ABSTRACT

SIMPSON, JAMILA RASHIDA. African American Perspectives: A Qualitative Study of an Informal Science Enrichment Program. (Under the direction of Eileen R. Carlton Parsons).

The purposes of this study were to determine what program characteristics African American parents consider when they enroll their children into an informal science education enrichment program, the parents' evaluation of a program called Jordan Academy in which they enrolled their children, and the alignment of the parents' perspectives with Black Cultural Ethos (BCE). BCE refers to nine dimensions posited by Wade Boykin, a psychologist, as comprising African American culture. Participants were parents of students that attended Jordan Academy, an informal science enrichment program designed for third through sixth grade students from underserved populations. Qualitative methodologies were utilized to perform a thorough assessment of parents' perspectives. Data sources included classroom observations, student surveys, academy curriculum, photos and video-taped class sessions. Data included teachers and parents' responses to semi-structured, audio recorded interviews and students' written responses to open-ended items on the program's evaluation instrument. The data were analyzed for themes. and the findings compared to Black Cultural Ethos. Findings revealed that the participants believed that informal science education offered their children opportunities not realized in the formal school setting - a means of impacting their children holistically. The parents expressed the academic, cultural, and personal development of their children in their characterizations of the ideal informal science education experience and in their evaluations of Jordan Academy. Overall, the parents' views emphasized the BCE values

of harmony, affect, verve, movement, orality and communalism. The study has important implications for practices within and research on informal science education.

AFRICAN AMERICAN PERSPECTIVES: A QUALITATIVE STUDY OF AN INFORMAL SCIENCE ENRICHMENT PROGRAM

by

JAMILA RASHIDA SIMPSON

A dissertation submitted to the Graduate Faculty of
North Carolina State University
in partial fulfillment of the
requirements for the Degree of
Doctor of Philosophy

SCIENCE EDUCATION

Raleigh, North Carolina

2007

APPROVED BY:

Len Annetta	Allen Riordan
Eileen Parsons Chair of Advisory Committee	Glenda Carter Co-chair of Advisory Committee

DEDICATION

This dissertation is dedicated to my uncle Curtis. I miss you.

BIOGRAPHY

Jamila Rashida Smith was born on November 22, 1977 to Clarence and Yvette Smith. She is the oldest of three children, with two younger brothers: Hakeem and Sean.

Jamila attended Iredell County Public Schools in Statesville, NC and graduated from West Iredell High School in 1995. Her love of weather brought her to North Carolina State University where she met her husband Clarence Simpson and earned her bachelor's degree in meteorology. She became Jamila Simpson when the two married in August 2002.

Her love for teaching and encouraging students drew her to enroll in the Masters of Science degree program for science education. After her completion of the degree she decided to continue her education and pursue a Ph.D. in science education.

In the future Jamila hopes to continue to do work on issues related to encouraging underrepresented students in science.

ACKNOWLEDGEMENTS

To God: I know I am being prepared for something and I can't wait to find out what it is. My life is truly a manifestation of Psalms 121.

To my husband: You are truly one of the best men that I have ever known. I cannot believe that I am so blessed to have you in my life. Thank you for loving me. I love you, I love you, I love you! Thank you for being my rock through all of this.

To my family: I don't know where I would be without you. I know I would not be where I am today. There were many times others told me I could not do it but you encouraged me and gave me the strength I needed to do my best. I hope that I can continue to make you proud and help others as you have always instilled in me to do. I hope you can see yourselves reflected in my work.

To Dr. Hill: Thank you for having faith in me and pushing me. Other than my family, you were one of the first people to believe that I could accomplish greater things.

To Dr. Parsons: Thank you for being a role model and a guide throughout this process and through everything. You've helped in so many ways that I cannot truly articulate. I hope to do you proud.

To Dr. Carter: Thank you for your sweet spirit and encouragement.

To Dr. Riordan: Thank you for hanging in there with me through all 3 degrees. ☺

To Dr. Annetta: Thank you for being a part of this experience and your kind words throughout the process.

To the parents in the study: Thank you for participating, thank you for your encouragement, and I hope your words inspire others, I know they inspired me.

To my church family and friends: Thank you for praying for me. Thank you for

being there for me. I love you all.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

Introduction

Recent reports show that the United States (U.S.) has become less competitive in terms of producing the world's new scientists and engineers. According to the US Department of Education (2006), in 1970 approximately fifty percent of the people in the world who held science and engineering doctorates were Americans. It is now projected that by 2010 only fifteen percent of those holding science and engineering degrees will be American citizens. Furthermore, over the past two decades college enrollments in U.S. institutions of higher education have risen from 12.6 million students in 1983 to 15.7 million in 2001. However, the number of entering freshman who declare science and engineering majors, as well as the percentage of science and engineering degrees conferred, remained steady at approximately thirty-three percent of all degrees (American Competitiveness Initiative, 2006). Statistics also indicate that retention rate of students that receive a bachelor's degree in science and go on to pursue a graduate degree or remain in a science field has declined (American Competitiveness Initiative, 2006).

These startling statistics prompted the White House (American Competitiveness Initiative, 2006), the National Academies (Broad, 2005) and the Task Force on the Future of American Innovation (TFFAI) (2005) to publish reports calling for measures that increase the percentage of students going into science and engineering fields. The measures suggested in these reports pertain to increasing the number of students that take advanced placement courses, increasing standardized test scores, and recruiting and retaining students in science, engineering and math majors at the undergraduate and graduate levels. It is understood by the organizations issuing calls for action that it is

imperative that American students are exposed to mathematics and science in order to improve and continue U.S. innovation and global competitiveness.

One measure of American student progress in science is The National Assessment of Educational Progress (NAEP). The NAEP is a nationally representative test which measures the achievement of students in 4th, 8th, and 12th grades in various subject areas. Results from the assessment are used to indicate progress or areas of academic need for US students. Results from the 2005 assessment indicated that 4th graders had higher science scores than in 1996 or 2000; 8th graders had no significant improvements in science scores when compared to 1996 or 2000, and 12th grade students' science scores significantly decreased when compared to 1996 (National Assessment of Educational Progress, 2005). While the results for younger students show promise, the statistics for older students reveal an area of need.

For African American students, the NAEP results showed an increase in science scores for 4th graders in 2005 in comparison to the 1996 and 2000 scores; an increase in the 8th grade science scores compared to 1996, but showed no significant change for the 12th grade scores in 1996, 2000, or 2005. Closer examination of NAEP test scores show that significant gaps continue to persist between White students and their African American peers through 4th, 8th, and 12th grades.

Results such as NAEP findings continue to illustrate the unequal opportunity available to a significant portion of the United States population. Although the rhetoric of "science for all" is prevalent in the science education literature, equitable science education practices and results are not often manifested in the science classroom for African American students. Statistics show that many African American students in

comparison to their White peers are more likely to be placed in lower level science courses and that African American males are more likely to be found in special education classes and less likely to be found in gifted and advanced science courses (Atwater, 2000; Rascoe & Atwater, 2005). Unsurprisingly, the statistics for African Americans going into science fields are similarly skewed. For the 2003-2004 academic school year, African Americans made up approximately 12% of the U.S. population and approximately 12% of students enrolled in degree granting institutions (National Center for Education Statistics, 2004). However, only 5% of bachelor's degrees in engineering, 6% of bachelor's degrees in the physical sciences, and 8% of bachelor's degrees in the biological sciences were conferred to African Americans (National Center for Education Statistics, 2004). Researchers debate several reasons why African Americans underachieve in science; the explanations are detailed in the section entitled "The Problem." This study focuses upon one of those explanations: the mismatch between the culture of school science and the culture of African American students. In this study, the culture of African Americans is referred to as Black Cultural Ethos (BCE).

Overview of Study

Most science education research regarding African American students has been conducted in the formal school setting; research in informal education is scarce. Informal science environments offer a possible means of engaging African American students in science. Informal science experiences, such as the one that is examined in this study, offer an opportunity for students to learn science in a setting where the cultural expectations for students can be less rigid than formal classrooms. Some researchers characterized informal science institutions as free choice, non-evaluative, and non-

threatening learning environments that promote and nurture learning (Falk & Dierking, 1992).

In this non-evaluative environment, informal science experiences may provide a more open venue than formal school settings for incorporating the cultural values of students. Because of the non-evaluative nature of informal science experiences, students may feel more at ease to participate in science without having to compromise their cultural values. These types of learning environments are an excellent setting for cultural research. "Out-of-school learning is strongly socioculturally mediated, so research designs need to offer opportunities to explore social and cultural mediating factors" (Rennie, Feher, Dierking, & Falk, 2003). This dissertation examines one informal science education experience primarily from the perspective of African American parents.

Because parents ultimately have the choice of whether to enroll their child in an informal learning experience, understanding the factors that influence parental choice may be crucial in reaching more diverse populations. Among various sources of data, the perspectives of African American parents who have enrolled their child/children in an informal science education experience are elicited to address six research questions. The research questions that guide this study are as follows:

(1) What happens in Jordan Academy, an enrichment program that has successfully recruited African American students?

(2) Do the occurrences in Jordan Academy align with BCE? If so, how?

(3) What do African American parents/ guardians consider when they enroll their children into an informal science education enrichment program?

(4) Do the African American parents'/ guardians' considerations align with Black Cultural Ethos (BCE)? If so, how?

(5) What are the African American parents'/ guardian's opinions of the program?

(6) Do the African American parents'/ guardians' opinions of the program align with Black Cultural Ethos (BCE)? If so, how?

Research in informal science education continues to grow; however, there has been little done examining culture and the experiences of underrepresented groups in science. The few informal science research studies that have been conducted regarding diverse populations typically center on the impact the program has on diverse students' attitudes towards science (Gerber, 2000; Rahm, 2002) or information as to whether they are more interested in pursuing a science career after their experience in an informal program (Jones, 1997). Few studies have given voice to diverse students and parents or examined what cultural practices they would like to have in an informal science program. This research addresses the gap in the literature by examining the culture of an informal science program that successfully recruits African American parents and students. This study is significant in that it seeks to illuminate the cultural factors that may be influential in African American parents enrolling their children into informal science programs.

The Problem

Although the informal setting appears conducive for encouraging under-represented groups in science to engage in science, some informal science programs have reported difficulties in recruiting and retaining diverse populations (Simpson, 2003; Stake & Mares, 2001). Stakes and Mares (2001) suggest that more research is needed to determine how best to attract minority students to science enrichment programs, "where

they may develop the knowledge and commitment to science that can help to sustain them in the science track" (p. 1083). This dissertation attempts to provide some insight on the recruitment and retention of African American students in informal science education programs by viewing parents' and program participants' opinions and program events in relation to culture. Culture underlies one set of assertions posited to explain the under-achievement and under-representation of African Americans in science.

Culture and Science Education

Although it is not always recognized, every individual is a participant in a culture. Gutierrez and Rogoff (2003) define culture as being a dynamic repertoire of practices. This repertoire is developed, refined and transformed through an individual's prolonged participation in cultural communities – a coordinated group of people who share some common traditions and understandings that span across several generations. Whether an individual is aware of their culture, or not, it can have a significant impact on their worldview and subsequently, their choices.

All students and teachers come to the classroom with cultural lenses or perspectives. The cultural lens each person brings impacts the way they view the world and interact in it. In educational settings, curriculum is entrenched in culture and cannot be separated from culture. Cultural influences found in curricula may include myths, customs, and history that are taken for granted by the dominant culture (Tobin, Tippins, & Gallard, 1994). School science is not exempt from these cultural influences.

Scholars characterize science as a subculture of Western culture (Aikenhead, 1998; Kelly, Carlsen, & Cunningham, 1993). Because of the prestige, power, and progress associated with science, science tends to be a Western cultural icon that is held

in esteem. By engaging in the practice of science, participants are often called to take on the cultural attributes of science and subsequently Western cultural attributes (MacIvor, 1995). Like science, school science also aligns with Western science. The major aim of both school science and Western science is the cultural transmission of the subculture of science and the dominant culture of the country (Aikenhead, 1998). Because school science is based upon Western culture, students from other cultures may face a cross-cultural experience when they study Western science. Research shows that minority students often perceive the world of science as different from their own and subsequently resist participation in school science (Costa, 1995; Gilbert & Yerrick, 2001; Seiler, 2001). The move students make from their personal culture into the culture of school science has been referred to as "cultural border crossing" (Aikenhead, 1998).

Cultural Border Crossing

According to Phelan et al. (1991) students often must negotiate between the worlds of home, peers, and school. It is posited that the negotiation that occurs between these worlds can significantly impact the experiences students have with each world. In terms of schooling, educational outcomes may be significantly hindered or helped. By interviewing and observing students, Phelan et al. (1991) found four distinctive patterns that emerge as students move across settings. Type I: Congruent Worlds/Smooth Transitions, Type II: Different Worlds/Boundary Crossings Managed, Type III: Different Worlds/Boundary Crossing Hazardous, and Type IV: Borders Impenetrable/Boundary Crossings Insurmountable.

Type I, Congruent Worlds/ Smooth Transitions, refers to students whose values, beliefs, expectations, and customary ways of behaving are, for the most part, parallel

between worlds. Students in this category rarely perceive boundaries between their family, friends and school worlds. Students who are characterized as Type II, Different Worlds/Boundary Crossings Managed, perceive a difference between the worlds of home, school and peers; however, these students manage the different border crossings by adapting to the different contexts. Type III, Different Worlds/Boundary Crossing Hazardous, students view their school, family, and peer worlds as distinctly different and find transitioning between the contexts very problematic. Border crossing is possible only under certain conditions. Conditions are usually conducive for border crossing when the teacher instructs students in a manner that is similar to a student's home environment. Finally, type IV, Borders Impenetrable/Boundary Crossings Insurmountable, students find that their values, beliefs and expectations are so discordant across worlds that boundary crossing seems impossible. When border crossing is attempted, it is usually painful and in response, students develop reasons to protect themselves and usually resist crossing into other worlds.

Using the Phelan et. al. (1991) framework, Costa (1995) developed a model for understanding the congruency students face between their worlds of family, friends, school and science. From this study, five categories emerged: potential scientists, other smart kids, "I don't know" students, outsiders, and insider outsider. "Potential scientists" are characterized as students whose worlds of family and friends are congruent with the worlds of both school and science; to these students, science closely aligns with many aspects of their worldviews and life experiences. "Other smart kids" are students whose worlds of family and friends are congruent with the world of school but inconsistent with the world of science. These students recognize the value of school science, but do not see

it as intrinsically meaningful. "I Don't Know" students are those whose worlds of family and friends are discordant with the worlds of both school and science, but they retain enough self-esteem to persevere. "Outsiders" are students whose worlds of family and friends are discordant with worlds of both school and science. Science does not fit their self-image or their lifestyle. Finally, "inside outsiders" are those students whose worlds of family and friends are irreconcilable with worlds of school, but are potentially compatible with world of science. A large percentage of the students whose worlds of family and friends were congruent with the worlds of school and science were White males. Students strongly alienated from both schooling and science were often minorities. Described in the literature are different ways to alleviate students' alienation from science and to facilitate their border crossing into science. The venues most relevant to this study are teacher expectations, parental involvement, and cultural congruency.

Teacher Expectations.

According to Atwater (2000), the science teacher is the most powerful influence on the school science learning of Black American students. The mistrust that students hold can be heightened when science teachers do not expect students to succeed in science, thus presenting a serious barrier to achievement (Gilbert & Yerrick, 2001). Research indicates that both preservice and inservice teachers often hold lower expectations for minority students than for their White peers (Aaronsohn, Carter, & Howell, 1995; Abt-Perkins & Gomez, 1993; Terrill & Mark, 2000).

Ladson-Billings (1994) found that successful teachers of African American students believe that all students can achieve in their classroom. A positive relationship

between student and teacher may actually motivate students to succeed academically. In a study by Rascoe and Atwater (2005), academically gifted African American males shared that science teacher perception of their intelligence reinforced their own self-perception of their academic ability. Even though they perceived themselves to be academically gifted, the students still wanted to receive praise from their science teachers. This same study reported that African American students that decided to pursue science degrees received a significant amount of encouragement from their science teachers (Russell & Atwater, 2005). Researchers believed that the degree to which the students were encouraged related to the student's persistence and pursuit of a science degree. This encouragement is not delimited to teachers but also includes parents.

Parental involvement.

Parental involvement in African American student achievement is critical to student educational outcomes. Research shows that African American students may internalize the academic expectations their parents hold for them. Solstice and Hausafus (1998) reported that low socio-economic status ethnic minority students whose parents stressed the importance of taking advanced science and mathematics courses and reinforced high expectations for science and mathematics with visits to extra science/mathematics opportunities received higher test scores than similar students with less supportive parents. Russell and Atwater (2005) interviewed African American students pursuing a science degree at a predominantly White institution. Participants shared that they encountered high expectations from their parents and that education was valued in the home. Also, students shared that parents who were in science related careers were role models for them, enticing them to go into science related careers. Maple

and Stage (1991) also found that students whose parents were scientists were more likely to go into a science field; this was especially true for minority males. These researchers posited that minority males may be more influenced by a parent in a scientific career because having a parental role model can be a counterforce to the numerous factors encountered in school that push them away from science. It is clear that the messages students receive from their home environment (role modeling and parent expectations) are extremely influential in encouraging students to persist in and pursue science. Another message that is important in African American students' persistence in science pertains to culture.

Cultural Congruency.

Unlike the previously described means to facilitate the border crossing of African Americans into science, cultural congruency directly addresses culture. A major area of study in addressing African American student involvement in science is cultural congruency. According to scholars, the culture of science and the culture of African American students are incompatible. Research in this area seeks to examine and develop continuity between the culture of school science and the culture of African-American students by way of curriculum and instruction. Varying instruction in a manner that is culturally familiar to students is known as culturally congruent instruction. It is often the case that the cultural capital, knowledge, and dispositions of African American students are not valued in academic settings and teachers have difficulty designing a curriculum that draws upon the resources of minority students (Elmesky & Tobin, 2005). It is posited that by implementing culturally appropriate instructional strategies educators will assure that the strengths students bring into the classroom are factors that give shape to

the content, context, and mode of instruction employed by the teacher and that this will enhance students' own intrinsic motivation (Boykin, 1979; Vasquez, 1990).

Devaluing or not acknowledging the cultural capital of ethnic/racial minority students may actually have a significantly negative impact on students' involvement in science. A study by Gilbert and Yerrick (2001) examined eight lower track underrepresented students, their teacher, and the culture of their science classroom to examine the negotiation of student cultural identity. When examining the cultural identity of students, Gilbert and Yerrick (2001) found that students' had developed a microculture within the setting of their classroom. Students were found to create a collective identity of opposition to mainstream culture as a response to low expectations of the school structure and teacher. Students embraced the identity of "other" (viewing themselves as outsiders to mainstream culture) which tied to their interactions with curricula, pedagogy, and core beliefs about success. The study also revealed that the lower tracked African American students did not associate themselves with African American students placed in higher level science courses because they considered the higher tracked African American students as 'trying to be of another race' and 'trying to be someone they're not'(Gilbert & Yerrick, 2001, p. 584). The oppositional nature and mistrust these students had for their school and teacher seemed to contribute to their resistance to their science class.

In a study by Seiler (2001), an effort was made to use the cultural interests of eight African American teenage students to discuss science in their everyday lives. A science lunch group was formed that met once a week to discuss the lives of the students and to discuss and conduct different science related activities. Topics such as hair

products, roller coasters, and other activities salient in the students' lives were used to examine science topics. Seiler states that, "By valuing these cultural attributes and providing opportunities for students to participate in science in their own ways, [the group] reversed the symbolic violence frequently experienced by such students in school" (Seiler, 2001, p. 1012).

Conclusion

Research indicates that many educators are not aware of the cultural aspects of science (Aikenhead & Otsuji, 2000). "If science teachers are not aware of the cultural aspects of Western science, and are not aware of the differences between scientific and other cultures (those of their students), then teachers will not make good culture brokers and the science curriculum will be less accessible to their students" (Aikenhead & Otsuji, 2000). Therefore, understanding that curriculum is influenced by societal culture is important in offering all students an equitable science experience. Unfortunately, research suggests that teachers do not view science as a cultural phenomenon and tend not to see the cultural difficulties their students may experience in their classes (Aikenhead & Otsuji, 2000). In fact, research suggests that many ethnic minority students demonstrate different cultural behaviors than the majority of educators (Vasquez, 1990). For example, while a written mode of informational transmission may be preferred by teachers, who are more aligned with mainstream culture, African American students may prefer an oral mode. While mainstream teachers may prefer to teach using one stimuli at a time, African American students may prefer a varied presentation method (Boykin, 1986; Vasquez, 1990). Students may be expected to remain silent while a teacher talks and then wait until they are called upon to talk. This however, may differ from the

cultural norms of some African American students whose communicative styles value more active participation. These cultural conflicts in the classroom may impact the teacher's expectations and treatment of the child (Boykin, 1994; Gay, 2000). This may in turn impact the student's performance (Boykin, 1994), making it less likely that students who do not conform to mainstream values will go on to advanced science courses, thereby limiting their opportunity to enter into a science career. Limiting the opportunity of African American students and others that do not share mainstream cultural values also limits the United States' ability to remain innovative and competitive in the global marketplace.

One way that the United States can begin to overcome these discrepancies is by making attempts to understand other cultures. Costa (1995) suggests that educators should gain an understanding of the students' cultural worlds. With knowledge of students' cultural worldviews, teachers can work as ambassadors to help bridge the gap between a student's home world and the world of science. One such non-mainstream cultural orientation encountered in schools is characterized by Boykin (1985) as Black Cultural Ethos or BCE. Boykin (1985) characterizes African American values or BCE as consisting of the following nine dimensions: spirituality, harmony, movement, verve, affect, communalism, expressive individualism, orality, social perspective of time. These nine dimensions are explained in Chapter 2.

These African American cultural values are not necessarily ascribed to an individual because of their racial categorization, but are instead influenced by a person's experiences and their identification with those cultural ways of being (Gutierrez & Rogoff, 2003). Boykin (1996) states that BCE is "likely to be more manifest in those

African American students who are most disconnected or disenfranchised from the current mainstream American life" (p. 127).

An informal environment, without the standard school structure may offer students who have developed oppositional identities to a formal school setting, a new opportunity to have positive experiences in science. With time and continued positive experiences, there may be an opportunity for students to build a positive relationship with science education. Utilizing the culture of African American students could be informative to informal science settings and work to engage African American students in science. Currently, research on engaging diverse groups in informal science settings has been under-investigated, a gap addressed by this study.

Overview of the Dissertation

Four chapters remain in this dissertation. Chapter two introduces the reader to relevant literature on informal science education, reviews several studies regarding informal science education programs and their impact on students, and concludes by examining research on the experiences of African American students in science education. In chapter three, the reader is introduced to the reader to the methods utilized in the study and the findings of the study in relation to the theoretical framework of the study (Boykin's black cultural ethos) are presented in chapter four. Finally, in chapter five the findings in relation to the research problem are summarized, the implications of the findings for research and practice are discussed, and the limitations of the study and corresponding suggestions for future research are presented.

CHAPTER II

The purpose of this study was to determine what aspects of an informal science enrichment program make it successful in recruiting African American parents and students. The following review of literature begins by first introducing the reader to what constitutes informal science education and provides a summary of research conducted on different informal science programs and their impact upon students. This chapter also reviews the dominant perspectives on the educative experiences of African Americans.

Informal Science Education

Informal science education has been broadly defined as science programs and experiences that occur outside the classroom (Falk & Dierking, 1992). Such experiences include, but are not limited to, museums, science centers, zoos, parks, nature centers, television, internet, film, community-based organizations and projects, etcetera (NSTA, 1999). Although informal science education comprises many experiences, the majority of the research on informal science education has occurred in the context of museum-type settings. The research conducted in the museum and related settings is clearly needed; however, there is a dearth of comparable studies of learning or experiences in other informal settings like film, radio, community-based organizations, etcetera. This dissertation will address the previously mentioned gap in the informal science education literature by examining a community-based program.

Community-based programs are informal learning environments that usually share the following characteristics:

- The targeted participants typically have similar backgrounds and are usually from a particular age group

- The duration of services tend to vary from several hours to years.
- Cooperative learning is emphasized.
- Explicit connections are made among participants, the relevance of science to their daily lives, and future careers.
- Adults and sometimes older youths are instrumental in preparing materials and structuring sessions as part of the program's services.

According to Crane et al. (1994), there are three types of community-based programs: discovery programs, science camps, and career programs. Discovery programs usually refer to after school programs that make engagement in science the priority. Science camps are known as intensive short-term programs, often residential or day camps, with course-like immersion in science and mathematics and with a focus on providing participants with the confidence and competence to pursue formal education in science. Finally, career programs are long-term programs with frequent participation and multiple strategies including targeted contact with science professionals and focus on preparing participants for careers in science. Contained in the literature are a few research reports on community-based informal science education programs.

Discovery Programs

Rahm (2002) conducted a case study of an informal science gardening program for middle school inner-city youth. Rahm found that through the students' active participation in doing the science, learning became relevant and meaningful to them. In the gardening process, students were able to determine the nature of their science knowledge instead of having it dictated to them.

Career Programs

A qualitative study by Jones (1997) examined The Young Scholars Program at The Ohio State University. The six year pre-collegiate intervention program was designed to prepare academically gifted, economically disadvantaged sixth grade minority students who would be the first-generation college students for postsecondary studies. The goals of the program were to increase the agricultural knowledge of the students and possibly recruit students into an agricultural field of study. An informal approach was used to emphasize the breadth and relevance of the agriculture science to students' lives. In order to shatter the participants' stereotypical images of the scientist as a White male, the program participants interacted with diverse scientists, men and women from various racial and ethnic groups. Also, in an effort to make the science more relevant to African American students, science concepts regarding Africa were shared in the program.

In order to assess the efficacy of the program, the participants completed reflection exercises which included essays that were written about science fieldtrips that were taken with the program. The program participants also completed open-ended surveys about attitudes towards science at the beginning and end of the program. Students' written reflections revealed that during the program student ideas regarding agricultural science were broadened. Seventh, eighth and ninth graders were more prone to share specific facts that they learned during the program while older students were able to connect facts and share broader understandings of agricultural and environmental issues. Furthermore, the students indicated in their reflections an appreciation for the informal format of the program; the student respondents shared that the informal format

helped promote interest, decreased boredom, and made them feel more comfortable. The students conveyed their appreciation for the inclusion of facts regarding Africa, topics with which they seemed to connect. Finally, several participants shared that as a result of being in the program, they considered studying or taking classes in agricultural science at college. Another study investigating the experiences of African American middle school students from economically disadvantaged backgrounds reported similar results.

Via a mixed method approach, Gerber (2000) investigated the effectiveness of a five-week academic summer science enrichment program for 11 African American middle school students examining the impact of the program on student attitude toward science and student science achievement. Participants were involved in ten physical science lessons that incorporated learning cycle activities. Each lesson included how the science concept impacted local businesses. During class, students viewed slides of local business people and listened to explanations of how the science concept studied in the lesson was utilized by the business. To assess the impact of the program, a pretest/ posttest design was employed; the students completed a criterion-referenced test to measure science content knowledge. In addition, the students completed the Attitude Towards Science Survey (ATSS) to assess student attitudes toward science. Throughout the program, the researcher also recorded observations of student behaviors. Results suggested that student content knowledge and attitude toward science improved from pretest to posttest, thereby, indicating that participation in the enrichment program had a positive impact upon students.

Although some informal science research has been conducted and shows promising results, there are obstacles to what is accessible to researchers in informal

science. The following section presents some of the challenges that may be present when attempting to research an informal science program.

Challenges to Researching Informal Science Education Programs

A challenge to evaluating community-based programs arises from several factors. One factor is that the programs examine short-term indicators such as student attitude toward science for long-term goals such as career choice. A second factor related to the first one is that contact in a program may be brief while program goals may be long-term in nature. For instance, a one-week program serving elementary school students may have as its objective to impact students' considerations of college majors. In respect to observing informal science programs' future impacts on students, time, the duration between students' completion of informal programs to their enrollment in college or participation in careers, is a major concern in evaluation. Although there may be challenges to studying informal science programs, the possible positive impact of such programs upon students who are underrepresented in science makes it a worthwhile endeavor.

As presented in chapter 1, scholars contend that the school system in the United States and the formal science classroom are rooted in Eurocentric cultural values (Aikenhead, 1996; Atwater, 2000). Students who do not share the same cultural values enacted and esteemed in the classroom may find it difficult to engage in school science (Aikenhead, 1998). Informal science experiences may offer a greater opportunity than formal school settings for incorporating the cultural values of students. By way of informal science education, the culture of the student can be used as capital by designing experiences that are culturally relevant to the students, by teaching in a

manner that is culturally congruent to the student's culture, and by exposing students to science in their everyday lives. Cultural pluralism could also be incorporated into informal settings such that students learn of other cultures and their contributions in science.

The Notion of Culture

The notion of culture is one that has been researched for decades. There are many different definitions of culture presented in the educational literature. For example, Peshkin (1992) defines culture as the 'learned and shared standards for ways of thinking, feeling, and acting…' (p.249); Shade (1997) suggests that culture is an adaptive process between people and their environment; and Mintzes and Wandersee (1997) define culture as impacting the conceptual goggles we use to perceive the world. I use the definition posed by Gutierrez and Rogoff (2003).

The definition employed in this dissertation comes from Gutierrez and Rogoff (2003) who state that culture is not a trait, but a repertoire of practices that are developed through an individual's prolonged participation in a cultural community – a coordinated group of people with similar traditions and understandings that extend across several generations. The Gutierrez and Rogoff conceptualization of culture was chosen because it situates an individual's culture as not being inherent in a person, but being dependent on an individual's involvement in a community of practice. This definition of culture therefore acknowledges commonalities among members of a group while simultaneously allowing for individual variability. This concept is exemplified in the following statement by Gutierrez and Rogoff (2003):

> People's varied participation in the practices of dynamic cultural communities can be distinguished from membership in ethnic groups, which often is treated in an

> all-or-none, static fashion…. Cultural-historical theory leads us to expect regularities in the ways cultural communities organize their lives as well as variations in the ways individual members of groups participate and conceptualize the means and ends of their communities' activities (p.21 – 22).

Culture is one of the major lenses through which the participation of African American students in science has been viewed.

African American Student Learning Experiences

Three frameworks dominate the literature that examines the schooling and educative experiences of African American students. The first frame is the deficit model which attributes the lack of African American success in certain contexts to a deficiency located in students' lives, such as their home environment. The second position is social mobility explanation which focuses on a nationalities' socioeconomic legacy in their country of residence and states that African Americans generally believe their life options are limited and subsequently develop and adhere to an oppositional culture to the mainstream. The last framework is the cultural difference model which identifies a cultural mismatch between students' and school culture as a root in the lack of African American success. The following section presents in relation to research on African American students a brief synopsis of the deficit model which is the dominant model, Ogbu's Social Mobility Theory which falls within the domain of the social defiance explanations, and Boykin's Triple Quandry which aligns with a cultural difference model. The framework of this dissertation will fall under the cultural difference model.

Perspectives on African American Performance

The first model is the deficit model. It has dominated the education research for decades. Past research attributes the academic difficulties of African American students to the students' own inadequacies or cultural deficiencies (Boykin, 1986). It was thought

that “if Black children do badly in school, we must discover what is the matter with them…” (Boykin, 1986, p. 60). Deficiency models, such as the one shared in Hernstein and Murray’s *The Bell Curve* (1994), have attributed lower achievement of African Americans to genetics stating that there are inherent intelligence differences between African American and European American students. Other deficiency models highlight the home and community environments of African Americans as being dysfunctional and label African Americans students as “culturally disadvantaged” or “at risk”. The implications of the deficit model were far-reaching and impacted the practices within schools and classrooms. Upon the basis of the research conducted from a deficit perspective, efforts were taken to fix African Americans. Programs like Head Start were federally funded to expose children very early to middle-class norms and school curricula were designed to teach social skills (Valencia, 1997). While the deficit model attributes the educational gap to inherent differences due to genetics and specific environments, the social mobility model takes a different stance and attributes the gap to societal constructs.

Ogbu (1986) posited that African Americans students lagged behind their European American counterparts because of complex psychological phenomenon connected to their minority status in the US. In examining the academic achievement of African American students, Ogbu noted that while some minority groups experience a significant gap in academic performance in comparison to their European American peers, others do not. According to Ogbu there are three types of minority groups: Autonomous, Immigrant/Voluntary and Castelike/Involuntary.

Autonomous groups are minorities only in the numerical sense. In the United States, for example, Mormons or the Amish fit into the autonomous minority criteria.

Immigrant/Voluntary minorities are those that have chosen to come to the country of residence because of the desire to obtain better opportunities (financially, politically, etc.). Castelike/Involuntary minorities are those who did not choose to come to the country of residence, but were forced against their will and who were systematically oppressed. Examples of castelike/involuntary minorities in the United States include African American and Native Americans.

Ogbu (1992) stated that the different minority groups can be classified by the types of cultural differences they possess and exhibit. According to Ogbu (1992), voluntary minority groups are characterized by their primary cultural differences. Primary cultural differences are the cultural differences that existed before the two groups, the minority and the dominant group, came into contact. However, involuntary minority groups are characterized by their secondary cultural differences. Secondary cultural differences are the differences that evolved from the different groups' interactions and are generally developed by the minority groups as a response to oppression from the dominant group.

Some of these secondary cultural traits also manifest themselves in schooling. Examples include differences in cognitive style (Shade, 1994), communication style (Kochman, 1983) and interaction style (Boykin & Toms, 1985). According to Ogbu (1992), comparative research suggests that minority groups with secondary cultural differences have more difficulty in school learning and performance because of the oppositional nature of the styles with mainstream culture.

> Secondary cultural differences evolved as coping mechanisms under 'oppressive conditions' and the minorities have no strong incentives to give up these

> differences as long as they believe that they are still being oppressed… and the minorities are not necessarily aware of their boundary-maintaining functions or oppositional quality… [but] view their culture and language as markers to their group identity, not as barriers to overcome (Ogbu, 1992, p. 10).

Ogbu's model essentially states that caste-like minority groups have adopted an ideology of resistance to the dominant culture's values, which lead them to display dysfunctional values and behaviors and do poorly in academia. This dissertation will focus on the third framework used to examine the educative experiences of African Americans in the U.S., the cultural difference model.

The cultural difference model asserts that the achievement gap between White and African American students is a result of the different cultural values of African American culture and mainstream (European American) culture. The cultural difference model does not purport minority academic achievement is a result of defiant choice or any inherent deficits of minority groups. One such researcher is Wade Boykin, who utilizes the cultural difference model to examine African American student achievement.

Similar to Ogbu (1986), Boykin posits that African Americans have a cultural journey that is unique from the mainstream culture. Boykin situates his theory in three cultural realms that he believes African American individuals must continuously encounter: mainstream, minority and the Black culture. Boykin (1986) stated that, "the conflicts created by these three realms of negotiation create a triple quandary for Afro-Americans. [African Americans] are incompletely socialized to the Euro-American cultural system (mainstream realm); they are victimized by racial and economic oppression (minority realm); they participate in a culture that is sharply at odds with

mainstream ideology (Black culture)" (p.66). European Americans must also negotiate three realms (mainstream, majority and Euro-American culture), however, it is believed that these realms' have values and beliefs that are in alignment. African Americans, on the other hand, must try to negotiate three divergent psychological realities.

According to the literature, African American parents show evidence of wanting their children to participate and function successfully in mainstream culture while maintaining their African American one (Boykin, 1986; Boykin & Toms, 1985). In order to participate in the mainstream and adhere to African American cultural tenets, African American parents and children must be bicultural. Becoming bicultural is the act of negotiating two cultural agendas which can be hazardous.

> It is not the mere fact that Blacks hold a dual identity which has constrained achievement; to one degree or another, every ethnic and racial group has faced a similar challenge. The Black experience in America is distinguished by the fact that the qualities attributed to Blackness are in opposition to the qualities rewarded by society. The specific features of Blackness, as cultural imagery, are almost by definition those qualities which the dominant society has attempted to deny in itself, and it is the difference between Blackness and Whiteness that defines, in many respects, American cultural self-understanding. For Blacks, then, the effort to reconcile into one personality images which are diametrically opposed poses an extraordinarily difficult challenge. To succeed in America raises the risk of being told – either by Whites or Blacks – that one is not 'really Black.' No other group in America has been so acutely confronted with this

> dilemma, for no other group has been simultaneously so systematically ostracized while remaining so culturally significant (Prager, 1982, p. 111).

These tensions that exist between the mainstream culture which was presented in chapter 1 as being reflected in science and school science and the culture of African Americans result in the hazardous border crossings articulated by Phelan et al (1991), Costa (1995), and Aikenhead (1998) also described in chapter 1.

Black Cultural Ethos

In line with some of the work of Boykin, this study continued to examine African American parents' perspectives. This study examined African American parents' hopes for their children enrolled in a predominantly African American enrichment program and their opinions of the program. Also in alignment with Boykin's work, this study utilized Boykin's (1986) Black Cultural Ethos (BCE). Some may argue that BCE disregards the diversity within African Americans as a group and possibly stereotypes African Americans. Even though African Americans are distinct individuals with varied experiences, racism in the U.S. defines a common experience for African Americans that is shared from generation to generation. This common experience buttressed by segregation that still exists in the United States leads to some commonalities that warrant the classification of African Americans into Gutierrez and Rogoff's (2003) conception of a cultural community. The commonalities assumed to exist among African Americans and examined in this study are captured in Boykin's notion of African American culture.

Boykin (1986) posed nine dimensions to capture this common cultural experience. The nine dimensions are as follows:

> (1) Spirituality – which connotes and acknowledges a non material life force that permeates all human affairs,

> (2) Harmony – which implies that one's functioning is fundamentally linked to events in nature and the elements of the universe, and placing emphasis on wholeness instead of discreteness
>
> (3) Movement – implying a premium placed on the interwoven mosaic of movement, dance, percussiveness and rhythm personified by the musical beat,
>
> (4) Verve – which connotes an especial receptiveness to relatively high levels of physical or sensate (i.e., variability and intensity of stimulation),
>
> (5) Affect – which implies the centrality of affective information and emotional expressiveness linked to the co-importance of feelings and thoughts,
>
> (6) Expressive Individualism – which connotes the gleaning of uniqueness of personal expression,
>
> (7) Communalism – which connotes a commitment to the fundamental interdependence of people and to social bonds and relationships,
>
> (8) Orality – which denotes the centrality of oral/aural modes of communication for conveying true meaning and to cultivating speaking as a performance,
>
> (9) Social Time Perspective – which connotes a commitment to time as a social construction such that there is an event orientation towards time (Boykin, Allen, Davis, & Senior, 1997, p. 249).

The nine dimensions of BCE can be manifested in various ways in different contexts.

Spirituality denotes a belief in fate or a higher authority that guides an individual's life with emphasis placed on the spiritual world instead of the physical world. It is often enacted in how individuals view events. For example, Lee (1999) examined the worldviews of 127 fourth and fifth grade students regarding the causality of hurricane Andrew, a hurricane that struck Southern Florida in 1992. Results found African American and Hispanic students more likely than Caucasian students to contribute the cause of hurricane Andrew to supernatural forces such as God. Students understood the natural causes of the hurricane; however, they believed the natural causes were controlled by a supernatural force for a purpose. The second dimension is harmony

which emphasizes the whole rather than the parts that comprise the whole. A common example of harmony, being one with nature, is often drawn from the Native American perspective but the expression of harmony can take other forms. The research on effective teachers with African Americans reflects an exemplar of harmony. One distinctive characteristic of effective teachers of African American children was their concern for and emphasis upon the development of the whole child (Foster, 1994; Ladson-Billings, 1994). In addition to the academic or cognitive development of children, these teachers focused upon the psychological, emotional, and social development of children.

Movement involves physical motion such as dance and rhythm; movement may be enacted by students via rapping and singing. In their work, Elemsky and Tobin (2005) provide examples of movement in the classroom. Movement and verve often occur together. Verve values change or variability in activity and is exemplified in the use of learning stations that feature different activities. For example in Boykin's (2005) study on classroom manifestations of culture, the teacher incorporated verve in various ways such as playing the radio while students work, allowing students to talk amongst themselves while doing work, or by allowing students to walk, talk, read or write at the same time. Affect places value on feelings and is most clearly illustrated in the explicit sharing of emotions in the classroom (e.g., a student tells another student not to bother him today because he is in a bad mood). Affect is considered to be just as important as cognition in a situation; feelings are believed to connect to thoughts and behaviors. Priority given to affect over cognition may include working hard on tasks because of their personal importance and interests (Boykin et al., 2005). Expressive individualism values

a person's uniqueness and highlights creativity. Unique and ever-changing hairstyles and distinctive names are two examples of expressive individualism. In classrooms, expressive individualism may be enacted via students' creativity in projects. Communalism places the importance on the group instead of the individual. From a communalistic perspective, affiliation with a group is a significant part of individual identity and benefits accrued by individuals are used in the advancement of the group. In line with communalism, a person gives to another without an expectation of being reciprocated. Orality values oral and aural communication. An orality preference places a reliance on the spoken word to convey feelings and meanings. For instance, a student may prefer to do an oral presentation versus a research paper. Speaking can also be viewed as performance and not merely disclosing information. Finally, social perspective of time values social interaction. The focus of a social time perspective is not regarding time itself, but on the social bonds created and nurtured during an event. For instance, time alone does not truly denote the beginning of an activity, but instead the arrival of all participants marks the start and the departure of all participants marks the end. In classrooms, social perspective of time may be enacted by way of socializing in the classrooms which can be used to facilitate students' engagement in learning tasks (Roth, Tobin, Carambo, & Dalland, 2004).

Boykin and Toms (1985) state that Black Cultural Ethos is likely to be passed on to children through day to day interactions with their parents and other family members. This cultural transmission usually takes the form of habitual behavior and patterns that are displayed consistently and African American parents are typically unaware of this cultural transmission. African American children come to understand and view the world

through the cultural meaning systems they have appropriated from their proximal environments. It is believed that when young African American children enter into school they will do so with the BCE frame of reference they acquired from their families and communities (Boykin & Allen, 2000). These cultural values, which have been prominent in the lives of these students, are often not reflected in the traditional classroom. "The absence of Afro-cultural themes within the classroom can lead to the perception that the most salient aspects of a child's life are neither valued nor relevant in the academic arena, thereby mitigating the possibility of the child discerning significance and proactive meaning in schooling pursuits" (Boykin et al., 1997, p. 27).

With respect to BCE, in this dissertation I attempt to meet the call made by Gutierrez and Rogoff (2003): the researcher's work, from a cultural-historical approach is to "focus on understanding developing individuals and changing communities, making first guesses about patterns and seeking confirmation or disconfirmation to extend what is known (p. 23). This furtherance of understanding is the primary goal of this dissertation.

In this dissertation, I intend to:

- Describe what occurs in Jordan Academy, an enrichment program that successfully recruits African American students.
- Identify African American parents/guardians' considerations in deciding to enroll their children into an informal science education enrichment program
- Determine how, if at all, African American parents'/ guardians' considerations align with Black Cultural Ethos (BCE)

- Elucidate African American parents'/ guardians' opinions of the enrichment program
- Determine how, if at all, African American parents'/ guardians' opinions of the enrichment program align with Black Cultural Ethos (BCE)

This study is qualitative in nature relying on parent interviews to gain an in-depth perspective of parent's opinions. Other data sources such as classroom observations, teacher interviews, the program's curriculum, and students' evaluations of the program are also utilized in achieving the above objectives. Data collection and analysis are discussed in more detail in Chapter III.

CHAPTER III

This chapter focuses on the research methods utilized in this study. The chapter begins with a description of the setting in which the study took place. The context of the study is then followed by the study's rationale, data collection methods, and concludes with the data analysis employed. The objectives of this study were to highlight what occurred during the summer and fall 2006 sessions of Jordan Academy, determine the considerations of African American parents in the enrollment of their children into programs and to ascertain the parents' opinions about one informal science program referred to as Jordan Academy, a pseudonym.

Research Context: Jordan Academy

The following study examined and described the environment of a community-based informal science education enrichment program. The study was conducted at Jordan Academy, a program started in 1998. It is a science and math camp located at a large state land grant institution in the southeastern United States. This is a free program that serves 3rd through 6th grade students in the surrounding counties with special emphasis on students from ethnic/racial groups underrepresented in scientific and mathematical careers. Jordan Academy is held for a total of seven days over the course of a year. The academy is held for five consecutive days during the summer and two one-day teacher workday sessions, one in the fall and one in the spring, are scheduled during the academic school year. The academy utilizes state certified teachers and University faculty, staff, and college students to teach classes. During the time period in which this study was conducted, the academy staff, which consisted of 100% African Americans included teachers, science professionals, undergraduate science students, and

former Jordan Academy students. This study involved six days of Jordan Academy during the 2006-2007 academic year. Data pertained to the five days during the summer and one day during the fall. Details of what occurred during the six days are shared in Chapter 4.

Research Design

This dissertation is a qualitative case study that examined the culture of the academy to gain an emic, or insider's perspective, of what aspects of the academy appeal to parents and students. Qualitative research is "inquiry that is grounded in the assumption that individuals construct social reality in the form of meanings and interpretations, and that these constructions tend to be transitory and situational " (Gall, Gall, & Borg, 2003, p. 634). The emic perspective was appropriate for this study because the study examined the constructed social reality of those who participated in Jordan Academy. The dominant method used to uncover meanings is studying cases intensively and extensively in their natural settings and subjecting the resulting data to analytic induction (Gall et al., 2003).

Study Participants

Parent and student participants.

This study of African American parents'/guardians' (collectively referred to as "parents" throughout this paper) perspectives on an informal science enrichment program took place during summer and fall of 2006. As obtained from the parents' responses to a demographic survey (see Appendix A), the eleven participating parents came from a wide variety of backgrounds. All of the parents interviewed for the study were African American females with most being 41-55 yrs. old (82%) and the other ages ranging from

26 to 40 yrs. old (18%). The household income of the parents varied widely. Four participants' households (36%) made an average of over $150,000 a year, four (36%) an average of $75,000 - 99,999 a year, one (9%) made $50,000-74,999, one (9%) $40,000-49,999 a year, and one (9%) made under $10,000 a year. The highest level of education acquired among the participants was a master's degree. Four of the participants (36%) had a master's degree, one (9%) received a bachelor's degree, three (27%) received an associate's degree, two (27%) had completed some college, and one (9%) had completed high school. Most of the parents lived in suburban areas (64%), some lived in an urban area (27%) and one (9%) lived in a rural area. Also, according to the parents' responses to the demographic survey, six of them (55%) had never enrolled their child in an informal science program before. Parents are referred to by pseudonym in this study. A summary of further parent demographic data is given in Table 1. The parents involved in the study represented only a subset of the parents with students enrolled in the program.

The academy session in the summer of 2006 had approximately 52 students enrolled in the academy. Approximately 58% were female and 42% male. Two percent of the student participants were Latino and 98% African American. Demographic data was not available for the fall 2006 session but the total number of students involved was 47.

Table 1

Parent Demographic Information

Parents	# of children in academy	Times Attended	Other Informal Science	Supplemental Science
Adrian	1	2	Y	kits, internet, encyclopedia
Betty	2	2	N	internet
Cynthia	3	9	N	internet, books
Diane	2	6	N	internet and kits
Elise	1	5 or 6	Y	internet and kits
Francis	2	5	Y	kits, internet, encyclopedia
Gladys	1	2	Y	internet, father
Hilary	1	3	N	internet
Irene	1	2	Y	kits, internet
Jamie	1	4	N	no
Karen	1	3	N	no

Teachers.

Four African American female teachers from the fall 2006 academy participated in this study. One of the four teachers interviewed taught in the summer and the fall academies. The three remaining teachers taught only in the fall academy. All teachers interviewed teach in formal school settings in local public schools.

Ms. Solstice is a public school teacher with eleven years of teaching experience and seven years experience teaching with Jordan Academy. In the public school setting Ms. Solstice works with English as a Second Language (ESL) students teaching language arts. Ms. Costner is semi-retired public school teacher that taught full-time for 31 years. At the time of the study Ms. Costner had taught part-time for two years teaching reading and math in a public school setting two days a week to prepare students for the end of the year standardized testing. Ms. Costner has worked with Jordan Academy for four years. Ms. Butner teaches in a public school setting and has ten years experience teaching and this is her first experience teaching at Jordan Academy. Finally, Ms. Hodgkin teaches

math in a formal school setting and has taught for five years. She.has worked with Jordan Academy since it began in 1998.

Data Collection

This study examined the occurrences of the summer and fall 2006 Jordan Academy sessions, opinions of Jordan Academy parents to determine what aspects of the program attract and retain African American parents and subsequently their children. To determine if culture plays a part in parent interest in Jordan Academy, several data sources were utilized which consisted of interviews of the program director, parents, and teachers; students' evaluations of the program from the summer and fall session; academy curriculum which consisted of teacher lesson plans , student hand-outs and the Academy's agendas for both sessions; and pictures of Jordan Academy class sessions from the summer 2006 session as well as observational field notes and videotapes from the fall session. The parent interviews provided the opportunity to further elucidate and explore the beliefs and experiences of parents in regards to science education and informal science education. The remaining sources of data were used to ascertain what occurred at Jordan Academy and to determine if the information provided by the parents was evident in other aspects of the programs.

Parent-related data

The study began by visiting Jordan Academy's parent orientation in June 2006. This orientation lasted for several hours and all parents were expected to attend if they wished for their child to be accepted into Jordan Academy. I introduced myself to parents at the orientation and explained my study. I then asked for parents to volunteer if they were willing to be interviewed. I passed around a sign-up sheet to gather the names

and contact information of parents who wished to volunteer after which I explained that I would call them in the future for an interview regarding the Academy. Twenty-one parents indicated that they were willing to participate in the study.

Because the academy involved sessions in the summer and fall, only parents that had a child enrolled in both the summer and fall academies were contacted for interviews. This criteria changed the number of possible participants from twenty-one to thirteen. Once I gathered the contact information I called the parents to schedule times that worked within their schedule for us to meet and conduct the interview. The interviews occurred at their homes, places of business, at public facilities-whatever was most convenient for them.

With each of the parents, I conducted one semi-structured interview that lasted for approximately forty-five minutes (see Appendix B). The semi-structured interview approach allowed for some flexibility in allowing parents the opportunity to share their perspectives. For the purposes of accuracy, each interview was audio-taped, an explanation I shared with parents during the first few minutes of each interview. The audio-taped interviews were transcribed verbatim by a professional transcriber. The interviews covered topics of how parents discovered Jordan Academy, what parents are looking for in an informal science program, what an ideal informal science program would look like, and what parents' thought of Jordan Academy. In an effort to secure anonymity, during the interviews I assigned each parent a reference number which I later changed to a pseudonym. In total, eleven of the thirteen parents were interviewed. One parent was called eight times and did not answer or return my phone calls. The second

parent called, apologized, but stated that her new work schedule was too hectic to be able to participate in the study.

I began each interview with introductions, thanks, and a reminder of my intention to find out their thoughts on Jordan Academy and their desires for their child in an informal science context. At the outset of the interview, I allotted time for the parents to read the permission form created for the university's review board; this form restated the purposes of the research. I also explained to parents that their interviews would be kept confidential and that I would use a pseudonym to represent them in my research. At the end of the interview I explained to parents that I wanted to be as accurate as possible with their perspectives and asked for each parent's email address.

Teacher-related data.

During the fall of 2006, I attended a teacher workshop session held by the academy; at this meeting, I invited teachers to participate in the study. Participating in interviews; being observed while teaching; providing teacher summaries which were reports teachers turned in at the end of every academy session that summarized what they taught students during their Academy classes; and providing copies of lesson plans constituted the teachers' involvement in the study. I videotaped for approximately 15 minutes the teachers' sessions at the academy, took fieldnotes of the classroom environment, and collected teacher lesson plans to examine if activities, topics, and teaching strategies aligned with the information parents provided and subsequently with BCE. I made sure to stress to the teachers that I was not evaluating their teaching style, only observing. I collected the lesson plans directly from teachers. Teachers made

copies of their lesson plans at the end of the Academy session and also supplied me with worksheets that they gave students.

An interview guide was designed to obtain the teachers' opinions regarding their instructional preferences and Jordan Academy (see Appendix C). I conducted interviews with teachers to determine if their teaching philosophies and thoughts about Jordan Academy correlated with those of parents in the study. I interviewed the first teacher at the fall 2006 Jordan Academy session and, because of the teachers' busy schedules, the remaining three teachers were interviewed during January 2007. For their convenience, two of the three teachers were interviewed together. The interviews were designed to obtain information about the teachers' philosophies on teaching as well as their teaching methods and whether their philosophies and methods differ in the formal school setting versus the Jordan Academy setting. Similar to the parent interviews, I explained to the teachers that their interviews would be kept confidential and that I would use a pseudonym to represent them in my research.

Student-related data.

In order to garner students' opinions about the program, I examined the student evaluation surveys that the program administered during the five-day summer 2006 session and the one teacher workday session held in fall 2006. The surveys are a regular part of the evaluation portion of the academy. The academy developed the survey and distributed the surveys to students during both the summer and fall sessions. The evaluation surveys were distributed on the last day of the academy during a class session and they were subsequently collected by the students' teachers. The students' completed surveys were then submitted to the Academy coordinator.

On the day of survey administration during the summer 2006 session 48 students were in attendance. Of the 48 students, teachers returned 23 surveys; two teachers from two grade levels did not turn in their student evaluations as requested. The coordinator and the director of the program called the two teachers who kept their evaluations but the calls were not returned. For the summer 2006 academy sessions, copies of the surveys completed by third and fifth grade classes were submitted to the coordinator and given to me for analysis. During the fall 2006 session I received the completed evaluations for 47 academy students. The total number of evaluations serving as data in this study was 70, 23 from the summer session and 47 from the fall session.

The summer and the fall surveys differed in format. The summer survey consisted of mainly open ended items for students to write in their responses (see Appendix D). The evaluations included a section that asked students to rate their classes from what they enjoyed most to least. Students were asked about portions of the program they both enjoyed and did not enjoy. Students were also asked to state what they believed the academy needed to make it better. The open-ended items regarding what portions of the program students enjoyed, what students believed would make the academy better, and general comments were used to inform the study. The fall survey consisted of Likert-type items and two open-ended questions asking students what they liked most and least about the academy (see Appendix E). Because of the qualitative nature of my study, I analyzed the open ended items on the fall and summer surveys that asked what students did and did not enjoy about Jordan Academy for this question allowed students to share whatever thoughts they had. In total, 20 of the 23 summer evaluations included responses to the open-ended items and all of the 47 surveys from the

fall session had responses to the open-ended items. In sum, for this study the data sources consisted of interviews of the program director, parents, and teachers; academy curriculum; classroom environment observation notes, videotapes, and pictures; and students' open-ended responses to an evaluation form devised and distributed by Jordan Academy. In the following section, I describe the methods of data analysis for each source.

Data Analysis

I obtained data that pertained to parents' perceptions of informal science programs, what occurred during a specific informal science program – Jordan Academy and their opinions of the program. Parent interviews as well as student survey responses were examined using open coding and inductive and deductive analysis. I analyzed the teachers' lesson plans by comparing them to what parents stated they wanted in an informal science program and also what the parents liked about Jordan Academy. Lastly, I examined the videotapes and class environment field notes to determine what types of instruction the teachers employed with students and if it aligned with parents' opinions.

Analysis of parent, director and teacher interviews

First, the verbatim-transcribed responses to the interview questions were separated and organized by question. As suggested by Creswell (1998), notes were taken in the margins of the transcripts during the preliminary process of exploring the text. This step was repeated several times to minimize the possibility of something being overlooked (See Table 2 for example). Second, to facilitate the identification of patterns in participant interviews, a table was created for each question with separate columns for each participant and their answers (See Table 3 for example). Colored pencils were used

to color code different ideas and concepts (Patton, 2002). Third, as suggested by Miles and Huberman (1994), counts were taken of any recurring opinions to determine their frequency among the participants. Fourth, I used the frequency counts to identify themes by sorting the data into more concise groupings.

After I completed my data analysis, I involved the parents, teachers and the director in a member check (Lincoln & Guba, 1985). According to Lincoln and Guba (1985), a member check is part of the research process, “whereby data, analytic categories, interpretations, and conclusions are tested with members of those stakeholding groups from whom the data were originally collected, is the most crucial technique for establishing credibility" (p. 314). I emailed each parent their portion of the data with my analysis and asked them whether I accurately represented their thoughts (see sample response in Appendix C). All parents replied and made note of changes, if they had any. Finally, themes were examined to determine if they corresponded with the theoretical framework of Boykin’s Black Cultural Ethos.

Table 2

Examples of preliminary codes derived from interview transcripts.

Code	Two Interview Excerpts What parents liked about Jordan Academy
○ Academy needs to be longer ○ Students liked it ○ Like Homework	C: The children thought they would have more fun if it was longer than a week in the summertime. They really had fun and they came home every day and I had to sign off on their folder.
○ Educational ○ Student liked it ○ Liked Homework	B: I think it was educational. They were enjoying it. I like the fact you had to come home and say what you did for the day. That's with the little one at least. I liked that. I thought it was fine. I had no complaints whatsoever. They learned and that's what they were there for.

Table 3

Example of Organization Chart

Will you enroll your child in Jordan Academy again?

A	B	C	D	E	F	G	H	I	J	K
Yes Benefit: Positive improved writing Finale Participation	Yes Great program Different topics	Yes Benefit: Learning Come home and talk about things and ask questions Do research on internet at home when parents don't have answers Now parents want to know too.	Absolutely Positive Experience Ahead of the curve As parent it is an obligation to give child opportunity	Yes It gives a lot to the whole child	Yes Good environment and good experience Like that they were going to State and going to the S.E. Center Different Children Different teachers	Absolutely Program changes science focus every year It keeps it fresh.	Yes	Yes It's been a positive influence Something new and fresh to learn Gave her a basic foundation that she needed to go anywhere	Yes Seen progress Don't feel it's a waste of time Complement and supplement what he's learning	Yes When you plant seeds you have to wait for the harvest She likes going, so I know she's getting something

Analysis of student surveys.

Students' responses to the Jordan Academy evaluation survey offered another source of data to triangulate with data obtained from the parents. Similar to the analysis of the parent interview data, preliminary data were first sorted by the open-ended questions on the survey. Following the initial sorting, notes were taken in the margins as the preliminary process of exploring the text. Notes were examined for frequency of certain patterns, frequent opinions were placed into categories, and the categories used to develop themes. Finally, themes derived from the student data were examined in relation to the themes identified in the parent data. Because the purpose of collecting the student data was triangulation with the parent data, I report only the thematic findings from the student data that are pertinent for understanding the themes from the parent data.

Analysis of curricula, instruction and environment.

I obtained and examined the teachers' curriculum which included lesson plans and student handouts to determine what teachers did during the summer 2006 and fall 2006 sessions. I analyzed the teachers' lesson plans to determine what topics were taught to students during the academy and how. I created a list of the teachers, the topics they covered, and how the teachers implemented the instruction. For the analyses of lesson plans, I employed the same procedure that I used for the interviews. Then I examined the instruction and utilized the teacher summaries to enhance my understanding of the curriculum. I subjected the teacher summaries to the same analyses procedures applied to the parent interview data. I also examined the videotapes and observational field notes and highlighted the activities occurring within the classrooms and the type of instruction that was implemented.

Summary

In summary, the study examined the perspectives of African American parents whose students were enrolled in Jordan Academy, a predominantly African American informal science enrichment program. This study also highlighted what occurred during the summer and fall 2006 sessions of the Academy. This study utilized several sources of data: director interview, parent interviews, teacher interviews, student surveys, academy curriculum, and classroom observations. All of the data were utilized to obtain what happened in Jordan Academy and to find supporting or discrepant events regarding the perceptions parents have of Jordan Academy and its intended or perceived impact on their children. All of the data were qualitative in nature and were analyzed accordingly. In Chapter IV the findings regarding what transpired in Jordan Academy and the parents' perceptions and views are presented.

CHAPTER IV

Until the lion has its own historian, the tales of the hunt will always glorify the hunter.

- African Proverb

The purpose of this chapter is to present the findings to the questions that guide this research study. The chapter is divided into four parts. In each part, the research questions are captured in the section headings. Part I provides a detailed description of the fall and summer 2006 Jordan Academy sessions; Part II presents the categories and corresponding themes that capture the insights shared by parents; Part III positions the themes with respect to BCE; and Part IV discusses the findings and their implications for future research and practice in informal science education.

In Part I, descriptive findings address the first research question "What happens in Jordan Academy, an enrichment program that has successfully recruited African American students?" Data encompassing teachers' lesson plans, academy curriculum, classroom observations, photographs, teacher interviews, and students' open-ended responses on academy evaluations comprise the findings on Jordan Academy. I utilized the data to describe the context of the academy.

In Part II, the research questions encapsulated in headings are followed by subsections which denote the emerging categories and themes. More specifically, the findings in Part II respond to research questions three and five of the study. These research questions were "What do African American parents/ guardians consider when they enroll their children into an informal science education enrichment program?" and "What are the African American parents'/ guardians' opinions of the program?" For Part

II, only categories and subsequent themes that were articulated by at least 27% (n=3) of the parents are shared even though 24 out of 26 of the themes were articulated by more than 27% of the parent research participants. For each theme, I present, in parentheses, the percentages of parent participants who iterated the presented sentiment. Exemplar quotes, those quotes that best illustrate the theme, accompany the presentation of each theme. The themes presented in Part II are central to the discussions in Parts III and IV.

In Part III of this chapter, I position the themes in relation to BCE. The examination of the themes with respect to BCE addresses questions two, four and six that guided the study. These questions included "Do the occurrences in Jordan Academy align with BCE? If so, how?", "Do the African American parents'/ guardians' considerations align with Black Cultural Ethos (BCE)? If so, how?" and "Do the African American parents'/ guardians' opinions of the program align with Black Cultural Ethos (BCE)? If so, how?" In Part IV of the chapter, I discuss the implications of the findings, results that highlight culture which is an unexamined aspect in informal science educational experiences.

Part I: What transpired at Jordan Academy

This section addresses the research question "What occurs at an informal science enrichment program that successfully recruits African American students?" This section describes occurrences during the summer and fall 2006 Jordan Academy sessions. The synopses are derived from the following data sources: classroom observations, field notes, student evaluations, photographs and academy curricula well as interviews with Jordan Academy staff and parents.

Summer 2006 Academy Session

During the spring of 2006 parents who reserved a space in Jordan Academy received a letter to remind them of the summer 2006 Jordan Academy. The letters included a detailed agenda of the summer academy session which explained what activities would occur and where students would be every hour of each day; notification of a summer academy orientation that parents and their children were required to attend; and a behavior form that each child and parent had to read, sign and submit at the academy orientation. The mandated orientation was the first physical gathering for Jordan Academy.

At the orientation the parents had the opportunity to interact with other parents as well as meet the director and the Jordan Academy staff who are described in Chapter 3. During the orientation, the director shared the history of Jordan Academy which included a brief presentation on why and when it was started. The director also articulated expectations for parents and students such as arrival time, pick-up time, appropriate behavior, and dress code. For instance, one academy rule was that all students had to wear a red shirt and blue jeans. Another rule was that the academy did not allow brand name clothes. In an interview with the director, the director explained the rationale for many of the rules. For example, the reasons for the previously stated rules were to give a unified look to the students and to keep students from differentiating each other economically. The orientation offered a time to explain the rules, share the purpose of the rules, and to acclimate parents and students to program expectations. The orientation also provided the opportunity for parents to meet the academy staff.

The academy took place on two sites, a University campus and a community center. The morning classes were held at the community center and the afternoon classes were held on the university campus. The director shared in an interview that when the program was created community representatives believed it was important that Jordan Academy be partially located in the community for all students to see and in an effort to recruit students from the community into the program. The director stated that this effort has been fruitful in attracting community residents.

Fifty-two students enrolled in the summer 2006 academy session. On the first day of the academy parents and children arrived at the community center at 7:30am. Parents went to the community center to check their child into the program session. At check-in each child received a notebook and nametag and parents paid for the child's lunch for the day. During the summer 2006 academy the theme was "Sharpening the Mind through Math, Science and History". The focus of the academy was on critical thinking and problem solving skills in hopes that it would assist students in their science and math coursework as well as in life. The predominant instructional approach to foster critical thinking and problem-solving was hands-on. In many cases, the hands-on activities did align with inquiry, the approach advocated in current reform for developing critical thinking and problem-solving skills.

The summer 2006 lesson plans, teacher summaries, videotapes, photographs and classroom observation notes documented that teachers implemented inquiry which is defined as "an active learning process in which students answer research questions through data analysis" (Bell, Smetana, & Binns, 2005). One example of inquiry involved the forensic science class where students explored different crime scenarios and used

skills learned in class to solve the crime. Another example of an inquiry activity would be the bridges students constructed from spaghetti to withstand a certain amount of weight. Although the Academy included some hands-on activities that did not reflect inquiry, inquiry driven science activities dominated the sessions. Every Academy teacher utilized some type of hands-on science instruction. Data indicated that lecture was also utilized as part of the science instruction. As indicated in one teacher's comments during an interview, the director encourages the staff to employ a hands-on approach.

> [The director] is always asking us to have hands-on, interactive activities. I mean that's just sort of a given [at Jordan Academy] whereas I still honestly can say that schools… standing up and lecturing and using a text... is not going to be the most appropriate way to get those kids to grasp those concepts.

The director substantiated the teacher's sentiment in an interview by discussing why she promotes hands-on teaching. Hands-on activities "allow students to put what they learn into action. The literature on students of color states that they learn better when the instruction is hands-on. Most kids learn better with hands-on instruction because it reinforces learning." The staff which included African American scientists and guest lecturers also involved students in hands-on science activities such as forensic science coursework where they worked in small groups to analyze data and solve crimes. Additional events that featured hands-on activities included "How to Make a Poster", a course taught by an African American mathematician who instructed students in planning, researching, and producing a poster using PowerPoint; and activities such as "Building a Spaghetti Bridge", learning about robotics building electronic circuits by using circuit kits, calculating rate, distance and time as well as plotting data using PowerPoint facilitated by another African American who worked in a large computer company.

The inclusion of African Americans among the academy staff was not accidental. The purpose of including African American professionals is highlighted by the director of Jordan Academy. The director shared in an interview that they are invited to the Academy to be role models for students:

> Role models are incorporated into Jordan Academy to help students envision themselves in that role. [We want students to know] that if [the professionals] can do it, [the students] can do it as well. The literature supports the notion that role models make it is easier for students to learn the math and science and envision themselves doing it….

To further assist students in envisioning themselves as scientists and mathematicians, the academy offered an African American history class to the students. One objective of this course was to help students identify contributions of African American scientists, to "give students a sense of pride, hope" and to help students "see themselves as inventors and problem solvers" (teacher summary, summer 2006). The director stated that she believed it important to incorporate African American history into the program to educate students who are unfamiliar with the accomplishments of African Americans in science and math and to encourage African American students to believe that they can become scientists:

> It is important for those who are not African American to understand the valuable contributions African Americans have made in science and to the world. I also want African American students to understand that we do have scientists and inventors that are African American. I also feel that students rarely learn about African American scientists and inventors in school… it's important for students to know their own heritage; to know that African Americans accomplished many things when times were tough.

Jordan Academy gave each teacher the responsibility to teach African American history to the grade level they were assigned. The academy organized students by grade level with a lead teacher for each grade level. For instance, third grade students were

assigned to Ms. Solstice who taught science, African American history and mathematics for that grade level. Each teacher at each grade level was told the theme of the academy and given the opportunity to choose activities that fit the theme. Ms. Solstice, a pseudonym for one of the academy teachers, shared in her interview that the organization of the Academy was influential in her choosing to teach there:

> The way [the director] and coordinator have the Academy organized with certain themes …and their expectations of teachers are clear. We meet ahead of time to discuss what we'll do every part of the day…. Some programs or academies just say, "oh whatever" and you can do what you want. However, Jordan Academy is carefully thought out with a common theme and focus and I appreciate that as a teacher.

The organization highlighted by Ms. Solstice was evident in the general structure of each day. For each day, the students would participate in the academy sessions and at the end of the day, students were given a homework assignment. The homework assignment included instructions for students to talk to their parents and share three things they learned at the academy that day. After parents talked to their students they were expected to sign the homework sheet and students were expected to turn it in to their teacher the next day.

At the end of the program, parents, university faculty, and individuals from the community were invited to the program's finale. The finale provided the opportunity for students and teachers to demonstrate what they learned during the week. Each teacher was given the freedom to decide how to have their students demonstrate to parents what they learned during the academy. Prior to the finale, program evaluations were administered to students on the academy's last day to assess students' opinions of the week's events.

The program evaluations completed by the students indicated that five of the 23 students ranked African American history as their favorite class. One student during the summer 2006 session shared that Jordan Academy would be better if it had "more [about]…African American Scientists". Students overwhelmingly shared that they believed Jordan Academy was fun. Student statements on evaluations included, "It is fun when you learn," "It is a great camp," "It was fun and educational," and "It was fun, I like to learn about new stuff so I will be prepared for the next grade". Students also complimented the staff stating that they wished there were "more counselors," that "the academy is fun… I like the teachers, counselors and students," and "This is a really cool academy. It has the best teachers. They are so cool too." Some students also indicated on the evaluation form regarding any further comments that they wished the academy was longer, stating, "[It would be] better if it were two weeks, and that they wished it would "last the whole summer." Some students thought older students should attend. A student asked on the summer 2006 evaluation form, "Why aren't there other grades?" and another student stated that the Academy would be better if administrators "let K-12 grades come."

Fall 2006 Academy Session

Several months after the summer academy, parents received letters to invite their children to attend the fall 2006 session. The fall academy offered a similar format to the summer academy, however, it was held at the university location and not the community center. Forty-seven students attended the fall 2006 session. The theme for this session was "Developing Students in Math, Science, Technology and Leadership Skills". During the academy, students attended classes for their grade level where they conducted science

experiments and learned mathematics. Some of the activities conducted examined the properties of air, the flow of water pollution, and ways in which students could save the environment through efforts like composting and recycling. As with the summer session, hands-on activities were the primary mode of operation.

Every teacher interviewed stated that Jordan Academy differed from the formal school setting because it offered teachers more freedom to utilize hands-on instruction. Teachers also shared a preference for hands-on science instruction. Ms. Butner stated, "I like the hands-on thing because a lot of children don't learn by lecture." Ms. Costner stated that in her "opinion the hands-on activities and experiments done at Jordan Academy are vastly more enriching then what's done in most schools to learn science and math which involves a lot of lecture, note taking and teaching to the test." The fall 2006 classroom observations, lesson plans, and videotaped class sessions showed that every teacher but one involved students in hands-on science activities. Data also indicated that some instruction contained some lecture.

Teachers also had a preference for science instruction situated in a real world context. For instance, Ms. Costner shared, "I prefer the students be able to do …activities involving real world applications. This makes the learning process more exciting and valuable." The videotapes and classroom observation notes from Ms. Costner's class highlighted her interest in teaching students science situated in the real world. Students in Ms. Costner' class learned about compost piles and their impact on the environment. Materials were brought into the class for students to make their own compost bags. Ms. Costner shared that she hoped students would take the compost bags that they made in the classroom and start their own compost piles at home. For Ms. Solstice, her preference

for science taught in a real world context stems from her hope that students will understand the importance of science in their everyday lives. Ms. Solstice shared:

> … I hope that they see that math and science are useful and just a part of our every day lives. Like today we were talking about Celsius and Fahrenheit and I was just saying if you are ever going to travel anywhere, you're going to have to know how to convert because all the other countries in the world practically use Celsius. They don't use Fahrenheit.... Next time we're going to be doing more with air quality ... because there are so many people with allergies and so many asthmatic things now, it's important for them to understand air quality. And when they're watching the forecast in the morning or the afternoons or whatever, to see what the air quality is and to understand what they mean when they say it's a Code Red or green or whatever. So yes, that's what I hope. That they see math and science are connected to our every day life ... That's what I hope.

All teachers stated during the interviews that they preferred teaching using hands-on instruction situated in a real world context.

"Weather in South Africa" was taught in combination classes: 3rd and 4th grade together and then 5th and 6th grade together. In "Weather in South Africa" class students learned to convert Fahrenheit to Celsius. Unlike the "Weather in South Africa" class which was restricted to the combination classes, all students were visited by a forensic scientist to teach the class on weather's impact on forensic investigation. "Weather in Forensic Science" was instructed by an African American forensic scientist. The forensic scientist spoke to students about forensic science and how weather can impact a forensic science investigation. The instruction was predominantly through lecture and after the lecture students were given an opportunity to ask the scientist questions. The scientist also passed around photos of a crime scene investigation, showed a mold of a shoe print taken from a mock crime scene, and took the fingerprints of a student volunteer.

Toward the end of the day, all students transitioned from classes to a larger room that had tables set up as learning stations. Students rotated between stations every 15

minutes. Each table, except for South African history and culture were facilitated by the Jordan Academy teachers. During the "Mathematics" station students were introduced to a hands-on instruction that had them stack pennies to determine how many it would take to reach the moon. The "South African and African American scientists and mathematicians" station had students complete word search worksheets as well as play an African counting game called Mankala. The final station, "The Culture and History of South Africa", had an African American undergraduate student teach academy students; the university undergraduate used PowerPoint and lecture to teach about the culture and history of South Africa. Afterwards, students interacted with South African musical instruments, created beaded necklaces, and had their faces painted by the African American undergraduate student in ways that might be found in South Africa.

On the evaluation forms for the fall 2006 Academy session completed by students, four of the 47 students indicated that what they enjoyed most about the session was learning about South African History and Culture. Examining the student evaluation data also revealed that students coming to the University's campus may have contributed to one student hoping that she may attend the university in the future. In the space available for things students liked about the Academy one student stated, "Being in my future school and meeting new people. I hope I can come again one day".

The occurrences of the summer and fall 2006 Jordan Academy sessions offer insight into what students and parents experienced and lay the foundation for examining parents' opinions of the Academy. Part II of this chapter examines insights from parents' regarding their thoughts on informal science education and Jordan Academy.

Part II: Insights from Parents

Section I: Parent Considerations in Relation to Informal Science

Parents often have a wide variety of hopes, goals, and expectations that they take into account when evaluating informal science programs for their children. This section examines some of the themes that were uncovered during the course of the parent interviews. The categories and their corresponding themes are summarized in Table 4. The findings address the third research question guiding the study: What do African American parents/guardians consider when they enroll their children into an informal science education enrichment program? In order to find out what parents consider for the enrollment of their children into informal science education enrichment programs, the interview questions elicited the parents' views on identifying enrichment opportunities, ideal informal science experiences, and what they expect from informal science enrichment opportunities.

Finding Informal Science Education Experiences

The first category that emerged in addressing what parents want from a science enrichment program was how parents learned about the program. The category called "Discovering Jordan Academy" consisted of two themes that I called "Informal Channels of Communication" and "Formal Channels of Communication". Some of the parent research participants expressed specific preferences regarding the publicity about programs for African American children and the responses of others implied the effectiveness of certain publicity mechanisms.

Discovering Jordan Academy.

The first task of great import was to determine how parents found out about this particular informal science program. The interview was able to elucidate which method was the primary way of alerting parents to an informal science program such as Jordan Academy. Results from the interviews revealed that all participants except two (82%) found out about Jordan Academy through word-of-mouth. One hundred percent of those who found out about the program via word-of-mouth were not intentionally searching for a program in which to enroll their children.

The following parent shares how she was not looking for a program in which to enroll her child, but heard about Jordan Academy from a co-worker and was motivated to place her child in the program:

> I heard about Jordan Academy from a coworker. She told me about the program and I said it sounds good to me so I signed them up…I wasn't looking for it. You know how females talk all the time. She told me she was sending hers to Jordan Academy and I inquired about what it was. She was like, 'Hands-on math and science'. So I said, 'Get me a form'. So there's three of us (co-workers) at work whose children go to Jordan Academy. – (Adrian, interview, December, 2006)

Another participant shares how she knows the director of the program and that her trust in this individual prompted her to enroll her child into the program (Danielle, interview, December, 2006).

> Danielle: We belong to the same church.
>
> Interviewer: And she just told you about the program?
>
> Danielle: She told me about the program, told me my kids were getting of age so they could attend the program – she told me about the math and science aspect of it.
>
> Interviewer: And that piqued your interest?
>
> Danielle: Absolutely.

Interviewer: And you've known her for a while?

Danielle: Yes, so I trusted her judgment.

Two of the participating parents shared how they learned about Jordan Academy, not through other adults, but through students who had previously attended the academy.

> I heard about Jordan Academy by word of mouth. There was a young lady that dances with [my daughter] who is also a neighbor who had gone through the program and was working as a volunteer and recommended it. She was in school at the time and had aged out of Jordan Academy. She was involved in [another informal science program] I guess and recommended Jordan Academy for my child. – (Elise, interview, December 2006)

> [I heard about Jordan Academy from a former student and her mother]. [The former student] was in it and she was always saying [how my daughter] needs to be in it and when [the former student] became the camp counselor she was always pushing for [my daughter] to do it …so I got [my daughter] in there the first year …. – (Irene, interview, December 2006)

Only two of the participants found the Jordan Academy by purposefully seeking out programs in which to enroll their children. One of the parents found the academy via a web search and the other parent found the academy while at a summer camp open house at the University that hosts the academy.

In articulating how they found out about Jordan Academy, 36% of the parents stated that they had previously searched for programs for their children with no success. Betty mentioned how she was often frustrated because they were not told about programs and other enrichment opportunities by their children's schools. She stated,

> Parents are not informed of the things that are going on or the programs that they have. They're not necessarily geared towards minorities, just in general what's out there for these children to get into. If we don't go on the internet but still you have to know going on the internet what to look under to find out what programs are available… We are not being informed. (Betty, interview, December 2006)

Betty was not sure of the main method programs use to advertise themselves, but she believed that they were not doing enough to reach minority populations.

> I don't know… how they can do it … if they can do it through school or send out flyers to let you know what these programs are. I'm thinking from a museum you would think they would want more publicity but I guess it's the other people other than minorities that know about it so between their getting enough publicity they don't need us but we're being left out basically. And I don't know if black people communicate with each other to let other black people know,' ok this is going on, this is going on, this is going on'… whether they choose to enroll their children or not…we're just not getting that information (Betty, interview, December 2006).

Another parent shared her frustration with her daughter's school when she asked them for help with finding a program to assist her child academically, and they had no assistance for her:

> Even with asking the school whether or not they have programs – sometimes they'll tell you they don't know. You have to go outside of the school. Like my daughter, they really couldn't … they couldn't really tell me they had a program that would help… - (Karen, interview, January 2007)

Karen was not the only parent to feel abandoned by her child's school system. Irene also shared how hard it was for her to find programs in which to enroll her daughter. Like Karen, Irene believed schools should know more about educational programs for children. Irene explained that, "…it's hard for us to find the programs that she needs and you would expect the school districts to help you but they have their own idea of when they need to get this and I disagree" (Irene, interview, January, 2007).

It is evident from these responses that the African American parents felt a distinct disconnect regarding communication and advertising of informal science education programs. Parents overwhelmingly utilized word of mouth for information to find out about educational opportunities for their children. Parents also felt that the formal school system should shoulder some of the burden of making these programs known to them.

After discussing how parents were introduced to Jordan Academy, I was eager to gain insight into their ideas of what constituted their ideal informal science education program.

Instruction

In response to questions pertaining to what the parents considered to be the perfect informal science program, categories I labeled “Instruction” and “Teacher Characteristics” emerged. The “Instruction” category highlighted the type of science lesson teachers might use to teach their students and the themes contained within this category were “Hands-On" (82%) and “Real Life Context” (64%). The second category “Teacher Characteristics” which emphasized the qualities a teacher might possess, included three themes referred to as “Science Background”, “Teacher Demeanor” and “Student Impact”. The “Instruction” category and the two corresponding themes captured the parents’ views on what constituted the ideal instructional experiences of the perfect informal science program.

Instruction

Hands-On.

Parents overwhelmingly stated that students should do hands-on work. It seemed important to parents that students are engaged and interactive with science; they believed that this would increase student interest and excitement for the subject. As exemplified in the sentiments of two parents, reasons for wanting hands-on experiences included keeping the students’ interests and helping students understand the science on a deeper level. Betty shared that she wanted students to experience “Hands-on. Just fun stuff. Stuff to keep their interest. Stuff to keep them going wanting to know more and want to

come back" and Cynthia wanted "Something that would involve seeing, something they can touch, using their five senses. Because I feel like when you use those, you can retain what you're learning. That's my ideal program" (interview, December 2006). In addition to preferring learning that was hands-on and interactive, parents also shared that they would like their students to learn science in "real life" circumstances.

Real-Life Context

The parents' ideas of what "real life" science encompassed several activities. These activities included but were not limited to going on field trips to labs, learning in the outdoors, or meeting science professionals. Parents believed it was very important for students to view science in context.

> I like the fact that they're exposed to real life science. I like the fact that they're exposed to real science settings like the university. I think they would go to either places where real science is viewed a lot like [professional] laboratories or agricultural centers to see different kinds of science. I like the variety of science like the robotics and the natural science. I could see them going to some of the parks. Like in [the city] there are parks-natural settings and seeing how science is studied in natural settings. Like a tree for example. – (Gladys, interview, December 2006).

> Something that teaches some kind of activities to help them learn temperature, convert Celsius and Fahrenheit temperatures. Learning the different measurements that can help them with conversion. I'm trying to think of things you could really apply to your real life. – (Jamie, interview, January 2007).

The parents' comments about real-life contexts illustrated various meanings of "real life".

As shown in the first quote, for some parents real life meant observing science within and learning the science content involved in the actual places where people live and work. For other parents, real life referred to the personal application of science content; this notion of real life is reflected in Jamie's quote. The informal science educator is critical to the instruction captured in the parents' preferences for certain

methods to teach science within in a real-life context. Recognizing the pivotal role of the educator, parents described the kind of characteristics they wanted this individual to possess.

Three themes comprised the category of Teacher Characteristics. These themes included "Science Background" (36%), "Teacher Demeanor" (55%), and "Teacher Impact" (55%).

Teacher Characteristics

Science Background.

One theme that emerged was that teachers have a background or experience in science. Parents seemed to believe that this prior experience would not only make teachers more knowledgeable about the subject matter, but also contribute to teacher excitement about science, and subsequently impact the children's excitement about science. The amount of science experience required of teachers varied among participants. Jamie stated that, "Just the understanding of science. Maybe one year of experience and exposure to a science program or science curriculum" was enough (interview, January, 2007). However, another parent revealed that she would actually prefer a scientist with some education experience to a teacher with science experience, because she believed a scientist may be more effective at creating student enthusiasm in science:

> …Someone who is a scientist who comes in and has taken educational courses. I guess that's what I would like to see. I would like to see a scientist who would come in and their main focus is the science…. their content knowledge would be a lot more knowledgeable in the areas and number 2 is they would have – I would think a natural enthusiasm about what it is that they're doing and believe in what they're doing because that's what their primary goal is. And then the education, because if you enjoy what you're doing and you are knowledgeable yourself, just by people being around you is going to be able to allow you to transfer that

> knowledge to them. And I think that's what's important. The kids themselves need to be able to see that number one the person has a general enthusiasm and love for what it is that they're doing in that particular field. – (Francis, interview, December 2006)

In the above quote, Francis also emphasized enthusiasm which is also representative of the second pattern that was evident in the parents' comments. I labeled the second theme "Teacher Demeanor."

Teacher Demeanor.

There are two dimensions to "Teacher Demeanor." Teacher Demeanor refers to the teachers' expressed disposition when teaching science and the interactions a teacher may have with others, specifically with students. Although the dispositional aspect of Teacher Demeanor was highlighted by other parents, Francis' quote above aptly illustrated this theme. Comments such as "a teacher who likes kids," "a teacher who interacts with kids," and "a teacher who listens to kids" are examples of teacher demeanor as it pertains to the teachers' interactions with others. Additionally, with respect to Teacher Demeanor, it was very important to parents that teachers have traits that are "child friendly". Such traits as patience and understanding constituted the parents' ideas of what it means to be child friendly and a statement by Betty exemplifies this notion of child friendliness: "Teachers that like kids or are patient because… some are not patient. They shouldn't have that job… Not necessarily a parent but someone who's good around kids and who understands kids and how they think" (interview, December 2006). The last pattern evident in the parents' response was "Teacher Impact."

Teacher Impact.

Parents expressed a belief that the teacher's demeanor was not only important but also for teachers to have a noticeable impact on students. "Teacher impact" refers to changes that occur as a result of what the teacher instills or encourages in students. Examples of the teacher impact theme include "a teacher who challenges kids that need it", "a teacher who grooms students to become better" or "a teacher who encourages kids that need it". In order to have an impact, as it is demonstrated in the previous phrases, parents deemed it necessary for teachers to evaluate their children.

Parents understand and expect an ideal teacher to assess where students are and then to move them where they need to be. In essence, the type of instructor esteemed by the parents is a teacher who motivates, encourages, and challenges students when it is appropriate. For one parent, her ideal teacher is Ms. Joanna Cole, a fictional character on the cartoon *The Magic School Bus.* This character pushes her students to learn more.

> Just teachers that have a love of science and math. A love of learning. It's one thing to know it but it's another thing to be able to create a contagious enthusiasm. The teacher personality I want is the magic school bus personality. You know Joanna Cole [the teacher on the cartoon the Magic School Bus]. I want a Joanna Cole. Kids, what are we doing today? Wait until you see what we're doing today. You know just sort of out of the box thinking and then the magic school bus – the kids learn about it, they see it, they experience it, they have to put it on charts and they have to come back and talk about it. It's all of that. The teacher never stops surprising you. – (Gladys, interview, December 2006)

It was clear that in the participating parents' ideal program the parents desired teachers who were competent in the science content, who showed certain and positive dispositions in their interaction with children, and who helped children fulfill and surpass their potential. Not surprisingly, the categories and corresponding themes that captured the parents' views on the ideal informal science program experience for their children

foreshadowed what they actually expected from an informal science enrichment program. In the next section, I present the themes that relate to the specific expectations the parents had of any program in which they wish to enroll their children.

Expectations for an Informal Science Education Program

The final set of findings that pertain to the third question guiding this study, "what do parents look for in a program in which they would enroll their child," captures the parents' expectations for an informal science education program. Three categories comprise these findings. The categories are as follows: "Program Impact", "Program Structure" and "Program Curriculum". The category "Program Impact" consisted of two themes, "Needs of the Child" and "Cultural Reinforcement." The category "Program Structure" included the themes "Program Organization" and "Child Safety". Finally, the category "Program Curriculum" included the themes "Academic Focus" and "Experiential Variety".

Program Impact

Program impact refers to the influence a program has on a child. Two themes comprised this category: "Needs of the Child" and "Cultural Reinforcement."

Needs of Child.

A theme that was important for the parents when examining a program were the needs of their children (36%). Parents mentioned that they considered the needs and interests of their children before they enroll them into a program. While Gladys stated that she's **"**looking for a program that will...meet [my son's] interest…" (Interview, December 2006), Hilary shared how she is looking for the opposite, something her child is not interested in. In fact, she shared that she "look[s] for some things that [her

daughter's] not that good at and not that interested in… hoping that she'll learn or gain some knowledge from that" (Interview, January 2007). Finally, Adrian shared that she "look[s] for the positive things and what [her children] are going to get out of the program and see if it will fit their needs and their personality" (Interview, December 2006). The parents also considered it important that a program help their children to develop culturally.

Cultural Reinforcement.

As part of the learning that occurred in programs, parents wanted programs to help their children understand their cultural heritage. Gladys shared that she purposefully looks for programs that have African American staff and students to counteract the lack of role models her child encounters in formal school:

> …We're looking for a program for him specifically that will broaden his cultural exposure as an African American male. As an African American male it's very important for him to be exposed to and have a chance to relate to other positive African American males… We use our summers to kind of balance the disadvantages of the school system…. That sense of who I am was instilled. There would be no confusion. It may sound strange but when you live in the suburbs and you have the school system, you have so many white female teachers, but that's a good school system so we choose to keep them in that system. But there are disadvantages with that kind of demographic… There is a disadvantage to having all white male and all white female teachers if you're a black child. There's just an innate disadvantage because you don't see that role model…– (Gladys, interview, December 2006)

Gladys is working to purposefully build a positive self-image for her son and appreciates when it is reinforced outside of home.

Program Structure

Program structure is another category that emerged from the parents' discussions of what they expected from an informal science education program. It refers to the

guidelines and organization of the program. This category included two themes, "Program Organization, and "Child Safety."

Program Organization.

Parents expressed sentiments about structure and the organization of a program (36%). One distinguishing aspect of an organized program emphasized by the parents is that the program informs parents of what to expect from the program and what the children will learn during the experience. Jamie stated, "I like to see if they have an agenda or a description… Then after I read the description if I've not seen enough for education and it's too much free time then I'm not interested" (interview, January 2007). One belief shared by the parents is that the structured environment impacts the children enrolled in the program. Elise shared that she believed having a structured environment could impact and raise expectations students have of themselves and their peers:

> That there is going to be structure … And I think that's what it is when I say structure. It's extra patience. When you have high expectations then there's going to be a certain amount of structure built in anyway because you can't assist people in meeting these expectations without having it and so [the director] had high expectations of her students which is wonderful. Sometimes people would say well that's too strict or you shouldn't do that and I don't believe in that. People are going to conform to their expectations so if you have expectations down here then that's what you're going to get. When you think high then that's what you'll get. They may not necessarily meet those expectations but they're still going to be higher than if you had the expectations down here. So I like that. – (Elise, interview, December 2006)

Another aspect of a program the parents felt was important is the safety of their child.

Child Safety

For some parents, the safety of their child was of the utmost importance (27%). Parents primarily wanted to know **"**That my kids are going to be safe" (Danielle,

interview, December 2006). Adrian shared that not only is the place where the program is held examined in terms of it being secure and safe, but also the rules in place at the program, which also safeguard students:

> … Are they in a secure place as far as are they wandering around on their own? [At the orientation] when someone went to the restroom or whatever, there was somebody there so that was a good feeling. – (Adrian, interview, December 2006)

Elise shared that regardless as to how she may feel about the program, if it is not safe, then she is not interested in enrolling her child in the program. Elise shared that, "First and foremost as a parent, I ask "Is she safe"? Because no matter how great the program is… if she's not safe then it is not a good place for her. Is there is going to be a good ratio of adults to students? Is there going to be structure?…." (interview, December 2006). In addition to meeting the children's safety, the parents wanted programs that would help their children to develop cognitively.

Program Curriculum

The last category that captures the parents' expectations for an informal science education program was "Program Curriculum." This category refers to what the parents wanted to constitute the informal science program experience. It consisted of two themes called "Academic Focus" and "Experiential Variety."

Academic Focus.

It is important to parents that actual learning is going to take place in programs in which they enroll their children. As indicated in the interview data, the parents viewed learning as having several different dimensions. Parents shared that they look for learning that is fun, regards particular subjects, and supplements school. Adrian shared, **"**The main key is learning. But still fun. That's basically what I'm looking for"

(interview, December 2006). Jamie shared that she is specifically looking for specific subject areas, and "want[s] to see anything like science and math – because science, math and reading catches [her] eye automatically" (interview, January 2007). Parents also had opinions on the type of learning they wanted to take place in a program in which they would enroll their child. The type of learning the parents desired for their children was expressed in terms of different learning events.

Experiential Variety.

Parents deemed it important that the learning experiences and topics of a program vary. Parents believed that the varied experiences would keep students interested in the subject matter and increase their learning. Irene shared that the diversity of activities makes her feel as if real learning is taking place:

> I just want programs that really have a lot of things they'll expose the kids to and are diverse. You're going to learn this, this and field trips and just different things. Things that are going to help the child learn. The more activities and things they have planned means there will be a lot of learning. If they make it fun they don't even realize they learned. – (Irene, interview, January 2007)

Jamie also shared her interest in varied science experiences for her children:

> Then after I read the description if I've not seen enough for education and it's too much free time then I'm not interested. But if it's a lot of activity and something to keep him engaged and keeps him active then that's what I'm encouraged to do. – (Jamie, interview, January 2007)

Parents clearly set forth high expectations for the programs they consider for their children's enrollment. The combination of the impact on the child, the structure of the program, and the varied academic curriculum sheds some light on the concern these parents have for their children's cognitive development as well as their development as African Americans.

Synopsis of Section I

For the parents interviewed, finding an informal program for their children proved difficult at times. With little help from their children's schools, parents believed that schools should do more to find out about programs, and that programs should do more to reach out to all populations. An ideal program for parents to find and enroll their child in included hands-on science instruction and science set in a real-world context. Teachers in the ideal program would have a background in science, possess a child-friendly demeanor, and impact students by encouraging and challenging them when appropriate. There were certain characteristics of an informal program that parents looked for before enrolling their child. It was important to parents that a program had structure. Parents viewed a structured environment as being organized and keeping students safe. Parents also considered curriculum; they wanted to ensure the program had an academic focus and offered a variety of science experiences. Finally, the impact on their children was very important. Parents looked for programs that not only addressed the needs of the child, but also reinforced and cultivated the child's culture.

Section II. Parents' Evaluation of Jordan Academy

I address the study's fourth question in this section. The fourth question guiding the study is concerned with the parents' evaluations of Jordan Academy. The evaluation consisted of three aspects: decision to enroll, opinions about the program, and the perceived effects of the program. Interview questions elicited statements regarding why parents enrolled their children in Jordan Academy which resulted in the category called "Reasons for Enrollment." Parents also shared their views about Jordan Academy. Parents who were interviewed in this study overwhelmingly shared positive comments

regarding the program. The categories "Jordan Academy versus School" and "Evaluation of Jordan Academy" emerged from the analyses of the parents' opinions about Jordan Academy. Finally, the parents' sentiments regarding the effects of Jordan Academy on their children were captured in the category "Impact of Jordan Academy." I present the findings for each of the categories and their corresponding themes.

Reasons for Enrollment

Enrolling their children into an informal science program is a decision thoroughly deliberated by the participating parents. Parents shared many reasons as to why they specifically chose Jordan Academy in which to enroll their children. The following themes captured the reasons posed by the parents during the interviews: Cultural Impact (55%), Exposure to College Campus (36%), Caring/Nurturing Environment (36%), Trusting those in Charge (36%), Reinforcement of Math and Science (73%), and Parental Responsibility (36%).

Cultural Impact.

Cultural Impact refers to the influence parents believed the academy had on student identity as African Americans. According to parents, it was very important to them that Jordan Academy was geared toward African American students. Many parents believed that their African American children needed exposure to other African Americans who understood that you could retain your cultural heritage and also excel in math and science. One mother shared that she wanted her daughter nurtured by someone that looked like her:

> … I wanted [her] to be nurtured by someone who looked like her… [I like] that it is run by African Americans. Not only to have the kids around them but as far as role models and mentors and the people who come and talk with them so they will see African Americans in these roles. – (Elise, Interview December 2006)

In addition to the positive reinforcement from other African American students and staff, parents also liked that the academy was well-rounded. Jordan Academy not only exposed students to science and math, but also Black History.

> I liked it because it was predominantly African American … so they could just see others that were willing to learn and that wanted to learn or their parents were making them go because they'd get exposed to other kids that would let them know that hey it's cool to learn math and science. I liked it because it was well rounded. They did math, they did science as well as giving some black history. – (Jamie, Interview, January 2007)

While cultural reinforcement deals with the idea of nurturing a sense of identity in the children, parents also felt it important that Jordan Academy exposed their children to new experiences.

Exposure to College Campus

A number of parents believed it was significant to have students experience life on a college campus because for most students, it is not an experience they have had before. The following parent shares how she was excited for her children to gain access to new things: "… I liked thinking of [my kids] being on that college campus where there's more access to different things they wouldn't normally be able to have" (Cynthia, interview, December 2006). Another parent viewed the college campus experience as one that is extremely important for African American children to have. This parent believed that many students may have never been on a college campus before and that psychologically the experience may open students to the possibility of going to college:

> It gives [my child] the opportunity to get exposure to a college campus so she can get used to that and realize that is where she belongs. I'm not going to necessarily say [that university]... But on a college campus. Because that's what I really feel has a lot to do with it. We (African Americans) have to get accustomed to it and know this is where we belong. That's why you have so many people that grow up – kids that have never been on a college campus so when they get in 11th grade

> and you start talking about it to them it's foreign to them. – (Elise, interview, December 2006)

The logistic of Jordan academy being held on a college campus was one factor important to parents. The affective dynamics of the academy and the staff were also important to parents.

Caring, Nurturing and Trustworthy Environment.

Another aspect of this science program that was important to parents was the nurturing environment. This environment is described by parents as a space that prioritizes helping the whole child. Karen explained that when she was told the story of how the Academy was started she was drawn to the program. From that story she believed that the program cared about children. She stated that "I heard that the gentleman, I think that started it, wanted the kids to be more educated or something. I heard a little bit about that background… and it just struck something in me" (Karen, interview, January 2007). This parent believed that the Academy cared about children succeeding; something she felt was not necessarily the case with her child's public school:

> I felt like maybe [my daughter would] get a little bit more help than she does in the regular school because sometimes the schools claim that they help the children but sometimes they don't give the kids what they really need and I felt like [Jordan] was something that was really concerned about the kids, their education and helping them… It seems like somebody out there is really concerned about the children's education and giving them something that would help them later on in life. Because I personally have not heard of anything like that before. Of anyone doing anything like that. I'm not saying they don't have it but I've just not had it presented to me. – (Karen, interview, January 2007)

Another parent shared how her daughter was nurtured by Academy staff and college students to do a scientific poster for an undergraduate research symposium. The Undergraduate symposium offers young students a chance to experience what it is like to

be an undergraduate research student and the mother shared how much she appreciated the Academy's input:

> …to see [my daughter] hold her own … because of the love and the nurturing and the preparation that she was given, to be able to do so… To have these young [college students]… spend … time with [my daughter] when they were working at the same time because they had to be there to present as well. It was just awesome. It was great. So can they do any wrong? No. There's nothing. – (Elise, interview, December 2006)

The trust in the staff of Jordan Academy that Elise conveyed in her comment was echoed in other parent interviews as well.

Many of the parents (45%) shared that they chose to place their children into Jordan Academy because of the trust they had in the academy staff or others they had spoken to about the academy. Cynthia shared that she worked on getting to know people in charge of the academy which helped her be able to "trust them with my children" (interview, December 2006). Danielle shared that she knew and trusted the director, which is why she could trust the program. For Francis, it was important that the staff and everyone involved were "very friendly" (interview, December 2006).

While nurturing, caring, and trusting were affective dimensions emphasized by the parents, they did not expect learning to be a trade-off. That is, the parents made it very clear that they wanted their children to be exposed to math and science learning experiences.

Reinforcement in Math and Science

The majority of parents mentioned that they enrolled their children in Jordan Academy because they wanted their children exposed to and encouraged and reinforced in math and science. Most parents shared in their earlier responses to interview questions

that elementary school science offered their children little experience with science, so many parents viewed Jordan Academy as a way to supplement what was missing.

> Here at [Jordan Academy] there's… hands-on math and science. You don't learn everything in the schools… they might not go to the same extent as [Jordan], so I said, let me try this and see if they like or are they learning in it. – (Betty, interview, December 2006)

> What attracted me was the fact it was science and math based… [my daughter] is analytical and has shown promise in that area so I wanted it nurtured – (Elise, interview, December 2006)

> The main thing was that I wanted her to get an opportunity to experience science on a whole other level – (Hilary, interview, December 2006)

While some parents hoped their child would be introduced to science, others hoped it would complement or supplement what was occurring at school.

> It seemed to complement what they were already getting in the public school system – (Jamie, interview, January 2007)

The last theme regarding the parents' enrollment of their children into Jordan Academy pertained to their perceived responsibility as parents.

Parental Responsibility.

Parents shared that they believed putting their child into Jordan Academy was something that they should do or were drawn to do because of their own deficiencies. One parent shared that she did not like science so she wanted to give her child the opportunity to grow in that area. Another parent stated that she had a "deficiency in math/science", but that she wanted her daughter to exceed her in the future:

> Because I heard that it was math and science and I had a deficiency in math and science. Because I was not pushed into that area as a child because as a female, I guess the given was, go to school, get an education, get something you'll make a life out of and most of them were teacher or you could be a lawyer or doctor but most girls, there was a stigma – or a nurse or something like that but you never went into the heavy math and sciences. – (Irene, interview, January 2007)

Another parent connected the enrollment of her child in Jordan Academy to the statistics of Black students in science and math and believed that she had to do more to expose her children to math and science because of it.

> I felt like they needed… this is not going to come across right, but in all the statistics that you read and that I've read, Black kids are lacking in math and science so I think as a parent I'm obligated to expose them to as many opportunities in those areas as I can. – (Danielle, interview, December 2006)

The reasons parents shared for enrolling their children into Jordan Academy varied widely, but the ideas of Cultural Impact; Exposure to College Campus; Caring, Nurturing, and Trusting Environment; Reinforcement in Math and Science; and Parental Responsibility were common ground for many parents. After reasons for enrollment were determined, interviews subsequently highlighted parents' perspectives and evaluation of Jordan Academy. Two categories emerged from the parents' evaluation of Jordan Academy.

Jordan versus School

In sharing their views about Jordan Academy, the parents compared and contrasted what occurred in the program to what they perceived to happen at their children's schools. The parents articulated through their interview responses that this particular program provided something that was not available to their children in formal school settings. Two themes surfaced for this category-"Science Instruction" and "Science Content."

Science Instruction

Thirty-six percent of the parents emphasized the science instruction their children received at Jordan Academy. When comparing formal and informal science, parents

stated that Jordan Academy employed hands-on science experiences, while formal school science mainly consisted of book work and little hands-on instruction.

> They just have more hands-on at Jordan Academy. – (Adrian, interview, December 2006)

> They have that hands-on thing and a lot of our public schools don't have hands-on – they don't have it for kids. – (Betty, interview, December 2006)

> They don't do anything hands-on [at school]. I would say that's pretty much it. We don't do anything hands on here. – (Diane, interview, December 2006)

Parents stated that they believed students in informal science settings were exposed to more science topics and learned science through more authentic experiences (i.e., science situated in real life contexts) than in formal school settings.

Science Content.

Another theme that emerged from interviews was the different "Science Content" parents (36%) believed children learned at formal and informal institutions. The parents' perceptions of what constituted true science learning experiences for their children varied widely. Cynthia shared her dissatisfaction regarding the level of science her child was learning in school and the science content offered. She believed that formal school science was not allowing her child to experience real science and she attributed it to laziness on the school's part. She believed that Jordan Academy was an avenue for her child to experience "real" science:

> The projects they've told me about in school have all involved food and I know that there are more projects than projects that involve food. Is this a ranch Dorito, is this a cheese Dorito? That's not science in my opinion. That's somebody being lazy. But every time they come home talking about science it's always dealing with food. I don't understand. There's more to science than food…. I don't call that science. I don't know what the rationale of it is but it's not science in my opinion. At Jordan Academy I feel like that's science. When they were learning about airplanes, that's science. How things fly, that's science. Doritos – that's not science. – (Cynthia, interview, December 2006)

> What they're doing with science now at elementary schools is not a whole lot, from what I gather, I think they go like once a week to science in elementary school. So it's not an every day curriculum for them. It's like a once a week… Personally, they need to have more of it in the public school at the elementary level than what they have because they want kids to be engineers and this and that and I think if they could focus on it at elementary school more and once they get to middle and high school their mind will be focusing on sciences. – (Adrian, interview, December 2006)

> Well the academy stepped it up a notch in terms of the level of science and the exposure to the careers…[they] go beyond what you get only in the classroom setting which is the book knowledge exposure to then some real life experience – (Gladys, interview, December 2006)

The concept of "real life science" rings true as one of the major differences parents perceived to exist between Jordan Academy and formal school science. The education that their children experienced at Jordan Academy was one that they felt was lacking or in some cases completely absent from the formal school system. In their further evaluations of Jordan Academy, the parents provided details about those experiences provided by Jordan Academic but not by the public schools.

Evaluation of Jordan Academy.

The parents' opinions about the program as they pertained to the success of the program for their children included one category comprised of several themes. The category, Evaluation of Jordan Academy, consisted of three themes: Confirmation of Learning (82%), Structure (36%), and Program Extension (36%).

Confirmation of Learning

The category confirmation of learning refers to the need parents shared to determine that learning has truly taken place at a program. In regards to Jordan Academy, parents appreciated the various methods the Academy provided to show

evidence that their children were learning. In the regard of confirming learning, parents highlighted homework assignments and the program finale.

As previously described in part I of this chapter, at the end of each day during the academy sessions, the Academy staff told the students to go home and write about three things they had learned that day. After students had written about what they had learned, students were instructed to sit and talk with their parents about it. After the parent/student discussion, the Academy staff asked parents to sign the homework sheet for students to turn in to their teacher the next day. Parents expressed gratitude for this assignment because it gave them a chance to find out what their children had learned that day.

> [My kids] really had fun and they came home every day and I had to sign off on their folder… [I liked it]… Because I was able to see what they were actually doing in the academy so I enjoyed that. – (Cynthia, interview, December 2006)

The homework was especially helpful when parents were not sure that students truly had enough time to really learn science content. The homework was daily confirmation for parents that significant learning was going on during the academy:

> During the program, in the beginning I was like, “ok are they really doing anything?" Then I would get her to tell me every day what she did and see how excited she was about it and being able to really tell me some of the things they were doing…. Her feedback and her telling me and me throwing questions back at her and seeing if she could answer…. That let me know she was really learning. – (Hilary, interview, December 2006)

> They had to because you had to tell your parents every day. You had to sign off. I liked that. I thought [that] was [a] really good strategy. At first when I’d ask [my son] he’d say, ‘I don’t know’ and I’d say, ’You have to tell me’. Then he’d start going and he couldn’t stop. – (Jamie, interview, January 2007)

Another aspect heralded by the parents was the finale. The academy’s finale occurred at the end of the summer 2006 week session. The finale is a closing program

where students present what they have learned in each class. The finale's purpose is to allow parents the opportunity to witness their children's classes demonstrate what students learned during the week. For many parents it was an affirmation that significant learning was accomplished during the week's academy.

> I really liked the finale... I think that was a good positive reinforcement to [my son's] self esteem… he was George Washington Carver. It's not the first time he's heard about George Washington Carver but being able to do that. He's shy so being able to have that experience was very positive. – (Gladys, interview, December 2006)

For other parents, the finale clarified objectives of the program

> It could be me, but during the academy I have a hard time understanding what they're doing and a full understanding of what the program is, what the objective is. I don't ever question the objective. I always thought it would be a good objective. …I don't question the objective but it's hard for me to understand exactly what it is that we're trying to do. But then it always comes together for me at the closeout session. So you know, maybe it's by design. Maybe I don't need to know all of that. I just need to see the finale. But definitely by the finale I know what the objectives were and I can see the objectives at the end of that. – (Danielle, interview, December 2006)

Parents also enjoyed the finale experience because they witnessed their children having fun presenting in their own unique fashion what they learned. Barbara shared that she liked that the finale incorporated different presentation styles that ranged from performing an experiment to rapping.

> … [The] last day when they had to perform … you got to see some of the stuff they had learned and what they did. I liked the volcano explosion. Even when they had the little rap song – they were rapping about what they learned about and that's enjoyable – to see them enjoying themselves. ... I just enjoyed the whole experience. It was good. – (Betty, interview, December 2006)

Another manifestation of Jordan Academy's making available to parents what students learned was captured in the second theme regarding Jordan Academy's structure.

Structure.

In expressing their positive views about Jordan Academy, the parents highlighted specific aspects of the program. A major first impression that a program can make on possible participants is regarding its organization. For Jordan Academy parents, this impression was made at different opportunities, including mailings, orientation and morning check-in. An agenda of the program was sent to parents in the mail and also handed out during parent/student orientation. An analysis of the fall and summer 2006 agendas revealed that parents and students were informed about what students would be doing from the beginning of the Academy until students were dismissed. The agendas displayed the times of events (such as class, lunch, break, et cetera), where the events took place, and who was in charge of the event. The agenda gave parents an opportunity to see the structure of the academy as well as let them know what classes students would take and where students would be at all times.

> [I liked them] giving you the agenda and knowing what's going to happen at these times and what's going to be involved in that. – Elise
> It's very organized in my opinion. I like when I go there, you find a name tag. They keep you moving. It's very organized and I look for that to see if whoever is running it is organized… [in the morning at drop off]their name tags would be there. I just paid the money for lunch, their name tags were there. I was happy. – (Cynthia, interview, December 2006)

The interaction that parents had with Jordan Academy and their overwhelming positive evaluation of the program led some parents to desire that Jordan Academy be offered for a longer duration and include more grade levels. An additional theme that captured the parents' evaluations of Jordan Academy highlighted recommendations, ways to improve the program.

Program Extension

One area often noted by parents as an area needing change was the length of the academy. Jordan Academy only runs for a week in the summer, one day on a public school teacher workday during the fall semester and one day on a public school teacher workday during the spring semester. Many parents hoped that Jordan Academy could possibly extend their program to longer than a week in the summer with suggestions for lengths ranging from two weeks to a year. Some parents based their assessments for the need of a longer program on their children's opinions. Cynthia stated that, "The children thought they would have more fun if it was longer than a week in the summertime" (interview, December 2006). Betty shared that she felt students were just getting used to the academy and the routine expected by the end of the week:

> It needed to be longer. That's what the girls at work told me to [share] …. They need an extra week… As a parent, it's always good to give more work for them to learn a little bit more, but to me it was just short. Of course the one day is short but just a week it's like you know we were in a routine of getting everybody where they needed to be at and by Friday it was over. What are we going to do next week? (interview, December 2006)

Comments pertaining to the extension of the academy were not delimited to the duration of the program. In addition to extending the program, parents proffered that the academy provide services to students in more grades.

Interviews revealed that parents hoped the academy could possibly extend the grades that it encompasses so that students in higher grades could attend. Currently Jordan Academy serves third through sixth grade. Not all parents discovered Jordan Academy when their child was first eligible. For Karen, her daughter was first introduced to Jordan Academy in the fifth grade.

> [My daughter's in the] Sixth [grade]. When I introduced my daughter it was in fifth grade so we got in right on the end of it. I was wishing why can't they do it longer than that and expand it. I'm hoping that is something they'll consider doing. Because she's in sixth grade right now…. – (Karen, interview, January 2007)

Elise, like Karen, had a student that was about to age out of the program. Because of Elise's high opinion of the program and the impact on her daughter, she was sad about her daughter aging out of the program. Elise stated that, "Yes I think it's a great program. I'm disheartened that this is our last year of participating because of aging out" (interview, December 2006). One parent shared that she wanted the program to encompass more age groups because she wanted her oldest child to have the same opportunity that her younger child had been given through Jordan Academy:

> …more grades. The older children – or my older child… Same thing for her. I want her to learn and be aware there are more things to do. More choices to make if you know what choices you have. She's the eighth grader and she's at that point where they're showing them the options of places to work for and careers to have and if she knew all the ones that science involved she might be more apt to go into the science field, whatever that might be. – (Betty, interview, December 2006)

The next category regarding Jordan Academy is the impact the parents believed the program had on their students.

Impact of Jordan Academy

The parents in this study would not enroll their children in informal science programs if they did not believe the program would impact their children in some way. In the case of Jordan Academy, results showed that parents believed their children were impacted. The following three impact themes emerged from the interview data: academic (45%), cultural (36%), and internal (45%). Contrary to what one might expect from an academically oriented enrichment program, the parents did not delimit the

impact to the cognitive; that is, the parents wanted their children to learn science but they also wanted more for their children. The parents wanted the program to develop the whole child—the cultural and personal as well as the cognitive.

Academic Impact.

The academic impact of Jordan Academy refers to how the Academy impacted their child in their school work. In regards to Jordan Academy, some parents stated that they recognized improvements in academic areas in which their children needed assistance. Although the focus of the academy is math and science, Adrian shared that her daughter had a problem with writing, but that the Academy homework during the summer session, which encouraged journal writing, actually improved her daughter's writing skills.

> [My daughter] gained a lot of strength in the program because some of her areas were kind of weak in her journal writing. They had to write the journal and everything and I could see where she gained some strength in the writing area there. Plus in her reading. – (Adrian, interview, December 2006)

Another parent, Danielle shared that Jordan Academy had a positive impact on her son. Danielle explained that at Jordan Academy her son had been introduced to a science concept before he had been introduced to it at school; because of this prior experience during Jordan Academy, her son was able to utilize this new knowledge in his regular class and show his classmates the science he had learned at Jordan Academy.

> Oh a very positive impact. Let me tell you – these lighthouses you see here, these were a class project that was due today and they had to… you can sit here and tell me these are hands-on but this is at home, it's not in the school – he had to make the light work by using a battery and using the wires and you know they work on a circuit. [My son] announced in class 'I did that at Jordan Academy.' He said 'I did that this summer at Jordan Academy.' That's what I'm talking about. – (Danielle, interview, December 2006)

An impact on student academics was noted by many parents. Parents also noted that they believed Jordan Academy impacted their children by reinforcing their African American culture.

Cultural Impact.

The theme "Cultural Impact" refers to how Jordan Academy reinforced the students' African American culture by providing role models and curriculum for students to experience. One parent simply stated that she believed her son was nurtured. When asked how, Gladys shared he was nurtured through "the balance with the African American history and because of the demographics of the teachers and classmates" (interview, December 2006). Parents seemed grateful for the reinforcement of the African American cultural heritage the child received from the Academy. Elise explained that while she tries to share what it means to be an African American woman with her daughter, it helped that the Academy reinforced this sentiment as well.

> I think just that they were helping her with her cultural background because she's always been a Black girl and she knows she's a Black girl but being able to see what being a Black girl means. That helped. And other than what her momma tells her being a Black girl means. – (Elise, interview, December 2006)

Irene shared that she wants her daughter exposed to different situations where she has to interact and learn about herself as well as other African Americans. She shared that Jordan Academy was a way of exposing her daughter to other African American children. She believed her daughter learned not to discriminate against other African Americans and that skin color does not equate how smart an individual is.

> It's being exposed and not being inferior or afraid of our people especially because a lot of black people are afraid of black people… You know, we're the same all over…. Why be afraid of us? It's just from a parents' standpoint…you have to teach your children it doesn't matter… It's just a rainbow of colors so you can't discriminate against your people… That's how you go forward. It's all

> about you can be as smart as you want to but when you get to the point where you don't recognize your people and you don't use your common sense in doing what you're supposed to be doing, you don't have that. – (Irene, interview January 2007)

For these parents, it was very important that their children become knowledgeable about and understand their African American cultural heritage. For the parents interviewed, the knowledge of African American history and interaction with African Americans students offered their children a means of embracing their African American cultural identity and community. This African American cultural identity, while embraced in the family homes of these parents, may not be embraced or encouraged in mainstream society or schooling.

Personal Impact

The personal impact of the program is defined as learning lessons that influence the way the students view life. It refers to the implications, which are personal in nature, of the students' involvement in the Academy beyond the Academy.

Adrian shared that with the help of Jordan Academy her daughter "learned to have a positive attitude and it seems like she gets frustrated and they have worked on that with her too there at Jordan Academy. It was just something about Jordan Academy. It worked through some of her anger so that was a big help" (interview, December 2006). Irene also explained that she viewed Jordan Academy as preparing her daughter for life beyond home and parents.

> ... I'm trying to get this child ready to go because she's not always going to be with me so she has that knowledge base so she'll know how to take care of herself… By going out and going to different places and meeting new people she'll know how to handle herself. Whereas mommy's always there to drop you off and if there's a problem I'll take care of it but you've got to learn to take care of it. You've got to learn to speak up for yourself and you've got to learn to take

> control of the situation and be in charge of the situation. – (Irene, interview, January 2007)

A personal impact also encompasses a change in a student's perception of themselves as learners or potential scientists. Two parents shared that prior to Jordan academy their children did not mention science or engineering as potential careers, however, since participating in Jordan Academy one student wants to be an engineer and another wants to be a forensic scientist.

> The biggest impact is that it has actually made her want to go into the sciences. She wants to be a forensic scientist now. She is just really intrigued to the point where she's in a program at school … through the YMCA, it's like a tutoring type program to help after school. They had asked them about some of the things they would like to do when they grow up and what were some of the careers and she said she wants to be a forensic scientist and they were actually able to get a forensic scientist to come in and talk to them because she made that suggestion. - (Hilary, interview, December 2006)

> …It opened them up to wanting to be engineers because I've never heard them say that. That's something they want to do in their lives and you don't hear too many black children speaking like that so I'm glad that the program is there for them that they would even want to think to be something more than what the average person is… - (Cynthia, interview, December 2006)

In Jordan Academy parents found an organized program with caring staff that impacted their children in various facets. The impacts of the program were confirmed through parent/student interactions, homework, the finale and other means. The opinions the African American parents had of Jordan Academy highlight their appreciation of a program that catered not only to the academic, but also to the personal and cultural dimension of the child.

Synopsis of Section II.

The opinions parents have of Jordan Academy were overwhelmingly positive. Parents believed that the experiences offered at Jordan Academy and the environment at Jordan Academy corresponded with what they wanted their children to experience. When parents compared Jordan Academy to formal school science, they believed that Jordan Academy offered children more hands-on instruction and more enriched science learning that was situated in real world contexts. Parents stated that they enrolled their children into the academy because of the cultural reinforcement their children would receive, the exposure to a university campus, the nurturing the children would experience, the trust they have in the academy staff, the exposure to math and science, and a sense of parental responsibility. The evaluations parents gave the academy were also positive. Parents liked the organization of the academy and the confirmation they received that their children were actually learning science. The only recommendations parents shared pertained to extending the academy in terms of duration and the grade levels from which it pulled its participants. Finally, parents believed that the academy positively impacted their children on an academic, cultural and personal level, thereby impacting the whole child.

Table 4

Descriptions of Categories and Themes

Aspect	Categories	Themes
Finding Experiences	**Discovering Jordan Academy:** Ways in which parents found out about enrichment program	**Informal Channels of Communication**: Utilizing personal contact to publicize events **Formal Channels of Communication**: Making information available but parents have to find it on their own.

Table 4 (continued).

Aspect	Categories	Themes
Ideal Program	**Instruction:** The way content is taught in the program	**Hands-On**: Using tactile experiences to teach science content **Real-Life Context**: Coursework that situates the science content in a real world situation
	Teacher Characteristics: Attributes of program instructors	**Science Background**: Experience the instructor has in science **Teacher Demeanor**: Teachers' expressed disposition when teaching science and the interactions a teacher may have with others **Teacher Impact**: Changes that occur in student as a result of what the teacher instills or encourages in students
Program Considerations	**Program Impact:** Influence the program may have on student	**Needs of Child**: Meeting the needs and interests of children **Cultural Reinforcement**: Supporting and teaching about student cultural heritage
	Program Structure: Guidelines and organization of the program	**Program Organization**: Methods to inform parents of the program's overall format and evidence of order **Child Safety**: Attributes of program that keep student safe
	Program Curriculum: The experiences parents wanted to constitute the informal science program experience	**Academic Focus:** Evidence of learning occurring in program **Experiential Variety**: Diversity of experiences offered to students in the program
Program Evaluation-Decision to Enroll	**Reasons for Enrollment:** Rational parents gave for enrolling their children in Jordan Academy	**Cultural Impact**: Influence parents believed the academy had on student identity as African Americans **Exposure to College Campus**: Significance of students experiencing life on a college campus **Caring, Nurturing, and Trustworthy Environment**: An environment that parents

Table 4 (continued).

Aspect	Categories	Themes
		believe is concerned for students and work to foster growth **Reinforcement in Math and Science**: Expose and encourage students in math and science **Parental Responsibility**: Role of the parent in giving child experiences that develop them.
Program Evaluation-Opinions about Program	**Jordan Academy versus School:** A comparison of Jordan Academy to the formal school setting	**Science Instruction**: Type of coursework instructors utilize with students **Science Content:** Authentic science experiences
	Evaluation of Jordan Academy: Parents' thoughts and experiences regarding Jordan Academy	**Confirmation of Learning**: Need parents shared to determine that learning has truly taken place at a program **Program Extension**: The wish that the informal science program lasted longer in terms of time
Program Evaluation-Perceived Effect of Program	**Impact of Jordan Academy:** Parents' perceived influence of Jordan Academy on students.	**Academic Impact:** Influence on student learning **Cultural Impact**: Reinforcement of student culture **Personal Impact:** Influence on students' views of life

Part III examines in relation to BCE the above findings that pertained to what transpired in Jordan Academy, what parents consider when enrolling their children into enrichment programs, and what the parents' conveyed about Jordan Academy. The BCE values that were reflected in the data organize this part of the chapter.

Part III: Themes with Respect to BCE

The following section highlights the study's findings and examines them in regards to Boykin's nine dimensions of Black Cultural Ethos: spirituality, harmony, movement, verve, affect, expressive individualism, communalism, orality, and social time perspective. The data garnered from this study support the notion that many of the occurrences in Jordan Academy as well as the desires and opinions of the African American parents interviewed are linked to BCE.

Figure 1 illustrates the themes that emerged from the data and how they relate to Boykin's dimensions of BCE. The BCE framework is represented by the large circle in the center of the diagram. The major questions that guide the study and their subsequent themes are represented by the outer circles. The themes that are reflected in BCE dimensions overlap and are contained in their circle of origin as well as the BCE center circle. The themes and related BCE dimensions are also color coded to better highlight their correspondence. Also, there are some themes that when examined alone do not align with a BCE dimension; however, when these themes are viewed in conjunction with other themes, they reflect dimensions of BCE. These themes (i.e., academic, personal, academic focus) are located outside of the inner BCE circle and are color coded to correspond with the dimensions that they align with when examined in tandem with

another theme (ex. cultural impact).

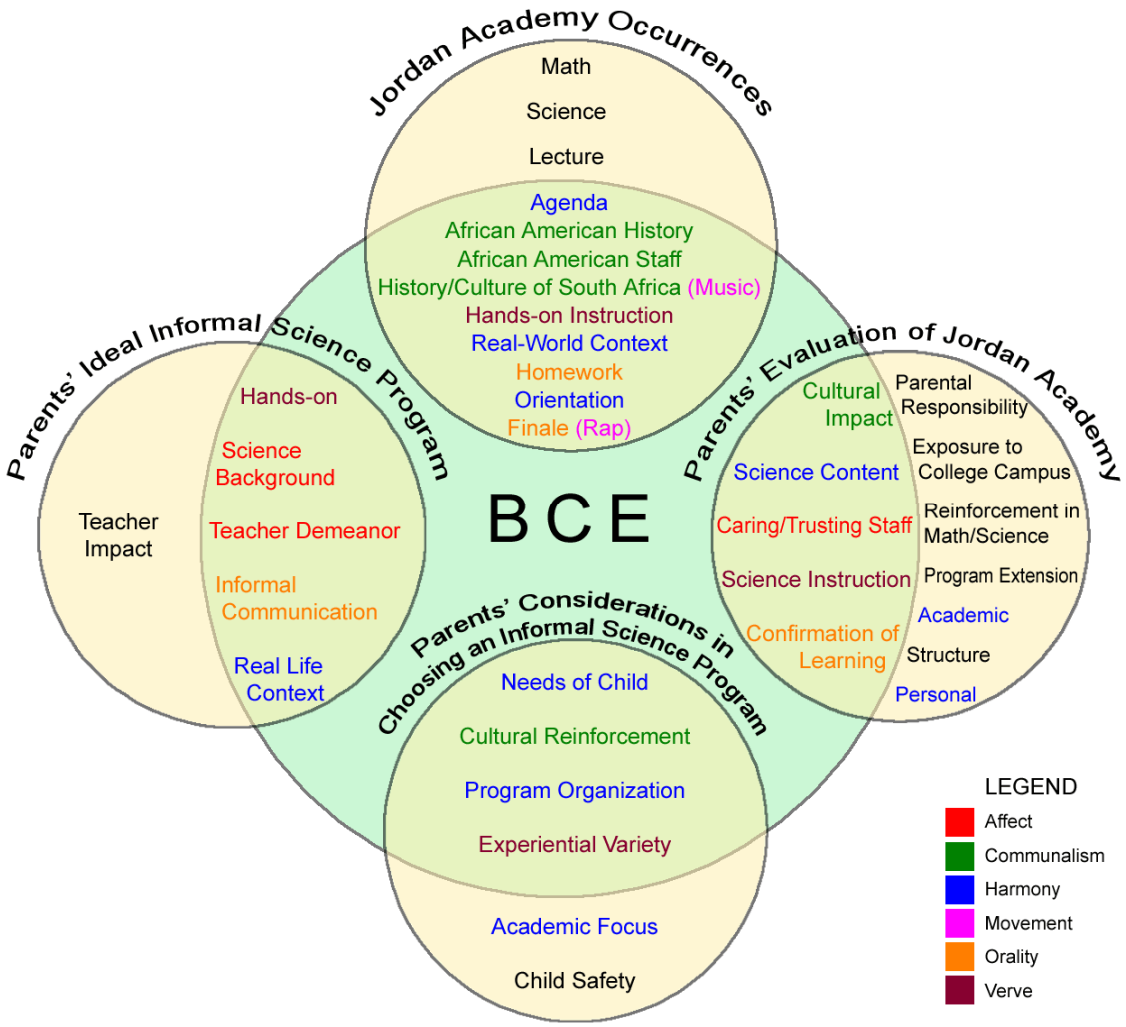

Figure 1. Themes that emerged in relation to Boykin's dimensions of Black cultural ethos.

As shown in the Venn diagram, the majority of the themes that emerged from the data are manifestations of BCE dimensions. The following findings are organized and discussed by the BCE values and then followed by the subsequent themes that emerged from the data. Each value is discussed under its own heading.

Not all of the values highlighted in Boykin's Black Cultural Ethos were reflected in the findings garnered from the data sources. The BCE dimensions of spirituality, expressive individualism, and social time perspective were not reflected or captured in

the data. However, of the nine dimensions, six emerged which includes: harmony, movement, verve, affect, communalism, and orality. I begin this discussion by focusing upon harmony, the BCE dimension that emerged as the predominant BCE value.

Harmony.

The findings of this study highlight the critical importance of harmony in the organization of Jordan Academy and the impact of this dimension on the African American parents' opinions of the program. Harmony is referred to as viewing a concept in a holistic manner rather than discretely. In varying contexts, harmony may be manifested differently. In instruction, harmony might be manifested in students completing concept maps to view how topics are interconnected. In nature, harmony may be manifested in a person viewing themselves as integrally connected to the environment. In approaches to the development of children, harmony is reflected in the nurturing of the whole child rather than one specific aspect of development like cognition.

The parents stated that they look for programs that address their children's needs. The theme "needs of the child" was broad and encompassed more than just academics-what one would expect from an academic enrichment program, but the child's social, emotional, and cultural development were also captured in the theme. In their views, the parents highlighted the cognitive (i.e, kinds of science activities, teacher competence in subject matter), the social (e.g., to be around other African Americans), the affective (i.e, teacher demeanor), and the cultural (e.g., role of African Americans in science and math). Parents reiterated this notion of developing the whole child in their sentiments regarding the impact of Jordan Academy upon their children. Parents shared that they believed

Jordan Academy impacted their children academically, culturally and personally. Examining in isolation each of the previously mentioned themes, only the theme of cultural impact aligned with BCE. However, if the various impacts are viewed in tandem then they, again, reflect harmony as the development of the whole child.

Harmony was also reflected in what happened at Jordan Academy. Its initial manifestation occurred at the outset of the program. The agenda and orientation offered parents both a holistic and particularistic overview of what students would learn during the week or day. The agenda and the orientation provided parents the big picture as well as the intricacies of the academy; the big picture fits the BCE dimension of harmony. Harmony was emphasized throughout the academy via instruction.

The real life context of the science instruction also reflects the BCE value harmony. In this case, harmony is manifested as the connection among parts. It was important to parents that the science their children learn be placed in context with the world and not separated into mere facts. Parents and teachers shared their thoughts that science in a real world context would motivate students and facilitate their comprehension of science concepts.

Communalism.

Allen and Boykin (1992) refer to communalism as the fundamental interdependence of people, where one places importance and priority on social bonds and interconnectedness with others. This also includes a sense of belonging to a group that one considers important and a source of pride from membership in the group. Parents in this study wanted informal science programs that would reinforce the African American cultural heritage of the child. Parents in this context believed it was important for their

children to learn about and be around other African Americans. The parents implicated the notion of a group identity as African Americans and the need for their children to feel a part of that group identity through their desires for the children to know their cultural heritage and for their culture to be reinforced in the program. The parents wanted the children to know themselves as African Americans both on a cognitive level and a social level. The parents' expectations not only addressed to what their children would be exposed but also under what conditions this exposure would occur.

The events at Jordan Academy which included learning about African American history and the history and culture of South Africa as well as interacting with other African Americans as peers and as role models met the parents' expectations. The parents believed that Jordan Academy impacted their children culturally. As denoted by the sentiments parents shared during the interviews, the cultural impact stemmed from parents' beliefs that Jordan Academy encouraged students in their understanding of a shared cultural heritage and facilitated the development of a social bond with other African Americans (students, staff, and professionals) and the community. All the aforementioned aligns with the premises of the BCE value communalism. Furthermore, the themes pertaining to trust and caring also reflected communalism which is most evident in the parents' beliefs that Jordan Academy viewed their children as part of a larger family community and as part of an African American community.

Orality.

The parents' expectations and preference for oral and aural communication and advertising is a perfect example of Boykin's BCE dimension of orality. Boykin's dimension of orality assigns a special importance to knowledge gained by word of mouth.

An analysis of the interview data revealed that most parents involved with Jordan Academy discovered the program through word of mouth. Parents also shared that they appreciated the homework that students were assigned and the finale program where students presented what they learned. Both the homework and the finale facilitated the development of orality. Via the homework assignments students were encouraged to talk to their parents about what they learned during the day at the Academy. During the finale a cumulative presentation was organized where students orally demonstrated, by grade level, what they learned. Parents seemed to trust the knowledge that their children conveyed orally as being proof enough that true learning occurred.

Movement.

Movement conveys the value placed upon rhythm and percussiveness in dance, gestures, and syncopated music. Two clear examples of movement are provided in the rotation stations and the finale. During the rotation stations students had the opportunity to interact with musical percussion instruments such as a South African drum and xylophone. This rotation station reflects the percussive and rhythm dynamic of the movement dimension. The second example of movement found in the data occurred during the summer 2006 finale. Classes presented to parents using a variety of formats. One class decided to present what they learned through rap. Using rap to convey information reflects the music and rhythm dynamic of movement. The finale also gave students the opportunity to incorporate other forms of BCE such as orality and verve; as described in the findings, some groups did an experiment while others performed a rap. Even though verve is not embodied in movement, it often accompanies it.

Verve.

Boykin describes verve as receptiveness to high levels of physical and sensate stimulation. Verve may be witnessed in high energy activities that offer students a variety of experiences. For parents, variation in curriculum was very important. Parents shared that they considered the experiential variety and diverse science topics of a program's curriculum before enrolling their child. It was important for parents to know that their children would experience a variety of science topics and that the program would give them as many opportunities as possible. Boykin (1979) shared that "Black children are bored primarily because school is relatively unstimulating, constraining, and monotonous place…" (p. 354). Jordan Academy parents realized and shared that through the formal school setting students were often not challenged and not excited about science.

Affect.

The BCE dimension of affect values emotions and the expression and cultivation of those feelings. Parents' ideal informal science program as well as their opinions of Jordan Academy included components that reflect affect. The characteristics of program instructors were implicated by parents in their views of an ideal program. Parents explained that they wanted the following characteristics in their ideal academy teacher: a science background, a child friendly demeanor, and an impact on students. Parents stated that the science background of the teacher was important because they believed the background would engender enthusiasm for the subject in students. Although a science background is not a manifestation of BCE, the desired outcome of a student having enthusiasm for the subject align with the BCE dimension of affect. The teacher

characteristic of a child-friendly demeanor also reflects Boykin's BCE dimension of affect. Regarding the evaluation of Jordan Academy, parents viewed the academy as nurturing and shared that they trusted the staff of the program. The themes of trust and caring also reflect affect.

Summary

Jordan Academy, as an informal science program, was structured such that the African American parents interviewed felt it truly benefited their children in a holistic way. While some programs may focus on the cognitive realm (the science), Jordan Academy offered a program that impacted children academically, culturally, and personally. For parents, Jordan Academy offered them something they had not witnessed in the formal school setting. Many of the BCE values that parents shared they wanted in an ideal program were reflected in Jordan Academy.

Chapter Synopsis

This chapter presented the data that were obtained from Jordan Academy classroom observations, field notes, student evaluations, photographs and academy curricula well as interviews with Jordan Academy staff and parents. The findings indicated that what occurred during the academy, what parents want and appreciate in an informal science experience and parents' perspectives of Jordan Academy corresponded conceptually to six of nine dimensions in Boykin's cultural framework of Black Cultural Ethos. Chapter five highlights the significance and implication of this study's findings.

CHAPTER V

The goal of this research was to determine what aspects of an informal science education program made it successful in recruiting African American parents and their children. In this chapter, I summarize the problem addressed by the study and findings of the study. I discuss the implications of the findings for research and practice in informal science. I also describe the limitations of the study and present issues for future research.

The problem presented in chapter one highlights the lack of involvement of African Americans in informal science education and the plausible cultural mismatch between informal science education and BCE. In Simpson's (2003) study, informal science educators in museum settings who had varied years of experience complained of the difficulties of recruiting and retaining African American participants, both teachers and students. Stake and Mares (2001) also reported difficulties in recruiting under-represented minorities for their informal science programs. Stake and Mares (2001) suggested that science education researchers should investigate the under-representation of minority groups in informal science education programs and determine how to attract them to science enrichment programs. In an attempt to shed light on this recruitment and retention dilemma, this study examined what occurred in an informal science enrichment program that successfully recruits African American students, what parents considered before they enrolled their children into a program, what their opinions were of the program in question and if the previously stated events reflected BCE. The study addressed the following questions:

(1) What happens in Jordan Academy, an enrichment program that has successfully recruited African American students?

(2) Do the occurrences in Jordan Academy align with Black Cultural Ethos (BCE)? If so, how?

(3) What do African American parents/ guardians consider when they enroll their children into an informal science education enrichment program?

(4) Do the African American parents'/ guardians' considerations align with BCE? If so, how?

(5) What are the African American parents'/ guardians' opinions about the program?

(6) Do the African American parents'/guardians' opinions of the program align with BCE? If so, how?

Discussion

Participant interviews revealed that the African American parents in the study believed in the importance of science education in the lives of their children. The fact that Jordan Academy was a math and science program piqued the interest of the parents, yet, they were looking for more than simply science enrichment. Results indicated that the parents wanted an informal science program that met their children's academic and personal needs of their children. In every domain investigated in the study, parents spoke of the impact they wanted an informal science program to have or the impact Jordan Academy had. The impact, both in the present and in the future, was viewed as more than merely academic.

Parents wanted a program with conditions that were optimal for learning and personal growth. It is evident from the results that the African American parents in this study shared certain cultural values regarding what they wanted in an informal science program and what they liked about Jordan Academy. Parents overwhelmingly reiterated

that they wanted a program that impacted their children in a holistic fashion: academically, culturally, and internally. This holistic way of viewing the potential impact of an informal science program on a child aligned with Boykin's BCE notion of harmony. Also, repeatedly present in the findings is the fact that parents wanted the science that was taught to vary, a characteristic they also esteemed about Jordan Academy. The notion of variety whether in the science topics, in the students' experiences, or in the instruction aligned with BCE value of verve. These two values, verve and harmony, were the dominant BCE characteristics reflected in the data, but others such as communalism and affect were present in the parents' emphases upon nurturing and caring. The findings of this study offer a unique perspective from which to examine what parents want from an informal science program, what they think of a program, and how an informal science program can reach out to its community.

In Chapters I and II, the tension among mainstream and BCE was presented. The views the African American parents shared in this study provide examples of how this tension is manifested via what they consider when deciding upon their children's enrollment in informal science education programs; what they desire from such programs; and what they want for their children. Parents shared that, unlike schooling in formal settings, Jordan Academy provided opportunities that developed their children culturally, academically, and internally.

The parents' views also corresponded with findings from previous research in informal science education. More specifically, the findings pertaining to cultural impact resonated with findings from previous research. In the Jones (1997) study, students shared their appreciation for the program connecting science to Africa. Parents and

students in Jordan Academy also shared their appreciation of having a cultural connection to the science they learned. The very nature of the findings has implications for informal science education programs and illuminates areas warranting more research.

Implications

As previously mentioned in Chapter I, there is an underrepresentation of African Americans in science and engineering fields. It is believed that African American students may become discouraged from pursuing science and engineering careers because of a cultural mismatch between a student's home life and the school culture. Cultural incongruence between students' life worlds and educative experiences was posited as one perspective from which to view the under-representation of African American and other students of color in science and engineering fields. This cultural mismatch was the framework for this study. This research study proceeded upon the premise that informal science education may be one avenue that can foster crossing the borders between the culture of science and students' cultures.

The possible implications of this study are numerous and offer insights for both practice and research in informal science education. For instance, there was a clear disconnect between the methods informal programs use to advertise and how parents believed they should advertise. Parents believed that schools should be informed about informal programs for students. One action informal programs can take is to work in conjunction with schools to advertise their programs. Informal programs may also begin to reach out to diverse populations by going to events and organizations that are important to those groups, such as community meetings or churches, and presenting

information about their services in ways that are culturally valued by their targeted populations.

Informal science programs may also want to begin to take into consideration the cultural values of their community. For instance, for the African American parents in this study, harmony was a major desire for an informal science program and asset for Jordan Academy. Informal science programs serving populations with a harmony perspective may want to develop a multifaceted program that not only focuses on the academic aspect, but also on the cultural by teaching about contributions diverse populations have made in science. Harmony may also be shared through activities or exhibits that highlight the science concepts as they interconnect to nature and humanity. Informal science programs may encourage groups with verve and movement perspectives by offering more hands-on activities and interaction with exhibits as well as changing programs or exhibits more often. The willingness of an informal program to examine itself and the cultural messages it conveys to its public may illustrate to the public that the institution cares about its community which may be very powerful for individuals that value the affective dimension.

Oftentimes, programs and literature adopt a deficit view in explaining the lack of participation of students of color. A deficit model entertains what is wrong with certain populations to determine why they are not engaged in certain informal science programs. The deficit model also puts the onus on the various cultural groups to change, or in some cases, abandon their own culture in order to be able to participate in and experience what these programs have to offer. In her book entitled *The Museum in Transition,* Hein (2000) insinuated that unintended messages may be conveyed by informal science

programs. Hein (2000) asserted that museums continue to be seen as places of social and intellectual privilege. In lieu of acting upon a deficit perspective, informal programs should conduct self-evaluations of their own programs to determine if there are any cultural cues that they are projecting that may turn away certain ethnic groups. The evaluations of such cues is essential in making thoughtful and informed changes in informal science education experiences that are likely to result in increased participation of diverse groups.

Limitations of the Study and Future Research.

Although the findings are significant, there are limitations of this study. These limitations pertain to the qualitative nature of the research. It is understood that every research method has inherent limitations of its own. For this particular study, my status as an African American conducting the interviews may have influenced the responses provided by the participants who were also African American. To address this limitation, I used a variety of data sources and triangulated the findings across them. Also, the nature of qualitative data means that findings are information rich, but case dependent. The case dependency of the findings eliminates generalizing the findings beyond the context of Jordan Academy and the study participants. Also, the fact that all parents interviewed were females may be a limitation since the African American male parent may offer different perspectives. However, this research highlights African American perspectives that few research studies in informal science education have examined and warrants future investigation in other settings and with more participants.

In my study, the primary focus was the perspective of parents. In recruiting and retaining African Americans in informal science education enrichment programs, the

views of students are of utmost importance. Future studies should interview students on a longitudinal basis to assess their views of science by way of informal and formal settings and their views of individuals who do science within those settings. In this study, results found that parents viewed the science at Jordan Academy differently than the science taught at school, but the study did not examine the views of students. Do students hold the same or similar perceptions? How do the students view themselves in a context like Jordan Academy and, in relation to formal settings, how do the students' perceptions, roles, and participation differ? Another topic worthy of study is teachers' perceptions of students in the formal classroom versus an informal program such as Jordan Academy.

Future studies could also examine students and the impact of an informal science program on their perceptions of science. For example, students who feel they cannot succeed in school science without compromising their identity may feel more at ease at engaging in science during an informal science experience. Future studies may also examine inter-group interaction while at informal science institutions. For instance, in a setting that does not evaluate students' performances like informal science settings, are students from different groups more likely to work well together?

Most science education research regarding African American students has been conducted in the formal school setting; research in informal education is scarce. Informal science environments offer a possible means of engaging African American students in science. Clearly more research is needed in the endeavor to make science in the informal setting as inclusive as possible. This study is one step in that direction.

References

Aaronsohn, E. A., Carter, C. J., & Howell, M. (1995). Preparing monocultural teachers for a multicultural world: Attitudes toward inner-city schools. *Equity & Excellence in Education, 28*(1), 5-8.

Abt-Perkins, D., & Gomez, M. L. (1993). A Good Place to Begin - Examining Our Personal Perspectives. *Language Arts, 70*, 193-202.

Aikenhead. (1996). Science Education: Border Crossing into the Subculture of Science. *Science Education, 27*, 1-52.

Aikenhead. (1998). Many Students Cross Cultural Borders To Learn Science: Implications for Teaching. *Australian Science Teachers Journal, 98*(4), 9-13.

Aikenhead, & Otsuji. (2000). Japanese and Canadian Science Teachers' Views on Science and Culture. *Journal of Science Teacher Education, 11*(4), 277-299.

Allen, B., & Boykin, W. (1992). African-American Children and the Educational Process: Alleviating Cultural Discontinuity through Prescriptive Pedagogy. *School Psychology Review, 21*(4), 586-596.

American Competitiveness Initiative. (2006). American Competitiveness Initiative: Leading the World in Innovation [Electronic Version]. Retrieved March 10, 2006 from http://www.whitehouse.gov/stateoftheunion/2006/aci/index.html.

Atwater. (2000). Equity for Black Americans in Precollege Science. *Science Education, 84*(2), 154-179.

Bell, R., Smetana, L., & Binns, I. (2005). Simplifying Inquiry Instruction: Assessing the Inquiry Level of Classroom Activities. *Science Teacher, 72*(7), 30-34.

Boykin. (1979). Psychological/ behavioral verse: Some theoretical explorations and empirical manifestations. In A. W. Boykin, A. Franklin & J. Yates (Eds.), *Research directions of Black psychologists* (pp. 351-167). New York Russell Sage.

Boykin. (1986). The Triple Quandry and the Schooling of Afro-American Children. In U. Neisser (Ed.), *The School Achievement of Minority Children: New Perspectives* (pp. 57-92). Hillsdale, NJ: Lawrence Erlbaum Associates.

Boykin. (1994). Afrocultural Expression and Its Implications for Schooling. In E. R. Hollins, J. E. King & W. C. Hayman (Eds.), *Teaching Diverse Populations: Formulating a Knowledge Base* (pp. 243-256). Albany, NY: State University of New York Press, Albany.

Boykin, & Allen, B. (2000). Beyond Deficit and Difference: Psychological Integrity in Developmental Research. In C. Yeakey (Ed.), *Edmond W. Gordon: Producing Knowledge, Pursuing Understanding* (pp. 15-34). Stamford, CT: JAI Press, Inc.

Boykin, Allen, B., Davis, L., & Senior, A. (1997). Task Performance of Black and White children Across Levels of Presentation Variability. *The Journal of Psychology, 131*(4), 427-437.

Boykin, & Toms, F. (1985). Black Child Socialization: A Conceptual Framework. In H. McAdoo & J. McAdoo (Eds.), *Black Children: Social, Educational, and Parental Environments* (pp. 33-51). London: Sage Publications.

Boykin, Tyler, K. M., & Miller, O. (2005). In Search of Cultural Themes and Their Expressions in the Dynamics of Classroom Life. *Urban Education, 40*(5), 521-549.

Broad, W. (2005, October 13). Top advisory panel warns of erosion of the U.S. competitive edge in science. *New York Times,* p. 22.

Costa, V. B. (1995). When Science Is "Another World": Relationships between Worlds of Family, Friends, School, and Science. *Science Education, 79*(3), 313-333.

Crane, V., Chen, M., Bitgood, S., Serrel, B., Thompson, D., Nicholson, H., et al. (1994). *Informal Science Learning: What the Research Says About Television, Science Museums, and Community-Based Projects*. Dedham, MA: Research Communications Ltd.

Creswell, J. (1998). *Qualitative Inquiry and Research Design: Choosing Among Five Traditions*. Thousand Oaks, California: Sage Publications.

Elmesky, R., & Tobin, K. (2005). Expanding Our Understandings of Urban Science Education by Expanding the Roles of Students as Researchers. *Journal of Research in Science Teaching, 42*(7), 807–828.

Falk, J. H., & Dierking, L. D. (1992). *The Museum Experience*. Washington, D.C.: Whalesback Books.

Foster, M. (1994). Effective Black Teachers. In E. R. Hollins, J. E. King & W. C. Hayman (Eds.), *Teaching Diverse Populations: Formulating a Knowledge Base* (pp. 289). Albany, NY: State University of New York Press.

Gall, Gall, & Borg. (2003). *Educational Research: An Introduction* (7th ed.). Boston, MA: Pearson Education, Inc.

Gay, G. (2000). *Culturally Responsive Teaching: Theory, Research and Practice*. New York: Teachers College Press.

Gerber, B. (2000). Effects of a Science Intervention Program on Middle-Grade Student Achievement and Attitudes. *School Science and Mathematics, 100*(5), 236-242.

Gilbert, A., & Yerrick, R. (2001). Same school, separate worlds: A sociocultural study of identity, resistance, and negotiation in a rural, lower track science classroom. *Journal of Research in Science Teaching, 38*, 574-598.

Gutierrez, & Rogoff. (2003). Cultural Ways of Learning: Individual Traits or Repertoires of Practice. *Educational Researcher, 32*(5), 19-25.

Gutierrez, K. D., & Rogoff, B. (2003). Cultural Ways of Learning: Individual Traits or Repertoires of Practice. *Educational Researcher, 32*(5), 19-25.

Hein, H. S. (2000). *The Museum in Transition*. Washington: Solsticesonian Institution Press.

Hernstein, & Murray. (1994). *The Bell Curve*. New York: Free Press.

Jones, L. (1997). Opening Doors with Informal Science: Exposure and Access for Our Underserved Students. *81*, 663-677.

Kelly, G. J., Carlsen, W. S., & Cunningham, C. M. (1993). Science education in socio-cultural context: Perspectives from the sociology of science. *Science Education, 77*, 207-220.

Kochman, T. (1983). *Black and White Styles in Conflict* Chicago: University Of Chicago Press.

Ladson-Billings, G. (1994). *The Dreamkeepers*. San Francisco, CA: Jossey-Bass.

Lee, O. (1999). Science Knowledge, World Views, and Information Sources in Social and Cultural Contexts: Making Sense After a Natural Disaster. *American Educational Research Journal, 36*(2), 187-219.

Lincoln, Y., & Guba, E. (1985). *Naturalistic Inquiry*. Thousand Oaks, California: Sage Publications.

MacIvor, M. (1995). Redefining science education for Aboriginal students. In M. Battiste & J. Barman (Eds.), *First Nations Education in Canada: the circle unfolds* (pp. 73-98). Vancouver: University of British Columbia Press.

Maple, S. A., & Stage, F. K. (1991). Influences on the Choice of Math/Science Major by Gender and Ethnicity *American Educational Research Journal,, 28*(1), 37-60.

Miles, M., & Huberman, M. (1994). *Qualitative data analysis : an expanded sourcebook* (2nd ed.). Thousand Oaks, California: Sage Publications.

Mintzes, J., & Wandersee, J. (1997). Reform and innovation in science teaching: A human constructivist view. In J. Mintzes, J. Wandersee & J. Novak (Eds.), *Teaching science for understanding: A human constructivist view* (pp. 41-58). New York: Academic Press.

National Assessment of Educational Progress. (2005). *Nations Report Card*.

National Center for Education Statistics. (2004). Educational achievement and black white inequality. from http://nces.ed.gov/das/library/tables_listings/show_nedrc.asp?rt=p&tableID=2077

NSTA. (1999). NSTA Position Statement: Multicultural Science Education. Retrieved April 2006, from http://www.nsta.org/positionstatement&psid=21

Ogbu. (1992). Understanding Cultural Diversity and Learning. *Educational Researcher, 21*(8), 5-14.

Patton, M. (2002). *Qualitative Research and Evaluation Methods* (3rd ed.). Thousand Oaks: Sage Publications, Inc.

Peshkin, A. (1992). The relationship between culture and curriculum: A many fitting thing. In P. Jackson (Ed.), *Handbook of research on curriculum: A project of the American Educational Research Association* (pp. 248-267). New York: MacMillian Publishing Company.

Phelan, P., Davidson, A., & Cao, H. (1991). Students' multiple worlds: Negotiating the boundaries of family, peer, and school cultures. *Anthropology and Education Quarterly, 22*, 224-250.

Prager. (1982). American racial ideology as collective representation. *Ethnic and Minority Racial Studies, 5*, 99-119.

Rahm, J. (2002). Emergent learning opportunities in an inner-city youth gardening program. *Journal of Research in Science Teaching, 39*(2), 164-184.

Rascoe, B., & Atwater, M. (2005). Black Males' Self-Perceptions of Academic Ability and Gifted Potential in Advanced Sciences Classes. *Journal of Research in Science Teaching, 42*(8), 888-911.

Rennie, L. J., Feher, E., Dierking, L. D., & Falk, J. H. (2003). Toward an Agenda for Advancing Research on Science Learning in Out-of-School Settings. *Journal of Research in Science Teaching, 40*(2), 112-120.

Roth, W.-M., Tobin, K., Carambo, C., & Dalland, C. (2004). Coteaching: Creating Resources for Learning and Learning to Teach Chemistry in Urban High Schools. *Journal of Research in Science Teaching, 41*(9), 882–904.

Russell, M. L., & Atwater, M. M. (2005). Traveling the Road to Success: A Discourse on Persistence Throughout the Science Pipeline With African American Students at a Predominantly White Institution. *Journal of Research in Science Teaching, 42*(6), 691-715.

Seiler, G. (2001). Reversing the ``Standard" Direction: Science Emerging from the Lives of African American Students. *Journal of Research in Science Teaching, 38*(9), 1000-1014.

Shade, B. (1994). Understanding the African American Learner. In E. R. Hollins, J. E. King & W. C. Hayman (Eds.), *Teaching Diverse Populations: Formulating a Knowledge Base* (pp. 175-189). New York: State University of New York Press.

Shade, B. (1997). Culture: The Key to Adaptation. In B. Shade (Ed.), *Culture, style, and the educative process: Making schools work for racially diverse students* (pp. 5-11). Springfield, IL: Charles C. Thomas Publisher.

Simpson, J. (2003). *Science Educators' Concerns Regarding Racial/Ethnic Diversity Issues in Science Education.* North Carolina State University, Raleigh.

Solstice, F. M., & Hausafus, C. O. (1998). Relationship of family support and ethnic minority students' achievement in science and mathematics. *Science Education, 82*, 111-125.

Stake, J. E., & Mares, K. R. (2001). Science Enrichment Programs for Gifted High School Girls and Boys: Predictors of Program Impact on Science Confidence and Motivation. *Journal of Research in Science Teaching, 38*(10), 1065-1088.

Task Force on the Future of American Innovation. (2005). The Knowledge Economy: Is the United States Losing It's Competitive Edge? Benchmarks of our Innovative Future [Electronic Version]. Retrieved March 10, 2006 from http://www.futureofinnovation.org/PDF/Benchmarks.pdf.

Terrill, M. M., & Mark, D. L. H. (2000). Preservice Teachers' Expectations for Schools With Children of Color and Second-Language Learners. *Journal of Teacher Education, 51*(2), 149-155.

Tobin, K., Tippins, D., & Gallard, A. J. (1994). Research on instructional strategies for teaching science. In D. Gabel (Ed.), *Handbook of research on science teaching and learning: A project of the National Science Teachers Association* (pp. 45-92). New York: MacMillan Publishing Company.

US Department of Education. (2006). Increasing America's Competitiveness [Electronic Version]. Retrieved February 2006.

Valencia, R. (1997). *The evolution of deficit thinking : educational thought and practice*. Washington, D.C.: Falmer Press.

Vasquez. (1990). Teaching to the Distinctive Traits of Minority Students. *The Clearing House, 63*.

APPENDICES

Appendix A

Parent Interview Questions:

- How did you hear about Jordan Academy program?

- **Informal science** education is defined as: *free choice, non-evaluative, and non-threatening learning environments that promote and nurture learning*.
  - (Ex. Museums, Science centers, etc.)
  - What do you think of other informal science experiences?

- In your opinion, how does this experience compare (different/same) to what children do in schools to learn science?

- If you could create the perfect informal science program for you to enroll your child in, what types of
  - Activities would the students participate in?,
  - Work would you have students do?
  - What type of teachers' personalities would you like to see?

- Are you interested in science? If so, how would you describe your interest? For instance, are you very excited about science or only certain topics in science.
  - If not, why aren't you interested in science?
  - Were you interested in science in school?

- Can you tell me about your experiences in science both inside and outside of school as a child?

- Why did you specifically enroll your child(ren) into Jordan Academy program?

- What were your opinions of the program (during/after)?

- What do you look for in a program to place your child in?
- What do you hope your child(ren) gain as a result of being in this (Jordan Academy) informal science program?
- How is Jordan Academy like or unlike formal school science?
- What impact, if any, do you believe Jordan Academy has had on your child?
- Will you enroll you child in Jordan Academy again? Why or why not?

Appendix B

Parent Questionnaire

- **Collect demographic data:**
  - What is your gender?
    Female
    Male
  - What is your age?
    25 or under
    26-40
    41-55
    56 or older
  - What is your current household income in U.S. dollars?
    Under $10,000
    $10,000 - $19,999
    $20,000 - $29,999
    $30,000 - $39,999
    $40,000 - $49,999
    $50,000 - $74,999
    $75,000 - $99,999
    $100,000 - $150,000
    Over $150,000
    Would rather not say
  - What is the highest level of education you have completed?
    - Some high school
    - High school graduate
    - Some college
    - Associate's degree
    - Bachelor's degree
    - Master's degree
    - Doctoral degree
    - Professional degree (ex. MD, DDS, DVM, LLM, JD)
  - What is your current marital status?
    Divorced
    Living with another
    Married
    Separated
    Single
    Widowed
    Would rather not say

- Which of the following best describes the area you live in?
  Urban - city or densely populated area
  Suburban - a residential district located on the outskirts of a city
  Rural - living in or characteristic of farming or country life

- Race/Ethnicity:

- Occupation:

- Number of children enrolled in program:

- Number of times their child(ren) has/have attended:

- **Informal science** education is defined as: *free choice, non-evaluative, and non-threatening learning environments that promote and nurture learning*.
  Have you had previous experience with informal science (parent & child)? If yes, what program(s)?

- Do you have/do supplemental science at home (kits, internet, encyclopedia)? If so, what?

Appendix C

Teacher Interview Questions

- Why do you teach at Jordan Academy?

- In your opinion, how does this experience compare (different/same) to what children do in schools to learn science?

- What do you hope students gain as a result of being in your class at Jordan Academy?

- What kind of activities do you like to have students do in your class?

- What is your teaching philosophy?

Appendix D

STUDENT SURVEY FORM

1. Is this the first time you have been to Jordan Academy?

   Yes ____ No_____ What grade are you in? _____

2. Name TWO things that you learned in math during this session of Jordan Academy.

   _____

   _____

3. Name TWO things that you learned in science during this session of Jordan Academy.

   _____

   _____

4. Name TWO things that you learned about African Americans during this session of Jordan Academy.

   _____

   _____

5. Would you like to come to another Jordan Academy session, even if you are in the 6^{th} grade?

   Yes _____ No _____

   Explain why?

   _____

6. Please rank the activities of this session of Jordan Academy from 1 to 7, with "1" being the activity you liked MOST and "7" being the activity you liked LEAST.

   _____ MATH

   _____ SCIENCE

   _____ AFRICAN AMERICAN HISTORY

   _____ FORENSIC SCIENCE

   _____ SPAGHETTI BRIDGE, ROBOTICS, PLOTTING GRAPHS

   _____ HOW TO MAKE A POSTER

   _____ JOURNALING AND DISCUSSIONS WITH PARENTS

7. What would you do to make this summer's session of Jordan Academy better?

   _____

   _____

   _____

8. Make any additional comments here:

   _____

   _____

   _____

   _____

   _____

Appendix E

Jordan Academy

October 30, 2006

EVALUATION

1. What grade are you in? (Circle)

   3rd 4th 5th 6th

2. Have you attended Jordan Academy before?

   Yes No

3. What was your last grade on your report card in MATH?

   4 3* 3 2 1 A B C D F

4. What was your last grade on your report card in SCIENCE?

   4 3* 3 2 1 A B C D F

Rate the following statements (#5 thru #15) by circling the correct response where 5=strongly agree, 4=agree, 3=neutral, 2=disagree, 1=strongly disagree

5. During this session of Jordan Academy, I learned something new in morning

   MATH 5 4 3 2 1

6. During this session of Jordan Academy, I learned something new in morning

   SCIENCE 5 4 3 2 1

7. During this session of Jordan Academy, material was covered that was a review of work I am doing at my school this year

   5 4 3 2 1

8. I want to return to Jordan Academy again.

   5 4 3 2 1

9. I think the things I learned during Jordan Academy today will help me with my schoolwork. 5 4 3 2 1

10. I enjoyed learning about weather in South Africa

5 4 3 2 1

11. I enjoyed learning about weather in forensics

5 4 3 2 1

12. I enjoyed learning about the history of South Africa and about African and African American Scientists and Mathematicians

5 4 3 2 1

13. I enjoyed learning about the Culture of South Africa

5 4 3 2 1

14. I enjoyed MATH during the Rotations at Witherspoon

5 4 3 2 1

15. Tell the one thing that you liked *most* about Jordan Academy today

---

16. Tell the one thing that you liked *least* about Jordan Academy today.
