methodology. McKeown and Thomas (1988) stated that the P sample can be selected

because of both theoretical and pragmatic considerations. Theoretical considerations are described as those criteria, which have specific relevance to the goals of the study while pragmatic considerations focus on the practicality of obtaining participants. Brown (1986) emphasized that the goal in selecting participants is to select participants from varied backgrounds and perspectives. The primary objective is to establish a sample of sufficient size to reveal a variety of existing views. The researcher recruited six hiring managers from organizations within the RTP. Q-sort methodology is suited for small samples and relies on theories in the domain area being under research to develop items for analysis (Hazari, 2005).

Mailed letters invited the appropriate organizational managers to participate in the study. During the Q-sorting process, employers contributed their perceptions of HBCU technology graduates. Participants received specific instructions directing them to rank order the statements along a defined continuum (McKeown & Thomas, 1988). The participants were free to place an item anywhere within the distribution; however, there were a number of items appropriate for each rank. Identification of the Q-sort continuum as *forced free* was due to the prescribed number of items within the sorting process; however, participants received the freedom to place any item in any position along the continuum.

Population Sample

The population sample of the study included hiring managers from corporations within the North Carolina RTP. These corporations represented a variety of industries and actively recruit technology graduates from HBCUs within a 100-mile radius of the RTP, consequently establishing proximity with both students and employers. Prior to

conducting the study, the researcher completed an Institutional Review Board application requesting permission to conduct the research. A signed consent enabled each participant to take part in study. The researcher of the study graduated from a historically black university and was a participant within the employer campus-recruitment process. The researcher has either personal knowledge of the curricula of the schools of technology and computer science within North Carolina universities or convenient access to that information.

Many large American corporations recruit at HBCUs each semester, as do government agencies. Selection of 15 employers located within the North Carolina RTP for participation in the research ensured manageability. The hiring managers for these organizations were the target population of this study. As mentioned earlier, Q methodology is suited for small samples and relies on theories in the domain area under research to develop items for analysis. According to Smith (2001), another advantage of Q methodology is that it does not require a large number of subjects since it can reveal a characteristic independently of the distribution of that characteristic relative to other characteristics. According to Singleton and Straits (2005), students that have a research topic that is appropriate for study with a brief survey or a small number of participants can use Q methodology.

Participating employers used a Q sort to rank order a Q sample extracted from the concourse. The participating employers were not familiar with Q methodology and the research was tasked with explaining the methodology to them. The researcher explained the instructions to all employers to ensure that the participants understood the instructions. Unstructured sample statements were included items relevant to the area of

study without a theoretical base for item construction and without claim that all possible issues are covered (McKeown & Thomas, 1988). The intention of this approach is to provide a reasonably accurate portrayal of expressed positions, or those expressions that are likely for a given issue. Structured samples are more systematic in that they allow for theory testing. The proposed research will employ an unstructured sampling technique.

Participating employers were asked to review the consent form and approve it by signature prior to rank ordering the Q-sort. This research only accepted participants that willingly volunteered to participate in the study and that agreed to sign the informed consent form. Participants who choose not to participate were in no way be penalized. Participants were informed of the confidentiality agreement between the researcher and the participants and that their anonymity was guaranteed. Participants were informed that individual responses would not be revealed to their organization or reflected in the finished study.

All persons involved in this study were treated in an ethical manner not only by respecting their decisions and protecting them from harm, but also by making efforts to secure their well-being. The researcher administered the Q-sort process. The researcher interviewed each participant at the completion of the Q-sort activity. According to Brown (1980), this discussion provided an opportunity to test some assumptions of the Q-sorting process. The researcher hoped to glean further information by asking the participants their thoughts while completing the Q-sort process. Participants' identity remains anonymous. The Q-sort forms did not require the participant to complete any demographic information such as name, ethnicity, Social Security number, date of birth, or gender. The researcher will maintain all research data for a period of seven years.

Instrumentation

The research presented a concourse of opinions and perceptions gathered through interviews, observation, and further analysis of the literature review presented in the proposal. The researcher followed all the requirements established by Walden University regarding the use of human beings in research. The researcher also secured letters of consent from the participants involved in the research.

Interviews are an effective method of gathering data. Therefore, to ensure data collection and that employers understood the research methodology, the researcher used personal interviews to gather employer perceptions. Subsequently, statements chose from the concourse, Q-sort, were rank ordered by six employers that agreed to participate in the research. Six employers agreed to participate in the research. The format of the interviews with the employers was semi structured. In either a structured or unstructured design, Q samples are not selected randomly but rather "compos[ed] artificially… achieved by applying Fisher's (1942) methods of experiment design (Stephenson, 1953, p. 66). Fisher experimental design permits the researcher to segment Q samples into relevant dimensions or effects, allowing the Q sample to take the form of table or a matrix.

The list of statements were developed by the researcher and completed by the employers. These statements were developed as the interviewer examined literature for this study. Information that did not emerge from the interviews came from the literature review. Thirty-two statements shaped the final list.

Score Sheet

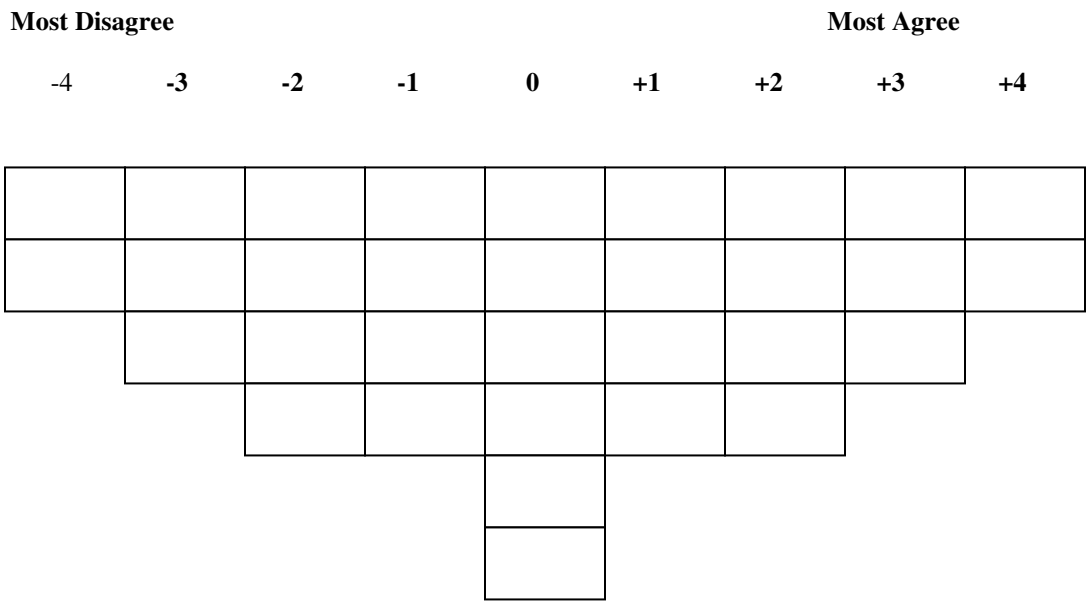

Figure 5

Validity and Reliability

Research using a survey instrument should address both validity and reliability. Reliability refers to the accuracy and precision of the instrument. A highly reliable instrument is free of random error and provides consistent results. A highly valid instrument measures no more and no less than what the researcher expects.

There are three types of instrument validity: a) content, b) criterion, and c) construct. Content validity is defined as the "degree to which the content of the items adequately in the universe of all things under study" (Cooper & Schindler, 2003, p. 232). A panel of field experts may evaluate this aspect of a survey instrument. Cooper and Schindler, (2003) defined criterion validity as the "degree to which a predictor is adequate in capturing the relevant aspects of criterion" (p. 232). This type of validity is determined through a statistically significant correlation between a criterion and a

measure. The sample used for this study might not lend itself to supporting predictive criterion validity; however, this is a fertile area for further research. According to Cooper and Schindler, (2003) construct validity is determined when the instrument is evaluated for its ability to measure a theoretical construct or trait.

Following Stephenson's (1953) suggestions for a Q-sort five experts in the field of Human Resources will be used to pilot test the survey instrument. Three primary areas will be addressed in the pilot study:

1. How much time it takes to complete the Q-sort.
2. To determine if there are any statements that cause confusion or if there are any statement that could be misunderstood.
3. Assure that the Q-sort items receive a range of responses.

At the completion of the pilot study, if there are any changes to be made, the researcher will make them at that time.

Data Analysis

The correlation and factor analysis of rankings upon completion of the data collection process will determine opinion groupings. In 1988, McKeown and Thomas described data analysis in Q methodology as the involvement of sequential application of three sets of statistical procedures. These three sets are correlation, factor analysis, and the computation of factor scores. Stephenson (1935) referred to this process as an "interdependency analysis" because any independent variable is reliant upon a dependent variable (p. 34). The PQMethod 2.11 software program will enable entry of the data in the form collected, leading to computation and factor analysis of the correlations among the sorts.

In Q methodology correlation has a different emphasis than in quantitative methodological research. According to Crowl (1993), correlation is determined by statistically calculating the degree of relationship between two variables, in this case people's perspectives. The range of correlations is from +1 (perfect positive correlation) to -1 (perfect negative correlation). S.R. Brown (1980, 1993), and McKeown and Thomas (1988) emphasized that when using Q methodology the correlation of various participants' perspectives is the focus, not the correlation of test items or traits. When using Q methodology, when a positive correlation is discovered it indicates the level of agreement, and when a negative correlation is discovered it indicates the level of disagreement between the participants' perspectives on the items they sort. According to Brown (1993), each Q sort is the viewpoint of a research participant; the correlational coefficients divulge the similarity of the participants' point of view.

Factor analysis, the second step of the analysis of a Q design, is "fundamental to Q methodology since it comprises the statistical means by which subjects are grouped-or, more accurately, group themselves through the process of Q-sorting" (McKeown & Thomas, 1988, p. 49). The process of Q methodology factorial analysis involves the study of correlations between all person-samples computed across all factors, as the basis of Q factors is individuals rather than tests. This analysis will reduce the data into several perspectives held in collective or individually by the participants. A factor score is the score for a statement as a type of average of the scores given that statement by all of the Q-sorts associated with the factor" (Brown, 1993, p. 18).

Factor analysis using the Centroid approach with varimax rotation will identify common themes among participant viewpoints. This is the most frequently used method

of data analysis. It allows a change in the vantage point from which all data are viewed (McKeown & Thomas, 1988). Analytical or judgmental rotation of resulting factors occurs with the help of two-dimensional plots. According to van Exel and Graaf (2005), a judgmental rotation looks for confirmation of an idea of theory, and a theoretical rotation identifies an acceptable vantage point by statistical criteria. The researchers also indicate that rotation does not affect the consistency in sentiment throughout individual Q sorts or the relationships between Q sorts; it only shifts the observational perspective.

McKeown and Thomas (1988) described factor loadings as how each Q sort is associated with the factors that emerge during the factor analysis. Factors represent points of view and how the respondents' point of view or sorting is expressed on the factor in comparison to the sortings of other individuals. Each respondent's factor loading noted will note the amount of similarity between the Q sort of the individual and the composite Q sort factor. If an individual has a positive loading on a factor then there is common subjectivity with others on the factor.

Brown (1980) indicated that factor is the next step in order to perform interpretation. When numerous participants load on a factor, the individuals Q sorts will merge together and the outcomes will be representative of the perspectives of the participants on the factor. McKeown and Thomas (1988) indicate that the factor array is a model Q sort for each factor. In addition, they mentioned that factor scores obtained from weights and presented as z scores are changed into whole numbers based on the position of the z scores in the factor array. This statistical step will enable the researcher to analyze the differences in placements of Q sample statements for the participants defining

the different factors. Factor scoring will be performed to improve the factor interpretation.

Upon completion of the factor analysis, factor rotation, loading, and scoring the results will be interpreted. Brown (1980) stressed that no matter how many factors emerge in the process there will always be some points of commonalties and differences. When commonalities and differences are found the researcher will interpret them based on theoretical construct of the factors. When using Q methodology, S.R. Brown (1986), states that the researcher will do the interpretation only after the Q sorting, correlation, factor analysis, rotation, loading, and scoring has been conducted. Brown indicated that the order of the items is extremely important and comes before meaning. Brown continues by stating that the meaning is not determined "a priori," but ultimately originates from the participants' points of view. Items t rated as high and low as well as those items that differentiate one group from another will be featured in the interpretation.

This study utilized Q-Methodology as a reliable research method to address perceived employer discrimination against technology graduates from HBCUs. This research methodology identified employer attitudes, beliefs, and perceptions toward these graduates. Q Methodology enabled the researcher to transfer employer beliefs, attitudes, and perceptions into information that employers and HBCUs can use to develop collaborative recruiting strategies and policies. This research method is unique because it combines the strengths of qualitative and quantitative research traditions and provides individuals the opportunity to share their attitudes, beliefs and perceptions subjectively through rank ordering of statements. The findings of this Q-methodological research

provided subjective views of how employers perceive technology graduates from HBCUs.

Summary

Using Q methodology, the study identified employer perceptions of HBCU technology graduates, and the impact of those perceptions on employability of the graduates. Following concourse development, and extraction of the Q-sort from the concourse, the participating employers rank ordered the statements from the concourse. This ordering provided the data needed to measure employer perceptions. The three-step statistical analysis process of correlation, factor analysis, and factor scores assisted in the development of the theoretical operant types of groups in the subjective study. The basis for the subjective study is perceptions and the identification of subjective operant behavior and responses of participants with expressed personal opinions, rather than testing a predetermined trait or testing hypothesis. This approach helped employers and HBCUs understand how perceptions affect hiring decisions. The researcher selected Q methodology to perform this research as it measures the subjectivity of perceptions.

CHAPTER 4: RESULTS

Introduction

Q methodology is a means to uncover types of like-minded individuals who see an issue of concern in similar ways. According to Brown (1995) there is not other method or theory which matches Q methodology's versatility or reach. Q methodology respects the integrity of the participants as results can be recorded anonymously and factorial results cannot be predicted. Conversely, this methodology provided distinct contrasts between the types of people with respect to the issue under study. This research revealed employer perceptions of technology graduates from Historically Black Colleges and Universities.

The objectives of this study were to answer the following research questions:

1. What are the general perceptions of employers regarding technology graduates of HBCUs?

2. Why is it important to understand employer perceptions of HBCU technology graduates?

3. How can HBCUs influence employer perceptions of HBCU technology graduates to improve employment opportunities for this population?

Q methodology was employed to ascertain and discover employer perceptions. The statistical analysis of Q methodology involved a three-step process of correlation, factor analysis, and examination of the scores obtained from the factor analysis (McKeown & Thomas, 1988). This chapter contains the demographic information and provides a detailed discussion of the correlation and factor analysis of the Q sorts using the PQMethod 2.11 programs (Schmolck, 2002).

Participant Information

As described in the procedure of the previous chapter the researcher targeted fifteen organizations within RTP to participate in this research. In an effort to secure participants, the researcher mailed 75 invitations and followed up with 75 calls to secure the participants. Of the 75 invitations mailed, only six organizations agreed to participate in the research. Three of the hiring managers that participated in the study were female (50%) and three were male (50%).

The participants came from a variety of industries. Industries represented in this research include the insurance industry, the educational assessment industry, and the local government. The participants were from both the public and private sector. All participants were familiar with HBCUs.

Table 1

Demographic Characteristics of Participants

Variable	*f*	%
Sex		
Male	3	50%
Female	3	50%
Race		
African American	5	83.3%
Caucasian	1	16.7
Industry		
City Government	2	33%
County Government	1	16.7
Insurance	2	33%
Education Assessment	1	16.7
Education		
HBCU Graduate	4	67%
Non-HBCU Graduate	2	33%

Correlation Matrix

The first step of the statistical analysis for Q methodology is correlation. In the correlation matrix each statement of the Q sort has been placed in one column along the "least agree" to "most agree" continuum. The correlation matrix shows the extent to which employer perceptions about HBCU technology graduates were similar or different. The correlation matrix displays the level of agreement or disagreement among all participants. Q sorts were correlated producing a 6 x 6 matrix (see Appendix E). This matrix numerically encapsulates the various ways in which each of the six participants subjectively arranged the Q sort items to produce an individualistic viewpoint about technology graduates from HBCUs. These calculations for obtaining correlation matrixes from Q sorts were obtained by use of the computer software program PQMethod 2.11 (Schmolock, 2002).

The correlations obtained between this step ranged from -1 to + 1. Brown (1999) stated that correlations of zero would indicate there is no relationship between the sorts, whereas a -1 means two sorts are completely opposite (perfect negative relationship), and a +1 indicates an exact match (perfect positive relationship). The resultant matrix exhibits only numeric representations of comparable or opposing subjective responses obtained from the P-samples. As Brown (1993) commented, the correlation matrix "is simply a necessary way station and a condition through which the data must pass on the way to revealing their factor structure." (p. 13).

The second step in the correlation process was to qualify the significance level of a correlation value. For this research, which employed 32 statements, the standard error (*SE*) was 1/v32 = 0.18. To achieve 99% ($p<.01$) utilization the correlation coefficients,

the result would have to be 2.58(SE) = 2.58(.18) = .464. To achieve 95 % (p<.5) utilization of the correlation coefficients, the result would be 1.96(SE) =1.96(.18) =3.53. Brown (1993) indicated that correlations that are 2 to 2.5 times the SE might be considered statistically significant.

Factor Analysis

The correlation of sorts led directly to the factor-analysis process in order to determine the number of factors or communalities represented among the Q sorts. Using the correlation matrix, factor analysis established the manner in which individual sorts were correlated with each other, as determined by the way the 32 statements or variables were sorted by the P-sample. The correlation analysis preliminarily created a matrix of the number of participants correlated to the number of Q sorts. Factor analysis produced a "matrix *m* X *N,* where *m* indicates the number of underlying dimensions on which the *N* traits cluster together" (McKeown & Thomas, 1988 p. 47). Those sorts that exhibited high correspondence to each other were clustered into a factor together, and others that were uncorrelated to that feature became associated with a separate factor.

This task was performed using the principal components method of factor analysis of the PQMethod 2.11 (Schmolock, 2002) computer program. The unrotated factor-loading matrix (see Appendix F) displays a record of every participant across a six principal components or factors. The first factor displayed the largest percent variance (3%), and other unrelated components comprised the following different factors, each factor accounting for as much of the variance as possible.

To determine the number of factors to analyze in the current study, the researcher followed the recommendation of Brown (1980) and McKeown and Thomas (1988) to use

factors with eigenvalues that are 1.00 or larger. Eigenvalues are an expression of the amount of variance for each factor; thus, eigenvalues below 1.00 supply inconclusive theoretical values. The PQMethod program identified one factor with an eigenvalue greater than 1.00 in this research (see Appendix F).

Each of the 32 statements of the Q sort must attach significantly to the factor that was identified. Factors that become apparent in this type of process are tested for independence to that factor and must reject the alternative hypothesis of the other factors (Triola, 2001). Brown (1999) posited, "In the overwhelming number of cases unrotated loadings do not give the best view of what is transpiring; it is typically the case, therefore, that the unrotated factor loadings are superseded by an alternative set of loadings which give a more focused view" (p.616).

The varimax rotation of orthogonal rotation was chosen to produce a "simple structure" (McKeown & Thomas, 1988, p. 52) by which each participant's Q sort responses were maximized on the strongest factors according to their subjective perception. The PQMethod 2.11 (Schmolock, 2002) automatically selects any Q sort that explains more than half the common variance at the significance level of $p < .05$. A three, four, five, or six factor varimax rotation of the data utilizing the PQMethod 2.11 computer program will extrapolate the Q sort information into separate factors. Additionally, each factor solution was automatically flagged by the software for a maximum statistical significant representation ($p < .01$). In order to probe and determine the optimal representation of factors, it was determined that an individual analysis of the data would be performed.

It was determined that the two identified factors explained 62% of the variance. The two factors were verified with both a scree test and visual analysis of the data. Each of these factors had at least two participants to adequately characterize a factor (see Table 1). Having fewer factors strengthens the remaining factors and the numbers of Q sorts loaded on these factors (Brown, 1980). Furthermore, it was decided to utilize the programmed automatic Q sort from PQMethod 2.11, which flags a Q sort if it is significant on only one factor. According to Stephenson (1953), these factors represent authentic "hypothetical" cases, by which "results may make their empirical appearances" (p.179).

Participants loading on the same factor shared similar perceptions or opinions. A factor score is the score for a statement as a type of average of the scores given that statement by all of the Q sorts associated with each factor (Brown, 1993, p.18). Each factor also reflects significant differences in opinions. Table 2 presents the correlations between the two factor scores indicating that some participants loaded significantly on more than one factor. Similarities and differences were discussed below. The number of individual Q sorts for each factor is listed in Table 2.

Table 2

*Rotated Factor Loading Matrix an X or * Indicating a Defining Sort*

	Loadings	
Q Sort No.	1	2
1	0.3131	0.4959
2	0.7948X	0.0251
3	0.8648X	0.2293
4	0.0204	0.8376X
5	0.2072	0.6204X
6	-0.8648X	-0.2293

Eigenvalue	3.0010	0.9152
% of Total variance explained	38	24

Note. X indicates PQMethod 2.11 significant loadings (p <.05),

Table 3

Correlations Between Factor Scores

Factors	1	2
1	1.0000	0.2853
2	0.2853	1.0000
No. selected	3	2

In summary, the ranking of Q sort concerning the employer perceptions of technology graduates from HBCUs resulted from the six participants' thoughts and experiences. The factors are a reflection of feasible combinations of similar perceptions among the participating employers. "The factors are a function of the experiences of employers, and they are purely inductive in the sense that their number and character have been induced from those individuals who produced them" (Brown, 1999, p. 619).

Factor Scores

The analysis of factors in Q methodology is based on factor score (Stephenson, 1953). The factor score created a "factor array" (McKeown & Thomas, 1988, p.53) that was computed for every statement in all factors. This process was performed using the PQMethod 2.11 (Schmlock, 2002) program. First, a "factor weight (Brown, 1980, p. 240) was calculated for the factors. Then, the factor array was produced by choosing statistically significant variables that are exclusively loaded on specific Q sorts and amalgamating them.

Factor scores, which are a kind of average of the score given to a statement by all of the Q sorts associated with the factor, are first presented as z scores in the computer program by which it is possible to make "direct comparison" with scores for the same statement" (Brown, 1980, p.243) across all factors. Table 4 shows factor loadings in z scores for each of the 32 Q-sort items. Next, the Z scores were converted to whole numbers based on the number continuum of -4 to +4 as offered in this study. This process of assigning values and ranks to the scores permitted the researcher to make distinctions between similarities and differences of statements in order to discover Q-sorts that were significant employer perceptions in each factor. Appendix K illustrates the z score values combined with the individual ranking of each Q-sort statement for all factors.

Before analyzing the distinguishing statements attributed to a factor, reliability was addressed. Table 5 illustrates the association of the factor characteristics for each of the factors and cites the number of significant Q sorts that are contained in that factor. It also indicated the average reliability coefficient for each factor. Brown (1980) verified that reliability for operant subjective responses of individual perceptions of the participants ranges from 0.80 upward.

Table 5 contains the composite reliability and the standard error of factors scores for Factor 1 and Factor 2. In Table 5 Factor 1 has a composite reliability of .923 and a standard error of .277. The composite reliability is significant in that it serves as an index of how much confidence can be placed in this factor. Further, a high composite reliability reading provides a clearer point of view which that factor represents (Brown, 2000). Factor 2 in Table 5 has a composite reliability of .889 and a standard error of .333. This

factor is not as reliable as Factor 1 however, it still provided good basis for examining employer subjectivity about HBCU technology graduates.

Table 4

Q-Sort Item Descriptions in Z Scores by Normalized Factor Scores

	Factors	
Q-sort item no.	1	2
1	**1.187**	0.980
2	-*1.055*	0.100
3	**1.771**	**1.470**
4	0.358	0.230
5	-0.584	0.720
6	0.942	**1.440**
7	-0.829	-0.160
8	-0.358	-0.030
9	**1.167**	-0.980
10	-0.809	**1.470**
11	-*1.300*	**1.470**
12	-*1.525*	0.000
13	**1.187**	0.000
14	0.000	0.000
15	**1.055**	-0.490
16	-0.338	-0.490
17	0.471	-0.490
18	-0.471	-0.980
19	-0.113	-*1.470*
20	-0.113	-*1.470*
21	**1.413**	0.980
22	0.942	0.980
23	-0.338	0.000
24	0.000	-0.590
25	-*1.433*	-*1.960*
26	0.942	0.520
27	-0.849	-0.980
28	0.584	-0.230
29	**1.884**	**1.960**
30	-*1.658*	-0.950
31	-0.716	0.260
32	0.471	-*1.309*

Note. All factor arrays have an identical mean of 0 and standard deviation of 1.00.

Bolded *z* scores indicate the top items or preferences for each factor.
Underlined/italicized *z* scores show lower preferences among factors.

Table 5

Factor Characteristics

	Factor	
Characteristics	1	2
No. of defining variables	3	2
Average reliability coefficient	0.800	0.800
Composite reliability	0.923	0.889
SE of factor scores	0.277	0.333

Note: The standard error of factor scores indicates factor reliability for the Q sorts represented in each factor.

Determining whether two factors are significantly different from one another involves the standard error of difference (SED) between the normalized factor scores. Table 6 illustrates the relationship of the SED for each of the three factors.

Table 6

Standard Errors for Difference in Normalized Factor Scores

Factors	1	2
1	0.392	0.434
2	0.434	0.471

Note Diagonal entries represent error of difference within factors.

The relationship between the factors showing the descending array of differences are exhibited in Appendix H. Appendix I displays the factor Q-sort values for each of the 32 statements (+4 to -4) for each of the factors. With the relationship between the factors established, the next step in Q methodology was to address the actual factors by examining the findings of the similarities and differences of each factor.

Factor 1

The highest explained variance (38%) in this study of employer perceptions of technology graduates from HBCUs was Factor 1. Three of the 6 participants performed a Q sort equal to or greater than the correlation coefficient level of 0.353 ($p < .05$). Twelve of the 14 statements identified with this factor were significant at $p < .01$. Statements that were distinguishing for Factor 1 are shown in Table 7.

Table 7

Distinguishing Statement for Factor 1

No.	Statement	Rank	Score
13.	My company believes that HBCU grads possess the fundamentals	3	1.19*
9.	My company values HBCU tech grads	2	1.17*
15.	HBCU grads excel at my company	2	1.05*
17.	HBCUs have rigorous academic curriculums	1	0.47
32.	HBCU tech grads are not technically savvy	1	0.47*
19.	Grade inflation helps HBCU tech grads	0	-0.11*
20.	HBCUs provide inferior education	0	-0.11*
5.	HBCU tech grads are not critical thinkers	-1	-0.58*
31.	Top tech grads are not prepared at HBCUs	-1	-0.72
10.	My corporation does not recruit at HBCUs	-2	-0.81*
6.	HBCU tech grads are not analytical	-2	-0.94*
2.	HBCUs are diploma mills	-3	-1.05*
11.	My corporation cannot find qualified HBCUs	-3	-1.30*
12.	My corporation visits HBCU campuses for PR	-4	-1.53*

Note. Both the factor Q-sort value and the normalized scores are shown. * $p < .05$ ** $p < .01$

Of the three statements that were ranked +3 or +2, all were related to positive employer perceptions of HBCUs and HBCU technology graduates. Those statements that ranked -2, -3, and -4 related to negative employer perceptions of HBCUs and HBCU technology graduates. Further analysis of these perceptions is explained in detail in Chapter 5.

Factor 2

Factor 2 accounted for 24% of the explained variance in this study. Three of six participants performed a Q sort equal to or greater than the correlation coefficient level of 0,353 ($p < .05$). There were no distinguishing statements for Factor 2 at $p < .05$ or $p < .01$. Statements for Factor 2 are displayed in Table 7. Further analysis and discussion of this factor is in Chapter 5.

Table 8

Distinguishing Statements for Factor 2

No.	Statement	Rank	Score
13.	My company believes HBCU grads possess fundamentals	0	0.00
9.	My corporation values HBCU tech grads	-3	-0.98
15.	HBCU grads excel at my company	-1	-0.49
17.	HBCUs have rigorous academic curriculums	-1	-0.49
32.	HBCU tech grads are not technically savvy	-3	-1.31
19.	Grade inflation helps HBCU tech grads	-4	-1.47
20.	HBCUs provide inferior education	-4	-1.47
5.	HBCU technology grads are not critical thinkers	2	0.72
31.	Top tech grads are not prepared at HBCUs	1	0.26
10.	My corporation does not recruit at HBCUs	3	1.47
6.	HBCU technology grads are not analytical	3	1.44
2.	HBCUs are diploma mills	1	0.10
11.	My corporation cannot find qualified HBCU grads	3	1.47
12.	My corporation only visits HBCUs for PR	0	0.00

Note. Both the factor Q-sort and the normalized score are show.

Consensus Statements

Q-sort items that provided a consensus of statements for any factor at either 0.01 or .05 levels are listed in Table 8. Consensus statements represented Q-sort items with which the participants in both factors either agreed or disagreed.

Table 9

Consensus Statements: Those That Do not Distinguish Between the Two Factors

	Factors			
Statement No.	1		2	
	Rank	Score	Rank	Score
1*	3	1.19	2	0.98
3*	4	1.77	3	1.47
4*	1	0.36	1	0.23
7*	-2	-0.83	0	-0.16
8*	-1	-0.36	0	-0.03
14*	0	0.00	0	0.00
16*	0	-0.34	-1	-0.49
17	1	0.47	-1	-0.49
18*	-1	-0.47	-3	-0.98
21*	3	1.41	2	0.98
22*	2	0.94	2	0.98
23*	0	-0.34	0	0.00
24*	0	0.00	-2	-0.59
25*	-3	-1.43	-4	-1.96
26*	2	0.94	1	0.52
27*	-2	-0.85	-3	-0.98
28*	1	0.58	-1	-0.23
29*	4	1.88	4	1.96
30*	-4	1.66	-2	0.95
31	-1	-0.72	1	0.26

Note. All listed statements are non-significant at $p > .01$ and those flagged with an * are also non-significant at $p > .05$.

All 20 statements were non-significant. These consensus statements may not provide information that is unique to the three factors of this study; however, a deeper meaning of value for these statements is discussed in chapter 5.

The results from this study show that employers perceive HBCU technology graduates in a positive manner. Employers perceive these graduates as having received a quality education from quality institutions. HBCU technology graduates are also perceived as being intelligent and possessing the necessary skills to succeed in the corporate workplace even though employers have positive perceptions of HBCU technology graduates, they perceive that these graduates do not have the same employment opportunities as their peers at non-HBCUs. This research does not explain why employers do not recruit at HBCUs more often given their positive perceptions of these graduates.

Data Triangulation

To ensure the validity of this study the researcher gathered data from the Career Counseling Placement Centers from two HBCUs and two nonHBCUs in the RTP area. The purpose of gathering this data was to determine if companies that recruited at the nonHBCUs also recruited at the HBCUs. The researcher was also interested in determining if the employment opportunities were consistent for nonHBCU technology and HBCU technology graduates. This data triangulation provided further insight into employer perceptions technology graduates from HBCUs.

The researcher examined a list of 276 employers that recruited at the two nonHBCUs and the two HBCUs. A comparison of the list of employers provided insight into which employers recruited at which schools. The researcher also interviewed the

Directors of the Career Services Centers to gain further insight into how the Directors think employers perceive their technology graduates. From the list of 276 employers only 43 employers recruited at both the nonHBCUs and the HBCUs. Of the 43 employers recruiting at both types of institutions 30 were specifically recruiting technology graduates.

The researcher contacted the Directors of the Career Services Centers to find out what percentages of employer's were serious about hiring technology graduates from the universities. The Directors of the nonHBCU centers indicated that 100% of employers recruiting at their university are serious about hiring their technology graduates. In contrast, Directors at the HBCU indicated that 67% of employers recruiting at their university were serious about hiring their technology graduates. They further posited that 33% of the employers are there just for public relations. When asked if employers extend that same type of employment opportunities to HBCU technology graduates as they extend to nonHBCU technology graduates Directors from both HBCUs and nonHBCUs agreed that more opportunities are extended to nonHBCU technology graduates that HBCU technology graduates. Both sets of Directors indicated that discrepancies in salary offers to HBCU and nonHBCU technology graduates also exist.

Summary

This chapter presented analysis of the data for this research to identify employer perceptions of technology graduates from HBCUs. Q methodology was used for this purpose. The correlation between sorts was examined and factor analyses were explained. The principal component factor analysis was employed to interpret the participant Q sorts.

The varimax rotation of the two-factor solution accounted for 62% of the total explained variance. Factor loadings, which provide evidence of the extent to which a Q sort is related or unrelated, were observed. Significant factor loading were calculated. Q sorts that were significant to a factor were chosen to represent theoretical factors. In addition, z scores for each of the sorts permitted the researcher to make further comparisons among the factors.

Resultant statements that characterized the majority perceptions of employers provided a suitable example for each of the factors that were affirmed. These statements were displayed with their relative significance show that employers perceive HBCU technology as having received a quality education and possessing the necessary skills to succeed in the workplace. Each statement and its significance or lack thereof identified employer perceptions of HBCU technology graduates. Distinguishing statements were also identified and provide insight into how employers perceive technology graduates from HBCUs.

Each of the factors identified in the research represented employer perceptions of technology graduates from HBCUs. Conclusions concerning these perceptions and a discussion of these results follow in Chapter 5.

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of the research was to determine employer perceptions of technology graduates from HBCUs, and how those perceptions impacted the employability of HBCU technology graduates. This topic has yet to receive thorough attention in the literature. While research considers bias and discrimination frequently and continuously, minimal research exists on discrimination against African Americans specifically within the field of technology.

Chapter 4 presented the study's results. These results were based on employers rank ordering the Q sort and the PQMethod software analyzing the ranking.
Chapter 5 analyzes these results as they pertain to the research questions. In addition, chapter 5 discusses the statistical results' significance, provides ways to address the study's research topic of employer perceptions of technology graduates from HBCUs and discusses other areas of further research that could glean a better understanding of this research issue. The conclusions in this chapter are drawn from the research literature of chapter 2 and the statistical results presented in chapter 4. Finally, the conclusions and recommendations discussed in this chapter will be provided to HBCUs and employers so that both parties can gain a deeper understanding of employer perceptions of technology graduates from HBCUs. Recommendations will also include strategies for positive social change with the aim to create a dialogue between employers and HBCUs to dispel negative perceptions of HBCU technology graduates resulting in improved employment opportunities for this population.

Factor Interpretation

Although the responses are subjective, "the factors are grounded in concrete behavior… [and] are subject to statistical summary, which facilitates more careful description and comparison" (Brown, 1980, p. 6).

The two factors were named according to employer perceptions of HBCU technology graduates and the unique distinguishing characteristics displayed in their Q sort: (a) HBCU Quality Basic Education and (b) HBCU Needs Education. Each factor portrays a consensus perception of the participants as they completed the Q sort, allowing each factor to "represent a version of the world that is commonly held and which speaks to us through the unison of the factor scores" (Brown, 1993, p.22). Appendix J lists all the Q sort values for each of the individual statements with each factor. The distinguishing statements reiterated in the discussion below were presented as a group in the reporting of the results in Chapter 4.

Factor 1: HBCU Quality Basic Education

Factor 1 employers, identified as HBCU Quality Basic Education, defined themselves by their individual affirmative feelings toward HBCU technology graduates. Factor 1 accounted for 38% of the total variance. Of the 32 Q-sort items, 12 were significant at Factor 1. Characteristic statements for the Factors 1 that were ranked +3 and +4 (see Appendix I) in Q sort Factor 1 employers indicating assenting perceptions toward HBCU technology graduates. The agreement statements are in Table 8.

Table 10

Factor 1: HBCU Quality Basic Education Agreement Statements

Item no.	Statement	Rank Score
3	HBCUs are quality institutions	+4
29	HBCU grads need mentors to succeed	+4
1	HBCUs provide educational opportunities to the disadvantaged	+3
13	My company believes that HBCU grad possess the fundamentals	+3
21	Technology graduates from HBCUs are intelligent	+3

Agreement with statements such as these indicates that employers in Factor 1 perceive HBCUs to have some value as institutions and provide some quality of education. Employers in Factors 1 also perceived HBCU technology graduates to be intelligent but need mentors to ensure their success in the corporate world. While employers perceived HBCUs as universities that provide educational opportunities to the disadvantaged, they also perceive technology graduates produced at these institutions as possessing the necessary fundamentals when they enter the workforce. Employer agreement on these statements may enable dialogue between employers and HBCUs to improve employment opportunities for technology graduates from these institutions.

Factor 1 employers who perceived HBCU technology graduates as receiving a quality education also ranked the following specific statements as less true in Table 10 (see Appendix I).

Table 11

Factor 1: HBCU Quality Basic Education, Disagreement Statements

Item no.	Statement	Rank Score
12	My corporation only visits HBCU campuses for PR	-4
30	HBCU tech grads have the same employment opportunities as others	-4
2	HBCUs are diploma mills	-3
11	My corporation cannot find qualified HBCU tech grads	-3
25	HBCUs are not longer needed	-3

These statements, ranked by Factor 1 employers, illustrate the employer disagreement about the statements. Based on these statements employers do not perceive HBCUs as diploma mills nor do they believe that HBCUs should be closed. Employers have indicated that they visit HBCUs campuses for more than just public relations and that they perceive HBCUs technology graduates to be qualified for the positions for which they are recruiting, however employers do not perceive that HBCU technology graduates have the same employment opportunities as graduates from non-HBCU institutions.

Distinguishing statements for employer Factor 1 loadings were ranked significantly ($p < .01$) differently from Factor 2. The distinguishing statements for this factor are listed in Table 8 of Chapter 4. The statements, as discussed above, plus the following distinguishing items provided support for how employers perceive HBCU technology graduates. Two of these statements have been further analyzed below.

For example (see Table 8), employers ranked Item 9, my corporation values HBCU technology graduates, +2. Employers also ranked Item 15; HBCU graduates excel at my company, +2. Again, these statements, although not placed in the highest column

of the Q sort represent employers positive perception of HBCU technology graduates. Factor 2 loadings have been examined below.

Factor 2 was identified as HBCU Needs Education. Factor 2 accounted 24% of the total variance. Of the 32 Q-sort statements, twelve were significant for Factor 2. Table 12 below characterizes statements that were ranked +3 and +4. See the assessing statements below.

Table 12

Factor 2 HBCU Needs Education: Agreement Statements

Item no. Score,	Statement	Rank
29	HBCU graduates need mentors to succeed	+4
3	HBCUs are quality institutions	+3
6	HBCU technology graduates are not analytical	+3
10	My corporation does not recruit at HBCUs	+3
11	My corporation cannot find qualified HBCU graduates	+3

These statements, although similar to the Factor 1 statements indicate that employers perceive HBCUs to be quality institutions and believe that with mentors these graduates can succeed in the corporate world. However, employers' perceptions also indicate that employers do not perceive HBCU technology graduates as being analytical nor do employers believe that they can find qualified technology graduates from HBCUs.

Factor 2 disagreement statements are displayed in Table 11. Employers disagreed with these statements. These statements characterize employers' perceptions of HBCU technology graduates and were ranked -3 and -4. See the assessing statements below.

Table 13

Factor 2 HBCU Needs Education: Disagreement Statements

Item no.	Statement	Rank Score
25	HBCUs are no longer needed	-4
19	Grade inflation helps technology graduates	-4
20	HBCUs provide inferior education	-4
18	Anyone can make good grades at HBCUs	-3
27	HBCU graduates do not understand corporate politics	-3
9	My corporation values HBCU technology graduates	-3
32	HBCU technology graduates are not technically savvy	-3

These rankings indicate that employers disagreed with these statements. Employers perceive technology graduates as being technically savvy, having value for the organizations in which they are employed, and recipients of good grades. Employers perceive that there is a need for HBCUs and that HBCUs do not provide inferior education to it student population.

In summary, the employers ranked Q sort that they perceive HBCUs to be quality institutions and technology graduates from HBCUs to have received a quality education. The employers have ranked Factor 1 and Factor 2 similarly. These rankings indicate that employers perceive HBCUs and the technology graduates positively. The researcher also reviewed the statements in which the employers were in consensus.

Consensus Statements

Twenty statements of the Q-sort items presented to the employers did not differentiate significantly between the two factors (see Table 12). This does not mean that these consensus statements are not important but rather indicates that a more extensive meaning must be explored. Examination of the Q rankings across both factors for this study revealed two groups, as shown in Table 13. In order for a statement to be

significant for a factor, it is isolated to one factor array in relation to the other factor at $p < .05$. Thus, a normal distribution pattern would have less than a 5% chance that a Q sort item would be located on one factor in the same way in which it appeared for the other factor.

Table 14

Consensus Statements

		Factors	
		1	2
Item no.	Statement	Rank Score	
1	HBCUs provide educational opportunities for the disadvantaged	3	2
3	HBCUs are quality institutions	4	3
4	HBCUs are poorly managed institutions	1	1
7	HBCU technology graduates are not able to apply knowledge	-2	0
8	HBCU technology grads only know the basics	-1	0
14	My company has to spend more time training HBCU grads	0	0
16	HBCUs do not prepare grads to be corporate leaders	0	-1
17	HBCUs have rigorous academic curriculums	1	1
18	Anyone can make good grades at HBCUs	-1	-3
21	Technology graduates are intelligent	3	2
22	HBCU technology graduates have adequate skills	2	2
23	Instructors at HBCUs do not have updated skills	0	0
24	HBCU graduates have inflated skills	0	-2
25	HBCUs are no longer needed	-3	-4
26	HBCUs prepare technology leaders	2	1
27	HBCUs do not understand corporate politics	-2	-3
28	HBCUs only understand diversity from an African American persp	1	-1
29	HBCU graduates need mentors to succeed	4	4
30	HBCU technology graduates have the same employment opportu	-4	-2
31	Top technology graduates are not prepared at HBCUs	-1	1

Note: All statements are nonsignificant

Brief Overview of Statistical Results Research Questions

In Q methodology, the response to the research questions requires an in depth examination of the factors. Information used to interpret the factors includes the factor arrays produced by rank ordering the statements according to z scores and examination of

the distinguishing statements for each factor. The following research questions guided this study:

1. What are the general perceptions of employers regarding technology graduates of HBCUs.

2. Why is it important to understand employer perceptions of HBCU technology graduates?

3. How can HBCUs influence employer perceptions of HBCU technology graduates to improve employment opportunities for this population.

Of special interest in answering these research questions are statements 1, 3, 21, 29, and 30 in Table 12, which ranked as the stronger of the two factors.

Research Question 1

The statistical results for this research question provide insight into the general perceptions of employers regarding technology graduates from HBCUs. The results indicate that employers perceive HBCU technology graduates as intelligent however; these students need mentors to succeed in the corporate world. Statement 30 is particularly interesting because employers perceive that HBCU technology graduates do not have the same employment opportunities as their peers at non-HBCUs.

Generally, employers perceived HBCUs as being institutions that provide opportunities for disadvantaged students who may not be able to attend other universities and have indicated that these institutions provide quality instruction to these students.

Research Question 2

The second research question inquired into understanding the importance of employer perceptions of HBCU technology graduates. Results show that employer

perceptions of HBCU technology graduates are positive however they do not explain why they do not recruit at HBCU more often. Employers agree that these graduates are intelligent and have received a quality education from quality institutions but hiring and recruiting practices are contradictory to what the results show. These results illustrate employer perceptions of these graduates however further insight is needed to understand why employers perceive HBCU technology graduates positively but do not recruit them on a regular basis.

Research Question 3

The study's final research question inquired into how HBCUs can influence employer perceptions of HBCU technology graduates to improve employment opportunities of this population. Results indicate that employers perceive these graduates to be intelligent, to have received a quality education from quality institutions; however, employers also indicate that HBCU technology graduates do not have the same employment opportunities as their peers from non-HBCUs. The results show that employers view these graduates and these institutions in a favorable light.

Recommendation for Action

In view of these observations, these recommendations became apparent:

1. Employer's diversity goals should be realized by recruiting and hiring qualified HBCU technology graduates.

2. Upon employment, employers should assign mentors to HBCU technology graduates.

3. HBCUs should task their career placement centers to develop measurable strategies and goals to attract more employers to recruit technology graduates.

4. HBCU career placement centers should track all technology graduates that received job offers and the companies that made the offers.

5. Employers should hire a consultant to examine their perceptions prior to recruiting at HBCUs. This will enable employers to objectively recruit technology graduates at HBCUs.

Limitations

The present study extends our understanding of employer perceptions toward HBCU technology graduates. However, this study has several limitations.

1. This study was centered on employer perceptions towards technology graduates from HBCUs.
2. Only six employers were involved in this study and all were located in the RTP area. Low response rates do not bias Q methodology because the primary purpose is to identify a typology, not to test the typology's proportional distribution within a large population.
3. Of the Human Resource managers that completed the Q sort, five were African American and the only Caucasian Human Resource Manager to complete the Q sort is an HBCU graduate.
4. Another limitation of this research is that all of the Caucasian HR managers except one chose not to participate in the study.
5. This study involves the assumption that subjective responses from participants could provide meaningful explanations as to their beliefs about HBCU technology graduates. However, socially desirable response bias to the Q sort items among these participants may be represented in this study.

6. Finally, although Q methodology is quantitative in nature it does not propose to provide a priori meaning (McKeown & Thomas, 1988), except in relationship to the employer's perception.

Recommendations for Further Study

The present study provided a unique view of the subjective perceptions of employers towards HBCU technology graduates. Q methodology was a practical means by which reality and "actions" of the inner thinking of these employers was exposed. However, Q method is only the first step in this research area that leads to further investigations. Below are recommendations for further research.

Continuing a similar theme, this Q methodology study could be used to examine employer perceptions of Caucasians who attend HBCUs and how those perceptions impact employment for that student population. This research could be compared to the current study to determine if employer perceptions are similar to the results in this study. A comparison would create some potentially interesting results. Q method could also be used to examine employer perceptions of African American that attend predominantly white institutions.

The possibilities for using Q methodology to identify employer perceptions of any student population are endless. Longitudinal studies could be conducted in all of the recommended studies. Research of this nature would permit the exploration of changes in subjective behavior towards these student populations. Q methodology would provide an advantageous means by which to explore these topics.

Implications of Social Change

The purpose of this research was to identify employer perceptions of HBCU technology graduates and how those perceptions impact employment opportunities for this population. The results of this study indicate that employers perceive HBCU technology graduates as intelligent, skilled, and in receipt of a quality education. However, the participants also indicate that these graduates do not have the same employment opportunities as nonHBCU technology graduates. With this in mind, this research can help employers examine the effectiveness of their diversity programs.

By identifying these perceptions and communicating them to both employers and HBCUs, a dialogue can begin that may help both parties understand these perceptions. A collaborative process between employers and HBCU could be developed to improve employment opportunities for HBCU technology graduates that would result in more employment opportunities for these graduates. This improvement of employment opportunities for HBCU technology graduates would help improve the quality of life for not only the graduates but also the families of the graduates. In a corporate environment where diversity is valued, these graduates would add to a diverse workforce. By employing these graduates employers will be hiring graduates with different cultural and socioeconomic backgrounds, therefore, having a workforce that is representative of society.

Conclusion

The findings of this study illustrate that employers perceive HBCU technology graduates from HBCUs in a positive light but agree that these graduates do not have the same employment opportunities as their peers at non-HBCUs. Results from the study

indicate that employers perceive HBCUs as quality institutions producing intelligent, educated, and skilled graduates. However, employers that participated in the study agree that these graduates are not provided with the same employment opportunities, as their counterparts at non-HBCUs. Q methodology was essential in exposing employer perceptions and the shared operant communicability among employers.

These employers provided form to the structure of their subjectivity. In this study, Q methodology revealed how employers' points of view clustered within particular factors of meaning. Two factors provided a picture of the subjective frames of how employers perceive HBCU technology graduates. The current study has identified important factors that provide explanations for understanding employer perceptions of HBCU technology graduates. This Q methodology study was based on the comprehensive nature of capturing subjectivity versus defining objective traits often used by other research methods. To this date there has been no research conducted to expose employer perceptions of HBCU technology graduates and how those perceptions impact employment for these graduates.

Sharing the results of this research may guide others to utilize Q methodology to study nonlinear dynamic human behavior. This may lead to the discovery of multiple elements that interact and connect, to produce structures of meaning or points of view about any situation. As demonstrated by this research, the study of human subjectivity is an accurate channel to reveal the entire flow that becomes our operant communicability. For HBCU technology graduates the operant communicability shared in this research was how employers perceive technology graduates from HBCUs and how those perceptions impacted their employment opportunities.

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APPENDIX A:

SELECTED Q SAMPLE FROM CONCOURSE

Selected Q Sort

Factor 1	Factor 2	Number	Item
Individual			
	Perception toward HBCUs	1.	HBCUs provide educational opportunities for the disadvantaged.
		2.	HBCUs are diploma mills.
		3.	HBCUs are quality institutions
		4.	HBCUs are poorly managed institutions
	Perception toward HBCU technology graduate preparation	5.	HBCU technology graduates are not critical thinkers
		6.	HBCU technology graduates are not analytical
		7.	HBCU technology graduates are not able to apply their knowledge in real world settings.
		8.	HBCU technology graduates only know the basics
Corporate			
	Perception toward HBCUs	9.	My corporation values HBCU technology graduates
		10.	My corporation does not recruit at HBCUs
		11.	My corporation cannot find qualified HBCU graduates
		12.	My corporation only visits HBCU campuses for PR
	Perception toward HBCU technology graduate preparation	13.	My company believes that HBCU technology graduates possess the fundamentals
		14.	My company has to spend more time training HBCU technology graduates.
		15.	HBCU graduates excel at my company
		16.	HBCUs do not prepare graduates to become corporate leaders.
Academic			
	Perception toward HBCUs	17.	HBCUs have rigorous academic curriculums
		18.	Anyone can make good grades at an HBCU
		19.	Grade inflation helps HBCU technology graduates GPAs
		20.	HBCUs provide inferior education
	Perception toward HBCU technology graduate preparation	21.	Technology graduates from HBCUs are intelligent
		22.	HBCU technology graduates have adequate skills
		23.	Instructors at HBCUs do not have up to date technology skills
		24.	HBCU technology graduates have inflated skill sets

Society		
	Perception Toward HBCUs	25. HBCUs are no longer needed 26. HBCUs prepare technology leaders. 27. HBCUs do not understand corporate politics 28. HBCUs only understand diversity from an African American perspective.
	Perception toward HBCU technology graduate preparation	29. HBCU graduates need mentors to succeed in the corporate world. 30. HBCU technology graduates have the same employment opportunities as graduates from other universities. 31. Top technology graduates are not prepared at HBCUs 32. HBCU technology graduates are not known for being technologically savvy.

APPENDIX B:

CONSENT FORM

A Study of Employer Perceptions of Technology Graduates From Historically Black Colleges and Universities

You are invited to participate in a research study of Employer Perceptions of Technology Graduates from Historically Black Colleges and Universities. Please read this form and ask any questions you may have before acting on this invitation to be in the study. Terence Jackson, a Doctoral Candidate at Walden University, is conducting this study.

Background Information:
The purpose of this research is to assess employer perceptions of technology graduates from historically black colleges and universities. The researcher will bring light to an issue that has yet to be thoroughly researched in academia. While bias and discrimination has been researched on a frequent and continuous basis, little research has been conducted on discrimination against African Americans in the field of technology.

Procedures:
If you agree to be in this study, you will be asked to rank order the list of statements on cards provided by the researcher.

Voluntary Nature of the Study:
Your participation in this study is strictly voluntary. Your decision whether or not to participate will not affect your current or future relations with Walden University. If you initially decide to participate, you are still free to withdraw at any time later without affecting those relationships.

Risks and Benefits of Being in the Study:
There are no risks associated with participating in this study and there are no short or long-term benefits to participating in this study.

In the event you experience stress or anxiety during your participation in the study you may terminate your participation at any time. You may refuse to answer any questions you consider invasive or stressful.

Compensation:
There will be no compensation provided for your participation in this study.

Confidentiality:
The records of this study will be kept private. In any report of this study that might be published, the researcher will not include any information that will make it possible to

identify you. Research records will be kept in a locked file, and only the researcher will have access to the records.

Contacts and Questions:
The researcher conducting this study is Terence Jackson. The researcher's faculty advisor is Dr. Raghu Korrapati. You may ask any questions you have now. If you have questions later, you may contact them via email at tjack002@waldenu.edu and rkorrapa@waldenu.edu. The Research Participant Advocate at Walden University is Leilani Endicott, you may contact her at 1-800-925-3368, extension 1210, if you have questions about your participation in this study.

You will receive a copy of this form from the researcher.

Statement of Consent:

☐ I have read the above information. I have asked questions and received answers. I consent to participate in the study.

Printed Name of Participant _____

Participant Signature _____

Signature of Investigator _____

APPENDIX C:

INSTITUTIONAL REVIEW BOARD APPROVAL

IRB Approval

This email is to notify you that the Institutional Review Board (IRB) has approved your application for the study entitled; "A Study of Employer Perceptions for Technology Graduates From Historically Black College and Universities"

Your approval # is 03-06-07-0229859. You will need to reference this number in the appendix of your dissertation and in any future funding or publication submissions.

Your IRB approval expires on March 6, 2008. One month before this expiration date, you will be sent a Continuing Review Form, which must be submitted if you wish to collect data beyond the approval expiration date.

Your IRB approval is contingent upon your adherence to the exact procedures described in your original application. If you need to make any changes to your research staff or procedures, you must obtain IRB approval by submitting the IRB Request for Change in Procedures Form. You will receive an IRB approval status update within 1 week of submitting the change request form and are not permitted to implement changes prior to receiving approval. Please note that Walden University does not accept responsibility or liability for research activities conducted without the IRB's approval, and the University will not accept or grant credit for student work that fails to comply with the policies and procedures related to ethical standards in research.

When you submitted your IRB application, you a made commitment to communicate both discrete adverse events and general problems to the IRB within 1 week of their occurrence/realization. Failure to do so may result in invalidation of data, loss of academic credit, and/or loss of legal protections otherwise available to the researcher.

Both the Adverse Event Reporting form and Request for Change in Procedures form can be obtained at the IRB section of the Walden web site or by emailing irb@waldenu.edu: http://inside.waldenu.edu/c/Student_Faculty/StudentFaculty_4274.htm

Researchers are expected to keep detailed records of their research activities (i.e., participant log sheets, completed consent forms, etc.) for the same period of time they retain the original data. If, in the future, you require copies of the originally submitted IRB materials, you may request them from Walden Research Center.

Please note that this letter indicates that the IRB has approved your research. You may not begin the research phase of your dissertation, however, until you have received the **Notification of Approval to Conduct Research** (which indicates that your committee

and Program Chair have also approved your research proposal). Once you have received this notification by email, you may begin your data collection.

APPENDIX D

A LIST OF HISTORICALLY BLACK COLLEGES AND UNIVERSITIES

- Alabama A&M University (Ala.)
- Alabama State University (Ala)
- Albany State University (Ga.)
- Alcorn State University (Miss.)
- Allen University (S.C.)
- Arkansas Baptist College (Ark.)
- Barber-Scotia College (N.C.)
- Benedict College (S.C.)
- Bennett College (N.C.)
- Bethune-Cookman College (Fla.)
- Bishop State Community College (Ala.)
- Bluefield State College (W.Va.)
- Bowie State University (Md.)
- Central State University (Ohio)
- Charles Drew University of Medicine (Calif.)
- Cheyney University (Pa.)
- Chicago State University (Ill.)
- Claflin College (S.C.)
- Clark Atlanta University (Ga.)
- Clinton Junior College (S.C.)
- Coahoma Community College (Miss.)
- Concordia College (Ala.)
- Coppin State College (Md.)
- Delaware State University (Del.)

- Denmark Technical College (S.C.)
- Dillard University (La.),
- Edward Waters College (Fla.)
- Elizabeth City State University (N.C.)
- Fayetteville State University (N.C.)
- Fisk University (Tenn.)
- Florida A&M University (Fla.)
- Florida Memorial College (Fla.)
- Fort Valley State University (Ga.)
- Grambling State University (La.)
- Hampton University (Va.)
- Harris-Stowe State College (Mo.)
- Hinds Community College (Miss.)
- Howard University (D.C.)
- Huston-Tillotson College (Tex.)
- Interdenominational Theological Center (Ga.)
- J. F. Drake State Technical College (Ala.)
- Jackson State University (Miss.)
- Jarvis Christian College (Tex.)
- Johnson C. Smith University (N.C.)
- Kentucky State University (Ky.)
- Knoxville College (Tenn.)
- Lane College (Tenn.)
- Langston University (Okla.)
- Lawson State Community College (Ala.)
- LeMoyne-Owen College (Tenn.)

- Lewis College of Business (Mich.)
- Lincoln University (Mo.)
- Lincoln University (Pa.)
- Livingstone College (N.C.)
- Mary Holmes College (Miss.)
- Meharry Medical College (Tenn.)
- Miles College (Ala.)
- Mississippi Valley State University (Miss.)
- Morehouse College (Ga.)
- Morehouse School of Medicine (Ga.)
- Morgan State University (Md.)
- Morris College (S.C.)
- Norfolk State University (Va.)
- North Carolina A&T State University (N.C.)
- North Carolina Central University (N.C.)
- Oakwood College (Ala.)
- Paine College (Ga.)
- Paul Quinn College (Tex.)
- Philander Smith College (Ark.)
- Prairie View A&M University (Tex)
- Rust College (Miss.)
- Saint Augustine's College
- Saint Paul's College (Va.)
- Saint Philip's College (Tex.)
- Savannah State University (Ga.)
- Selma University (Ala.)

- Shaw University (N.C.)
- Shelton State Community College (Ala.)
- Shorter College (Ark.)
- South Carolina State University (S.C.)
- Southern University and A&M College, Baton Rouge (La.)
- Southern University, New Orleans (La.)
- Southern University, Shreveport (La.)
- Southwestern Christian College (Tex.)
- Spelman College (Ga.)
- Stillman College (Ala.)
- Talladega College (Ala.)
- Tennessee State University (Tenn.)
- Texas College (Tex.)
- Texas Southern University (Tex.)
- Tougaloo College (Miss.)
- Trenholm State Technical College (Ala.)
- Tuskegee University (Ala.)
- University of Arkansas at Pine Bluff (Ark.)
- University of Maryland, Eastern Shore (Md.)
- University of the District of Columbia (D.C.)
- University of the Virgin Islands (V.I.)
- Virginia State University (Va.)
- Virginia Union University (Va.)
- Voorhees College (S.C.)
- West Virginia State University (W.Va.)
- Wilberforce University (Ohio)

- Wiley College (Tex.)
- Winston-Salem State University (N.C.)
- Xavier University of Louisiana (La.)

APPENDIX E

CORRELATION MATRIX BETWEEN SORTS

Correlation Matrix Between Sorts

	Sorts					
SORTS	1	2	3	4	5	6
1 sub1	100	25	59	47	47	-59
2 sub2	25	100	68	-1	21	-68
3 sub3	59	68	100	27	41	-100
4 sub4	47	-1	27	100	53	-27
5 sub5	47	21	41	53	100	-41
6 sub6	-59	-68	-100	-27	-41	100

APPENDIX F

UNROTATED FACTOR MIX

Unrotated Factor Matrix

	Factors					
	1	2	3	4	5	6
SORTS						
1 sub1	0.7020	0.2345	0.0470	0.1645	-0.0363	0.0646
2 sub2	0.5061	-0.4578	0.2650	-0.1852	-0.1902	0.2018
3 sub3	0.9339	-0.3310	0.1216	0.0116	-0.0576	0.0106
4 sub4	0.4140	0.5421	0.4056	0.1658	0.1913	0.1404
5 sub5	0.5800	0.3711	0.1340	-0.1848	0.1910	0.1405
6 sub6	-0.9339	0.3310	-0.1216	-0.0116	0.0576	-0.0106
Eigenvalues	3.0010	0.9152	0.2845	0.1233	0.1172	0.0846
% expl.Var.	50	15	5	2	2	1

APPENDIX G

RANK STATEMENT TOTALS WITHIN EACH FACTOR

Rank Statement Totals with Each Factor

No.	Statement	Factors No.	1		2	
1	HBCUSprovideeducationaloppsforthedisadvantaged	1	1.19	5	0.98	8
2	HBCUSarediplomamills	2	-1.05	28	0.10	13
3	HBCUSarequalityinstitutions	3	1.77	2	1.47	4
4	HBCUSarepoorlymanagedinstitutions	4	0.36	13	0.23	12
5	HBCUtechnologygraduatesarenotcriticalthinkers	5	-0.58	22	0.72	9
6	HBCUtechnologygradsarenotanalytical	6	-0.94	27	1.44	5
7	HBCUtechnologradsarenotabletoapplyknowledge	7	-0.83	25	-0.16	19
8	HBCUtechnologygradsonlyknowthebasics	8	-0.36	20	-0.03	18
9	MycorporationvaluesHBCUtechgrads	9	1.17	6	-0.98	28
10	MycorporationdoesnotrecruitatHBCUs	10	-0.81	24	1.47	4
11	MycorprationcannotfindqualifiedHBCUgrads	11	-1.30	29	1.47	4
12	MycorporationonlyvisitsHBCUcampusesforPR	12	-1.53	31	0.00	17
13	MycompanybelievesHBCUgradspossessthefundam	13	1.19	5	0.00	17
14	MycompanyhastospendmoretimetrainingHBCUgrads	14	0.00	15	0.00	17
15	HBCUgradsexcelatmycompany	15	1.05	7	-0.49	23
16	HBCUsdonotpreparegradstobecorpleaders	16	-0.34	19	-0.49	23
17	HBCUshaverigorousacademiccurriculums	17	0.47	12	-0.49	23
18	AnyonecanmakegoodgradesatHBCUs	18	-0.47	21	-0.98	28
19	GradeinflationhelpsHBCUtechgrads	19	-0.11	17	-1.47	31
20	HBCUsprovideinferioreducation	20	-0.11	17	-1.47	31
21	TechgradsfromHBCUsareintelligent	21	1.41	3	0.98	8
22	HBCUtechgradshaveadequateskills	22	0.94	9	0.98	8
23	InstructorsatHBCUsdonothaveuptodateskills	23	-0.34	19	0.00	17
24	HBCUgradshaveinflatedskills	24	0.00	15	-0.59	24
25	HBCUsarenolongerneeded	25	-1.43	30	-1.96	32
26	HBCUspreparetechleaders	26	0.94	9	0.52	10
27	HBCUsdonotunderstandcorporatepolitics	27	-0.85	26	-0.98	28
28	HBCUonlyunderstanddiversityfromaAAperspective	28	0.58	10	-0.23	20
29	HBCUgradsneedmentorstosucceed	29	1.88	1	1.96	1
30	HBCUtechgradshavethesameemploymentopportunities	30	-1.66	32	-0.95	25
31	ToptechgradsarenotpreparedatHBCUs	31	-0.72	23	0.26	11
32	HBCUtechgradsarenottechnicallysavvy	32	0.47	12	-1.31	29

APPENDIX H

DESCENDING ARRAY OF DIFFERENCES BETWEEN FACTORS

Descending Array of Difference Between Factors

No.	Statement	Type 1	Type 2	Difference
9	My corporation values HBCU graduates	1.167	-0.980	2.147
32	HBCU tech graduates are not tech savvy	0.471	-1.309	1.780
15	HBCU graduates excel at my company	1.055	-1.780	1.545
19	Grade inflation helps HBCU tech Grads	-0.113	-1.470	1.357
20	HBCUs provide inferior education	-0.113	-1.470	1.357
13	My company believes HBCU grads have fund	1.187	0.000	1.187
17	HBCUs have rigorous academics curriculums	0.471	-0.490	0.961
28	HBCUs only understand diversity from AA pers	0.584	-0.230	0.813
24	HBCU grads have inflated skills	0.000	-0.590	0.590
25	HBCUs are no longer needed	-1.433	-1.960	0.527
18	Anyone can make good grades at HBCUs	-0.471	-0.980	0.509
21	Tech grads from HBCUs are intelligent	1.413	0.980	0.433
26	HBCUs prepare technology leaders	0.942	0.520	0.422
3	HBCUs are quality institutions			

APPENDIX I

FACTOR Q SORT VALUES FOR EACH STATEMENT

Factor Q Sort Values for Each Statement

No. Statement	Rank score by factor 1	2
1. HBCUs provide educational oppos for the disadvantaged	3	2
2. HBCUs are diploma mills	-3	1
3. HBCUs are quality institutions	4	3
4. HBCUs are poorly managed institutions	1	1
5. HBCU technology graduates are not critical thinkers	-1	2
6. HBCU technology grads are not analytical thinkers	-2	3
7. HBCU tech grads are notable to apply their knowledge	-2	0
8. HBCU tech grads only know the basics	-1	0
9. My corporation values HBCU tech grads	2	-3
10. My corporation does not recruit at HBCUs	-2	3
11. My corporation cannot find qualified HBCU tech grads	-3	3
12. My corporation only visits HBCU campuses for PR	-4	0
13. My company believes HBCU grads possess the fundamentals	3	0
14. My company has to spend more time training HBCU grads.	0	0
15. HBCU grads excel at my company	2	-1
16. HBCUs do not prepare grads be corporate leaders	0	-1
17. HBCUs have rigorous academic curriculums	1	-1
18. Anyone can make good grades at HBCUs	-1	-3
19. Grade inflation helps HBCU tech grads	0	-4
20. HBCUs provide inferior education	0	-4
21. Tech grads from HBCUs are intelligent	3	2
22. HBCU tech grads have adequate skills	2	2
23. Instructors at HBCUs do not have up to date skills	0	0
24. HBCU grads have inflated skill sets	0	-2
25. HBCUs are no longer needed	-3	-4
26. HBCUs prepare tech leaders	2	1
27. HBCUs do not understand corporate politics	-2	-3
28. HBCU only understand diversity from an a AA perspective	1	-1
29. HBCU grads need mentors to succeed	4	4
30. HBCU tech grads have the same employment opportunities	-4	-2
31. Top tech grads are not prepared at HBCUs	-1	1
32. HBCU tech grads are not technically savvy	1	-3

Note: Variance = 4.938 Standard Deviation = 2.222

APPENDIX J

FACTOR MATRIX INDICATING A DEFINING SORT

Factor Matrix with an X Indicating a Defining Sort

	Loadings	
No.	1	2
1.	0.3131	0.4959
2.	0.7948	0.0251
3.	0.8648X	0.2293X
4.	0.0204	0.8367X
5.	0.2072	0.6204X
6.	-0.8648X	-0.2293
% explained variance	38	24

APPENDIX K

NORMALIZED FACTOR SCORES FOR FACTOR 1

Normalized Factor Scores—For Factor 1

No.	Statement	No.	Z Scores
29	HBCUgradsneedmentorstosucceed	29	1.884
3	HBCUSarequalityinstitutions	3	1.771
21	TechgradsfromHBCUsareintelligent	21	1.413
13	MycompanybelievesHBCUgradspossessthefundamentals	13	1.187
1	HBCUSprovideeducationaloppsforthedisadvantaged	1	1.187
9	MycorporationvaluesHBCUtechgrads	9	1.167
15	HBCUgradsexcelatmycompany	15	1.055
22	HBCUtechgradshaveadequateskills	22	0.942
26	HBCUspreparetechleaders	26	0.942
28	HBCUonlyunderstanddiversityfromaAAperspective	28	0.584
17	HBCUshaverigorousacademiccurriculums	17	0.471
32	HBCUtechgradsarenottechnicallysavvy	32	0.471
4	HBCUSarepoorlymanagedinstitutions	4	0.358
14	MycompanyhastospendmoretimetrainingHBCUgrads	14	0.000
24	HBCUgradshaveinflatedskills	24	0.000
19	GradeinflationhelpsHBCUtechgrads	19	-0.113
20	HBCUsprovideinferioreducation	20	-0.113
16	HBCUsdonotpreparegradstobecorpleaders	16	-0.338
23	InstructorsatHBCUsdonothaveuptodateskills	23	-0.338
8	HBCUtechnologygradsonlyknowthebasics	8	-0.358
18	AnyonecanmakegoodgradesatHBCUs	18	-0.471
5	HBCUtechnologygraduatesarenotcriticalthinkers	5	-0.584
31	ToptechgradsarenotpreparedatHBCUs	31	-0.716
10	MycorporationdoesnotrecruitatHBCUs	10	-0.809
7	HBCUtechnologradsarenotabletoapplyknowledge	7	-0.829
27	HBCUsdonotunderstandcorporatepolitics	27	-0.849
6	HBCUtechnologygradsarenotanalytical	6	-0.942
2	HBCUSarediplomamills	2	-1.055
11	MycorprationcannotfindqualifiedHBCUgrads	11	-1.300
25	HBCUsarenolongerneeded	25	-1.433
12	MycorporationonlyvisitsHBCUcampusesforPR	12	-1.525
30	HBCUtechgradshavethesameemploymentopportunities	30	-1.658

CURRICULUM VITAE

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Entrepreneurial endeavors include owning and managing a strategic management consulting firm focused on architecting and executing business and marketing strategies to drive client revenue. Grew two successful businesses by leveraging wealth of business expertise. Vast experience in consulting, business analysis, Profit & Loss analysis, and auditing, coupled with foundational knowledge in TQM, ISO 9000, and Six Sigma principles.

Business Credentials: P&L Management… Strategic Management Consulting… Full-Scale Business Operations… Staff Leadership… Project Management… Change Management… Sales Analysis and Planning… B2B Sales & Marketing… New Business Development… New Territory Development… National Account Management… Fortune 500 Account Management… Account Acquisition and Management… New Product Launches… Territory Turnarounds… New Market Development… Sales Pipeline Development… Brand Management and Awareness… C-Level Presentations… Contract Negotiations… Six Sigma Black Belt Trained… Process Improvements…