Urban Education Reform: A Qualitative Study of Change in Selected District and

Public Charter High Schools

by

Victoria Jean Milazzo Bigelow

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Higher Education)
In the University of Michigan
2013

Doctoral Committee:

       Professor Edward P. St. John, Chair
       Professor Phillip J. Bowman
       Professor Daniel M. Burns, Jr.
       Emeritus Professor George I. Shirley

2013

Dedication

I dedicate this dissertation to my family: to my children, Nicole Elise Bigelow Cluley, Angelica Noelle Bigelow Kearns, and Michael William Bigelow, the muses who inspire me to do great things and to be a better person every day; to my sons-in-law, Andrew George Cluley and Ryan Patrick Kearns, sources of love for my daughters and sources of support and encouragement for me; to my first grandchild, Brady Patrick Kearns, in the hope this dissertation will give him a reason to be proud of his grandmother, inspire him to be curious, and to encourage him to work for things beyond his own needs; to my brilliant and talented mother, Jean Theresa Wallace Milazzo, for being a resourceful role model, instilling a strong work ethic, and teaching me to persevere in the face of seemingly insurmountable challenges; **and, most of all, I dedicate this dissertation to my father, Tony Carl Milazzo, EdD**, who dedicated hundreds of hours reading drafts, provided advice and endless encouragement, and, without whom, I may never have achieved this milestone.

> I heard it said, that people come into our lives for a reason, bringing something we must learn. And we are led by those who help us most to grow, if we let them, and we help them in return. Well, I don't know that I believe that's true. But, I know I'm who I am today, because I knew you. . . Like a comet pulled from orbit, as it passes the sun. Like a stream that meets a boulder, halfway through the woods. Who can say if I've been changed for the better? But. . . because I knew you, I have been changed for good.

For Good (from Wicked) by Stephen Schwartz (2003)

Acknowledgements

First, I would like to acknowledge the holy art, music. William Shakespeare said, "The man that hath no music in himself, nor is not moved with concord of sweet sounds, is fit for treasons, stratagems, and spoils." Hopefully, then, the fact that music IS so much a part of me speaks well for my good intentions with regard to this research. I cannot begin to describe the important role music has played in my doctoral process and in the completion of this dissertation. Music is an anchor in my life. It keeps me sane and feeds my soul. There were so many times when I turned to music to lift my mood, to keep me going, to celebrate my successes, and help me get through difficult times. "Du holde kunst, ich danke dir dafur[1]." (Von Shober)

I want to give special acknowledgement to the research team and those who organized and participated in the interviews at the eight case schools. Without their willingness to give of their time and to tell their stories, this dissertation would not have been possible.

I would also like to thank Professor Edward P. St. John for his guidance; for offering me a place on his research team; and for helping me to grow and gain visibility as a scholar through the many opportunities he has given me to do and publish interesting

---

[1] The German to English translation is: "You holy art, for this I thank you." Franz Schubert set Von Shober's text to music in his popular German lied *An die Musik.*

and meaningful work. I would especially like to thank him for chairing my dissertation committee.

I thank my committee, including Professor St. John, and Professors Phillip Bowman, Daniel Burns, Jr., and Professor Emeritus George Shirley for reviewing my work and for offering advice and guidance.

Special thanks to Professor Emeritus Marvin Peterson for providing helpful insights into organizational aspects of my study and to our CSHPE director, Associate Professor Michael Bastedo, for sharing resources and offering workshops on qualitative research.

There are also a number of others who supported me during this long journey toward completing my doctoral degree. I would like to thank Roger E. Bigelow, MD, for convincing me that I had the intelligence and talent to do anything I set my mind to and for providing some financial support for my doctoral work. I would also like to thank my father, Tony Milazzo, again and again for all of his extraordinary effort to see me to the finish. I often felt like Sisyphus rolling a boulder up a steep hill. However, my father was right there cheering me on, nagging me, arguing with me, editing, staying up all night reading, buying countless ink cartridges for his printer, giving advice, threatening me, but most of all supporting me to get the thing done and to make my mark.

I wish to acknowledge the strong, intelligent, resourceful women in my family who have been role models and inspirations for me throughout my life. They include Jean Milazzo, Catherine Burns, Marion Wallace, Mary Bigelow, M. Elizabeth Chinn, Joan Clarke, Judith Randall, and Janet Tayman. Their examples have influenced me to strive

to succeed, to advocate for my goals, to take on leadership roles on the issues I believe in, to persevere in the face of challenges, to apply myself, and to never set limits on what I can do.

I would also like to thank the friends and mentors who have influenced and supported me, including: Caroline and Felix Rogers; Judith and Michael DuLong; David and Marcia Bigelow; Vanessa and James Ferriole; James and Rebecca Coffin; Jeff Bigelow and Kim Mackenzie; Janet Bigelow; Shawn McDonald; Jacqueline Csurgai-Schmitt; Maureen Kennedy; Sylvia Gleason; Andrea J. Lee, IHM;[2] Bernie Les; JoAnn Cusmano; Mary Lou Schroff; William Bigelow, Chaepyong (JP) Song; Mary Katherine Hamilton, IHM; John R. Novak, Jr.; E. Harden Graves; Chukwunyere Okezie; Judith Heinen; Glenda Price; Steffanie Bowles; Vivian Johnson; Joan Littman; Gale McFedries; Mary Ann Dalton, SSJ[3]; James Rivard; Suzanne Mallare Acton; Kim Henderson; Caroline Helton; Cindy Veenstra; Anthony McGlaun; Elaine Dowell; Jerry Caldwell; Henry Meares; Joseph Lupo; Annette Lakein; the late Mary Frances Fridley; Dr. Yvonne Friday; Michigan Opera Theatre; and the Rackham Symphony Choir.

Linda Rayle, Senior Student Services Coordinator, and Melinda Richardson, Assistant Director of the Center for the Study of Higher and Postsecondary Education

---

[2] IHM is the abbreviation for Sisters, Servants of the Immaculate Hear of Mary, a Catholic institute of sisters committed to social justice, education, peace, and a sustainable way of living. The IHM sisters sponsored Marygrove College, which has been located in Detroit since 1927. I attended Marygrove College and worked there for sixteen years.

[3] SSJ is the abbreviation for Sisters of St. Joseph, a Catholic institute of sisters committed to education, healthcare, housing, social services, and spirituality.

(CSHPE), both deserve special acknowledgement and thanks. Throughout my doctoral program, they have been constant sources of technical assistance, reliable information, empathetic listening, and endless support and encouragement. I was a part-time student through much of the time I was in the program. I was without a cohort after my first year and did not always have fellow students to turn to for support. I cannot thank Linda and Melinda enough for being there for me.

Finally, I want to thank my children for their sacrifice and extreme patience in waiting for me to finish my doctoral degree and this dissertation. I hope you are proud of your mother and think it was all worth it.

Table of Contents

List of Tables

List of Figures

Abstract

This dissertation examines how eight urban high schools responded to mandates
to raise graduation requirements in mathematics. The change process was complicated by
challenges such as the conditions of poverty, lack of adequate financial support for
schools, and large numbers of students who come to high school with inadequate
preparation in mathematics. Using a qualitative multiple-case study approach, the
dissertation examined and compared patterns of change in four public charter schools and
four district-accountable high schools. The schools used a range of school reform models
such as early college, schools within schools, and schools with curricula linked to career
themes. Data was collected from interviews with teachers, administrators in eight schools
and with students, adult mentors, and program directors in four schools. Additional
information sources included document analysis and observations.

The study used a three-level approach to analysis: differences in organizational
adaptation in public charter schools compared to district-accountable schools; schools'
adaptation of the mathematics curriculum to meet new requirements; and social support
processes that helped motivate students. The comparison reveals that: 1) the charter
schools were free from centralized district governance, but school-level adaptivity could
be constrained by other management structures exerting top-down control; 2) mandates
for college-preparatory standards posed capacity-building challenges for all eight high

schools because most of their students were prospective first-generation college students without basic math skills; and 3) the charter schools had greater flexibility to adapt the curriculum locally than the district-accountable schools, but only two of these schools took advantage of this freedom.

Although the district-accountable schools were constrained in their ability to adapt the mathematics curriculum locally, they were able to build capacity to provide social support interventions for students through partnerships with a non-profit organization. Student interview data indicated that these interventions motivated them toward higher achievement and college aspirations. Three of the charter schools had also formed partnerships to provide interventions. However, as there were no interviews with students or parents, the evidence supporting positive outcomes was indirect.

Chapter I. Introduction

Let us think of education as the means of developing our greatest abilities,
because in each of us there is a private hope and dream which, fulfilled, can be
translated into benefit for everyone and greater strength for our nation.
John F. Kennedy, 1961

Policy mandates to prepare all students for college and career readiness have been

transforming traditional comprehensive high schools into college preparatory models

across the United States (St. John, Bigelow, Masse, & Lijana, in review). Traditional

comprehensive high school models in the United States were geared toward transitioning

the majority of students into the workforce rather than college. This made sense, as until

late in the twentieth century, one could hope to earn a middle class income with benefits

with a high school diploma. High school administrators processed students utilizing a

tracking system that placed some students into college preparatory courses and everyone

else into vocational, general, and business tracks. These tracking decisions were based on

perceived aptitudes, standardized testing, grades, career plans, and race (St. John,

Bigelow, Masse & Lijana, in review; Martin, 2006). Advanced mathematics course

offerings, for example, were limited and generally offered to college preparatory students,

most of whom were white (Martin, 2006). Today, public policy mandates that high

schools offer all students a college preparatory curriculum, including advanced

coursework.

The transition to the college preparatory high school model has been especially difficult in the nation's cities, where urban schools face complex problems including capacity-building challenges for offering the advanced coursework needed for college readiness, particularly in mathematics. In addition, many urban students enter high school several grades behind in core subject areas and lack social networks to support high education and career readiness attainment.

At the same time, the movement to a market system of school choice that began during the last two decades of the twentieth century poses additional challenges for urban schools. Pressure to address public school reform led to the enactment of policies favoring deregulation and privatization (private companies managing public services) and a market system of consumer choice. In this policy environment, public charter schools, early college high schools, schools within schools, small district high schools with career themes, and other reform models have emerged in urban communities to compete with traditional high schools for students. Therefore, urban schools must simultaneously find ways to build capacity to offer a college preparatory curriculum while remaining competitive in a market system.

Despite the pressures to adapt, schools must often work within limited frameworks. Specifically, there are aspects of school models, management, and governance structures that affect the ways in which schools approach change. For example, organizational adaptation such as reducing school size, creating synergy between high school and college through early college partnerships, and linking schools and curriculum to career themes have been tried. In other models, faculty and staff take

on multiple roles in the building to support instructional programs and counseling students. School governance and management constructs have expanded beyond traditional public school districts to include charter boards and independent management companies, some of which are for-profit organizations. Aspects of governance and management affect the ways in which decisions are made and who gets to participate in the process.

Proponents of private management and governance, (e.g. Chubb and Moe, 1988, 1990) argue that freedom from highly centralized school district management and the ability to operate in a free market system of school choice allows schools the freedom to be responsive to the changing needs of students and society. Opponents of privatization (e.g. Ravitch, 2010), disagree. They argue that private management and governance, such as those controlling charter schools, are not more adaptive or effective. In fact, they argue that the market system of school choice, along with the current system of accountability based on standardized testing and are actually undermining public education and the professional role of teachers.

This study explores ways in which school models, school governance, and management structures influence change processes in eight urban public school reform model high schools located in five cities across the U.S. Broadly described, four of the schools are charter schools and four are district schools. The four district schools are located in the same large city and are governed by a highly centralized corporate board. The governance and management of the charter schools are varied, from centralized corporate to decentralized. The dissertation research explores responsiveness through the

lenses of change and capacity building for a mathematics curriculum and the ability to build capacity for social support interventions.

Background and Context

The Urban Context

Urban school reform affects the largest and fastest growing segment of the population. For example, the New York City school district is the largest school system in the country, serving 1.1 million students in 1,600 schools. African American and Hispanic students comprise 70.7% (30.9% and 39.8% respectively) of the total student population (Sable, Plotts & Mitchell, 2010). In fact, students of color now comprise the largest and fastest-growing population segments in the United States. Although Hispanic and African American people are still categorized as ethnic/racial minorities in the U.S., a demographic shift is occurring. Between 2000 and 2010, for example, the Hispanic population growth rate (43%) was more than four times the growth rate of the total population (9.7%). During that same time span, the African American population growth rate also exceeded that of the total population (12%) (Ennis, Ríos-Vargas, Albert, 2011; Rastogi, Johnson, Hoeffel, & Drewery, 2011).[4] Failure to provide a college preparatory education for urban students of color equal to that received by white suburban students not only has implications in terms of achieving democratic principles but also for

[4] By comparison, the white population grew at a slower rate (6%) than the total population with the total proportion of whites actually decreasing from 75% to 72% (Hixon, Hepler & Kim, 2011).

workforce and economic development, given the possibility of leaving so many American students behind.

Despite these stakes, achievement gaps persist in graduation rates, mathematics, English/language arts, and other indicators of attainment for urban students. Further, urban students continue to be underrepresented in college (Hochschild, 2003; NCES, 2009; Payne, 2010). Many scholars and educational professionals continue to describe traditional comprehensive high schools as not being positive environments for students or optimal for teaching and learning (Crosby, 1999). As a result, policy makers have attempted to enact policies that support schools' efforts to prepare students for college.

Traditional comprehensive urban high schools. Researchers have described traditional comprehensive urban high schools as dropout factories with poor test scores, high rates of absenteeism, and low graduation rates. They are too large, under-resourced, strangled by bureaucracy, overpopulated, and in poor physical condition. Researchers have described them as unwelcoming environments located in high-crime areas with metal detectors and police officers stationed in the entryways (Crosby, 1999; Hochschild, 2003; Kozol, 2005). Historically, urban high school teachers have taught out-of-area or without certification on substitute or emergency permits. They are required to take on non-teaching roles such as policing school hallways (Crosby, 1999; Hochschild, 2003). Many low-income, underrepresented minority students attending comprehensive urban high schools face significant non-cognitive barriers (also known as nested inequalities) to high educational attainment due to historical racial inequities and other forms of social

injustice. Urban high schools have been unprepared to address those needs (Aul et al. 2011; Hochschild, 2003; Kozol, 2005).

Policy Context

The federal government attempted to achieve a more equitable standard of education for low-income and minority students with the Brown v. Board of Education decision in 1954, which ended legal segregation of schools and the enactment of the Elementary and Secondary Education Act (ESEA) of 1965. The latter was intended to support not only equal access to education but high standards and accountability (Dahill-Brown, 2012). Two major types of policy levers are dominating education reform today: (1) accountability and (2) market-based mechanisms of competition and choice (Hannaway & Woodroffe, 2003; Rowan, 2006; St. John, Milazzo-Bigelow, Masse, & Lijana, in review). These are the focus of the reauthorization of the ESEA in 2002, commonly known as the No Child Left Behind Act (NCLB) of 2002.

Accountability. Accountability as defined by NCLB focuses on high-stakes testing, data-driven decision-making, sanctions, and merit pay for teachers (Ravitch, 2010). These are all internal incentives that assume schools have the capability of accountability and have focused on the two core subject areas of mathematics and reading or language arts and graduation rates. Mathematics attainment has been of particular interest for several reasons. There is a need to build capacity for a professional and entrepreneurial science, technology, engineering, and mathematics (STEM) workforce. Overall changes in knowledge and skill set requirements for the post-industrial, knowledge-based, global economy of the twenty-first century include a need

6

for advanced mathematics knowledge and skills (Kirst & Bracco, 2004; Partnership for 21st Century Skills, 2011; St. John, Hu & Fisher, 2011). Manufacturing jobs that accommodate lower quantitative and technological knowledge and skill levels are disappearing in the United States. Research has been published that supports the assertion that students who take advanced mathematics courses have a better chance of becoming college graduates (Adelman, 1999; 2006).

Currently, mathematics attainment is defined by what courses students take, the grades they receive, but most importantly, the scores they receive on state tests. The success of curricula, pedagogy, and even teacher competence are being determined by these measures, particularly by high-stakes test scores. Therefore, important questions arise regarding who controls curriculum and instruction through the selection of texts and pedagogies and whether schools are able to adapt the curriculum to respond to the needs of students.

School accountability works as follows: NCLB legislation allows state and local education agencies to determine how each public school is performing by virtue of a measurement of adequate yearly progress (AYP). AYP is determined by: (a) yearly progress of students toward achieving proficiency in state-determined standards in mathematics and reading or language arts as measured by state standardized tests and (b) student graduation rates. Those schools that do not meet the goals for AYP are deemed

"schools in need of improvement." Public high schools receiving Title I funding[5] that are rated "in need of improvement" for two years or more are held accountable by federal, state, and local education agencies and will be targeted for intervention.

  Market system of consumer choice and competition. In addition to accountability, NCLB (at least in theory) accommodates for market systems of consumer choice and competition by allowing families, particularly those whose children attend Title I schools, to participate in school selection. In a departure from the traditional system in which students are assigned to high schools based on where they live, the market approach works much like a voucher system. According to rational choice theory (RCT) (Walberg, 2000) people make choices based on their perception of where they will receive maximum benefit, in terms of realizing their goals, for minimum cost (Ritzer, 2003). In a market system of consumer choice and competition, families exert rational choice by first determining which public schools will best serve their students' needs and then requesting admission. This impacts the allocation of school funding, as per pupil funding follows students to the schools in which they enroll. Proponents of a market system of school choice argue this system supports innovation and responsiveness to the needs of students and society by encouraging competition (Chubb & Moe, 1981; Miron & Nelson, 2002).

---

[5] All eight of the schools included in the case studies for the dissertation receive Title I funding.

The Organizational Context

        Urban school models. Throughout the last few decades of the twentieth century and the first few of the twenty-first century, reform models have emerged and been tested in cities throughout the U.S.

        Charter schools. Charter schools emerged in the 1980s. One similarity between public charter schools and traditional public high schools is the way in which they are funded. Although public charter schools may be required to seek additional resources from private sources, they, like conventional public high schools, rely primarily on public funds to operate and are not allowed to charge tuition. As public charter schools are publicly funded, they must accept applications from all students just as traditional high schools do. However, if they are oversubscribed, they may allocate admission by lottery. Currently, there are 5,000 charter schools serving 1.5 million American children, and the movement continues to grow (Center for Education Reform, 2009).

        Charter schools have *authorizers*, which are the legal, charter-granting entities that have responsibility for providing oversight to ensure the schools are meeting the goals of the charter and are in compliance with applicable laws. Additionally, they communicate with state boards of education on behalf of the school and make renewal or closure decisions. They are not responsible for determining whether or not a school has met federal and state policy mandates. However, they are responsible for implementing consequences when schools do not (Farrell, Wohlstetter, & Smith, 2012; NACSA, 2009).

        Charter schools also have governing boards, whose members are appointed by authorizers rather than by the voters (as is the case for traditional public school boards.)

Miron and Nelson (2002) suggest that there are political implications for these selections as "board members are selected by the schools' founders, often with an eye toward finding representation of certain viewpoints" (p. 33). They also point out that founders often recommend themselves for board positions, and retiring board members often recommend their replacements. This, Miron and Nelson (2002) add, serves to "narrow the range of interests represented by charter school boards" (p. 33).

Charter operators manage many charter schools. The terms *operator* and *manager* may be used interchangeably in this study. There are two basic types of charter operators. The first is an educational management organization (EMO), which is a for-profit company that receives public funds to manage schools (Miron & Urshel, 2009). EMOs exert corporate management styles over schools that are characterized by strict central control, top-down decision-making, and hierarchical policy implementation with strict oversight. The second type of charter operator is the non-profit charter management organization (CMO). CMOs create groups of schools with a shared educational vision and mission and provide administrative support for them (Farrell, Wohlstetter & Smith, 2012). CMO administrative structures may be centralized and hierarchical, much like those of public schools. Schools that are not run by management companies are called independent or freestanding charter schools. The school itself or school partners may run these. In some cases, the board may take on a more active role.

In theory, public charter schools should be more autonomous than traditional public high schools due to dissimilarities in management and accountability structures (Gleason, Clark, Tuttle, & Dwoyer, 2010). Proponents of charter schools argue that

10

traditional public high schools are managed by monolithic structures consisting of "local school boards, superintendents, central office bureaucracies, and corresponding apparatuses at the state and federal levels…" (Chubb & Moe, 1988, p. 1065) that bind them through "regulation, inhibiting innovation and enforcing uniformity in the way children are educated" (Lubienski, 2003, pp. 395-396). Proponents of public charter schools allege they take "a radical approach to decentralizing management in education that allows individual schools to become self-governing" (Wohlstetter et al, 1995, p. 332). They believe that self-governance frees charter schoolteachers and administrators from the burden of fighting through bureaucratic regulations and processes. These barriers, proponents say, often exhaust and defocus the energies and resources of teachers and administrators who are trying to be innovative in traditional public school settings. Conversely, critics of charter models and market systems of school choice argue that charter management companies are often just as bureaucratic as traditional public school districts. They also argue that these so-called innovative models are not actually innovative but rather isomorphic with traditional public schools (Ravitch, 2010).

   Small schools. One of the organizational components school reformers debate today is school size. Some researchers argue that students achieve better in small schools (as opposed to large "factory" models) with personalized learning environments and a rigorous, purposeful college preparatory curriculum for students. Such settings also act as collaborative environments for teachers (Darling Hammond, Ancess & Ort, 2002; Edmunds, Bernstein Glennie, Willse, Arshavsky, Unlu, Bartz, Silberman, Sacles & Dallas, 2010; Lee & Smith, 1997; Lee, Smith & Croniger, 1997; Raywid, 1998). Small

11

school environments provide opportunities for students to develop relationships with teachers and other staff and for teachers to develop professional learning communities that support their practice (Lee & Ready, 2007). Lee and Smith argue that nine hundred is the optimal student population size for high schools (2005).

Urban high school redesign that involves breaking down large, comprehensive high schools into smaller subunits and the creation of new, small schools is part of a large-scale education reform initiative begun in 2005 and funded by the Bill and Melinda Gates Foundation in the amount of more than $2 billion (Ravitch, 2008). This movement is rooted in long- and widely held beliefs about the social and academic disadvantages of large, comprehensive high schools. At the social level, the hierarchical and formal relationships inherent in large organizations[6] can be problematic. Large high schools make the development of personal relationships difficult at a time in adolescents' lives when strong personal relationships with mentors, teachers, and other trustworthy adults are critical. Smaller school environments theoretically allow more frequent interaction between students and teachers. Teachers in smaller schools tend to take on multiple roles, such as that of teacher-coach.

At the academic level, the differentiated curriculum found in large high schools fosters inequitable social environments in racially diverse environments. That is, minority and low-income students are less likely to be enrolled in advanced college preparatory courses based in part on assumptions about future careers (Lee & Ready, 2007, p. 10-11).

---

[6] Conclusions about the bureaucratic/hierarchical nature of large organizations are based on Weber's studies of organizations ([1922] 1978 in Lee & Ready, 2007).

Lee & Smith (1997) found that scaled-down schools could offer a more focused, college-preparatory-based curriculum and a more equitable opportunity to prepare students for postsecondary education and professional careers.

Schools within schools. One model of urban high school redesign initiatives is the Schools Within Schools (SWS) model. Scholars conceptualized this model as far back as the 1960s and revived it in the 1980s. Lee and Smith (1995, 1997) supported the SWS high school redesign. It was not until the new millennium that the model was realized on a large scale (Lee & Ready, 2007). The SWS model is basically a campus model in which a large comprehensive high school is broken up into small independent schools that are generally organized around a theme or niche. These schools report to the district and the school board directly. According to Lee and Ready (2007) there are two types of SWS models: full and partial. In full SWS models, all students and most faculty are members of one of the subunits. In partial SWS models, some students are enrolled in the subunits while the rest of the students remain part of the larger public high school (Lee & Ready, 2007, p. 16). Theoretically, the SWS models would allow students to realize the benefits of small schools without the expense of building new schools from scratch.

One caveat is related to the theme or niche of the subunits. While the school may offer a base curriculum to all students and the themes may provide opportunities to connect urban students with college majors and careers, the theme-related subunits may serve to stratify students. This stratification may occur according to students' achievement or perceived ability in a subject area (based on standardized test scores), or

13

perception of students' career choices. This possibility is greater or lesser depending on the selection process for admission. Some students may be admitted to the engineering or medical subunit of an SWS model based on a screened admissions process that considers mathematics scores. Some may be admitted into a humanities subunit based on an English/language arts score, while others may be placed into an alternative subunit for students placed randomly into the school from a pool of students who were ineligible for selective or screened programs. Often, the students in the alternative subunit are the disaffected or low-performing students (Lee & Ready, 2007, p. 16). In this case, students can end up with a lesser experience even though they are exposed to the same core curriculum. That is, the students in humanities or alternative subunits may be enrolled in a less rigorous version of an Algebra II course than students enrolled in engineering or medical subunits. Students enrolled in an alternative subunit may not be provided with the same opportunities to develop networks that could facilitate their transitions into postsecondary or career opportunities as students in the other subunits have. Case study research by Lee & Ready (2007) in five urban SWS models found subunits to be socially and academically stratified (p. 145).

Mini-schools. Mini-schools are similar to the SWS model. They involve small, themed subunits of large comprehensive high schools. A difference between the SWS model and the mini schools model is that in the latter, the internal houses are still dependent on the large schools for staffing and resources. It is the larger school that reports to the district or school board (Lee & Ready, 2007).

14

Small high school academies. Small high school academies are independent

schools with populations smaller than large traditional high schools enrolling a thousand

or more students. Some began as subunits in redesigned high schools and later became

independent. Some were created from scratch. In fact, more than 2,600 small schools

were opened in 45 states as a result of the Gates initiative.

In terms of size, one small high school model enrolls fewer than 400 students or

100 or fewer students in each grade. This was the initial vision of the Gates Foundation

for small schools. There are also medium-sized small schools that enroll six hundred to

nine hundred students. Large-scale studies by Lee & Smith (1997) found that the

medium-sized schools of 600 to 900 students are most effective for student learning.

As with the SWS model described above, proponents of small school academies

argue that small schools offer intimate learning environments characterized by

personalized, differentiated instruction[7] resulting in greater participation and achievement

(Ancess & Allen, 2006, p. 401). Like the SWS model, they also offer a curriculum that

focuses on the college-preparatory core. They are generally organized around a theme or

niche.

Unfortunately, a report published by the American Institutes for Research (AIR)

in 2006 for the Gates Foundation demonstrated that SWS and small schools did not

---

[7] Differentiated instruction refers to learning plans and teaching strategies geared toward
meeting individual students' attainment and learning needs. Differentiated curriculum,
discussed in the section on Schools Within Schools refers to a catalog of programs and
courses geared toward the needs of groups of students relative to their educational and
occupational futures (Lee & Ready, 2007, p. 10).

produce better student outcomes in terms of mathematics and English/language arts

scores (AIR, 2006). Bill Gates himself stated, "We have not seen dramatic improvements

in the number of students who leave high school adequately prepared to enroll in and

complete a two- or four-year postsecondary degree or credential" (2008, in Ravitch,

2008). Although graduation rates and other measures of students success appeared to be

higher in New York City, it was revealed they were being artificially inflated through

credit recovery or distorted through other means. Ravitch, for example, found that "what

Gates did not realize was that the small schools in New York City were permitted to

restrict the admission of English-language learners and disabled students, meaning that

the large schools got a disproportionate share of students with high needs" (Ravitch,

2008).

 Themes or niches. Specialized theme or niche schools are a product of the choice

movement in urban schools. According to St. John & al. (In review), "The niche is the

content or process around which schools specialize so they can compete for students, the

money following students, and other funding attracted through grants" (p. 61). The theme,

e.g., teaching, arts, math, and science, is not only a means by which schools distinguish

themselves from one another in a market system of consumer choice and competition.

Enrolling in a theme or niche-based school represents an early career choice for the

student. Theme schools also provide a means of integrating students based on interests

and abilities rather than by race, socio-economic status, test scores, or address (Ancess &

Allen, 2006). The core college preparatory curriculum is aligned with the theme or may

be nuanced in such a way as to accommodate it (St. John & Milazzo-Bigelow, 2011).

16

According to Ancess & Allen (2006), themes may be nominally, marginally, or fully integrated into the culture and curriculum of the school. That is, a school may be engineering or sports or arts or whatever the theme may be in name only. The need to help students with basic skills meet high school graduation requirements or to overcome social barriers may be so overwhelming in terms of resource allocation that it becomes impossible to work toward the development of advanced skills or other aspects of college readiness. Themed schools have the potential to connect students with college majors and career pipelines (St. John, Milazzo-Bigelow, Masse, & Lijana, in review). On the other hand, they may also represent just another form of tracking, of moving students who can demonstrate certain strengths and abilities forward and leaving the others behind. One scholar questioned whether fourteen-year old freshmen are prepared to make life decisions about future careers (T.C. Milazzo, personal communication, July 8, 2013).

Governance and management. Aspects of organization such as centralization and decentralization of school governance and school management structures are factors that are integral to studying the effectiveness of urban high schools, particularly where the ability to adapt and be responsive are concerned. Brennen (2002) offers these definitions:

> Centralization refers to the condition whereby the administrative authority for education is vested, not in the local community, but in a central body. This central body has complete power over all resources: money, information, people, and technology. It decides the content of curriculum, controls the budget, is responsible for employment, the building of educational facilities, discipline policies, etc.
>
> Decentralization, on the other hand, refers to the extent to which authority has been passed down to the individual school. Site-based management is

an example of decentralization in which individual schools can make their own decisions related to finances and curriculum. However, the locus of power remains with the central body. (para. 1-2)

The governance and management of schools in some large cities takes the form of highly centralized corporate models. The central office maintains top-down control of hundreds of schools, with strict hierarchical and tightly coupled supervision of process and policy implementation at the school level (Ravitch, 2010). On the other hand, charter schools may have decentralized governance structures with increased control over policies, curriculum, and instruction at the local level. However, charter management companies may overlay a top down, centralized business model on what would otherwise be a horizontal, more collegial approach, mimicking the strict corporate model found in large districts.

The Mathematics Curriculum Context

Strength in STEM fields has long been identified as key to economic development, national security, and international competitiveness. Regrettably, the United States has found itself outpaced in student preparation for STEM fields by European and Asian nations that have done more to invest in and grow their STEM education capacities.[8] Consequently, facilitating transitions for American students along a trajectory from high

---

[8] Some scholars argue that the greatest barrier the United States faces to capacity building in STEM fields is attrition, as STEM graduates often do not enter STEM fields or they leave after just a few years, finding other careers such as finance more attractive. (Lowell, Salzman, Bernstein, Henderson, 2009). Consideration of this factor is outside the scope of this study.

school to college and into the STEM workforce[9] is a national priority for education

reform (Achieve, 2011; Drucker, 1994; Duderstadt, 2000; Institute of Medicine, National

Academy of Sciences and National Academy of Engineers, 2007; National Commission

on Excellence in Education, 1983; National Science Board, 2010; Sporn, 1999).

Focus on advanced mathematics. Advanced high school mathematics courses

are critical components of preparation for students entering college in STEM majors, as

the development of advanced mathematical literacy is foundational for engineering,

medicine, and other scientific and technological fields. Achievement in Algebra II has

been specifically identified as a predictor of postsecondary attainment and calculus and

physics readiness.[10] Successes in calculus and physics courses are important predictors of

persistence in STEM (Adelman, 1999, 2006; Marra, Shen, Rodgers & Bogue, 2009;

Perna, 2005; Tierney, Bailey, Constantine, Finkelstein, & Hurd, 2009). Students who

enter STEM majors are typically required to complete Calculus III and IV, and calculus

is a pre-requisite for many science and engineering courses.

At the same time, research correlating mathematics achievement, particularly in

algebra and general quantitative critical thinking skills, with college and workforce

readiness (e.g., Adelman 1999, 2006), has been used to build a rationale for increasing

graduation requirements in mathematics for all students, not just those planning to enter

---

[9] This trajectory including transitions from school to college to workforce in STEM fields is also called the STEM pipeline.

[10] Calculus and physics are considered first-year barrier courses to persistence in engineering in that both have high levels of failure and dropout. Both are required for graduation (Suresh, 2006).

STEM majors (St. John & Musoba, 2006). Silva & Moses (1990) compared the demand for high mathematics "literacy" with the demand for the general population to master the tools of reading and writing that evolved from the industrial revolution (p. 376). Consequently, states have implemented rigorous mathematics standards and increased graduation requirements in order to develop a more coherent, systemic, and tightly controlled mathematics education policy (Allensworth, Nomi, Montgomery, & Lee, 2009; St. John, Milazzo-Bigelow, Masse, & Lijana, in review).

For example, most states now require four years of mathematics for graduation. Many specifically require Algebra II[11] and have established course-taking patterns such as Algebra, Geometry, Algebra II, and Probability and Statistics or Integrated Mathematics 1, 2, and 3. The Common Core Standards (CCS),[12] based on international benchmarks, and a recent iteration of the National Council for Teachers of Mathematics *Principles and Standards for School Mathematics* (2000) have been adopted by all but six states in order to clearly articulate mathematics learning goals for all students. Recent research (Daun-Barnett & St. John, 2012) supports the positive effects of a more rigorous curriculum on college continuation for underrepresented minority students, particularly when combined with financial support.

---

[11] As of December 2011, twenty-one states and the District of Columbia specifically require Algebra II for high school graduation (Achieve, 2011b).

[12] "The Common Core State Standards Initiative is a state-led effort coordinated by the National Governors Association Center for Best Practices (NGA Center) and the Council of Chief State School Officers (CCSSO). The standards were developed in collaboration with teachers, school administrators, and experts, to provide a clear and consistent framework to prepare our children for college and the workforce" (CCSSI, 2011).

In spite of policy-mandated changes in state mathematics requirements (number of courses and rigor as well as the addition of exit exams) over the last few decades, the majority of U.S. students are not achieving advanced level skills. In fact, the majority of U.S. students are not even achieving mathematics literacy beyond the most basic levels, a phenomenon reflected in student performance on assessments that measure proficiency in both cognitive and content domains. For example, in 2009 only 3% of all seniors taking the National Assessment of Educational Progress (NAEP) mathematics test scored at advanced level. 23% scored at proficient level, while 74% were at or below basic knowledge and skill levels (Aud, Hussar, Kena, Bianco, Frohlich, Kemp & Tahan, 2011). College entrance exam scores corroborate the NAEP assessment results. In 2006, only 42% of the students taking the American College Testing (ACT) achieved the College Readiness Benchmark in mathematics (ACT, 2010).

International assessment data substantiates national findings that U.S. students are underperforming in mathematics and also validates concerns about an achievement gap between U.S. and foreign students. Despite gains in overall average scores on the Trends in International Mathematics and Science Study (TIMSS)[13] between 1995 and 2007, the overall average score for U.S. eighth grade students participating in the *Trends in International Mathematics and Science Study* in 2007 was 508. This score is just slightly

[13] TIMSS is used to measure over time the mathematics and science knowledge and skills of fourth- and eighth-graders. TIMSS is designed to align broadly with mathematics and science curricula in the participating countries. This report focuses on the performance of U.S. students relative to that of their peers in other countries in 2007, and on changes in mathematics and science achievement since 1995. Thirty-six countries or educational jurisdictions were included in the study (Gonzales et al., 2008, p. iii).

above the TIMSS scale average of 500 and considerably lower than the highest average scores, which range from 570-598. It also ranked ninth among the scores for all forty-seven participating countries. Further, the percentage of U.S. students achieving the advanced international benchmark for advanced literacy in mathematics, the level needed to enter most STEM fields, has remained stable at only 6%.[14] While this is four percentage points higher than the international median of 2%, it pales in comparison to those of students in five participating Asian countries[15] whose achievement of the advanced international benchmark ranged from 26-45% (Gonzales, Williams, Jocelyn, Roey, Kastberg & Brenwald, 2008, pp. 14-16). These score disparities in mathematics achievement between Asian and U.S. students are not surprising given that Asian competitors also outpace the U.S. in awarding degrees in fields that rely heavily on advanced mathematics literacy, such as science and engineering.

A major impediment to resolving the advanced mathematics challenge in the U.S. is the failure of education policy reforms to successfully address persistent disparities in educational achievement across student populations. Disaggregated assessment data for U.S. students reveals that African American and Hispanic/Latino students, historically underserved population groups through all levels of education, receive lower levels of mathematics preparation than their White and Asian/Pacific Islander peers. For example,

---

[14] 31% achieve a high level of literacy, 67% an intermediate level, and 92% a low level. (Gonzales et al, 2008).
[15] Chinese Taipei, The Republic of Korea, Singapore, Hong Kong, and Japan. Hungary, England, the Russian Federation and Lithuania also outscored the U.S. in advanced mathematics, only by slimmer margins.

African American and Hispanic/Latino seniors struggle to meet even the minimum

proficiency standards in mathematics on the NAEP[16] or benchmark scores (21) in

mathematics on college placement tests such as the ACT. These students are also

consistently and significantly[17] outpaced on these assessments by White and

Asian/Pacific Islander students. African American and Hispanic students not only score

lower on mathematics assessments, but experience lower graduation rates (greater than

50% dropout rates). They are underrepresented[18] in colleges and universities, particularly

in STEM fields, when compared to their White and Asian/Pacific Islander peers (Aud,

Fox, & Kewal-Ramani, 2010; ACT, 2010; Bozick, Lauff, & Wirt, 2007; Fass & Cauthen,

2006; U.S. Department of Education, Institute for Education Sciences, National Center

for Education Statistics, National Assessment of Education Progress, 2009; Perna, 2000;

Tierney, 1999).

State and local education agencies have responded to federal requirements to

provide a standard of education for all students by raising curriculum standards and

graduation requirements. However, urban high schools are struggling to build capacity to

provide sufficient access to these courses along with the necessary supports to help

---

[16] Regardless of locale, Native Americans as a group also have high numbers of students living in poverty and lagging behind White and Asian students in mathematics achievement (Aud et al., 2011).

[17] According to Aud et al. (2011), "In 2009, White students at grade 12 scored 30 points higher in mathematics than Black students and 23 points higher than Hispanic students. Neither score gap was measurably different from the corresponding score gaps in 2005" (p. 48).

[18] "Statistical concept that measures participation/presence relative to a denominator" (Chubin, 2011).

students pass them. Compounding the challenges is a paradigm shift in the way mathematics education is offered in high school. Prior to the policy changes, most high schools, even those outside of urban areas, tracked students into mathematics sequences based on measured ability and future academic plans. Advanced mathematics courses, when schools had the resources to offer them, were reserved for students deemed qualified to enroll in and pass them as they were taught (Hochschild, 2003; Klein, 2003). Under the new guidelines, expectations are raised for every child; that is, all students are required to complete advanced mathematics courses for graduation and postsecondary readiness. This creates additional need to attract highly qualified teachers and to provide space, textbooks, technology, and other resources, a particularly challenging prospect for many already under-resourced urban schools.

The frequent need for to improve math skills is an additional challenge that urban schools must address in order to help students meet new mathematics standards and graduation requirements. Students often arrive on high school campuses lagging several grade levels behind in mathematics. Most significantly, many have not successfully completed Algebra I, the designated gatekeeper course, before high school (Silva & Moses, 1990). Financial and other resource constraints can make these goals difficult to achieve, but the consequence of not helping students to move beyond basic math skills is the perpetuation of low educational attainment.

The Social Context

Poverty is highly correlated with race and ethnicity in American cities. For example, Hispanics and African Americans are vastly overrepresented in student

populations suffering severe poverty. Significant numbers of students of color live in homes with income levels at or below the poverty threshold[19] (Sable, Plotts & Mitchell, 2010). Students from poor families have: a) low access to healthcare, b) fewer opportunities for early educational experiences, c) higher incidences of homelessness, and d) insecure access to nutritional foods. They also face risks to their safety and engage in risky behavior at higher incidences than majority students. As a result, students from poor families experience higher levels of absenteeism, mobility, and poor health. They are less likely to enroll in college preparatory courses such as Algebra II and are more apt to drop out (Kirst & Bracco, 2004).

As income levels and educational attainment are linked (St. John & Musoba, 2006), it is not surprising that in economically disadvantaged families, parental educational attainment is lower than that of middle class families. Many low-income underserved minority students attending urban schools are first-generation[20] students and are clustered in communities where adult educational attainment is low. As a result, the social networks and cultural capital that would influence taking advanced mathematics courses, graduating from high school, and going to college may not be available to them. For example, parents and community members may have limited mathematics education

---

[19] Seniors attending schools with a 75% or greater percentage of low-income students earned, on average 38 fewer points on the NAEP than seniors attending schools with low percentages of low-income students (Aud et al., 2011).
[20] Will be the first in the family to attend college.

or have had racialized[21] experiences with mathematics that limited their own achievement expectations (Martin, 2006). There may be limited knowledge available about college options, how to navigate the financial aid system, or concerns about costs, and how costs can be mitigated as college translates into careers. Costs may be overestimated and parents may be loan-averse (Olivia, 2008).

Parents and communities, therefore, may not see college as financially possible for their children and in turn may not encourage them to take what are traditionally considered to be college prep mathematics courses. College counselors or coaches, who are responsible for creating a college culture and college knowledge, are likely to be absent in urban schools. Further, guidance counselors are overburdened with too many students (McClafferty-Jarsky, McDonough & Núñez, 2009). As a result, students may limit their expectations and plans and ultimately reproduce the family and cultural patterns of low educational attainment dominant in their communities. These dynamics work to preserve the status quo (Becker, 1975; Bourdieu, 1977; Carnevale, 2007; Children's Defense Fund (CDF), 2008, McCarron & Inkelas, 2006, St. John, Hu and Fisher, 2011; Tigges, Browne & Green, 1998).

Hispanic urban high school students are also more apt to be children of immigrants or have more limited English language proficiency than their suburban majority peers. There is the basic struggle to learn a language with all of its cultural

---

[21] Racialization in this context refers to presupposed, stereotypical, race-based assumptions about math ability or the need for advanced math courses (based on career expectation)

idiosyncrasies, and learning is only more difficult for poor families who do not have much support. Students whose parents have limited English language or who speak Spanish as their home language may struggle with meanings in the new mathematics curricula, which are language-rich and are taught in an English-only classroom (Acosta-Iriqui, Civil, Dize-Palomar, Marshall & Quintos-Alonso, 2011). Information about college such as what courses students need to take, how much college costs, and how long it will take to finish college may not be effectively communicated to English Language Learners if the information is only provided in English.

The relationship of these nested inequalities to differentials in learning outcomes and educational attainment is well documented (Aud et al., 2010; Lippman, Burns, McArthur, 1996; Hochschild, 2003; Solomon, Allen & Campbell, 2007). As education reform has not been effective in mitigating these nested inequalities and providing an equitable education, significant numbers of Hispanic and African American students are underachieving. Whereas urban schools were developed as dynamic learning centers, they now perpetuate low educational and economic aspirations and expectations; a social reproduction is cycling through generations (McLeod, 1995). Consequently, Hispanic/Latino students are the most underrepresented student demographic group in higher education (Olivia, 2008).

During the 1980s, publications such as Boyer's *High School: A Report on Secondary Education in America (1983)*, Goodlad's *A Place Called School Prospects for the Future* (1983) and National Commission for Excellence in Education's (NCEE) *A Nation at Risk* (1983) inflamed national passions for education reform. These studies and

27

reports called for raising the level of academic course taking and building a rigorous standards-based curriculum for all students. The researchers believed this course of action would provide a means of closing achievement and college readiness gaps along racial and socioeconomic lines (ACT, 2010; Adelman, 1999, 2006; Gewertz, 2010; Martinez & Klopett, 2005; Perna, 2005; Tierney, Bailey, Constantine, Finkelstein, & Hurd, 2009). Ravitch (2010) concurs that a strong curriculum is a road map for learning and an essential ingredient of effective education reforms. She also adds to her list effective instruction, adequate resources, and community support (Ravitch, 2010, p. 224).

Federal interventions have focused on removing financial barriers to high educational attainment for low-income students in the form of Pell grants, loans, and scholarships (St. John, Hu & Fisher, 2011; Swail & Perna, 2002). Pre-college programs such as the government TRIO initiatives (Upward Bound, Upward Bound Mathematics and Science, Talent Search, and Student Support Services) that emerged from Lyndon Johnson's War on Poverty during the authorization of the Higher Education Act of 1965 and the National Early Intervention Scholarship Program (NEISP) of 1992 have provided academic and financial support (Swail & Perna, 2002). However, Swail and Perna (2002) assert that gaps persisted over decades despite the fact that resources have been pumped into these education reform initiatives. This suggests there are critical issues that were not being addressed relative to social and academic capital formation.

Programs such as GEAR UP (Gaining Early Awareness and Readiness for Undergraduate Programs) and College for Every Student (CFES) address these issues of social and cultural capital formation. These programs focus on building support networks

28

for high achievement and educational attainment for low-income underserved minority students. GEAR UP is a federal grant program and CFES is a program offered by a non-profit organization. These programs involve early intervention and are situated in schools regardless of how or where they are administered. They also involve partnerships with multiple stakeholders, including but not limited to: elementary and secondary schools, community organizations, colleges, and universities.

The GEAR UP legislation was included in the reauthorization of the Higher Education Act in 1998. The Department of Education web site (2011) describes GEAR UP grants as "discretionary six-year grants awarded to states and partnerships geared toward high poverty middle and high schools. These partnerships must include a local education agency, including a middle and a high school; one institution of higher education; and at least two community organizations such as businesses, professional organizations, or state agencies. GEAR UP grantees serve an entire cohort of students beginning from no later than seventh grade through twelfth grade. The 21st Century Scholars program is the scholarship arm of GEAR UP and serves economically disadvantaged students. Students are notified during the seventh grade about their eligibility to receive Pell grants that will cover 75% of their tuition at an in-state four-year institution of higher education (U.S. Department of Education, 2013).

While GEAR UP is a federal discretionary grant program, the College for Every Student (CFES) program is administered by a nonprofit organization based in Essex, New York. CFES has established partnerships between schools and colleges throughout the United States. Like GEAR UP, the organization targets low-income and underserved

minority populations in urban and rural districts. These students are often first-generation

college students who are identified as "at risk" of dropping out of high school, not

enrolling in postsecondary education, and not persisting to completion. However, while

GEAR UP has a scholarship component, CFES is strictly a social intervention. The

program fosters participation of its "CFES Scholars" in interventions that are the core

practices of the CFES model: pathways to college, mentoring, and leadership through

service (CFES, n.d.). These three core practices may be defined as follows:

> ***Pathways to college.*** A practice in which CFES K-12 schools partner with
> colleges to provide opportunities for their CFES Scholars to visit college
> campuses, interact with college students and faculty, and gain exposure to
> admissions, financial aid, and other higher education components.
>
> ***Mentoring.*** Fosters academic and personal growth among CFES Scholars
> by providing them a supportive relationship with an older, more
> experienced individual who can serve as a role model. All CFES schools
> have mentoring programs for their CFES Scholars that utilize peers
> (including other Scholars), adults, teachers, and/or college students as
> mentors.
>
> ***Leadership Through Service.*** Activities are designed to help CFES
> Scholars identify and express their leadership potential to improve their
> school, neighborhood, and/or the global community. CFES schools create
> meaningful opportunities for CFES Scholars to provide student leadership
> in service activities. Gaining leadership skills and taking responsibility for
> others contribute to Scholars' self-confidence, stimulating greater personal
> aspirations for college and building resilience that leads to college success.
> (CFES, n.d.)

I briefly discuss the TRIO and GEAR UP programs here in order to provide

examples of a federal program that integrates social and cultural capital building with

rigorous academic study. However, I chose to study CFES-school partnerships as part of

the transitions underway in four high-performing urban charter schools for the

dissertation.

Statement of the Problem

Urban education reform is a multi-level challenge with policy, organizational,

curricular, and social levels influencing high-stakes outcomes in terms of workforce

development and adherence to democratic principles supporting equal opportunity for all.

This dissertation examines and compares patterns of change in eight non-traditional

urban public high schools. These schools are adapting to provide a higher standard of

mathematics preparation in response to policy mandates for more rigorous standards and

higher graduation requirements. They are also responding to the need to mitigate the

effects of poverty and culturally reproduced patterns of low educational achievement by

supporting and motivating students through social support interventions.

Research Questions

Three primary research questions reflecting three facets of the multi-level nature

of the problem comprised the foundation of the study. These questions were designed to

provide insight into the challenges schools face as they transition from traditional models

to a market system of college preparatory academies. These academies are geared toward

providing a higher standard of preparation for college and mathematics attainment and

support for academic capital formation for urban students.

1. How do the organizational characteristics (e.g., model, governance, and management) differ in the eight schools? How do these characteristics affect their ability to adapt at the local level?

2. How are policy mandates such as new graduation requirements, more rigorous standards, and demands for school accountability changing mathematics education in urban schools? How do school models and structures of governance and management facilitate or hinder a school's ability to adapt mathematics education at the local level?

3. How do social interventions such as those facilitated by partnerships with non-profit organizations support academic capital formation in the eight cases? How do the governance and management structures of the eight schools impact their ability to offer programs that support academic capital formation?

The multi-level conceptual framework through which the analysis will occur is described in Chapter II.

Definition of Terms

For the purposes of clarity and ease of reading, I provide these definitions:

Adaptation: Cameron (1984) defined adaptation as follows:

> Organizational adaptation refers to modifications and alterations in the organization or its components in order to adjust to changes in the external environment. Its purpose is to restore equilibrium to an unbalanced condition. Adaptation generally refers to a process, not an event, whereby changes are instituted in organizations. Adaptation does not necessarily imply reactivity on the part of an organization because proactive or anticipatory adaptation is possible as well. But the emphasis is definitely on responding to some discontinuity or lack of fit that arises between the organization and its environment. (p. 123)

Advanced Placement Courses: AP courses are taught in high schools by high school teachers and follow a college syllabus. The courses culminate in a standardized test, scored on a scale of 1-5, with high scores theoretically equating to college credit.

Carnegie Unit: The Carnegie Unit is a standardized way of setting up requirements for high school and college graduation based on "120 hours of class or contact time with an

instructor over the course of a year at the secondary (American high school) level"

("Carnegie Unit and Student Hour," 2012).

Dual enrollment: Courses offered to high school students that provide concurrent high school and college credit, exposing students to college level coursework.

Early College High School: School-college models are located on college campuses and offer a rigorous curriculum, typically to first-generation, low-income, underrepresented minority students. Students who attend early college schools graduate with a high school diploma and either two years' transfer credit or an associate's degree (Edmunds et al., 2010).

High Stakes Testing: Examinations impacting AYP, high school graduation, scholarships, or college admission.

Knowledge-based Economy: An economy in which the production, distribution, and use of knowledge is the main driver of growth, wealth creation, and employment across all industries, not only those classified as high tech or knowledge intensive (Organization for Economic Cooperation and Development, 1996, p. 7; in French, Rayner, Rees, Rumbles, 2011 p. 30).

Partnership: Collaborative relationships between schools and external partners enable capacity building, can facilitate reform activities, and mitigate market competition in a turbulent policy environment. "Collaboration is a relationship in which two or more partners work together by sharing resources to attain mutually agreed-upon goals" (Wasonga, Rari, and Wanzare, 2011, p. 252). Schools may partner with diverse

33

organizations such as colleges and universities, community organizations, non-profits, and government entities. Both parties have the potential to benefit from the collaboration.

Theme-based High Schools: Theme-based high schools are a product of the small schools education reform movement. The theme refers to curriculum themes connected to career trajectories. The themes may be in name only (nominal); reflected in the margins of curriculum, culture and organization of the school (marginal); or fully integrated. Proponents believe that these programs, as opposed to the traditional one-size-fits-all curriculum, have the potential to promote academic quality and boost engagement and achievement (Ancess & Allen, 2006, p. 405).

Urban (Locale, Urban-Centric): An indication of a school's location relative to a populous area. The urban-centric locale assignment system has been used by the National Center for Education Statistics (NCES) since 2005-2006. The new typology was influenced by changes in the Office of Management and Budget's definitions of metropolitan and non-metropolitan areas. The new system classifies territories into four major types: city, suburban, town and rural. Each type has three subcategories. For city and suburb these are gradations of size: large, midsize, and small. Their distance from an urbanized area further distinguishes towns and rural areas: fringe, distant, or remote (NCES, n.d.). For the purposes of the dissertation, I will use the term urban for cities of any size.

<div align="center">

Organization of the Dissertation

</div>

Chapter I provided an overview of the dissertation and described the problem, the context for the study, and its significance. I also outlined my research questions and the

limits of the study. Chapter II reviews the literature on organizational theory as it relates to the problem under study and lays the foundation for establishing a conceptual framework for the dissertation. Chapter III details the research methodology used in the dissertation, including descriptions of the case study method and the cases examined to address the research questions. Chapters IV, V, and VI contain analyses guided by the research questions. Chapter IV contains an analysis of organizational change within the case schools. Chapter V examines mathematics curriculum and instruction as the case schools have responded to public policy. Chapter VI is an analysis of a variety of social interventions employed by the eight case schools, including the College for Every Student program. Chapter VII provides my summary and conclusions. The conclusions focus on answering the three research questions. In addition issues of a cross-question nature are identified and conclusions drawn.

CHAPTER II. REVIEW OF RELATED LITERATURE

Urban education reform is a multi-level problem with policy, organizational, curricular, and social components. Background information describing the policy landscape influencing change was provided in Chapter One. In this chapter, the researcher reviews the literature and develops a framework for a three-level approach (organizational, curricular, and social levels) to examining and comparing differences in organizational adaptation in charter schools compared to district-accountable schools; schools' adaptations of curriculum to meet new requirements; and social support processes that help to motivate students. A visual representation of the framework appears at the end of the chapter in Figure 1.

Organizational Level

Although there are a number of approaches to the study of adaptation in educational organizations, St. John (2013), has reconstructed four frames from Habermas' (1984, 1987, in St. John 2013) theories of strategic action in organizations and used them to explain, "the ways rules and regulations are communicated and discussed in the change practice (p. 17). These four frames are: (a) the instrumental frame, (b) the closed-strategic frame, (c) the open-strategic frame, and (d) the communicative frame. St. John has applied these frames to public policy, professional development, moral reasoning, and, recently, policy research studies (St. John, 1994, 2009a, 2009b, 2013).

Of these four constructs, the closed- and open-strategic frames offer a useful way for thinking about how the dynamics of centralized or decentralized control of public schools facilitate or hinder change at the local level. Examples would include the ability to adapt mathematics curriculum and instruction or to build capacity to provide social support interventions.

St. John (2013) defines closed and open strategic action as follows:

> Closed strategic action, when it is the dominant frame in an organization, limits the range of acceptable professional action to the implementation of initiatives aligned with central scripts (curricula in schools, patient medication administration in health care, and so forth). However, there is professional discretion within certain predefined boundaries . . .

> Open strategic action as a dominant frame provides practitioners with some additional freedom of action, or professional discretion, including the ability to test new concepts and practices that deviate from predefined scripts . . .

St. John adds:

> This distinction between open and closed strategic action is very important in the current period and parallels the arguments about centralized versus bottom-up strategies for change. The tighter the alignment between strategic initiatives and acceptable forms of practice, the more important it is to frame research within the boundaries of central mandates. (pp. 107-108)

In theory, the distinction between the strategic orientation of public charter schools and regular district public high schools should be clear, as charter schools have decentralized governance structures and are theoretically more autonomous to innovate and adapt curriculum and instruction at the local level than regular district schools are (Chubb & Moe, 1988, Lubienski, 2003; Wohlstetter et al, 1995). Regular district high schools have gone through periods of decentralization that allowed school-level and

community participation in decision-making in an open-strategic environment, but the movement today is toward centralization and top-down control. In fact, urban high schools are part of tightly coupled,[22] strictly hierarchical, centrally controlled districts (Harris, 1985; Ravitch, 2010).

Charter schools with decentralized governance structures should, then, be free to engage in bottom-up change strategies in an open-strategic-dominant frame of action. In contrast, teachers and administrators trying to be innovative in traditional public school settings operate in closed-strategic environments, forced to adhere to scripts and policy mandates from above. Attempts to adapt curriculum and instruction at the local level could, in fact, be met with sanctions, including termination of principals and teachers.

However, charter boards typically hire management companies to provide educational and management services for charter schools. These may include back office services such as accounting, payroll, benefits, and human resource management. For-profit corporate models may impose strict top-down control of the technical work of schools, including mandating curriculum, instruction, etc. (Miron & Nelson, 2002). In this case, the open-strategic paradigm can close.

---

[22] Within the organizational literature, the metaphors of tight and loose coupling have been widely used as tools for examining the degree of articulation between bureaucratic/administrative structures (rules, policies, infrastructure, techniques, and the technical core (activities and actors). These metaphors have been used in research focused on changes in the relationship between educational policy and practice (Spillane & Burch, 2006; Fusarelli, 2002; Meyer & Rowan, 1978; Meyer & Rowan, 2006; Weick, 1976).

Table 1 builds a proposed classification framework for the typical governance and management paradigms evident in urban schools.

Table 1 Centralized and Decentralized Governance By Corporate Non-Corporate Management of Schools

	Management Type	
Governance Type	Corporate	Non-Corporate
Centralized Governance	Closed Strategic Centrally controlled Top down decision making, tightly coupled to technical work of schools Typical of large city school boards-Combine centralized governance and management with strictly controlled practices	May be a combination of Closed and Open Strategic. Hierarchical and monolithic, local school boards, superintendent, central office provide staff, curriculum, technology Typical district may fall into this or the corporate category May be room to innovate at local level
Decentralized Governance	Closed Strategic Typical of charter school controlled by for-profit EMO and some CMOs.[23]	Open strategic Bottom up decision making, horizontal, collegial. Typical of freestanding charter school management and some CMOs

Adapted from St. John (2013, p. 18, 44, 106).

This framework is adapted from St. John (2013) and will be used in this chapter as well as in the analytic chapters. It illustrates how centralization and decentralization combined with corporate or non-corporate management affects the ability of schools to adapt at the local level. Schools with centralized governance structures and corporate management, such as some district-accountable urban schools, operate in closed strategic

---

[23] The definitions of EMO, CMO, and freestanding management are provided on pp. 23-24.

environments and are subject top-down control. Some school districts do not adopt a corporate style of management. Those schools may have some freedom to adapt curriculum, etc. at the local level. Schools with decentralized governance and corporate management operate in closed strategic environments and are subject to centralized control. This model is typical for charter school operated by EMOs and some CMOs. On the other hand, charter schools with a non-corporate approach to governance operate in open strategic environments that allow more freedom for school-level adaptivity.

Mathematics Education Level

Mathematics education is an example that can be used to see how organizational characteristics, including model, governance, management, administrative structure, and strategic orientation, affect school-level change in response to challenges. The following section provides additional background related to policy mandates, such as higher graduation rates and more rigorous standards that are impacting mathematics education in urban high schools today.

Public policy initiatives geared toward providing high school students with a higher standard of preparation for college and the workforce are central to mathematics education reform in U.S. schools today. There is a growing national anxiety about American students' level of mathematics attainment given the broad implications for national security, the U.S. position as a technological leader, and the U.S. ability to compete in the global economy. There is also a growing recognition that building capacity will require increased democratization that can only be achieved by providing "all students with a fair, equal and significant opportunity to obtain a high quality

40

education" (NCLB, 2002, §1001). Underrepresented minority students (URM), particularly those who are economically disadvantaged and living in urban communities, are scoring at lower levels of proficiency than White and Asian students on national and international tests of mathematics achievement. They also have lower high school and college graduation rates. Therefore, mathematics education reform is a central issue for urban school reform.

Increased Graduation Requirements

One of the most common elements of mathematics education reform is increasing graduation requirements. Research suggests a correlation between the addition of advanced mathematics courses and additional topics to the high school math curriculum and postsecondary attainment (Adelman, 1999, 2006; Carnevale and Desroschers, 2001; Achieve, 2004). Adelman's longitudinal studies of the 1982 and 1992 cohorts showed that completing four years of high school mathematics, including Algebra II and higher, doubles students' chances of graduating from college. Carnevale and Desrochers' (2001) analysis used U.S. Department of Education's National Educational Longitudinal Survey (NELS) data.[24] In discussing their findings, they stated: "Clearly, algebra II is the threshold mathematics course taken by people who eventually get good jobs in the top half of the earnings distribution" (p. 7). The ADP recommends a sequence including Algebra I, Geometry, Algebra II, and Data Analysis and Statistics (p. 4).

---

[24] The NELS study was a 12-year survey following a cohort of students who were eighth graders in 1988 and graduated from high school in 1992. By the time the study ended in 2000, most participants were 26 years old and in the labor force (Carnevale & Desrochers, 2006, p. 5).

The arguments pointing to four years of mathematics, including Algebra II as (a) correlated with college and workforce readiness and (b) a democratizing force, have influenced graduation requirements across America. At the time of the site visits, all five states in which the case schools were located had moved to enact these requirements. All of the case schools required four years of math, including Algebra II for all students.

More Rigorous Standards

Question Two asks about the influence of compliance with more rigorous standards on mathematics education in the case schools. This begs the question: What is a *rigorous* standard? The word appears frequently in articles, books, reports, and legislation on the subject of education reform today. According to the Hechinger Report (2009), "by 2015, policies in 17 states will call for rigor" (p. 2). Unfortunately, the ubiquity of the word has not fostered a shared understanding of its *meaning*.

In order to get a sense of the meaning of the word, I begin with the dictionary. The Oxford dictionary defines *rigorous* as something "extremely thorough and careful; strictly applied or adhered to, or adhering strictly to a belief system; [or] harsh and demanding" (Oxford University Press, 2012). Some of the experts who were interviewed for a 2009 Hechinger Institute primer felt this was an apt definition. They refer to rigorous standards as: "difficult and inflexible (think rigor mortis)" (p.1) and "makes kids "narrow, rigid, and deadly dull" (p.3). This meaning suggests tremendous inflexibility in the application of the standards to teaching and learning contexts for diverse learners.

A Nation at Risk (ANAR) (1983) offers another opportunity for sensemaking. ANAR spoke of *rigorous* and measurable standards in connection the *Five New Basics*. The Five New Basics were the part of ANAR's plan to address "the rising tide of mediocrity" the report predicted would destroy the American economy unless there was some intervention. The meaning of "rigorous" in this sense was rooted in the beliefs about academic intensity of a curriculum measured by (a) the number of credits required within an academic subject and (b) the highest-level course within that academic subject. McCormick (1999) identifies students who have completed *The New Basics* curriculum itself (minus foreign language) as having completed a *rigorous* curriculum (p. 53). The Five New Basics include: four credits in English, three in mathematics, three in science, three in social studies, and two in foreign language. These requirements are designed to align with more *rigorous* standards. In recent years, this understanding of rigor has been broadened to include, for example, an extra year of mathematics, including Algebra II.

Adelman (2003) highlights a problem with the lack of specificity in this way of thinking about rigor. For example, although this curriculum was to be aligned with rigorous standards (again, rigorous is undefined), the requirements were really based on nothing more than Carnegie Units.[25] That is; there was no specificity as to knowledge or skillsets covered or levels of cognitive demand to be addressed in any of the courses. Adelman states:

---

[25] "A Carnegie Unit is the basic credit system for U.S. secondary schools. It is generally recognized as representing a full year (36–40 weeks) in a specific class meeting four or five times per week for 40–50 minutes per class session" (Martinez and Bray 2002, in Adelman, 2006, p. 27).

Quite frankly, the word "rigorous" is somewhat of a misnomer since a course requiring a high concentration of intellectual effort can be presented in a relaxed manner with comparatively low standards for success. Put another way, calculus or laboratory chemistry, for example, can be taught in a very laid-back fashion, while an otherwise "ordinary" survey of U.S. history can require the search for, discovery, and cataloguing of original source material, readings in archival methods, and frequent examinations and project presentations with criterion-referenced grading standards." (p. 27)

Offering yet another approach to the concept of rigor, the NCLB text uses the word *rigorous* to describe content and, instead, substitutes the word *challenging* to label standards with which the rigorous content is to be aligned. According to NCLB, challenging academic standards (a) specify what children are expected to know and be able to do, (b) contain coherent and rigorous content, and (c) encourage the teaching of advanced skills (NCLB, 2002, §1111). Again, this definition is non-specific. Around the same time the NCLB legislation was being written and enacted, researchers such as Strong, Silver, and Perrini (2001), whose definition is often invoked in the literature, were explaining rigor as the "goal of helping students develop the capacity to understand content that is complex, ambiguous, provocative, and personally or emotionally challenging" (p. 7). In reviewing this definition, Lecompte (2003) explicates three key points in the definition. These include 1) providing an enriched learning environment in which students can practice the skills to decode and understand complex and challenging material; 2) stretching students to grasp new ideas and concepts that may be difficult to grasp but that allow them to practice persistence and open-minded, flexible thinking; and 3) directing teachers to ways in which they can increase rigor within their own

44

classrooms based on classroom personality and time constraints. Lecompte adds: "overall, rigorous learning is not about the quantity of content covered, but rather, the high quality of learning in the classroom" (p. 259).

Further developing the concept, I cite Blackburn (2008), who finds that "rigor is creating an environment in which each student is expected to learn at high levels; each student is supported so he or she can learn at high levels, and each student demonstrates learning at high levels" (p. 126). She speaks about rigor in terms of setting the bar high and providing students with support to reach the learning goals set for them.

Schmidt (2009, in the Hechinger Report, 2009), revisits the concept of challenge in relationship to rigor, and adds additional criteria, e.g., focus and coherence:

> A curriculum that exemplifies academic rigor is focused, coherent, and appropriately challenging. In the case of mathematics, such a curriculum focuses on a small number of topics at each grade level to promote in depth/mastery and sequences topics across grades in a coherent manner, reflecting the logic and structure of the academic discipline. Finally, such a curriculum is appropriately challenging from a cognitive or intellectual perspective in that topics are not excessively repeated, but move students into an ever deeper and broader exposure to the discipline moving from basic concepts…to more developed ones.

So far, I have established that the following meanings might be applied to *rigorous* standards:

- Rigid, demanding, strictly applied
- Prescribing the breadth and scope of knowledge and skills to be covered the curriculum, i.e. the number of credits students what take in an academic subject, which topics, and at what level
- Coherent, focused, and challenging
- Specific about expectations
- Setting high expectations and focus on advanced skills
- Recommending content that is ambiguous and complex

45

A constraint inherent in these definitions, particularly where they use words like "advanced" and "complex," is that there is no real framework provided for analysis of what advanced or complex mean (other than highest course in units) in terms of content or cognitive demand and processes. A second problem is that the federal NCLB definition was left open to interpretation by each of the individual states. This has led to a great deal of variability and lack of alignment both within content areas and across grades (Porter, McMaken, Hwang, & Yang, 2011) This precludes the development of a shared understanding of the meaning of rigor and unevenness in its application to curriculum for American students.

Governance and Management of Schools and Math Curriculum and Instruction

All schools receiving public funds, regardless of governance and management, are required by federal and state policy mandates to adhere to requirements to offer advanced courses and to address the issue of rigor. However, governance and management paradigms do affect the ways in which curriculum and instruction, relative to federal and state policies, are decided upon and implemented. Governance and management paradigms also impact the ability of schools to adapt curriculum and instruction at the local level.

Table 2 illustrates the classification described earlier in the chapter as applied to these decision-making processes. It proposes that schools with centralized governance structures and corporate management are closed strategic environments characterized by centrally controlled, top-down decision making and tight coupling between the central office and the technical work of schools. That is, decisions about curriculum and

instruction are made in the central office, and policies and hierarchical structures are in

place to ensure schools strictly implement them. I propose there is little, if any, room for

innovation or adaptation to the needs of students at the school level.

Table 2 Math Curriculums and Instruction: Centralized and Decentralized Governance by Corporate Non-Corporate Management of Schools

	Management Type	
Governance Type	Corporate	Non-Corporate
Centralized Governance	Closed Strategic Centrally controlled Curriculum dictated Implementation strictly controlled. Tightly coupled relationship between central office and the technical work (curriculum and instruction) of schools Little freedom to innovate at the school level	May be a combination of Open and Closed Strategic. May be some possibility to discuss alternative strategies for curriculum and instruction at the local level.
Decentralized Governance	Closed Strategic Management company selects curriculum and strictly controls implementation Little freedom to innovate at the school level	Open Strategic Bottom up decision making, horizontal, collegial. Loose coupling between board, management, and school. Ability to adapt curriculum and instruction at the school level

Adapted from St. John (2013, p. 18, 44, 106).

At the other end of the spectrum, the schools with decentralized governance and

non-corporate management exemplify an open strategic environment where

administrators, teachers, and other members of the community can participate in

designing curriculum and instruction. For example, in Chapter I, I discussed the fact that

many urban high school students are several grades behind in mathematics. In an open-

strategic environment, members of the school community and partners, e.g., universities, can plan and implement alternative strategies when a curriculum or teaching methodology is not working.

The Social Level

In urban environments, nested inequalities may create an environment of lower educational attainment and the cultural reproduction of low socio-economic class (e.g., high unemployment, low expectations, and low-paying jobs). At the same time, social capital formation, or the development of positive relationships and structures that have the potential to influence alternative courses, may be missing. Interventions that contribute to social capital formation play an essential, complementary role to strong academics in helping low-income, first generation, urban high school students realize their potential.

Supportive networks and social support intervention programs such as GEAR UP, TRIO, and College for Every Student (CFES) provide mentoring, opportunities to learn about college, and help to build higher educational aspirations and an environmental culture that supports college going. These services are especially important for first generation students whose families have no college familiarity or knowledge. These types of programs may also help mitigate concerns that low-income families may have about the cost of a college education or about how an investment in college may translate into socio-economic uplift. Caring teachers, counselors, and other adults, in addition to partner organizations, can provide this type of support if used effectively. The theory of

Academic Capital Formation (ACF) provides a framework for viewing how individuals

or groups are empowered by interventions in ways that support college going and the

social mobility it enables (Winkle Wagner, 2012).

Academic Capital Formation

According the Winkle Wagner (2012),

The theory of ACF emphasizes those aspects of gaining access to college
opportunity which are often only available to students from high-income
or high social status backgrounds, such as the acquisition of social
networks, knowledge about college going, an understanding of how to
navigate college or financial assistance, and how to extend these benefits
to underrepresented students. (p. 293)

The theory of Academic Capital Formation (ACF) emerged from research by St.

John, Hu, and Fisher (2011). Using a critical empirical[26] approach, St. John and his

colleagues studied the influence of social action within the lives of students and their

families on (a) decision making at critical transitions along the pathway to high

educational attainment and (b) family cultural beliefs about the feasibility of college. This

work extended previous research, such as that which led to the Balanced Access Model

(BAM). The BAM model provides a lens for examining the influence of public financing

of higher education on decisions by low-income underrepresented minority students

about whether or not college is feasible (St. John, 2006). ACF also complements the

---

[26] Critical empirical theory involves treating various intuitive claims about social and
policy problems and using quantitative and qualitative methods to test them in context. It
differs from standard scientific research in that it begins with a set of competing
questions about problems rather than specific hypotheses that may be linked to embedded
in specific policy goals. St. John claims that critical empirical research can expose
inequities related to policy in ways traditional research may not (2007, 2013).

research on the influence of academic support programs and increased graduation requirements on access and persistence (Perna, 2005; St. John and Musoba, 2011; Tierney, Bailey, Constantine, Finkelstein & Hurd, 2009). The ACF extends this research by adding consideration of social and cultural needs. Financial assistance and academic support are critical, but not enough. ACF takes into consideration the importance of the development of supportive family and community networks and a college going culture within families.

Family engagement. Family engagement considers the social networks that shape and support students' educational aspirations. This is how social capital operates in educational attainment. Students who are surrounded by family and friends who have high educational aspirations for them are more apt to experience and act on the expectation that they will graduate from high school and go onto college (McDonough, 1997; McCarron & Inkelas, 2006). Social capital is valuable in promoting educational attainment because it is imbued with cultural capital. Parents who value knowledge and understand that knowledge is currency that can be invested in (a) social mobility or (b) the reproduction of a desirable social status through higher levels of occupational attainment are willing to invest the time, effort, and money that college requires (Bourdieu, 1977; McDonough, 1997). However, in low-income families, particularly in those where parents and others in the immediate environment did not go to college, a student who wishes to improve his or her social status by getting a college education as a "first generation" student may face resistance in terms of "bumping up" against parents' educational and occupational expectations (Bourdieu, 1977). Drawing on a "River City"

50

mentality, low-income families may resist college for their children. This may be rooted in conservative[27] fears about culture change and potentially harmful effects of leaving home and going to college. Families of first generation students (the first in their family to go to college) may also have fears about the cost of an education. Researchers have found that many first generation families have deeply internalized and subjective beliefs that college is not for people like them (Bourdieu, 1977; McDonough, 1997). College may seem like pricey snake oil, and they may hold firmly onto the belief that their children will not be able to play Sousa marches according to a *think system* [28] if they invest in expensive band uniforms. There is also the stark reality to consider that students whose families are poor may be required to enter the workforce early (even at the risk of dropping out) or whose contribution to childcare for younger siblings may prevent leaving home. Thus, low-socioeconomic status and low expectations are reproduced cross generationally. Finally, low-socioeconomic status families who do have high educational aspirations for their children, especially those who did not attend college themselves, may not be able to provide information about how to prepare for college, how to choose a

---

[27] *Conservative* is defined here as the desire of parents for their children to stay in the community and retain its traditional values and attitudes.

[28] This is an allusion to the plot of Meredith Willson's 1957 musical, *The Music Man*. Con man Harold Hill sells band uniforms and instruments to parents, planning to skip town with the cash. He has phony credentials and has no idea how to teach students to play. His strategy involves convincing skeptics that he has a unique and innovative (and phony) pedagogical style, *The Think System,* where students don't read music, they know how to play the notes just by thinking them. The allusion is used here to symbolize parents' fears that claims that college is necessary and will lead to social mobility are exaggerated, questionable, unverifiable, or even downright false.

college, how to apply, how to pay for it, and what to expect when they get there. They may not know how to help their student in choosing a major or to direct him or her to resources for doing so.

Community engagement. To the St. John, Hu and Fisher (2011) model, I add the concept of community social capital. Drawing from the literature on community field theory (Wilkinson, 1991, in Israel, Beaulieu & Hartless, 2001), Israel, Beaulieu & Hartless (2001) have determined that community social capital develops from "residents' action to improve local economy, provide human and social services and express local cohesion and solidarity" (p. 46). Community engagement in social capital formation involves psychological investment and active participation in developing networks that support community schools and their students.

According to Israel, Beaulieu, and Hartless (2001), "structural attributes that can influence the accumulation of community social capital include socioeconomic capacity, isolation, instability and inequality" (p. 46). The amount of structural differentiation within a community, specifically, the different types of human capital or expertise community members bring to the table, determines the kinds of resources a community has available to address issues. Low-income, low-capacity urban communities do not support the structures that contribute to educational success. Transience brought about as people move to more affordable housing or in search of employment may be disruptive to relationships within school districts. Chronic inequality, as is often experienced by minorities in urban communities across generations, may discourage participation in community networks or limit access to resources.

Israel, Beaulieu, and Hartless (2001) describe the process attributes of community social capital at two levels: "first, by the extent and character of community action, and second, by the individual relationships among adults and youths" (p. 48).

Emergence of ACF. The theory of ACF emerged as a set of propositions derived from the study of "social capital (Coleman, 1988), class reproduction (Bourdieu, 1977 & 1990), and human capital (Becker, 1964, 1975) to discern claims about social processes related to educational attainment" (St. John, Hu, & Fisher, 2011, p. 13). That is, the propositions that emerged provide lenses for examining the impact of economic, cultural, academic, and social factors at a sequence of educational transitions.

Educational transitions. These educational transitions include: a) family engagement, b) academic preparation for college, c) transition to college, d) academic success, and e) culture of uplift or giving back to the community and passing on new social status to the next generation (St. John, 2010). Further explanation of these transitions follows:

Academic preparation for college. Academic preparation comprises: a) knowledge about and belief in the value of a college-preparation curriculum, b) familiarity with college (campuses, majors and minors, living conditions, course formats, social opportunities, support systems available), and c) aid guarantee (reducing concerns about costs). First, according to Warburton, Bugarin, & Nuñez (2001), "the academic rigor of students' high school curriculum is strongly associated with students' postsecondary GPA, with the amount of remedial coursework they take and with their rates of persistence and attainment" (p. 2).

In addition to issues related to academic preparation, students who will be the first in their family to go to college may face a college-knowledge gap. Continuous generation families (cross generation college attendance) have backgrounds that include information about how to apply to, enroll in, and pay for college that they can share with their children. College choice, enrollment, choosing majors, filling out the Free Application for Student Aid (FAFSA), and finding funding sources are not mysterious ideas. Lack of college knowledge and particularly of ways in which families can meet college costs are serious impediments for low-income and first-generation families. These limitations make it difficult to advocate for and support high educational attainment for their children, even in communities where the "value-added" of a college education is understood and accepted.

Transition to college. Transition to college involves the college choice process and the first two years post-transition. It refers to understanding the connections between the high school and college curriculum; finding and establishing a fit with an institution and in a major; and making the adjustment from the home and secondary environments to college culture (St. John et al. 2011). Again, this is a situation where parents who did not go to college are unlikely to possess knowledge, skills, or attitudes to advocate or support the successful transition of their children into college. According to McDonough (1997), "A first generation college-bound senior in what, for her, is uncharted waters and is facing a high-degree of uncertainty, both in what college choices to make and how to make appropriate

ones. . ." (p. 100) is in an extremely difficult position. Many first-generation students have no idea what the differences are between two-year colleges and four-year colleges and selective colleges and non-selective colleges. Yet the trajectory for preparation for each is very different.

Academic success. The student who is engaged in the academic and social environment to the extent that she or he continues to move on a trajectory toward achieving academic and career goals, and who ultimately persists to degree attainment, has achieved academic success. Achieving academic success in college is contingent upon effective preparation through completion of a college-ready curriculum, a successful transition into college, an achievement of "fit," availability of social and academic support, and continued ability to meet costs (St. John, Hu & Fisher, 2011).

Culture of uplift. According to Tierney et al. (2009), "College access outcomes have important economic and social consequences: college graduates earn more than those with a high school degree and are more active in their communities" (p. 1). In addition, academic capital formation leading to degree attainment by a first generation student will result in a positive socio-cultural reproduction effect. Through the durable construction of a new *habitus,*[29] (Bourdieu, 1977, p. 48), dispositions about the value of college and college knowledge can be reproduced into the next generation of the students' family or through the social environment in which he or she lives and works (McDonough, 1997).

---

[29] A sociological term referring to the habitual cultural patterns and expectations of families and communities.

Social capital and ACF. Conceptualization of ACF came after a decade of studying outcomes for students who participated in three comprehensive social support interventions: Washington State Achievers, Gates Millennium Scholars, and Twenty-first Century Scholars (St. John, Fisher, & Hu, 2011, p. 8). They conducted interviews with program participants using instruments that included questions on family background, high school preparation, parent engagement, college choice, college search and application, and early college experience (Lee & St. John, 2012, p. 125). A reconstructed theory emerged from the coding. St. John and his colleagues identified four social processes that engage students in overcoming barriers. These include: (1) easing concerns about the cost of college, (2) providing supportive networks of mentors, teachers, and community leaders to allay family and student fears about going to college, (3) providing support for navigating through systems to facilitate educational transitions despite barriers caused by racism and classism, and (4) providing trustworthy information at critical junctures in the transition process (St. John, Hu, & Fisher, 2011, p. 15).

ACF and CFES. Dalton, St. John, & Milazzo-Bigelow tested the theory of ACF in a study of the implementation of the College for Every Student (CFES) in exemplary rural high schools serving economically disadvantaged students in New York and Florida (2012). The team chose schools in Florida and New York for the site visits because these states provide higher levels of financial aid for college (comparatively). Selecting states that had offered higher levels of financial support provided a mechanism for controlling for the financial aid variable and for focusing attention on social-cultural barriers to high attainment. The individual schools were selected because they were undergoing

56

transformation to college preparatory models and had established CFES programs. The research team interviewed students, administrators, CFES program directors, teachers, and community mentors about their experiences relative to the implementation of the CFES program. The results were analyzed using the ACF framework. As there was no comparison group and the design was non-experimental, no generalizations could be made. However, the team learned from the experiences of those interviewed that the college visits, mentoring programs, and opportunities for civic engagement were influential in terms of the students' plans after high school. However, financial concerns were still paramount.

Issues of persistence in college also arose for rural New York students due to problems with acclimating to being away from home. Those interviewed (few of whom were parents) indicated that parents often supported their children's decisions to give into homesickness or a feeling of lack of fit and to quit school. The interview data revealed, in fact, that parents in New York were not well connected with higher education. They were included in the intervention in limited ways, generally related to navigational aspects of college access (e.g., FAFSA workshops). In fact, students in rural New York indicated that they did not always discuss their CFES trips, etc., with their parents, and parents generally did not participate. Parents' opportunities for social capital formation through the development of trustworthy information networks where they could develop college knowledge were limited. Although there were no parents interviewed on this issue, the students, administrators, adult mentors, and others who were interviewed conveyed that rural New York communities were comfortable in their beliefs that opportunity continued

57

to exist in their communities. College was not necessary for their children to achieve

social mobility, and there was concern about students going away to college. The

administrators, etc., who were interviewed believed that parents in their communities

often used their agency to support the status quo.

This was not the case in Florida, where parents' own experiences working at low-

paying jobs led them to support higher education as a goal for their children. Others

besides the parents reported most of these experiences. Impediments to parental support

for college going in those communities were usually financial, e.g., relying on a child's

income to help support the family.

St. John and Milazzo-Bigelow (2011a, 2011b) also tested the theory of ACF in

urban district schools in NYC. Like the rural schools in New York and Florida, these

high schools were undergoing a process of transformation to college preparatory models.

Using a naturalistic, qualitative, and non-experimental approach, the research team

interviewed administrators, students, CFES program directors, and teachers, but no

parents. The data was analyzed using open coding of themes relative to the core

constructs of ACF: cultural reproduction (i.e., family uplift and college knowledge),

social capital (i.e., trustworthy information, family and community support networks, and

development of navigation skills), and human capital (i.e., students' concerns about

costs). One theme that emerged from this analysis relative to human capital led the

researchers to expand the ACF framework. That is, parents and students are not only

concerned about the cost of college but also about returns on the cost of college and

social mobility made possible by career choice. This concern about careers was partially

reflected in students' enrollment in high schools associated with career themes (St. John

& Milazzo Bigelow, 2011a; 2011b).

Table 3 Implementation of Social Support Interventions Supporting Academic Capital Formation: Centralized and Decentralized Governance By Corporate Non-Corporate Management of Schools

	Management Type	
Governance Type	Corporate	Non-Corporate
Centralized Governance	Closed Strategic Central office decides whether programs will be offered. If so, which programs will be offered, and how they will be implemented. Strict hierarchical oversight of implementation by central office.	May be a combination of Closed and Open Strategic. Decision making may be shared Relationship between central office and school varies. More tightly coupled and hierarchical with CMO oversight
Decentralized Governance	Closed Strategic Relationship between management company and technical work of schools tightly coupled. Management company must approve programs and implementation plan	Open Strategic Bottom up decision making, horizontal, collegial. School and school community free to select programs and to design implementation plans

Adapted from St. John (2013, p. 18, 44, 106).

Organizational Environments and Social Support Interventions

It is expected that the governance and management of schools impact who makes

decisions about whether or not social support interventions are offered in schools, which

programs are offered, and how they are implemented. Table 3 proposes a classification

system for decision-making by school governance and management.

59

Conceptual Framework

Policy mandates that all students receive a higher standard of college preparation have presented capacity building challenges for urban high schools. These require adaptation at the organizational, curriculum, and social level. Figure 1 provides a visual representation of the differences in the strategic approaches the schools take to meeting these challenges at these three levels based on their organizational characteristics. These orientations were explained in the Organizational Level section of this chapter. In one example, control is decentralized and schools take an open-strategic approach to change. This represented in the model by a horizontal arrow leading to boxes. In another example, control is centralized and schools take a closed-strategic approach to change. This is represented in the model by a vertical arrow. The figure will be included in Chapters 4, 5, and 6 to connect the analyses back to the theoretical constructs of change described in this chapter.

Figure 1 Conceptual Model
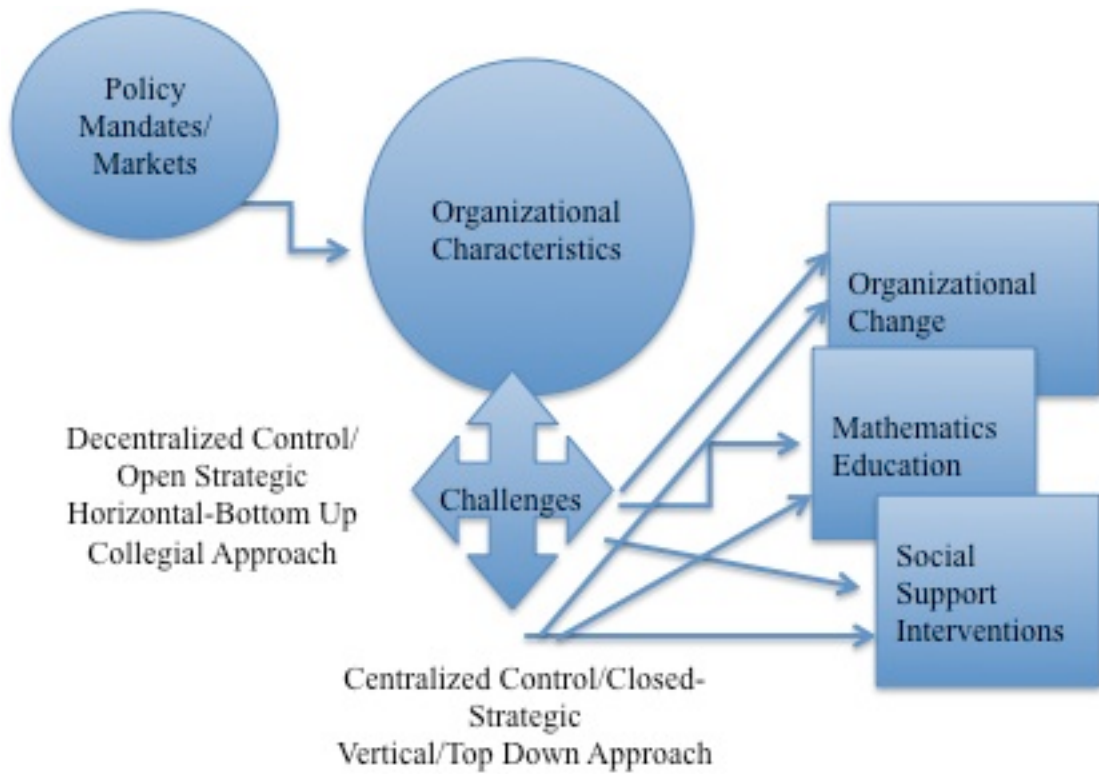
RESEARCH METHODOLOGY

> *I do not select, interpret, advise or direct…Being in the world of the other is a way of going wide open, entering in as if for the first time, hearing just what is, leaving out my own thoughts, feelings, theories, biases…I enter with the intention of understanding and accepting perceptions and not presenting my own view or reactions…I only want to encourage and support the other person's expression, what and how it is, how it came to be and where it is going.*
> *(Moustakas, 1995, 82-83, in Patton, 1990)*

Using a qualitative and non-experimental design, the researchers who collaborated on this fieldwork interviewed participants in naturalistic settings using an open-ended interview guide. This approach provided a qualitative database that can be used to build an understanding of how educators and students experienced the school reform process. The interview data was analyzed and sorted into themes and patterns. In some instances, the researchers made observations on-site. Information was also obtained from state board of education websites. This data was also interpreted and factored into the analysis. This approach was consistent with the social constructivist paradigm that holds that researchers can "generate or inductively develop a theory or pattern of meaning" (Creswell, 2003, p. 9). Consequently, ideas emerged as a means of explaining patterns that surfaced rather than determining theories a priori. The ideas that emerged influenced the review of the literature, allowing for comparison and situating the dissertation in relation to previous research.

Strategy of Inquiry: Multiple Case Study Research Design

A multiple case study design (Bloomberg & Volpe, 2008; Lincoln & Guba, 1985) was used to carry out the dissertation research in two sets of non-traditional urban public schools: four (4) charter schools, (3) small themed high school academies, and (1) large high school with internal academies. The case study method was chosen over other qualitative methods, e.g., a history or ethnography, due to its application of the social constructivist paradigm. Social constructivism holds that meaning making occurs within communities as a result of human relationships, institutional practices, agreements, and other collective actions (Creswell, 2003). The participants' historical, social, and cultural experiences and perspectives influence this meaning making. That is, "meanings are created by human beings as they engage with the world they are interpreting" (Creswell, 2003, p. 9).

The case study method was also chosen due to its ability to deal with a full variety of evidence, e.g., documents, artifacts, interviews, and observations (Yin, 2009). According to Baxter and Jack (2008),

> One of the advantages of this approach is the close collaboration between the researcher and the participant, while enabling participants to tell their stories (Crabtree & Miller, 1999). Through these stories the participants are able to describe their views of reality and this enables the researcher to better understand the participants' actions (Lather, 1992; Robottom & Hart, 1993). (p. 545)

Multiple case study research was chosen because it enables the researcher to (a) explore the differences within and between cases and (b) make generalizations to theories by replicating pattern matching across cases (Stake, 2006; Yin, 2003). Both are equally

important. As Lincoln and Guba (1985) note, "The object of the game is not to focus on the similarities that can be developed into generalizations, but to detail the many specifics that give the context its unique flavor (p. 201).

Case Study Schools

Eight non-traditional urban public schools in five different states[30] were selected in order to provide a cross section of new high school design models. These include: two early college charter schools (Beta and Sigma), two themed charter school academies (Alpha and Kappa), a comprehensive high school with internal themed academies (Remus), and two small themed high school academies (Acme Collegiate Academy and Twenty-First Century Technological Academy).[31] The selected cases were chosen because they (a) included collaborations with community and non-profit organizations, colleges, and universities, (b) had demonstrated capacity for change,[32] (c) were reporting improved outcomes for their students over time, and (d) were situated in state with more generous college financial aid options for low-income students who wanted to go to college.[33]

---

[30] Remus, Onye Nkuzi, ACA, and TFCTA were located in the same major city. Alpha, Beta, Kappa, and Sigma were located in four additional states.

[31] The school names are fictional to protect the anonymity of the participants.

[32] Capacity for change is defined as "the ability of leaders, organizations, coalitions and society at large to catalyze institutional change to achieve development goals" (World Bank Institute, 2010, p.1).

[33] "Concerns about costs" is a part of the conceptual framework for the theory of Academic Capital Formation (St. John, Hu & Fisher, 2011), which is described in Chapter II and was applied to the data analysis in Chapter VI.

Alpha High School Academy. This small (400 student capacity) public charter high school is located in a major city on the East Coast. Alpha High School Academy is a themed school with a pre-law focus founded by law students and law professors from a street law clinic. Their goal in founding the school was to promote college preparation and social justice pedagogy for low-income, underserved minority students living in the poorest neighborhoods of the city in which it is located, where students face the most significant barriers to learning.

> The school intentionally decided to locate here because we believe this is
> where the greatest challenges were and what the greatest need was…I
> think it's kind of a culture of commitment to best practices and
> commitment to introspection and evaluation that gives us the ability to
> help. Executive Director, Alpha High School

The school receives public funding to operate as well as grants from community organizations and law firms. Alpha's curriculum is college preparatory and aligned with state benchmarks and standards. Freshmen are required to take an entrance examination upon matriculation and a progress examination at the end of the year. Many of them enter below grade level despite passing grades in middle school courses. Therefore, a need for helping students improve basic skills is an ongoing process. Alpha's social justice pedagogical approach uses the tools of the legal profession to educate and empower the students to use their own voices to (a) solve complex problems, (b) think critically, and (c) advocate persuasively for themselves and their communities.

The school provides social support such as after-school programming, tutoring, personalized mentoring, and one-on-one college guidance counseling. Safety issues are addressed through Alpha's zero tolerance policy for drugs, fighting, or weapons. The

promise of a safer alternative (to other local schools) is a major attraction for parents. However, as the school's reputation has grown in the community, the college preparation and law emphases seem to have become more interesting to students and families.

Beta Early College Academy. Beta Early College Academy is located on the campus of a religious-affiliated private mid-western university. It serves about 400 students. Beta is a niche school whose focus is strictly college preparation. A Beta instructor stated: "We are only a college preparatory school. Our singular focus is to get…students who come in the doors to go to college and graduate from college. That's it."

Part of the value of the early college model for Beta students is concurrent enrollment. That is, Beta students are provided with tuition-free opportunities to complete their high school education at the same time as completing an associate's degree or the first two years of a four-year degree.

Kappa High School. Kappa High School is part of a Kappa Technological Academy. Kappa Technological Academy is an urban P-12 charter school located in the Midwest. The academy is part of an independent school district, the Kappa School District. Kappa's charter is authorized by a remote state university located a full day's drive from its campus. Kappa is a small school serving about 350 students who are primarily low-income and from underserved minority groups.

Kappa's curriculum is college preparatory. An institutional goal is to integrate the first two years of college with the last two years of high school through dual enrollment.

66

Kappa's curriculum is mapped[34] to the state curriculum framework. However, Kappa students can elect specialized curriculum tracks supporting career pathways in business, engineering, technology, and healthcare. Major elements of Kappa's curriculum include an interdisciplinary multi-modular program developed by a large corporate partner and ACT Work Keys. Work Keys is a career readiness curriculum that focuses on basic workforce skills. The corporate-developed program supports problem-based learning and presentation and communication skills. It is also group-oriented and includes workplace applications. Additionally, it helps students to identify potential career pathways. Nearly all Kappa students who participate are able to receive a National Career Writing Certificate, which is a portable work credential.

Sigma Early College High School. A small early college public charter school, Sigma Early College Academy is located on the campus of Sigma Community College in the Southwest. It serves about 245 students. Sigma's educational campus consists of the early college high school, a skill center, and the community college. Sigma was, as its president states, "placed here for a reason… for workforce development, healthcare, technology training… Sigma is well entrenched in the community with everyone turning out for its events and activities." According to the partner community college president, **"**We do that college fair…we figured, okay, we'll have some rides, maybe some people

---

[34] A system of determining what content and skills will be taught in which grades and courses and at what time during the school year. Curriculum mapping is generally informed by (a) state benchmarks and standards and (b) student data.

will show up. The damn place was packed! Every (chuckled) family and every kid came, riding the rides, eating hot dogs, dancing and stuff..."

Sigma Early College High School was established in 2004, with the community college holding the charter, as its own district. The school was founded to meet the needs of underserved urban high school students by providing small classrooms, a rigorous college curriculum, and critical academic and social support.

The Sigma model offers students the opportunity to earn a high school diploma, an associate's degree, or technical certificate in five years or less, or enough college credits to enter a university as a junior through dual or concurrent enrollment.

Remus Campus High School. Remus is located in Metropolis.[35] It is designated as a campus high school because (a) it is located on a large city university campus and (b) it mirrors the university structure, it consists of multiple small internal academic houses (medical professions, engineering, humanities, and academic professions) within a large comprehensive high school. Remus has a rich and proud history: It was the first school within its home city to be jointly established in the late 1970s as an educational collaboration by its partner city university and the state board of education. The school building is a city landmark that once housed a themed performing arts high school. Starting out with a population of about 300 students, Remus has grown to a school of about 1,425 students. The medical and engineering academies are the largest, with about 550 of the student population enrolled in each. These two academies account for about

---

[35] The name of the city is fictional to protect the anonymity of the participants.

77% of the total enrollment. The smaller Humanities and Academic Professions programs serve about 250 (18%) students combined. There are also a small number, about 75 (5%), of the students who are special needs students.

Onye Nkuzi. Onye Nkuzi High School is located in Metropolis. It is a small college preparatory high school academy with an enrollment of about 610 students. The school has a specialized teaching theme. That is, the curriculum is general college preparatory but includes child development and other teaching related electives. It also offers opportunities for its future teachers to intern in elementary schools. Students who are not interested in the teaching curriculum are able to pursue a general liberal arts curriculum and can select from non-teaching related elective courses.

Located in an affluent neighborhood, it attracts predominantly female (approximately 80%) students from different areas in the city. The gender gap at Onye Nkuzi may be due to codes associated with the teaching theme (Ancess & Allen, 2006). There is a large historical gender imbalance in the teaching profession favoring females, particularly in elementary school.

Due to social class differences between students and the community, the school had a tense relationship with its residential neighbors. After several decades of political skirmishes, Onye Nkuzi relocated to a newly refurbished building further south that also houses a women's leadership academy and a middle school.

21st Century Technological Academy and Acme Collegiate Academy. 21st Century Technological Academy (TFCTA) and Acme Collegiate Academy (ACA) are small public urban themed high school academies located in Metropolis. I have combined

them here for the purposes of this discussion because they are located in the same building on Educational Campus A,[36] which was once a large traditional comprehensive public high school. Some of the interviews involved personnel from both schools. Each school serves between 400 and 500 students, most of whom are African American or Hispanic.

TFCTA has a mathematics and science themed college preparatory curriculum geared toward preparing students for STEM. Acme's curriculum is also college preparatory. All students are required to take four years of mathematics and science as well as a foreign language.

Research Questions

The research questions outlined in Chapter I are restated here:

Research Question 1: How do the organizational characteristics (e.g., model, governance, and management) differ in the eight schools? How do these characteristics affect their ability to adapt at the local level?

Research Question 2: How have policy initiatives, such as new graduation requirements, more rigorous standards, and demands for school accountability, influenced mathematics education in the school models? How do the governance and management structures of the eight schools impact their ability to adapt mathematics education at the local level?

Question 3: How do social interventions, such as those facilitated by partnerships with non-profit organizations, support academic capital formation in the eight cases? How do

---

[36] Educational Campus A is a fictional name. The names of all the schools discussed in the cases have been changed to protect the anonymity of the participants.

the governance and management structures of the eight schools impact their ability to offer programs that support academic capital formation?

To address the research questions, data was collected through: (a) digital audio recording and transcription of in-depth semi-structured interviews conducted on site using open-ended questions from a common protocol used across the cases, (b) collection of supporting documentation, artifacts, and statistics both from the schools and related Internet sources, such as departments of education web sites, and (c) observations.

Methods of Data Collection and Analysis

The final element of qualitative research design is the specific method of data collection and analysis (Creswell, 2003, p.17). The interviews examined in this dissertation we collected as part of two research projects undertaken by a team of graduate students working with Professor St. John.

The first four cases, Alpha, Beta, Kappa, Sigma were undertaken between 2008 and 2010 to inform a capacity building project geared toward promoting equity in urban and higher education. The focus of these cases is on building capacity to provide a college preparatory curriculum in urban schools that serve low-income, minority students. Mathematics education reform was one of several school development processes studied as part of the overall project. Teams of graduate students traveled across the country to the schools to conduct interviews. A total of thirty-nine (39) interviews with administrators and teachers only were conducted. No students, parents, or dropouts were interviewed. In only one school, Sigma, were partners interviewed.

71

The second four cases, Remus, Onye Nkuzi, 21st Century Technological Academy, and Acme Collegiate Academy examine the integration of the College for Every Student Program (CFES) into the institutional fabric of four urban high schools. CFES was well established in the schools at the time of the visit and each of the four schools examined were considered by CFES to be exemplary in terms of the integration of its core practices. The site visits were undertaken during the spring of 2011. Each of the school models examined was comprised of a public high school (mostly small academies) working in collaboration with college and university partners. The CFES evaluation project supported the data collection visits to the four Metropolis public high schools. A team of three doctoral students visited each of the schools. A total of twenty (20) adult interviews (mostly administrators) were conducted, as were five (5) student focus group interviews of 8-10 students.

The researcher was part of both teams, collaborating on interviews and case development for the study of charter schools and providing leadership for the interview team for the study of schools for CFES. This engagement in the data collection process provided a grounded understanding of the schools and the communities they served.

Interviews

The interviews were conducted as part of two different sets of studies. The first set of four, Alpha, Beta, Kappa, and Sigma, were conducted as part of the study Projects Promoting Equity in Higher Education at the National Center for Institutional Diversity at the University of Michigan. This set of case studies was intended to provide examples that could be used to build urban college preparatory high school models in Michigan. I

am using the data from this project, but it is not the goal of my dissertation. The second set of interviews, Remus, Onye Nkuzi, TFCTA, and ACA, were part of a study of the implementation of the social support intervention CFES in urban college preparatory high schools. What tied the two sets of studies together was the focus on discovering ways in which the case schools were addressing challenges so as to improve (a) the percentage of low-income students who prepare for college and (b) the academic success of those students during college.

The interviews were conducted similarly in all of the sites.[37] Professor St. John's research team selected schools. The research team did not make any specification of the sample of participants. School administrators selected the adults to be interviewed. The host schools saw these individuals as being able to provide valuable insights, e.g., they could explain and recount critical incidents such as school start up, how the mathematics or CFES program was planned, and how it changed. The adults were interviewed individually, in pairs, or in small groups. Students at the CFES schools were invited to participate by the CFES team and the administration. With the exception of one individual interview, students were only interviewed in focus groups. Participation in all interviews was voluntary per the requirements of the school districts and the Institutional Review Board (IRB) of the University of Michigan. All interviews were anonymized.

Teams of one to three doctoral students traveled across the country to the sites and conducted open-ended interviews with purposive samplings of students and adults. Adult

---

[37] There are some critical issues regarding the selection process that will be discussed later in the chapter under limitations of the research methodology.

interviews were conducted individually or in small groups (twos and threes). Participants

included twenty-one (21) administrators,[38] twenty (27) teachers, (4) CFES program

personnel, six (6) counselors, (2) support staff and approximately (28) students. The

interview data is described in greater detail in Table 4.

---

[38] Some of the administrators were also teachers. They are categorized by their primary role here.

Table 4 Interview Data

School and School Location	School Type/Specialization	Number of Interviews	Interviews With
Alpha High School Academy Eastern U. S.	Charter, Social Justice Specialization	8	Assistant Director of Curriculum and Instruction/Math Teacher English Teacher Director of Programs Executive Director and Founder Academic Director Quality Assurance Manager College Counselor Math Department Chair/Ninth-grade Math Teacher
Beta Early College Academy Midwest U.S.	University-based Charter, College Prep Specialization	10	Principal Retired Teacher and Adviser Assistant Principal and Dean of Students for High School/Principal of the Middle School Math Teacher and Adviser Science Teacher and Adviser Curriculum Director College Liaison English Teacher and Adviser History Teacher and Adviser Seventh Grade Math Teacher

School and School Location	School Type/Specialization	Number of Interviews	Interviews With
Kappa High School Midwest, U.S.	Charter, Technical Specialization Business Partner in addition to College/University partner Corporate model of school management	10	American Literature and Government Teacher High School Principal Deputy Chief Officer and General Counsel Assistant Chief Academic Officer/Director of School Improvement/Math Chair/Math Teacher Curriculum Coordinator Director of Research, Planning, and Development/Work Keys Administrator/Former English and Social Studies Teacher Building Vice Principal Director of Title I CEO and Founder Teacher of English and Corporate Curriculum
Sigma Early College Academy Southwestern, U.S.	Community College Based Charter School, College Preparation Specialization	8	Parent Program Coordinator Community College President Italian and Tenth Grade English Teacher Vice President of Administrative Services Counselor ELL Coordinator and ELD Teacher Acting Principal Math Teacher

School and School Location	School Type/Specialization	Number of Interviews	Interviews With
Remus Campus High School	Large, Urban Public Campus High School with Four internal academies: Medical, Engineering, Humanities and College Preparation	9	Assistant Principal of Social Studies/History Teacher/Assistant Principal of Engineering House Focus Group: Math Teachers (2) Math Teacher Academic Support Person Principal CFES Program Director Student Student Focus Group (2 Seniors, 3 Juniors) Student Focus Group (1 Freshman, 1 Sophomore, 2 Juniors, 2 Seniors)
Onye Nkuzi High School	Small Urban Public High School Academy-Teaching Focus	6	English Teacher Principal Math Teacher Focus Group: CFES Mentors: Earth Science Teacher, AVID Elective Teacher; Coordinator of Student Affairs, Softball Coach; Social Studies Teacher/Dean of Students; English Teacher/Baseball Coach Physical Education Teacher/CFES Coordinator/Athletic Director/Leadership Class/Character Development Class/Youth Service Coordinator CFES Scholars (9 Students)

School and School Location	School Type/Specialization	Number of Interviews	Interviews With
21st Century Technological Academy	Small, Independent Urban High School High School with Math and Science Focus within Large Comprehensive School	8	9th Grade English Teacher English Teacher CFES Coordinator Group Interview (Principals of TFCTA and ACA) CFES Program Director Counselor Student Focus Group (3 Seniors) Principal
Acme Collegiate Academy	Small, Independent Public High School Academy with College Prep Focus within Large, Comprehensive High School	4	Group Interview (Principals of TFCTA and ACA)*See above CFES Program Director * See above Student Focus Group (All Seniors-approximately five, per researcher recollection) Focus Group Interview: CFES Team: Guidance Counselor for 9th and 10th Grades; Instructor; CFES Liaison for ACA; Guidance Counselor for 11th and 12th Grades and College

Interview Protocols

The primary instruments used for the study were semi-structured interview

protocols. The protocol used for the interviews that took place at the charter schools

(Alpha, Beta, Kappa and Sigma) was divided into eight parts, not all of which are

relevant to the phenomena under examination. The questions relative to mathematics and

literacy were excerpted and amended to the CFES protocols used at the four district-

accountable schools. The sections of the charter school protocol were:

- Personal Background: Information about interviewee's current position, professional experience, factors contributing to career choice, areas of certification and teaching assignments.
- School Environment: An exploration of the enrollment process at the school, its organizational structure, the effects of district requirements on teaching, typical days at the school, and any challenges with attrition.
- Competitive Strategy: Perceptions around a) demand for the school within the community and b) ways in which this school differentiates itself from other schools in the community in terms of the particular value it offers (special theme, curriculum).
- Technology Access: Focus on technology infrastructure at the school and ways in which technology is integrated into teaching and learning across the curriculum.
- Involvement in School Change: Initiatives and programs affecting curriculum and culture. Questions focus on change process, change agents, reactions to change, professional development, and perceptions about the success or failure of the change.
- Mathematics Programs: The data from this section factors heavily into the case study analysis for the dissertation. Questions focus on the evolution of the mathematics sequence at the school, level of preparation of students entering the school, pedagogy, perceived success of math courses in preparing students for college, assessment, professional development, dispositions of students towards mathematics, availability of advanced courses.
- Literacy Programs
- Student and Family Engagement: Role of interviewee in providing information about college and instilling college-going culture, perception of college going rates, perceptions of parental engagement and incentives for parental engagement, methods of information transfer, support for English language learners, school outreach programs, summer bridge to college programs, perceptions of student persistence in college, extracurricular activities supporting college going and parental involvement, alumni support.

The CFES protocols included: Administrator, Mentor, Program Director and

Student Focus Group protocols and the team chose which protocol to use based on the

role of the individual(s) being interviewed. Each protocol included background

information and contained questions relative to the subjects' experiences with the

enactment of the three core practices (see Chapter I, pp. 29-30) at the school.

Additional Data Collection

In addition to interviews, test data, and other supporting statistical information

(such as graduation rates, postsecondary enrollment, and high-stakes test scores), school

AYP statuses were collected from school and state board of education web sites.

Observation and informal conversation also played an informative role. The team

members wrote summaries based on field notes and jottings made during the visits to

Remus, Onye Nkuzi, TFCTA, and ACA. One team member attended a CFES leadership

summit in Metropolis during the research trip to that city, and she wrote field notes.

These notes were reviewed and coded.

Data Analysis

Analysis of the cases assume a priori that federal and state legislatures have

exercised political authority over schools by imposing systemic and tightly controlled

mathematics education policy based on more rigorous standards, higher graduation

requirements, and a system of high-stakes assessment. The case studies explore the

organizational and curricular level change in response to policy as well as the

implementation of social support interventions.

The steps in the data analysis process include:

- Reviewing the cases. Transcribed participant interviews were analyzed
  using open coding with emergent themes relative to the processes of social

and human capital formation (Coleman, 1988). TAMSAnalyzer[39] (Weinstein, 2006) was used to code the data. Coded data was categorized and organized according to organizational, academic, and social themes and then exported to Excel.
- Reviewing the documentation (artifacts), as well as selective recoding of the transcripts aimed at addressing the research questions and the topics under study.
- Reviewing observation notes.
- Reviewing all results to gain confidence and familiarity with the data and to ensure nothing has been overlooked.

Individually, each case has a compelling story to tell. Collectively, they provide the basis for a cross-case analysis from which common themes emerged to add to the understanding of the phenomena under study.

In Chapters 4, 5, and 6, I analyze the data from three perspectives: organizational frame, mathematical frame, and social frame. In this way, the research questions and their sub-questions will be addressed. Chapter IV includes the data analysis for research question one. The data analysis for research question two is in Chapter V. Chapter VI includes the data analysis for research question three.

Limitations of the Research Methodology

The following characteristics of the research methodology may have influenced the results of the study and impacted its reliability and validity.

School Selection

The case schools were not selected randomly. They were convenience selections based on contacts, faculty, and team knowledge of the schools. One member of the research team had worked at Alpha as a teacher. Another member of the faculty advisor's

---

[39] TAMS=Text Analysis Mark-Up System.

research team (who did not interview participants) was on the Board of Trustees for

Kappa, and her daughter also worked at the school. The faculty adviser for the project

had contacts at Sigma and Beta. The faculty adviser for the project is also the primary

evaluator for CFES, and it was through that connection that research in the Metropolis

schools was made possible.

Sample Selection

The adults who participated in the interviews were not randomly selected. Rather,

they were selected by the school administration. The host schools saw these individuals

as being most able to respond to the questions provided in the survey. There was no prior

specification of the sample by the researcher. This was particularly troubling in the case

of Kappa, a corporate, non-union school with a strong top-down management structure,

where the team was only able to interview one teacher who was not a department chair.

Two Kappa staff members, one teacher, and a human resources staff member both

declined to be recorded. The exclusion of parent and student interviews is troubling. It

seems that an evaluation of a market-driven corporate-based model would include

consumer feedback.

Also, the students selected for the CFES study were not randomly selected. The

Metropolis Board of Education would only approve the research proposal if the team

agreed that solicitation of participants would be low key and strictly voluntary. The

school administrators, teachers, and CFES staff identified the students who participated

as being among the most committed and involved in the program. There was also no

opportunity provided to interview students who had dropped out of the program. Students

at the CFES schools were invited to participate by the program director at the school and

by their mentors. Their interviews were anonymized. With the exception of one individual interview, students participated in focus groups only. Participation in all interviews was voluntary per the requirements of the school districts and the Institutional Review Board (IRB) of the University of Michigan. Therefore, the results cannot be generalized to the entire student population at the schools or to students in general. Nor can they be generalized as to the success or effectiveness (or lack thereof) of the programs or the school strategies.

School Admissions/Student Selection Process

All eight schools included in the study are public schools. Therefore, the expectation would be that each school would have an open admission policy. We found that this was not always the case.

Alpha. Application to attend Alpha is open to all students, including special needs students. Selection of students occurs through a lottery system. The lottery system works in this way: Alpha determines the number of open seats it has available and announces an enrollment deadline. At the end of the enrollment deadline, applications are chosen at random until Alpha's capacity is filled. The remaining applications are placed on a waiting list. The board of education in Alpha's city allows the waiting list applications to be ranked by random drawing or by date received. It is unknown which method Alpha uses.

During Alpha's first few years in operation, the school did not fill to capacity. Therefore, students who completed an application were assured a seat. However, as the school's reputation for protecting the safety of its students, high graduation rates, and college preparation has grown, there has been greater competition for admission. As a

result, the lottery system has played a greater role in determining which students would attend Alpha.

Beta. The academy serves about 400 public school students in grades 7-12, and these students are selected based on availability. When applications exceed available seats, students are chosen for admission by lottery. The lottery system by which Beta students are chosen is random and works similarly to that in the city where Alpha is located. The selection process information for charter schools in the state where Beta is located was confirmed by material on the state web site.

Kappa. As a public school, Kappa has an open admissions policy, but Kappa carefully assesses student preparation for the ninth grade work prior to matriculation. Many students who apply to Kappa need academic support, particularly in literacy and mathematics. As a result, some students are offered admission to the middle school rather than the ninth grade. Kappa administration believes this will give the student the best chance to acquire knowledge and skills and to succeed in high school. They admit this discourages some students from enrolling.

Sigma. As a public school, enrollment is open and students are admitted on a first come, first served basis. However, they must complete an application, including a five-paragraph essay or writing sample and an interview to be considered. The essay is for the purpose of evaluating student writing and also to give the school a sense of the student's commitment and goals. The school explained the interview as informational. The school feels it is important to convey its expectations up front and to gain assurance that families agree to comply. However, a counselor told the team that the writing sample acts as

somewhat of a deterrent for students to complete the admissions packet as students are not used to doing that type of writing.

Metropolis Schools. The Metropolis school lottery system is intended to be a ranking system of school choice. It allows students to choose and rank up to twelve high school choices to yield one perfect fit. The process is similar to the process hospitals choose to select medical residents from medical school graduates: graduates rank hospitals and hospitals rank graduates. The lottery system does not provide choice for all students. Screening processes often privilege those with high middle school test scores and attendance rates and those who live near the target school. About 83% of students are placed in one of their top five choices. The most attractive choices are those with high graduation rates, high majority populations, low poverty, low ELL, and low special education enrollment. Many students are placed in schools with 50% or lower graduation rates, particularly those who do not match (Boyd, 2011).

The lottery system affects the four Metropolis case schools in various ways. Of particular interest is the education option. For example, Remus' engineering, medical academies, and humanities academies are screened. The academic professions academy is an *education option* academy. The education option places students who do not meet the requirements of screened or selective schools or who do not win admission to one of their ranked schools. It privileges students who rank the school high.[40] Schools then select half of their education option students and the district selects the other half. Like Remus, Onye Nkuzi is an education option school.

---

[40] Students are ranked as high, medium, or low, based on the results of their 7th grade standardized test scores and their attendance.

In contrast to the education option, both TFCTA and ACA are designated as "limited screened." This means students do not have to meet the testing or attendance requirements of screened programs but have to meet some other criteria. TFCTA and ACA require that students interested in attending must attend a meeting with their parents or guardians and complete an application packet.

Table 5 Selection Requirements for Admission to Case Schools

School	Screening Process
Alpha	Open; Random lottery if over capacity, application packet required
Beta	Open; Random lottery, application packet required
Kappa	Open; application packet required; parental agreement to strict disciplinary policy required; students are tested once admitted; may be placed in middle school.
Sigma	Open; application packet required, including five-paragraph essay
Remus	Open; city lottery; screened: admission to engineering based on test scores and attendance
Onye Nkuzi	Open; city lottery; education option: those ranking school and interested in teaching theme given preference; city board of education selects half of students
ACA	Open; city lottery; limited screened; students and family must attend information meeting and rank school
TFCTA	Open; city lottery; limited screened; students and family must attend information meeting and rank school

Table 5 elucidates the fact that although the school admissions policies are theoretically open, there are requirements for admission such as admissions essays, need, math and literacy attainment, and attendance at a meeting that can affect a student's chances for admission. School capacity can also be a factor. For example, according to the administration, ACA and TFCTA are in great demand and, therefore, there is

tremendous competition for admission. Currently, there are approximately 3,000 applicants to ACA for about 100 seats in the freshman class, and approximately 2,000 applicants for about 100 seats in the freshman class at TFCTA. Although both of these schools are limited screened schools, it is possible that many of the students who rank either of these schools and attend the required meeting will not be admitted. It is unclear how the students are selected for admission when there are more applications than there are spaces.

Qualifications of the Research Team

Seven individuals interviewed the subjects, including me. Six members of the team were doctoral students in higher education and one with an earned Ph.D., also in higher education. All of the students had completed qualitative methods and research design courses prior to conducting the interviews. All were experienced in conducting open-ended interviews both with individuals and with focus groups. All had received training to do so. The focus group interview process was discussed prior to the site visits. The team developed the protocols with oversight from a faculty adviser.

Researcher Bias

A concern related to trustworthiness of qualitative research is researcher bias. In a qualitative study, the data is closely connected to the researcher, who is an integral part of the research process (Patton, 1990). Therefore, in approaching this project, I reflected on my own background, and how it might subjectively influence my interpretation of the data. I am a Caucasian female with an extensive background in teacher education, college teaching, and college administration. I have also completed beginning and advanced quantitative research courses, qualitative research courses, and research design courses in

partial completion of my PhD program in higher education. In keeping with Moustakas, however, I believe that I have undertaken this study with neutrality and impartiality while keeping an open mind.

Objectivity in qualitative inquiry is essential to sound research (Patton, 1990). Through this process of self-reflection, I have made my a priori notions transparent and have taken a critical stance towards them. Continuing to engage in reflexivity throughout the study will enable me to see where my experiences and preconceived notions are influencing my interpretations of data. Investigator triangulation and peer scrutiny will also mitigate bias on my part.

Reliability and Validity

Table 6 Case Design Tactics for Four Design Tests

Tests	Case Study Tactic	Phase of Research in Which Tactic Occurs
Construct validity	• Multiple sources of evidence-triangulation (interviews, documents, artifacts)	Data collection
	• Establish chain of evidence	Data collection
	• Case study report	Composition
	• Investigator triangulation	
	• Peer scrutiny	
Internal validity	• Pattern matching (Small schools)	Data analysis
	• Explanation building	Data analysis
	• Full descriptions of sites and participants	Composition
External validity	• Replication logic (multiple cases)	Research design
Reliability	• Case study protocol (same protocol used for each site)	Data collection

Source: Adapted from Yin (2003), p. 34.

Known Issues Affecting Reliability and Validity. There were several known issues of reliability and validity for the study. The validity issues were: (a) the sample selection process, (b) the school selection process, (c) the lack of student participation in the cases involving the four charter schools, (d) the lack of parent participation, and (e) few teacher interviews. The reliability issues were: (a) the sample size, (b) admissions/selection process in the schools (varies), and (c) a lack of follow-up data. There were also reliability issues in terms of the way in which the team used the protocol, e.g., not all of the questions were asked at every school. In addition, some of the school data was not available.

Summary

Chapter Three outlined the multiple case study research design and other methodological aspects of this qualitative dissertation. The questions of reliability and validity were discussed as part of the section on limitations of the research methodology. In particular, I focused on concerns about the generalizability of the conclusions of this study given the selection process of the participants and the dissimilarity of the selection process students undergo for admission to the school.

CHAPTER IV. ORGANIZATIONAL CONTEXT

See, that's to me, really fascinating…it seems like this school then, the way it's structured, can really change the way students view their whole future, their whole aspiration.
Kappa Principal

This chapter focuses on the eight schools as organizations. An analysis of the

interview and organizational data responds to research question one and its sub-question:

Research Question 1: How do the organizational characteristics (e.g. model,

governance, and management) differ in the eight schools?

Sub-question: How do these characteristics affect their ability to adapt at the

local level?

Response to Question 1 and Sub-question: Analysis of Data

In the section that follows, the case schools are discussed individually. The

schools have been organized into two categories: charter schools and district schools.

Figure 2 provides a visual representation of the topic under discussion in this

chapter. It replicates the conceptual model found in Chapter II, but is specific to

organizational adaptation. It illustrates how policy mandates create challenges for schools.

The organizational characteristics of the schools affect how schools adapt to meet those

challenges. The analysis of the data that follows compares how organizational adaptation

occurs in the four charter schools with how it occurs in the four district-accountable high schools.

Figure 2 Conceptual Model: Organizational Change
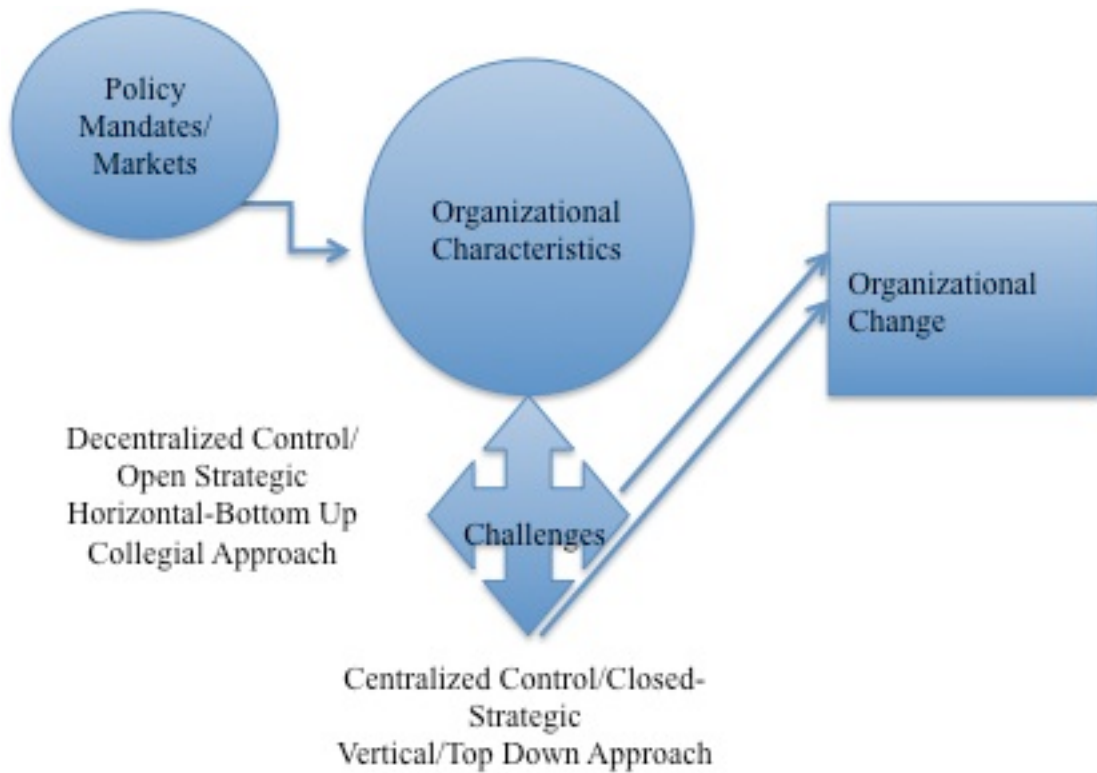
Charter Schools

Table 7 illustrates organizational characteristics of the four charter schools, including the charter authorizer. The school-by-school analyses that follow discuss the process of change in these four. I address issues and challenges that led to the change and how it affected the strategic orientation of the schools.

Table 7 Organizational Characteristics of Four Charter Schools Studied

School Name	School Model	Charter Authorizer	Governance	Charter Management
Alpha	Charter/Career Theme	State Board of Education	Charter Board/ Decentralized Independent District	Freestanding
Beta	Early College Charter	City Public School Board	Charter Board/ Decentralized Independent District	Freestanding
Kappa	Charter/Career Theme/ Mini Schools Model	Public State University	Charter Board Decentralized Independent District	EMO For Profit
Sigma	Early College Charter	State Board of Education	Charter Board/ Decentralized Independent District	Freestanding

Alpha. In an effort to become more technically efficient and productive, Alpha changed its administrative structure and with it the strategic organizational settings changed. What was once an open-strategic decision making environment characterized by horizontal communication and decision-making and teamwork, became a more vertical, hierarchical, mechanistic, and closed. For example, the initial administrative hierarchy placed the executive director and principal in peer positions. The executive director of the charter operator was part of the founding group from the street law clinic. From the executive director's perspective, there was little coordination or communication between these administrators, which led to bureaucratic inefficiencies. Divisions of labor were not clearly articulated, which was confusing both internally and to external partners. The executive director and the principal reported separately to both the charter board and

the external foundation that ran its after-school program. It was the executive director's

belief that having two people report to the board was both confusing in terms of chains of

responsibility and overwhelming for the foundation. As a result, the executive director

claimed that the value of the after-school program for students had been diminished. The

lack of communication resulted in a disconnect between the program and the core

curriculum.

The executive director stated that in order to improve communication and

increase efficiency, the school needed to take a more mechanistic[41] approach. As a result

of these changes, the executive director is now the only direct report to the board.

Meanwhile, the executive director has five administrators who report to him. This

includes a (a) program planning director, (b) chief operations officer, (c) academic

director (principal and dean of students roles combined), (d) director of development, and

(e) chief of staff. The structure is hierarchical with specialized differentiation of

functional tasks. It seems isomorphic with management structures of for-profit EMOs,

charter management organizations (CMO), and public school districts.

The executive director is of the opinion that the change contributed to greater

technical efficiency and productivity. He provided the example of the addition of the

program-planning department for out-of-classroom programs, such as after-school

programs, mentoring, and law programs. These changes have led to a more stabilized

relationship with partners in addition to greater synergy between teachers delivering

curriculum and staff delivering wrap-around services. At the time of the site visit, the ED

---

[41] Mechanistic approaches are characterized by very specialized tasks; clearly defined turfs; oversight of the performance of these tasks by supervisors; and top-down hierarchy of control, communication, and organization (Burns & Stalker, 1961).

reported that the new structure had enabled the expansion of the mentoring program to include Homework Help[42] office hours every day or every other day. It was his belief that structural change that facilitates communication and the delivery of a needs-based academic support intervention has the potential to support Alpha's efficiency in preparing its students to meet state curriculum standards and to progress toward meeting graduation requirements. One question about this new hierarchy to which no one could respond through direct questioning was why the title of "principal," which carries with it a commonly understood meaning of instructional leader, was changed to the more ambiguous "academic director" in a hierarchy that has three peer-linked instructional leadership positions. Participants did confirm, however, that there has been high turnover in both administrators and teachers since the school was established.

Another change in the organization setting is that since the start up, Alpha has experienced a weakened relationship with the street law clinic with which it was originally associated. This partnership has been replaced by collaborations with law firms in the city that provide social and academic support for the students. According to the academic director,

> And so, for example, every Tuesday all of our juniors go to law firm tutoring. And there's six partner law firms we work with that will host the same group of kids every Tuesday all year long where they feed the kids dinner and the kids get tutoring and one-on-one attention with someone who works at a law firm.

It is interesting that with this change, the street law clinic, which had been part of the original organizational structure, lost its voice in the governance of the school. The

---

[42] Homework Help is a form of needs-based academic support, including tutoring. It is aligned with the school day curriculum.

identity with the career theme was reduced to founding status, and community partners replaced the resources it provided to those interested in law careers. The reason for this shift could be explained by the reconceptualization of the law career niche to a broader focus on the study of law as a tool to enable participation in the democratic process and preparation for college going.

Beta. Beta was established in 2003 as its state's first early college high school under a Bill and Melinda Gates Foundation[43] Early College Initiative grant and with the support of the Knowledgeworks Foundation. Beta was originally a district-accountable public early college high school academy acting in partnership with a local Catholic university. In 2007, however, Beta reorganized as a 501c3 tax-exempt non-profit public charter school after the budget cuts in the district threatened to cost the school a third of its staff. The principal expressed that the restructuring of Beta as a charter school freed the school from traditional public school contractual obligations. (Beta teachers are now non-union. Beta does not have to honor the contract the teachers' union negotiated.) This also allowed the school more flexibility to seek philanthropic capital to supplement the public funding it receives. According to the principal, these changes allowed the school to raise the revenue to continue staffing at the levels needed to address the requirements of policy mandates and to sustain the early college initiative. Clearly, separating from the union was a cost-saving measure, but the effects of this action on students come into question.

With the restructuring, Beta's governance and management structures changed.

---

[43] The Gates Foundation also financed the small school movement in the Metropolis district.

The principal explained:

> We're an early college academy. We have charter status in [state] and so
> we're an independent school district sponsored by the University of [city]
> and [city] Public Schools. But we have an autonomous board and they
> have all the governance and fiduciary responsibility of an elected board.
> They're just appointed. We originally were a Melinda and Bill Gates
> Foundation-seeded early college [high school]. We were the first in [state].
> KnowledgeWorks was their intermediary in [state].

Beta's strategic organizational structure is decentralized with a non-corporate

management structure (Table 7, p. 90). The principle is the leader of the school, but there

is an open strategic orientation to decision making. The vice principal stated:

> You know if you're in a bigger school, you know, it, it almost kind of has
> to be a top-down thing where here is what everybody's going to do so
> we're all on the same page. Here it was, let's talk about it. Let's come to a
> decision everybody can live with and then we'll move on.

Beta has established a number of partnerships in order to achieve its strategic

goals. According to Beta's website, the University of [city], a sponsor, assists [Beta] with

curriculum development and identifying educational opportunities within the campus

environment such as (a) bringing Distinguished Speakers to [Beta's] campus and (b)

providing professional development opportunities for [Beta] faculty. [The university]

students provide tutoring assistance at study tables and boot camps throughout a semester

of service [learning].[44] It is also Beta's primary partner in the early college structure. Beta

has also developed a partnership relationship with a community college and the business

school of a public research university. These relationships act as a pipeline to college for

qualified Beta students interested in business. These relationships, like the one with the

university, not only have the potential to smooth transitions between high school and

---

[44] This refers to the college's service learning requirement. College students have to
engage in community service as part of their graduation requirements.

college for Beta students but also to support its early college model goal of helping Beta students complete up to two years of college before graduating from high school.

The administration of Beta Early College High School made a strategic decision to expand the Beta district to include a middle school. After realizing its students were entering high school with elementary and middle school skills in core subject areas, the administration of Beta began looking for solutions. This decision was made at the school level and taken to the board for approval. After studying the problem and researching other school models, they decided that fanning out to include the lower grade levels might be the answer. Beta began its expansion by adding a seventh and eighth grade. The Beta Dean of Students provides this rationale:

> You know, we only have four years and that we've worked with [names campus school in another state]…They're a 7-12 model and we kind of studied what they've done and we said, "Okay, this makes a lot of sense for us." You spend two years; focus on the basics, focus on testing a solid foundation…organization, discipline, and basic skills, and then in ninth grade you're able to kind of open the kids up to a lot more.

Unfortunately, based on the available data, one cannot conclude how or whether adding a junior high school has influenced outcomes for students entering the junior or early college high school. For example, prior to the expansion, the percentages of Beta Early College High School students scoring at or above proficient in reading and mathematics were already well above district and state percentages. Scores have not gone up or down since the expansion. Graduation rates were and still remain high for Beta. Similarly, one cannot draw conclusions about value added for the students attending Beta Junior High, even though percentages of Beta seventh and eighth graders also exceeded district and state averages. These are the only sources of information available. Assessment data on student knowledge and skill levels in mathematics and reading prior

97

to or at matriculation are not available. It appears that the expansion has facilitated the development of a comprehensive curriculum. If so, it is possible that it reduces the numbers of students stuck at basic skill levels, thus conserving resources. It is also possible that the expansion simply served as a tracking mechanism that brought borderline or higher performing urban students into a college preparatory program earlier.[45]

Kappa. Kappa High School is a public charter school and a mini-schools model, with multiple subunit themes tied to career pipelines in business, engineering, and technology. Students select their subunits. These subunits are somewhat informal and connected to the school as a whole for staffing and resources. The curriculum is specialized by theme but connected to a corporate sponsored program (CSP).

Kappa's charter authorizer is a small public state university located in a remote wooded area a day's drive from the campus. Kappa is its own school district, the Kappa District. This is a district governed by a local board, the Kappa Board. It is managed by an EMO, also bearing the name Kappa. The CEO of the EMO, Mr. Luthor,[46] is an energetic, entrepreneurial businessman with a long history in state education politics. He is also the founder of the school and was instrumental in Board selection. Kappa's organization is a more extreme example of what Miron and Nelson (2002) were describing when they commented on the "limited range of interests" represented by charter school boards.

---

[45] Regardless of the outcome of the expansion, perception that it was successful led the school to apply for a charter for a preparatory school. Beta Prep is a K-6 model that opened in 2012. It is a direct feeder school for Beta Jr. High, the feeder school for Beta Early College Academy.

[46] This name is a pseudonym.

The interview with Mr. Luthor took more than an hour and comprised a long and passionate historical narrative. It was clear from that interview and those with the other administrators and staff that Mr. Luthor was the leader who held most of the strategic decision making power. There are several deans, and there are principals at each level. However, no decision is made without his approval, and he and the Board are responsible for goal setting and strategic action. Decision-making is top-down, and implementation of policies is strictly overseen and enforced. The strategic organizational environment is closed. Some examples follow.

Kappa was established on the campus of a private technological university in 2000 with only the eleventh and twelfth grades. Since then, Kappa has moved its location twice. Mr. Luthor negotiated all these moves on behalf of the Kappa Board. The initial move was prompted by a number of factors. Kappa administration began to believe, over time, that Kappa students were academically unprepared for the rigor of college coursework as it was taught on a college campus and lacked maturity to share space with adult students. In addition, the state graduation requirements changed.[47] Previously, the state required only government and physical education. Local districts set all other requirements. Given that latitude, Mr. Luthor developed a curriculum that was career-oriented and set up as many dual enrollment classes as he could. This reduced the number of teachers Kappa needed to hire. As a final straw, Mr. Luthor explained that the technological university expressed an interest in tightening the partnership agreement and to develop an early college model that could serve as a feeder school for the university.

---

[47] Kappa students (who were disruptive in college classes) needed to learn there was more to workplace readiness than just academics.

Mr. Luthor was not interested in relinquishing control.[48] In 2002, they moved and added the ninth and tenth grades.

The school rented space in a building that once housed a Catholic high school. It was an old building with multiple facilities issues. Climate control was problematic, for example. The size of the facility and the materials used to build it, including old wiring and limited outlets, limited the capacity for technology integration. The building was also too small to accommodate expansion as new grades were added. Mr. Luthor believed the facility's shortcomings threatened Kappa's ability to expand, be technologically innovative, and compete in the marketplace for students. He negotiated to purchase land and buildings that belonged to a university. This particular university had lost its student market when downturns in the economy forced the closure of a large, local manufacturing plant that had sent its workforce there for training. Kappa moved to the new building in 2005.

Like Beta, Kappa has expanded since the school was established. Kappa added ninth and tenth grades within its first few years of operation. Also similar to Beta, Kappa administrators reported many Kappa students were matriculating with knowledge and skill levels, particularly in English and mathematics, which were well below grade level.[49] This presented what seemed to be an overwhelming challenge in helping students meet curriculum standards and complete graduation requirements on time. Mr. Luthor and the Board believed that the addition of a feeder school would give the school more

---

[48] Kappa continues to maintain a partnership for dual enrollment with the private technological university.
[49] According to interview data, this assessment is based on middle school test scores, grades, and Kappa's placement examination.

control and facilitate a more consistent, higher level of preparation for students entering high school. The elementary and middle schools were added in 2005. Unlike Beta, the expansion decisions were made at the top and were non-participatory. If we accept improvement in achievement test scores as a measure of progress, then the expansion did not meet its intended goal. Test scores at the third and eighth grade levels and those of special education students have been consistently low.

Kappa's expansion affected its ability to attract a professional teaching staff. Because it is a charter school, Kappa's teachers are non-union. In addition to paying lower wages and benefits, Kappa does not grant tenure to teachers. Kappa teachers stated they were offered one-year contracts with no option for tenure. It came out in the interviews (with no reasons given) that Kappa was having difficulty attracting experienced teachers. Due to its non-competitive pay and one-year contract structure, Kappa finds its greatest success in recruiting new teachers right out of college.

As mentioned above, Kappa's difficulties in recruiting teachers became critical when policy change required the school to follow the state's merit curriculum and to meet state graduation requirements. Kappa originally consisted of two grades, eleventh, and twelfth. For those grades, the only state-required courses were government and physical education. Therefore, Kappa was able to focus its curriculum not on liberal arts but on preparation for technological careers. Students took courses such as business English. They did not take social studies outside of government and those courses required by its technological university partner in partial fulfillment of a degree. They did not take arts courses. When the requirements changed and compelled Kappa to offer a full complement of liberal arts courses, they had to expand their staff. This was a struggle

because the school did not offer competitive salaries or job security. They fell short on staffing needs and had to get creative. One of the paraprofessionals on staff was encouraged to obtain teacher certification. They also attempted to mitigate the lower wage issue by providing adjunct teaching opportunities for teachers with master's degrees through their partnerships with colleges and universities.

Although Kappa is not formally an early college model, it shares the early college goal of having students complete the first two years of college while still in high school. Towards this end, it maintains multiple partnership relationships with colleges and universities. Mr. Luthor is largely responsible for negotiating these partnership arrangements.

One partner is its charter authorizer, which is located at a long distance. The distance may be symbolic of the fierce independence Mr. Luthor maintains in running the school. At the same time, the relationship is mutually beneficial. The university provides opportunities for students to gain college knowledge through sponsored college events (see Chapter VI). Kappa, in turn, provides space to the university to operate a satellite campus in its location near a major metropolitan area. Kappa students are able to take some of these courses for dual high school and college enrollment credit. Some Kappa teachers provide instruction for these classes and receive payment from the university for their services.

There are other examples of arrangements with college partners negotiated by the Mr. Luthor and the Board. Like its state university partner, they hire some of Kappa's faculty as adjuncts, which teach courses to college students. They are also able to deliver courses that are part of the college preparatory curriculum on the high school campus for

dual enrollment credit. Additionally, Kappa has a partnership with a major manufacturer that has provided a Corporate Sponsored Program (CSP) including: (a) a series of project and inquiry-based learning models, (b) training to implement them, and (c) authentic learning experiences at the corporation to facilitate Kappa's curriculum.

Sigma. Sigma was one of the early charter schools in its home state. It was established in the mid-nineteen nineties as both a charter school and an independent school district. The charter was a freestanding organization (no management company). At the start-up, the relationship between Sigma High School and its partner in the early Sigma Community College was very loosely coupled. The high school rented space and services, such as information technology and custodians, from the community college. However, according to the President of Sigma Community College, there was a lack of synergy between the two schools. It was not the norm for students to take community college courses for dual enrollment. There was no curricular dialog between the community college and high school faculty. While the community college was the governing board for the high school, the autonomy of the high school was reflected in the fact that Sigma reported to the vice president, a.k.a. the dean of administration of the community college, rather than its president.

Like Alpha, change occurred internally as its internal organizational structure began to take on characteristics of a corporate management paradigm. The arrival of a new community college president was the catalyst for this change. As he reflected on his first experiences with the high school, he recalled a "dumping ground" where students clocked in and clocked out for their fifty state-required hours per week. He noted that

instruction was self-paced independent study, i.e., no teacher interaction. The high school

dropout rate for this model was 50%.

With accountability to make AYP and to meet the goals of the early college

charter on his side, the president took control. He explained his determination to create

greater synergy between Sigma community college and the high school. He noted:

"When we began the intent of the early college model, now all of a sudden, you know,

there, there needed to be college involvement. More than just from a fiscal side or an HR

side, it needed to be fully integrated." Initial steps toward strengthening the partnership

included moving the physical plant onto the college campus. This resulted in the

development of a more hierarchical administrative structure that gave the college

president more authority over the operation of the high school. After the move, the model

continued to evolve over a two-three year period. During this time, the relationship

between the community college and the high school became more tightly coupled. For

example, the administrative structures were put into place and curriculum was negotiated

between the college faculty and the high school teachers. The participants indicated that

the community college culture was trying to learn to embrace the integration of high

school-aged students in its classes and activities.

District-accountable Schools

The district-accountable schools, Remus, Onye Nkuzi, TFCTA, and ACA are all

located in Metropolis and are managed by the same large urban school district. This is a

highly centralized bureaucratic district with mechanistic roles and hierarchical

communication. Goal setting and decision making occurs at the central office and is

communicated to the schools. Implementation is strictly overseen by methods including

evaluator visits to the schools. Evaluators write quality control reports and collect student data. Remedies are recommended, as needed. Schools are not encouraged to innovate or to consider alternative strategies on their own. The strategic organizational setting is closed-strategic.

Decisions to transform schools into new models (e.g., traditional comprehensive to mini-schools or SWS) are made at the top. In one example, part of a broad education reform initiative in Metropolis, Remus, and Educational Campus High School (ECHS), which are two large traditional Metropolis high schools, experienced adaptive change by splitting into houses or academies. Remus' split occurred internally. The split of ECHS produced Educational Campus A and several small independent high school academies, including TFCTA and ACA. In another part of the city, Onye Nkuzi emerged as a small, stand-alone, themed high school academy for those interested in teaching.

Remus. Remus' principal described the size of the school with nearly 1, 500 students as "mid sized" for the district, where schools of three-five thousand students exist. However, such large schools are unusual for the city, where small schools of no more than 600-700 students are the norm. He said: "You are not going to find as many large comprehensive high schools that offer what we do to children both academically and extracurricular[ly]."

Remus is a mini-schools model with formal divisions between the internal academies. The principal described the internal structure of the school for the interviewer. The size of the internal academies is similar to the size of independent small schools in the district: "You'll find that we have three very structured academies. It's almost like we have three schools, but we don't call them schools; they're academies within one

building. That offers the benefits of a small school program kind of feel, at the same time the large school benefits of advanced placement courses." He added: "I have close to thirty teams; boys, girls, varsity, junior varsity, … swimming, tennis, bowling, JV basketball. You have the whole array, and then you have all the AP courses, but at the same time finding balance between creating a small personalized environment for kids, which I believe is so important for them."

The development of internal houses has allowed Remus to (a) tighten relationships between students and a specialized curriculum track, (b) expose students to a college and a career major, and (c) motivate them to graduate from high school and transition into college. While this raises the question of whether or not students have enough insight to choose a career at thirteen, the career theme differentiates the school from competitors in the district. The administration also believes that the development of the internal houses has allowed the school to determine which students might benefit from resources like: (a) after-school tutoring in, for example, advanced mathematics or a specialized internship, e.g. engineering or (b) social support interventions (e.g. CFES).

Remus' principal reports: "I have seven assistant principals; we are engaging professionally with teachers twice a week, every week we're talking about curriculum, every week we're writing periodic assessments together, uniform periodic assessments, engaging how kids are doing …" The principal believes that this internal structure is critical to the success of the "small academies within an internal structure" model. He adds: "I think that's [internal structured academies] really unique for a school this size to have. I don't think you'll find that very often. It takes a high degree of organization to get that to work."

So, while Remus administrators and practitioners cannot participate in goal setting and decision making in the district, and to a large extent at the school, the scenario the principal described did appear to allow for adaptation by more closely aligning curriculum and other resources to the career interests of students. Discussions about the school's ability to adapt the curriculum itself (with specificity to math) and to provide social interventions are found in Chapters 5 and 6, respectively.

In Metropolis, Remus strengthened its relationship with the state college adjacent to its campus after creating its internal college and career-focused houses. The Remus Engineering Academy is partnered with the college's prestigious engineering school. High performing students may earn up to fifteen college credits through coursework at this institution. The university provides supplemental funding for Remus programs. Per the principal, "We have dual enrollment, and so our kids are taking College Now[50] classes. We have vouchers where kids in, in your senior year are sitting in classes with their tuition being fully paid." The principal believes this arrangement is important in terms of getting low-income urban students through college at a lower cost. It was unclear from the data or any of the published school reports how many students were able to take advantage of the opportunities to earn college credit as a result of this arrangement.

The lottery system of school choice is one way in which the central office exerts control over students in Metropolis. Remus is required to take a number of educational

---

[50] College Now is the largest dual enrollment facilitator in the country. The program also provides academic support such as tutoring and counseling, as well as social support such as helping students and their families navigate college applications and financial aid systems.

option students whose goals may not fit with the school's career themes. Remus also has a small population of special education students.[51] According to the vice principal, Remus has struggled to provide for the needs of these students. At the time of the site visit, the school was planning to augment its staff to better meet the needs of special education students. This was reflected in their quality control report. There is no additional information on how the organization is accommodating special education students' needs.

Onye Nkuzi. Onye Nkuzi was founded as a freestanding small high school academy with a teaching theme. However, the school experienced a transition to a mini-school model because the district's admissions policies continued to place significant numbers of students in the school who were not interested in teacher education as a career path.

This transition occurred as a result of Onye Nkuzi's education option admissions categorization. Through the education option process, the administration of Onye Nkuzi selects half of its students from the pools of students who rank it in the Metropolis high school lottery system. The balance is selected to attend the school by the district. These students are generally selected from high, medium, and low performing students who were ranked on the basis of middle school test scores and attendance rates. School theme is not considered. At the time of the site visit, the district had been filling its education option seats to transfer students from Onye Nkuzi from schools closed due to poor performance. Thus, Onye Nkuzi enrolled students with varying goals and levels of academic achievement.

---

[51] In 2010, the special education population was 75 out of about 1500 students.

The school responded by developing a second internal academy for liberal arts (Chapter V). It might be tempting to categorize this organizational level change as the result of an open strategic environment, but the development of internal academies was already an accepted strategic practice within the district when Onye Nkuzi split and supported district admission practices.

Onye Nkuzi has been free to develop strategic partnerships with local elementary schools, a dynamic that has made it possible for teaching academy students to do internships where they can gain classroom experience. It is unknown how partnerships support the liberal arts academy as no direct questions were asked about this.

TFCTA and ACA. TFCTA was originally part of a schools-within-schools model on Education Campus A. As stated above, TFCTA became an independent school when ECHS was restructured into a campus of independent small schools. Prior to the restructuring, TFCTA had been a structured internal academy within ECHS. Students who were more advanced in mathematics and science and who showed potential and interest in entering STEM majors in college were tracked into this academy.[52] The principal of TFCTA had been a member of the instructional team at ECHS.

TFCTA is a district school operating in a closed strategic environment. Its adaptive change initiatives are, therefore, limited and focused on established partnerships. For example, its partnerships with a public university and a private college facilitate college visits through participation in the College for Every Student (CFES) program. This program is discussed in Chapter VI.

---

[52] The admissions process changed after the restructuring. See Chapter III.

Like TFCTA, ACA is a small high school academy created on Educational Campus A at the time of the restructuring of ECHS. Like Remus and TFCTA, ACA is a schools-within-schools model. It shares the use of the lunchroom, gyms, auditorium, culinary arts room, and outdoor field. Students in all schools can participate in campus-wide sports teams and orchestras. Like TFCTA, ACA's ability to engage in strategic initiatives is limited by the fact that it is part of a highly controlled, centralized district. Also like TFCTA, its strategic initiatives are largely limited to establishing partnerships to provide resources for its students and to aligning its curriculum and resources with its career theme. ACA's peer mentor program is tied to their partnerships with the CFES program. This is discussed in Chapter VI. CFES also facilitates ACA relationships with the same public university as TFCTA.

Cross-case Analysis

As discussed previously, proponents of charter schools argue that administrators and practitioners in large district schools may be constrained in their ability to adapt strategically at the local level by centralized, hierarchical bureaucracies. They are also characterized by top-down decision making and tight coupling between the central office and the technical work of schools. The decentralized governance structures of charter schools, they argue, afford administrators and practitioners the freedom to respond strategically to the needs of students, market conditions, and other environmental aspects at the local level. Consistent with these arguments, the four urban charter schools we (the research team) visited had decentralized governance structures. That is, they were

autonomous from local school districts. The four urban district-accountable schools were subject to highly centralized control by the urban school district.

We also expected to see that while the charter schools we studied were decentralized and independent from district control, their management types (corporate or non-corporate) would have a significant influence on their strategic orientation (closed vs. open) and their communication and decision making structures. This turned out to be true. Kappa's management, for example, is corporate and for-profit. The management style is highly centralized. Decision-making is vertical, i.e. top-down. There are several high level administrators and principals (who were hand picked by Mr. Luthor) who, with the Board (also hand picked by Mr. Luthor), have the ultimate power in goal setting and decision- making. On the other hand, Beta's has no external management. Its internal hierarchy is minimal, consisting of positions including: principal, vice principal, curriculum coordinator. The structure is more horizontal with an orientation toward teambuilding and empowering practitioners to participate in solving problems and making decisions.

However, through our research at Alpha and Sigma, we also learned that changes in internal administrative structures could influence the transformation of what was essentially a horizontal, open-strategic orientation to a vertical, more closed strategic orientation (Alpha). We also observed that because the president of Sigma's community college partner was on the board governing the college and the high school he was able to exert tightened control between the community college president's office and the high school.

Alpha, for example, has no external management company and at the time the school was founded, an open-strategic approach to goal setting and bottom-up decision-making. Over time, the CEO was able to influence structural changes that transformed Alpha's internal administrative structure into one that placed him at the top and made him the only conduit to the Board. Even the instructional leadership, the principalship, of the school was eliminated and replaced by a non-descript academic directorship. The organizational structure is now hierarchical and mechanistic and decision-making is top with school administrators, teachers, and staff expected to implement and otherwise support initiatives decided upon at the central level. These changes have resulted in a less collegial and open strategic organizational setting.

Sigma began as a decentralized autonomous early college school with a relationship to its college partner that was very loosely coupled. When a new college president came on board, he empowered the governing board, of which he was a member, to take more control of the relationship between the college and the high school and to provide more oversight of the technical work of the high school. This internal change did not result in the development of a corporate management paradigm, but, rather, a demand for accountability and to transform into a true early college model.

The combination of the cross-case analysis and Table 8 provides a summary response to Question 1 and its sub-question. I propose that Alpha, Kappa, and the district-accountable schools have closed-strategic orientations that support central control and top-down approaches to change. Beta and Sigma have open-strategic orientations that one would expect to facilitate bottom-up change. However, it is not that simple. One must look at other variables. These orientations are not necessarily good or bad in and of

themselves. The key is how the strategies are used. In Chapter V, I provide opportunities to see these strategies at work, as approaches to addressing mathematics challenges are examined in the eight schools. In Chapter VI, I discuss strategic adaptation to provide social interventions.

Table 8 Organizational Variables Affecting Strategic Orientation by School

School	Organizational Variables	Strategic Orientation
Alpha	Decentralized governance No external management Vertical orientation to internal administration with centralized control	Closed-strategic
Beta	Decentralized governance No external management Horizontal decision making structure encouraging teamwork	Open-strategic
Kappa	Decentralized governance Corporate-style, for-profit management Vertical, hierarchical structure Tightly coupled relationship between management and technical work of school	Closed-strategic
Sigma	Decentralized governance No external management President of early college partner is board member. Board exerts more control and provides more oversight over technical work of school than is typical for charter board.	Open-strategic
Remus Onye Nkuzi TFCTA ACA	Highly centralized governance and management by large urban school district. Vertical, hierarchical structure Strict oversight of policy implementation Tightly coupled relationship between district and technical work of schools	Closed-strategic

Adapted from St. John (2013, p. 18, 44, 106)

113

CHAPTER V. MATHEMATICAL LEVEL

Imagine a classroom, a school, or a school district where all students have access to high-quality, engaging mathematics instruction. There are ambitious expectations for all, with accommodations for those who need it.

National Council of Teachers of Mathematics

Mathematics education provides an example through which to observe the effects of policy on the technical work of schools and of organizational variables on local adaptability. In Chapter V, I respond to question 2 and its sub-question:

Question 2: How have policy mandates, such as higher graduation requirements, more rigorous standards, and demands for school accountability influenced mathematics education in the case schools?

Sub-question: How did organizational variables (school model, governance, management, administration) and the strategic environment of schools (closed-strategic or open-strategic) impact the ability of teachers and administrators to adapt mathematics education at the local level?

Response to Question 2: Implementation of Policy Mandates

Policy mandates for higher graduation requirements, more rigorous standards, and accountability have changed mathematics education in American high schools. This was evident in the schools the team visited for the research study.

Implementation of Higher Graduation Requirements

At the time of the site visits, statutes and regulations that contained higher graduation requirements for mathematics had been enacted in all of the five states where the case schools were located. Specifically, the new requirements mandate four units[53] of mathematics, an increase from the previous maximum of three units. They also included a requirement for Algebra II or its equivalent. The requirement for Algebra II is for all students, not just those students who demonstrate an interest in or aptitude for advanced mathematics. Timelines had been set up in all of the states for the implementation of these new policies. At the time of the site visits, which occurred before the final deadline, all eight schools had met or exceeded state graduation requirements for mathematics, at least on paper. Table 9, below, shows the enacted state graduation requirements to which the eight schools had to adhere, as well as each school's requirements.

Table 9 Comparing graduation requirements between the states and the individual schools

School	State graduation requirements	Individual School Graduation Requirements/ Senior course offered
Alpha	4 credits of mathematics Algebra II and one additional advanced mathematics course	4 units of mathematics Pre-Calculus, Honors Pre-Calculus
Beta	3 units of mathematics 4 units of mathematics for honors diploma, including Algebra II and one additional advanced math course	4 units of mathematics Pre-Calculus, Calculus
Kappa	4 units of mathematics Algebra II and one additional advanced mathematics course	4 units of mathematics Pre-Calculus, Probability and Statistics

---

[53] In the five states where the case schools are located, required coursework is expressed in Carnegie units of credit, with one unit reflecting one year of coursework.

School	State graduation requirements	Individual School Graduation Requirements/ Senior course offered
Sigma	Variable, 2, 3 and 4 units of mathematics*[54] Algebra II and one additional mathematics course as of class of 2014.	4 units of mathematics Advanced Math (Trigonometry)
Remus	3 units of mathematics for standard diploma 4 credits of mathematics for advanced diploma	4 units of mathematics Pre-Calculus Calculus and AP Calculus for stronger students as budget allows
Onye Nkuzi	3 units of mathematics for standard diploma 4 credits of mathematics for advanced diploma	4 units of mathematics[55] Pre-Calculus AP Calculus for advanced students
TFCTA	3 units of mathematics for standard diploma 4 units of mathematics for advanced diploma	4 units of mathematics Calculus required
ACA	3 units of mathematics for standard diploma 4 units of mathematics for advanced diploma	4 units of mathematics Pre-Calculus or Statistics AP Calculus available for advanced students

Integration of More Rigorous[56] Standards

The five states had also developed new curriculum standards, which they had

linked to standardized tests, per the requirements of NCLB. The curriculum standards for

mathematics for each state are too numerous to mention here. Examples are available on

---

[54] Class of 2012, 2 credits of mathematics; Class of 2013, 3 credits of mathematics, including Algebra I, Geometry and one advanced mathematics course; Class of 2014, 4 credits of mathematics, including Algebra, Geometry, Algebra II and one upper level mathematics course.

[55] At the time of the site visits, Metropolis students were only required to take three credits of math. The majority of students stopped after the third unit.

[56] The term *rigorous* is unpacked in Chapter II.

all state department of education web sites. Typically, mathematics standards focus on conceptual understanding, procedural skill and fluency, and application of skills in problem solving within four topics: (1) numbers and operations, (2) measurement and geometry, (3) algebra and functions, and (4) probability and statistics. Those interviewed at the case schools described a continuous process of mapping the curriculum to evolving state standards that was linked high-stakes standardized tests. For the charter schools, this occurred at the school level. For the district schools, it occurred at the district level in the selection of textbooks, but also at the school level.

Response to Question 2: Mathematics Education in the Eight Case Schools

The organizational characteristics of the four charter schools and four district schools were discussed in Chapter IV. The four charter schools are accountable to charter boards and in one case, a management company, rather than school districts. The four district high schools are accountable to a centralized city board of education. Figure 3 is provided to remind the reader of the influences of organizational characteristics on the strategic orientation (open and bottom up or closed and top down) to adaptation of the curriculum to meet the new requirements.

I will begin the discussion of mathematics education in the eight case schools with a school-by-school analysis based on the data collected during the site visits. I have divided the school-by-school analysis into a section on charter schools and a section on district schools. Each analysis considers the challenges the schools faced and what adaptations were made. To the extent the data was available, I discuss the effects of the changes.

Figure 3 Conceptual Model: Math Curriculum Adaptation
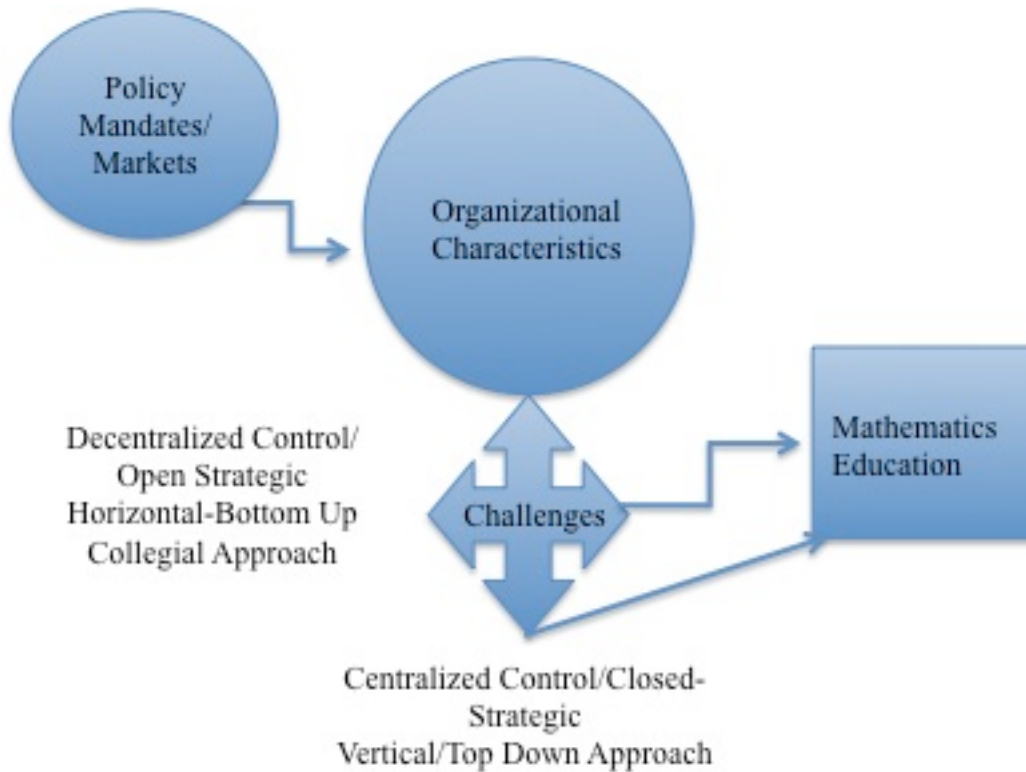
Charter Schools

The four charter schools are Alpha, Beta, Kappa, and Sigma.

Alpha. Of the interview participants from Alpha, two were mathematics teachers. The other participants were administrators, counselors, and teachers from other disciplines. Table 10 shows Alpha's sequence by grade level, courses, and support courses.

Challenge and adaptation. Alpha faced challenges related to the tension between having a large percentage of their student body matriculate with limited computational

skills and the need to eliminate Pre-algebra from the course sequence. The school also

found it challenging to offer advanced courses.

Table 10 Alpha Math Sequence

Grade	Course	Support Course
9	Algebra or Honors Algebra I	Math Workshop (Algebra Support)
10	Geometry or Honors Geometry/Algebra II	Math Workshop (½ Algebra I, ½ Geometry Support)
11	Algebra II or Honors Algebra I	
12	Pre-calculus or Honors Pre-Calculus or Honors Calculus	

Computational skills. The math sequence poses significant challenges for Alpha's

students and their teachers because Alpha students typically enter the school several

grades behind in mathematics. Alpha teachers describe frustration in trying to help

students who are so far behind to develop foundational knowledge and skills and then

learn Algebra. Prior to the implementation of the new graduation requirements, Alpha

students who needed help with basic computational skills could be tracked into pre-

Algebra. This did not entirely resolve the issue of knowledge and skill gaps, but it

minimized the leap students had to try to make when entering the school. Since the

implementation of the new requirements, Alpha has eliminated pre-algebra so students

can get through the required courses and graduate in four years. All students are tracked

into Algebra I regardless of knowledge and skill level. In lieu of the pre-algebra course,

Alpha teachers have now had to find alternative ways to support basic instruction while

also meeting requirements for the advanced math courses required for graduation.

An Alpha teacher described one strategy as a process of narrowing the scope of content and deepening how time and energy is spent on topics. An Alpha Math teacher stated, "I am seeing this curriculum structure helping us in spending more time in each area on a topic for a longer period of time, making sure. . . when we leave the topic, they understand the importance [of knowing] it." It was unclear from the data how this teaching strategy helped students realize the goal of covering high school mathematics standards in four years. It raises the question of whether the mathematics faculty is picking and choosing what material to teach and what to exclude based on its connection to high-stakes testing or their beliefs about what is needed for college readiness.

Another strategy was to provide additional opportunities for Alpha students to study and practice math outside a regular class period. Alpha has instituted a pre-freshman year bridge program, and math is offered as part of that program. After-school tutoring programs provide students with additional opportunities to build their knowledge and skills. Ninth and tenth grade students take algebra and geometry workshops in addition to their regular classes. The extended periods are called math workshops (see Table 8, p. 126). The math teacher indicated that in designing these workshops, they focused on creating connections between foundational knowledge and skills, Algebra I, and geometry, i.e., strand design. They hoped that the workshops would not only support students in their ninth and tenth grade math courses but also help them to build a foundation for Algebra II and beyond. She also stated that a purpose of the workshops was to prepare students to pass state standardized tests. She did not indicate which courses were eliminated from the liberal arts curriculum to accommodate the workshops or how successful they were in helping students close gaps in knowledge and skills.

As a complement to its instructional strategies, Alpha engages in a continual process of assessment to see what students are learning and where they need support. Alpha calls its process a *Benchmark Assessment Program*. This program provides immediate feedback on student progress that teachers can use to create learning profiles and develop focused teaching strategies. Alpha administrators and teachers believe this feedback loop is particularly important for the process of strengthening foundational skills during the freshman and sophomore years. Alpha employs a Quality Assurance Manager who collects, analyzes, and distributes Benchmark Assessment reports to those working with students. In addition to the Benchmark Assessment Program, formative assessments of student learning occur throughout their courses, and summative assessments occur at the end of courses. An Alpha Math teacher reported she believed that the assessment process was critical in determining what resources were needed to help students coming in below grade level to complete their mathematics requirements by the end of the senior year.

However, despite the continuous assessment process Alpha has in place, critical information about student learning and progress is being missed. Teachers continually find they have to re-teach skills as students transition from one course to another. An Alpha Math Teacher stated: "We are trying to get to the levels where they remember the pre-requisite knowledge they had of, say, Algebra I when they get to Algebra II." This seems to be a clear indication that Alpha students are not learning the material. This suggests that Alpha administrators and teachers should revisit their instructional strategies (extended curriculum blocks, etc.) and make sure pedagogical practices support the development of deep content knowledge that students can carry to the next course.

Offering advanced coursework. Some of the students enter Alpha at or above grade level in math. Alpha's honors math courses were designed to support the needs of advanced students and to provide necessary preparation for those who intend to go to college in STEM majors. Unfortunately, Alpha faces budgetary challenges to offering courses not absolutely required for graduation. Resources are strained due to the need to provide support for students who did not develop foundational knowledge and skills in elementary and middle school or at Alpha, where the students cannot remember what they are learning from course to course. The latter raises the question of whether the mathematics workshops, in which the mathematics teachers admittedly teach to high-stakes standardized tests, are providing necessary support in helping students with basic skills develop deep knowledge and skills they can transfer to different contexts.

Alpha students do not take dual enrollment courses. The school has no college partners.

Beta. Two Beta mathematics teachers participated in the interviews. The other participants were administrators, counselors, and teachers in other disciplines.

Challenges and adaptation. Like Alpha, Beta struggles with the challenge of meeting the needs of students with limited basic math skills. Beta's decentralized governance and management structures and its open strategic environment made it possible for the teachers and administrators to collaborate to adapt the curriculum. Beta addresses the need to offer advanced courses to those who are prepared for them by leveraging the partnerships it has established as an early college model and having the students take those classes as dual enrollment courses.

Basic math skills. Like Alpha, Beta struggles with the challenge of meeting the needs of students for the development of math basic skills. Beta's decentralized governance and management structures and its open strategic environment made it possible for the teachers and administrators to collaborate to adapt the curriculum. Beta addresses the need to offer advanced courses to those who are prepared for them by leveraging the partnerships it has established as an early college model and having the students take those classes as dual enrollment courses.

Table 11 Beta Math Sequence

Grade	General Track	Advanced Track
9	Wright Dunbar Math (Algebra I)	Geometric Optics and Algebra
10	Geometrical Optics and Algebra	Algebra II
11	Algebra II	Pre-Calculus
12	Pre-calculus	Calculus

Offering advanced coursework. Although the state graduation requirements do not require math proficiency beyond Algebra II, Beta administration and faculty believe that exposure to pre-calculus or calculus during the senior year is valuable even though the students may repeat those courses in college. They believe they benefit from developing a familiarity with the language and some basic knowledge and skills. A Beta teacher explained:

> Our goal is to get them at least exposed to things like pre-calculus and calculus so when they go to college, most of them will probably have to take the class again. I mean, I took AP Calculus in high school and still had to retake it in college. But, because I would already seen the material, that made it a lot easier learning from a professor who is going ninety miles an hour at the board.

In essence, they are betting that exposing students to pre-calculus in high school will net the students greater long-term gain than allowing them to build fundamental skills in pre-algebra. They have eliminated pre-algebra to make room for pre-calculus.

They are also not taking into account the value of the pedagogical approach to teaching math. For example, perhaps the teacher had to retake calculus in college because the pedagogical approaches to teaching calculus she experienced in high school and college were ineffective.

Regarding pedagogical approach, Algebra II and Pre-calculus are taught in the traditional lecture format. The thinking behind the use of the traditional format is to expose students to the type of teaching they will experience in college, only at a somewhat slower pace. They believe that without first having had this high school exposure to the content, a college pre-calculus course where the teacher stands at the board and lectures at a rapid pace might be too much of a shock. The first year these courses were offered in this format, the students foundered. Since then, the Beta teachers have integrated group problem solving, yielding results that are more favorable. It is unclear from the data why Beta administrators and teachers did not choose research-based pedagogical approaches geared toward helping students develop deep content knowledge and skills instead of the approach they took. The researcher brings up issues regarding this in Chapter VII.

Although Beta exposes all students to pre-calculus, the school is still struggling to find solutions for students who, based on their career aspirations, need to take calculus in high school but enter high school with middle school level knowledge and skills. For example, it is not unusual for students who enter Beta High School in the ninth grade to profess aspirations to careers in STEM fields. Calculus is a foundational discipline and one of the most significant barriers to minority students earning a STEM degree (Bonsangue & Drew, 1993). Unfortunately, despite the new curriculum, math is the area

of lowest attainment for Beta students. Few Beta students complete calculus, and this poses a significant barrier to achieving aspirations to enter STEM careers. A Beta teacher stated that when a student mentioned a planned STEM college major she thought to herself, ". . . and you talk about being an engineer when you're still talking about fractions and you've never been introduced to higher-level math?"

Beta has also added a Gateway requirement to its curriculum. This is a portfolio-type requirement containing various assignments and projects. Six Gateways are required for graduation. They are not a part of the math sequence per se. Students must complete two Gateways before they can take any of the required courses in the math sequence as dual enrollment courses. Beta has built capacity for offering higher-level mathematics courses for college credit through dual enrollment. College faculty teaches dual enrollment courses taken at Beta's partner college and university.

Kappa. The participants in the interviews included one math teacher. The other participants were administrators, the CEO of the EMO, the General Counsel (also a member of the Board), and teachers from non-math disciplines.

Kappa's mathematics curriculum is displayed in Table 12.

Table 12 Kappa Math Sequence

Grade	Course
9	Algebra I
10	Geometry
11	Algebra II (College algebra-dual enrollment)
12	One math course in final year of high school (pre- calculus/probability and statistics offered)

The curriculum coordinator indicated that Kappa's response to the new policy environment was to engage in an elaborate process of curriculum mapping. The curriculum coordinator led this process. During the interviews we learned that she has an

English degree and almost no teaching experience. The mapping process involved aligning curriculum and instruction with the (a) state High School Content Expectations (HSCE) for mathematics, (b) National Council for Teachers of Mathematics Principles and Standards for School Mathematics, (c) Work Keys Applied Mathematics Characteristics/Skills, (d) ACT College Readiness Standards, and (e) module goals for a Corporate Sponsored Program (CSP).

Administration and faculty at Kappa told the research team that this alignment ensures students are exposed to essential content, as well as opportunities to develop twenty-first century skills and dispositions such as: critical thinking; problem solving; teamwork; communication; creativity and innovation; and global awareness. It is unclear how the school is measuring the effectiveness of this mapping process beyond achievement in math and English/Language Arts. For instances, questions remain as to how school leaders measure students' attainment of twenty-first century skills and dispositions.

In her interview, the principal added that the curriculum is also aligned with the state's technology standards. The state where Kappa is located has placed a strong emphasis on its technology standards, which are aligned with the National Educational Technology Standards (NETS).[57] Kappa's principal noted: "As much as possible, because we are supposed to put technology standards into our lesson plans. . . and as much as possible—I would say math can't do it as much probably as maybe another class can do it, but—as much as possible they do it."

---

[57] I am aware of this emphasis because I contributed to the development of the technology standards for Kappa's state.

The director of school improvement, who is also the math chair, stated that the school was ahead of the timeline not only for aligning with the new state standards but also with enacting the requirement for four years of mathematics. The principal concurred, stating,

> Well, you know we did this even before the standards came out. We were following that model even before they told us that we had to follow them. And, of course, I think they are a good thing because then you are uniform in what you are teaching.

As four units of mathematics including Algebra II are required in the state in which Kappa is located, Kappa chose to eliminate its basic mathematic courses in high school, specifically, basic math and pre-algebra, in order to align. The math chair stated, "There was absolutely no way kids were going to graduate if they were taking basic math and then pre-algebra and then Algebra I. They wouldn't get through the curriculum." (See Kappa Math Sequence, Table 12).

The CSP is an integral part of the Kappa curriculum, not just for math, but also for other subjects. According to Kappa administrators and the material on the website for the CSP, it is interdisciplinary, project/inquiry based and technology-integrated. A vice principal told the research team that in Kappa math courses, students use computers and calculators to solve real-world problems. They work in groups, read materials and present their findings. Kappa math teachers try to engage students in learning math by developing and using word problems relevant to their program tracks (healthcare, etc.) and creating math toolboxes to help students match concepts with problem solving processes. A Kappa teacher shared these insights:

> …Well I think one of the…one of the big things we do here is we usually start off with a word problem before we even talk about what the skills are you need for it. So we already try and frame that for them. All of my word

problems or applied experiences in the math class are centered on engineering, healthcare, and business.

Kappa's administration and the CEO of the EMO believe this curriculum is important for helping students develop 21st century workforce skills. Whether it does or not was unclear from the available data.

Challenges and adaptation. Like Alpha and Beta, Kappa has a significant number of students who seek admission with limited basic skills. Also like Alpha and Beta, Kappa has eliminated Pre-algebra from the high school curriculum.

Basic math skills. A challenge for the school in helping its students to meet curriculum standards and graduation requirements is that the average student entering the freshman class at Kappa from other schools is up to three grade levels behind in math. The question becomes, how do they get students with such basic computational skills through four years of mathematics, including Algebra II, in four years? The school admits new students with the limited basic computational skills into middle school grades that more closely align with their test scores rather into the grade to which they were promoted by their last school. For example, a student applies for admission into the ninth grade, having completed the eighth grade at his/her previous school. He/or she scores at the fifth grade level in math on the entrance exam and is offered admission into the seventh grade at Kappa, rather than the ninth grade. This poses additional problems for the student and Kappa administration admitted it deterred some students from matriculating. There was no evidence that this solution adequately addressed the problem of basic skills development for the students who did accept being retained in middle school.

The rest of the students placed into the ninth grade are placed into Algebra I. The chair of the math department, who is also the director of school improvement stated:

> Students take Algebra I whether they're ready for it or not… we have a Title I math instructor who pulls out…our most at risk kids and does the remediation on…eighth grade skills that they don't have and then if that's still not enough, we have an after school program to support them, also. It's sequential. It's Algebra I, geometry, Algebra II, but we do that as a dual enrolled class through [names university], and that's College Algebra. Those students whose skills are too remedial for them to succeed in Algebra I even with the scaffolding provided are offered admission in a lower grade.

A Kappa vice principal indicated that many students spend an extra hour or two after school reviewing their work with tutors. They even eat dinner at the school.

Kappa students take Algebra II as a dual enrollment course. High school faculty, who have been hired as adjunct instructors by the partner college or university, teach these courses. This is a special course taught during the school day and adapted to spread over a year instead of one semester. The curriculum is aligned with the state high school curriculum standards. The connection to college is that instructors hired by the college/university partner, who also work for Kappa, teach the students and they receive a college transcript with course credit.

Assessment of learning occurs in a variety of ways at Kappa. The CSP assessments are performance based. Kappa also uses also traditional formative and summative assessments of student learning during and at the end of courses. Kappa high school students also take standardized quarter examinations and they take the ACT. The data from these combined sources provides a means of tracking each student's progress and planning support strategies where needed. It also informs curriculum revision. Kappa staff members state that they are meticulous about collecting, analyzing, and reporting

this data.

The ACT has now replaced the state's merit exam for high school students. This decision was made at the state level. At the time of the visit, Kappa had added a mandatory ACT prep course. The goal was to prepare students to do well on the merit exam and support them in accessing college. A voluntary version was piloted and resulted in improved test scores, so the management company made the course mandatory. What the course replaced in the curriculum was not reported.

Sigma. The CSP is an integral part of the Kappa curriculum, not just for math, but also for other subjects. According to Kappa administrators and also the material on the website for the CSP, the curriculum is interdisciplinary, project- and inquiry-based, and technology-integrated. A vice principal told the research team that in Kappa math courses, students use computers and calculators to solve real-world problems. They work in groups, read materials, and present their findings. Kappa math teachers try to engage students in learning math by developing and using word problems relevant to their program tracks (healthcare, etc.) and creating math toolboxes to help students match concepts with problem solving processes. A Kappa teacher shared these insights:

> Well I think one of the. . . one of the big things we do here is we usually
> start off with a word problem before we even talk about what the skills are
> you need for it. So we already try and frame that for them. All of my word
> problems or applied experiences in the math class are centered on
> engineering, healthcare, and business.

Kappa's administration and the CEO of the EMO believe this curriculum is important for helping students develop twenty-first century workforce skills. Whether it does or not was unclear from the available data.

Challenges and adaptation. Like Alpha and Beta, Kappa has a significant

number of students seeking admission who are underprepared in mathematics. Also like

Alpha and Beta, Kappa has eliminated pre-algebra from the high school curriculum.

Basic math skills. A challenge for the school in helping its students meet

curriculum standards and graduation requirements is that the average student entering the

freshman class at Kappa from other schools is up to three grade levels behind in math.

The question becomes, how do they get students with limited basic skills through four

years of mathematics, including Algebra II, in four years? The school admits new

students who are the most underprepared in mathematics into middle school grades that

more closely align with their test scores rather than into the grade to which they were

promoted by their last school. To illustrate, a student applies for admission into the ninth

grade, having completed the eighth grade at his or her previous school. He or she scores

at the fifth grade level in math on the entrance exam and is offered admission into the

seventh grade at Kappa, rather than the ninth grade. This poses additional problems for

the student, and Kappa administration admitted it deterred some students from

matriculating. There was no evidence that this solution adequately addressed the problem

of basic math skills for the students who did accept being retained in middle school.

The rest of the students placed into the ninth grade are placed into Algebra I. The

chair of the math department stated:

> Students take Algebra I whether they're ready for it or not… we have a
> Title I math instructor who pulls out…our most at risk kids and does the
> remediation on…eighth grade skills that they don't have and then if that's
> still not enough, we have an after-school program to support them, also.
> It's sequential. It's Algebra I, geometry, Algebra II, but we do that as a
> dual enrolled class through [names university], and that's College Algebra.
> Those students whose skills are too remedial for them to succeed in

Algebra I even with the scaffolding provided are offered admission in a lower grade.

A Kappa vice principal indicated that many students spend an extra hour or two after school reviewing their work with tutors. Many even eat dinner at the school.

Kappa students take Algebra II as a dual enrollment course. This course taught by high school faculty who have been hired as adjunct instructors by the partner college or university. This is a special course taught during the school day and adapted to spread over a year instead of one semester. The curriculum is aligned with the state high school curriculum standards. The connection to college is that instructors hired by the college or university partner, who also work for Kappa, teach the students. Students then receive a college transcript with course credit.

Assessment of learning occurs in a variety of ways at Kappa. The CSP assessments are performance-based. Kappa also uses traditional formative and summative assessments of student learning during and at the end of courses. Kappa high school students also take standardized quarter examinations, and they take the ACT. The data from these combined sources provides a means of tracking each student's progress and planning support strategies where needed. It also informs curriculum revision. Kappa staff members state that they are meticulous about collecting, analyzing, and reporting this data.

The ACT has now replaced the state's merit exam for high school students. This decision was made at the state level. At the time of the visit, Kappa had added a mandatory ACT prep course. The goal was to prepare students to do well on the merit exam and support them in accessing college. A voluntary version was piloted and

resulted in improved test scores, so the management company made the course

mandatory. What the course replaced in the curriculum was not reported.

Sigma. One Sigma math teacher participated in the interviews. The other

participants included the partner college president, Sigma administrators, teachers in

other disciplines, and counselors.

Challenges and adaptation. A significant shift in the mathematics curriculum

occurred when Sigma tightened its early college high school model under the leadership

of the new Sigma Community College president. Prior to this shift, the curriculum was

unstructured and self-directed. Learning materials consisted of packets containing

workbooks for each mathematics course in the curriculum. It was unclear from interview

participant comments how or if those courses were aligned with state standards. Students

signed in and completed their work, largely on computers, without the benefit of direct

instruction from teachers. In essence, courses functioned much like study halls or GED

work sessions. Teachers were present to supervise the students and assist with difficulties

or questions. Attendance was not monitored.

The Sigma administrators interviewed reported that not one student passed the

state test for graduation under this system. It was clear that the school was not going to be

able to meet state accountability requirements as NCLB was implemented. The school

vice president and college president blamed the unstructured nature of the coursework for

this problem.

The current mathematics teachers were hired at about the same time the new

principal was hired. They received a mandate from the new principal and the college

president to (a) create a standards-based curriculum and assessment plan and (b) teach the

133

students according to more traditional pedagogical practices. At the same time, Sigma began a process of aligning its curriculum with that of its partner community college. The counselor stated, "We aligned our graduation requirements to the university admission standards when we transitioned to an early college." The outcomes of this new standards-based curriculum plan included a drastic rise in the pass rate on the state graduation test and a broader view of "college preparatory" among the teachers and administrators. The interview data does not provide information about the number of students who transitioned to college. Nor does it explain how well prepared for college students who did transition were as a result of having taken these aligned courses.

After the restructuring, school leaders continued to modify the curriculum in response to changes at the state level. In 2008, the state board of education approved new mathematics standards. In order to accommodate the depth and breadth of these new standards, the state board of education expanded its high school mathematics graduation requirements from two to three credits in 2013 and from three to four credits in 2014. The new requirements included Algebra I and II, Geometry, and a fourth course with significant mathematical content. Sigma, in its new early college high school form, was ahead of its state's timeline in requiring four units of mathematics, including Algebra II.

Table 13 Sigma Math Sequence

Grade	Course
9	Algebra I
10	Geometry
11	Algebra II
12	Advanced Math (Trigonometry)

College faculty on the college campus rather than in the high school teaches math courses offered to students for concurrent credit through the community college. Nothing

in the data explained how many Sigma students were taking mathematics courses for college credit.

   Challenges and adaptation. A barrier to the completion of advanced math at Sigma is that many of Sigma's students enter high school unprepared for high school math.

   Basic math skills. Despite the fact that the average freshman enters Sigma having completed pre-algebra in junior high school, entrance exam results reveal significant gaps in basic skills. Nevertheless, the average freshman is placed in Algebra I. (Students who have already taken Algebra I are placed into Algebra II or Geometry.) Due to limited staffing in the mathematics department, there is no tracking of "honors" and "remedial" students by section. Instead, all Algebra I students, for example, are registered for one course, and teachers differentiate instruction for struggling students. As a Sigma counselor shared, "Remediation and enrichment occur within the same class." That is, the mathematics teachers compensate through differentiation. According to the Sigma counselor,

> They, they will customize their class for a student that's in there that should, that should have a different level. I think I mentioned yesterday that we don't have an honors level of Algebra I, we don't have a, a remedial Algebra I. We have Algebra I. So within that class, there has to be differentiation…they are very adept at making sure that the students' individual needs are met. They do tutoring outside of class, they make sure that students are on level by the time they finish their class…

The instructors use non-standardized in-house tests in addition to standardized state tests to determine whether or not the students are on track. It was unknown what they did if the students were determined not to be or not. It is also unknown

whether or not the teachers are compensated for the additional time they spend tutoring students outside of class.

According to the Sigma Math teacher, in any given semester, only three or four students fail a mathematics course. The same math teacher explained that "It's easy to identify which students are struggling . . . we usually get them in for tutoring and so that usually saves them from failing or anything like that." Yet, math is still anxiety provoking for the students. A Sigma counselor reported juniors taking the ACT during the summer after their junior year find the math unfamiliar. He explained that the mathematics covered on the ACT is the equivalent of Sigma's most advanced math class, which most Sigma students take during their senior year. This seems to indicate a flaw in the mapping process that may be contributing to student math anxiety and feelings of failure.

According to the math teacher, another support to mathematically challenged students is that the course sequence allows for overlap (strand design). Algebraic concepts such as properties of linear equations, slope of lines, parallel lines, and perpendicular lines are covered again in Geometry. This focus also supports students taking the mathematics section of the graduation examination, which is aligned with the algebra and geometry state standards. Students take this examination the end of the sophomore year and after they complete geometry. The mathematics teacher interviewed by the team alluded to a "crash course" that the geometry teacher offers for students preparing for the state test. This supplements the work students do in their regular mathematics courses.

Sigma teachers claim to know each student's level of mastery. However, student assessment data appears to be disconnected and incomplete. Students take a placement test at matriculation, and four benchmark exams are administered each year. There is also course data along with state graduation exam and College Board exam scores. There is no evidence that this data is tracked and analyzed to determine student outcomes and to inform modification of the curriculum. Curriculum modification appears only to occur in response to changes in state standards.

District-Accountable High Schools

The four district-accountable schools we visited were Remus, Onye Nkuzi, TFCTA, and ACA. In Chapter IV, I described the models and other organizational characteristics of these four schools. One characteristic they shared was being part of a highly centralized, hierarchical urban public school system that enforced a tightly coupled relationship with the technical work of schools. One example of this relationship was that the mathematics curriculum, including textbooks, was selected by the central office rather than by the schools. The administrators and teachers at Remus, Onye Nkuzi, TFCTA, and ACA were not free to deviate from that prescribed curriculum. However, the school-by-school analysis that follows reveals ways in which the schools were able to adapt despite the centralized governance and management structures. These responses to challenges are discussed in the following school-by-school analysis. As with the charter schools, the effects of the changes are discussed where data was available.

Remus. Three Remus math teachers participated in the interviews. The other participants included the CFES program director, Remus administrators, Remus teachers from other subject areas, and Remus students. Remus students were interviewed in focus

groups and were asked about the CFES program (discussed in Chapter VI), and not about math.

With some frustration, Remus teacher described changes in the organization of the state's math curriculum:

> Yeah, for me, I teach seniors and I've almost always taught seniors, so there was the change from Math A, Math B to Integrated Algebra, so we used to take two years for the Math A curriculum which was mostly algebra and a little bit of geometry, and two years for Math B, which was more geometry and then Algebra II and trig. Now it's one year, algebra; one year, geometry; one year, algebra II/ trig. So, for the ninth through eleventh graders that's a big change.

The current Remus curriculum is described in Table 14.

Table 14 Remus Math Curriculum

Grade	Standard Sequence	Advanced Sequence
9	Integrated Algebra	Geometry
10	Geometry	Algebra II/Trig
11	Algebra II/Trig	Pre-calculus
12	Pre-Calculus or Statistics	Calculus

Remus math teachers described the school's mathematics curriculum as being aligned to the state standards. They explained that the students have a minimum requirement to pass the Algebra I section of the state graduation exam, which is (per the requirement of NCLB) mapped to state mathematics standards. Students in the state where Remus is located have an option of earning an advanced diploma. A passing score on the Algebra II/ Trig test is a requirement for that credential. Per the requirements of NCLB, the Algebra II/Trig course is mapped to the state advanced diploma graduation examination. A Remus mathematics teacher indicated that at Remus, the faculty is influenced to make an effort to prepare students for the advanced diploma. He said, "And I think we do make an effort, the teachers, too, because we know we are a college prep

school and many of our students are going on to college, especially when they're seniors, [we] start teaching them topics that they'll be learning when they get to college."

Challenges and adaptation. When asked about the math level of the students when they entered the school, a Remus math teacher stated, "We have some that are on track and some that are way below grade level." As the data is limited, it was not made clear what the range of preparation was for the students in the four internal academies. According to a math teacher interviewed by the team:

> We try to push every student to get as far as they individually can. You know some of the students are never quite going make it to Algebra II/Trig; some of them will not make it to calculus. But, overall I think every math teacher tries to encourage each student to get as far through the curriculum as they can.

Despite the administration's intention to follow the prescribed sequences (Table 9, pp. 113-114) and offer advanced mathematics for all students, this was not occurring at the time of the site visit. The faculty and staff found that considerable numbers of Remus students (exact figure not available) were matriculating with math skills well below high school level. They felt it would be unrealistic to expect the students with the most limited basic math knowledge and skills to be able to pass Integrated Algebra. They choose to deviate from the plan and offer pre-algebra for those students. This posed a funding challenge that threatened the school's ability to offer a fourth year of math to students in the standard sequence and AP Calculus to students who qualify for the course as seniors. This is a significant challenge for students in the engineering and medical houses, who need to enter college Calculus-ready. However, there was not much Remus administration could do given that the school budget must provide for the needs of all students, not just the engineering students. A solution has been to collaborate with the

mathematics departments at its college partners to offer Calculus as a dual enrollment course for qualifying seniors. College faculty teach the courses on a nearby college campus.

At Remus, the principal told the team that the assessment process is conducted like action research and is a continuous, scheduled process. He explained:

> The AIM[58] cycle, we have similar cycle. It's worded differently but it's the same thing... And so that happens on a six week cycle, every six weeks we're looking at our practice and what's happening both with groups of children, and also within the curriculum assessment and, and teaching… I don't think you'll find that combination exactly once you go past a school with six, seven hundred kids. And the way we're able to do this, but keeping a small environment, while at the same time the big, and so it's a competition.

The principal did not provide any examples of how they had used the AIM process or any form of action research to improve curriculum and instruction.

Onye Nkuzi. One Onye Nkuzi math teacher participated in the interviews. Other participants included teachers from other subject areas, administrators, and students. Students were interviewed in focus groups about the CFES program (Chapter VI and not about math).

Onye Nkuzi offers its students one of two basic curriculum tracks depending on whether the teaching or liberal arts academy is selected. Electives and extracurricular activities differ for each academy. The core sequences are the same. Most Onye Nkuzi students are tracked into Integrated Algebra, Geometry, Algebra II/Trig, and Pre-calculus. Advanced students begin at Geometry and follow the sequence to Calculus. The principal indicated that the Calculus course is really more of a pre-calculus course, because

---

[58] AIM refers to the Action Inquiry Model described in St John, McKinney & Tuttle (2006). AIM is a generalized action inquiry process adaptable to different settings.

students are not ready for calculus. The school is working on better aligning the course with calculus standards.

Table 15 Onye Nkuzi Math Sequence

Grade	Standard Sequence	Advanced Sequence
9	Integrated Algebra	Geometry
10	Geometry	Algebra II/Trig
11	Algebra II/Trig	Pre-calculus
12	Pre-Calculus or Statistics	Calculus

The principal at Onye Nkuzi told the interviewers that the school's mathematics program is standards-based and places a special focus on algebra. He explained, "Now in seventh, in eighth grade, students take algebra as well, and then in ninth grade the integrated algebra course takes what they learn in seventh and eighth grade and builds upon that and goes more in depth." The school's integrated algebra course is aligned with the mathematics portion of the state graduation test and is taught over double curriculum blocks.

Challenges and adaptation. Onye Nkuzi faces math challenges related to students entering with limited basic math skills and also providing advanced coursework. When an Onye Nkuzi teacher was asked about student mathematical knowledge and skills at matriculation, the reply was: "It's very mixed, because certain topics they're good at; certain topics they're weak in. So it varies from unit to unit; but just basic number sense and operations, they're extremely low. I would say fifth or sixth grade." Onye Nkuzi students are placed into Integrated Algebra as freshmen.

Onye Nkuzi has initiated a number of changes to promote higher mathematics achievement. First, it changed its schedule to offer a double math period for ninth graders

who were struggling to complete Algebra I and stay on track with state graduation

requirements for mathematics. According to the principal of Onye Nkuzi:

> We took a look at the math results and two decisions went into that. One, a lot of schools give math, algebra especially, on a three-term basis. But every time you offer these courses in three terms it really messes up the sequence and we found that students were being restricted from really getting into higher-level math, so I wanted algebra done in ninth grade. And the whole idea was, I've always believed, this is my personal belief that students struggle with algebra it specifically is a time on task issue. It's just you just need more time on task to get different looks at various kinds of problems and various structures. . . They weren't getting that so the second period really builds in that kind of time on task and allows them to get those second, third, fourth, various looks and I think that's helpful.

This effort is not only to keep students on track with mathematics, but also to

keep them from failing a core course. Researchers have found that students who fail a

core course, particularly mathematics or English, are more apt to drop out of high school

(Allensworth & Easton, 2007). On the other hand, devoting double blocks to core subject

areas has restricted the schools' ability to offer a comprehensive liberal arts curriculum

including art, music, physical education, and elective courses.

In addition to the double blocks, a math teacher stated that Onye Nkuzi has also

initiated a number of mathematics support interventions:

> We also have a math resource center after school every day that students use constantly. There are always three math teachers in there [providing] after-school tutoring and assisting students after school. That's the most crowded resource center, so usually we have three teachers in there because we'll do three different levels, so we'll have an integrated algebra teacher, an algebra 2/trig teacher, and a geometry teacher in there at all times, and the calculus teacher does his on his own, on his own like office hours type thing. So there is always after-school tutoring as well, so there's always support for the students as long as they're willing to put in the extra time.

There is nothing in the data that indicates whether or not the teachers are compensated for the extra time, nor is there anything in the data indicating whether or not the students actually do put in the extra time.

Strategies to improve students' math skills at Onye Nkuzi were assessed using action research. This assessment focused on English and mathematics. This is not only because they were weak areas for Onye Nkuzi students, but also because those subjects are the main foci of high-stakes tests. Along with graduation requirements, student scores in math and English are determinants of AYP.

Advanced coursework. When asked whether or not the school was able to offer any advanced placement courses, the same teacher replied, "Yes. Students take calculus, I'm not sure if it's AP calc. I know our school[59] is very, very deficient in math, so I know that a select few take calculus,[60] but even our highest students are struggling in that, so I'm not sure if it's AP level or not." Onye Nkuzi students do not take advanced math courses for dual enrollment.

ACA. No ACA math teachers participated in the interviews. The participants included the CFES program director, ACA administrators, teachers from other subject areas, and ACA students. The students were interviewed in focus groups about their participation in the CFES program only (See Chapter VI).

The interviews produced very little data relative to mathematics education at ACA.[61] What is known is that ACA was required to align its curriculum with state

---

[59] By school, she means the student body.
[60] The teacher later adds that it's about 15%.
[61] No mathematics teachers participated in the interviews. Counselors provided some answers to the questions, and the primary focus was CFES.

standards. An ACA guidance counselor explained several major changes Metropolis educators had to go through within a ten-year period. These were the same changes that were described by interview participants at another Metropolis school, Remus. Originally, the state required a sequential Math 1, 2, and 3, which covered standards for algebra, geometry, and trigonometry, with some overlaps. This was phased out (timeline not provided) and the state integrated Math A and Math B. She stated, ". . . it's still algebra and trigonometry--and geometry but a combo and they just moved the units around. And it was a difficult-- and it didn't work. They thought they were. . . the state thought they were going to see better results." It was another mechanical quick fix. With the third change, the state went to integrated algebra, geometry, advanced algebra, and trigonometry.

Challenges and adaptation. ACA also struggles with meeting the needs of significant numbers of students who enter the school with basic math skills. This was the first Metropolis district school we visited where a teacher or administrator shared frustration with following a prescribed curriculum.

Basic math skills. The math teacher described challenges of coherence as a result of these changes. The sequential nature of mathematics dictates the foundational skills that are necessary for the learning prior to high school algebra. Their changes had not allowed sufficiently for mapping back. This problem remains unresolved. She explains:

So that certainly these kids there, the expectation for what they needed to do in high school wasn't even set so how could it be had in the middle school and elementary school to get them to that point? The math is a tremendous challenge, tremendous challenge and weakness when they get this level. Really, that's tough for us on the curriculum level for us to get these kids up to speed because our expectation in the schools are rated a certain way but they're not coming in readiness. We find many of our kids have to take placement tests and they have to take remedial courses.

144

Table 16 ACA Math Sequence

Grade	Standard Sequence	Advanced Sequence
9	Integrated Algebra	Geometry
10	Geometry	Algebra II/Trig
11	Algebra II/Trig	Pre-calculus
12	Pre-Calculus or Statistics	AP Calculus

It is extremely important for ACA students to accelerate the improvement of their

math skills if they are going to stay on the college preparatory timeline for mathematics.

When an ACA teacher was asked where new students were in terms their mathematical

literacy, she replied:

> It's a challenge. They are not where they need to be. It's weak. It's very
> weak. Our math teachers will tell us that the kids are not coming in with
> the basic foundations that they need to move on to. What the colleges want
> are at least algebra, integrated algebra, geometry, advanced algebra and
> trig and certainly pre calculus if we can get to it. And our kids are coming
> in not necessarily ready for the integrated algebra.

Because the students matriculate unprepared, the principal at ACA indicated that

they allot significant resources to providing tutoring for its students.

Continuous assessment occurs at ACA. The ACA guidance counselor described

how the school responded to the district's requirement that teachers use the data from

high-stakes tests to make adjustments geared toward improving student outcomes:

> . . . as the program evolved and the DOE is having us analyze data. What
> we decided to do to further help the school was to take a look at. . . [the]
> DOE system that, you know, tracks the students' progress, how well they
> score on the ELA and mathematics exams.

The interview participants did not provide any examples of how the assessments

were used to improve outcomes.

It is unknown whether ACA students take dual enrollment courses.

TFCTA. No TFCTA math teachers were interviewed. Interview participants included the CFES program director, a counselor, TFCTA administrators, teachers in other subject areas, and students. The students were interviewed about the CFES program only.

Because of its science and mathematics career theme, TFCTA requires all of its students to take Calculus. The TFCTA math sequence is shown in Table 17. It is unknown whether or not the TFTCA courses are aligned with calculus standards.

Table 17 TFCTA Math Sequence

Grade	Standard Sequence	Advanced Sequence
9	Integrated Algebra	Geometry
10	Geometry	Algebra II-Trigonometry
11	Algebra II-Trigonometry	Calculus
12	Calculus	Statistics

Although TFCTA is a themed school with a mathematics and science focus, it is not a test-in school. It is limited screened, meaning students need only rank it high and attend a meeting. However, the principal indicated that students who enroll are interested in the theme. She stated: "Students who are putting the school on their middle school application are already interested in math and science and so I have the vast majority of my female students who want to go into the sciences and so for me that's awesome." However, freshmen often enter with more potential than preparation. The principal reflected:

> The upper third of our population is strong and they come to us with a good work ethic; a learning; a desire to learn. They don't always have in the materials that they need, that is the capital that they need, they didn't learn some of these skills in middle school. We are excellent in that space so we take children who have the capacity, but haven't been challenged like this. We really challenge them. I have insisted upon, that was my mission actually, was to take children who didn't get into the testing schools…either they didn't test in or they were first generation and didn't

146

even apply in. Or they're late bloomers or they're poor test takers or whatever. And to push them as hard as we could. But to give them supports. I give them the opportunity. I give them a timeline task. And then I support that. Therefore we have, we lead them from the lower level courses. . . I don't put in any middle school courses. We start right with the high school level courses. And we structure it so that the children whose talents are strongly academic get to go into a very strong academic sequence. I don't teach any of the baby level maths. We do everything in one year. So for the upper children they go up to AP Calculus.[62]

Challenges and adaptation. Because of its theme and because the school had no special education students, the need to support students with limited basic skills was not as great at TFCTA. However, the principal did provide some insight into how the school approached the challenge of meeting the needs of students who were behind.

Basic math skills. The school supports stronger and weaker students, but within limits. The principal at TFCTA stated, "We structure it so that the children whose talents are strongly academic get to go into a very strong academic sequence." To support freshmen, TFCTA offers small group instruction; before- and after-school tutoring, one-to-one peer tutoring; and computerized, self-paced programs. The students who are unable to keep pace with the curriculum may be advised to transfer. This can mean becoming an education option student and being transferred to a lower performing school located in a neighborhood far away from home. The percentages of the students advised to transfer or drop out are unknown.

The interview data did not provide insight into TFCTA's use of data in instructional planning. However, the Metropolis Quality Review Board report did. They found that the teachers were proficient in reading assessment data and making

---

[62] Due to funding challenges, a Calculus teacher was cut. This meant only a select group of students were able to take calculus.

adjustments geared toward producing better student outcomes. For example, following a data analysis of student progress in advanced placement calculus coursework, the principal realized additional time was needed on task. As a result, double instructional blocks were instituted for the course so as to give the students more time on task. This allows teachers to revisit algebraic concepts used in calculus in an attempt to improve student outcomes. It is unknown whether or not this had any effect on outcomes. A potential constraint of instituting a double curriculum block is the effect on the comprehensive liberal arts curriculum when courses are deleted to accommodate additional blocks of mathematics. Since the site visit, the school has added an art course. It is unknown as to whether the principal determined that the extra block of math could be deleted to accommodate the art course.

Another constraint of the double curriculum blocks is that, at the time of the site visit, TFCTA had found it necessary to cut a math teacher. That is an interesting decision, considering the double time spent on math.

It is unknown whether TFCTA students take dual enrollment courses

Response to Question 2: Summary

The case-by-case analysis of mathematics education in the eight schools revealed that all eight schools were ahead of the curve in institutionalizing 4-year mathematics requirements mandated by state policy. However, all of the schools but TFCTA were struggling to find resources to provide advanced courses because so many of their students matriculated with limited basic math skills. Having to offer basic math help to so many students also impacted the ability of schools to offer a comprehensive liberal arts curriculum.

Basic Math Skills

As discussed in Chapter 1, underrepresented urban minority students face non-cognitive barriers to high education attainment related to poverty and first generation status. This phenomenon was visible in the case schools where students enter high school below grade level in core subjects, particularly in math. The movement away from offering pre-Algebra at the high school level exacerbated this problem. Those interviewed felt that considerable resources were expended providing academic support, mostly before and after school. They offer this in order to help students build foundational skills, particularly in Algebra I, which they believe is fundamental to success in high school math. The need to provide help for students with basic math skills and budgetary constraints can prevent schools from offering a fourth unit of math to students not ready for calculus. The lack of readiness for calculus remains an obstacle for students who might otherwise enter the STEM pipeline. Transfer is an option, but, in Metropolis, it can mean becoming an education option student transported to a school that may be low performing and far away from home.

Advanced Mathematics Courses

At the time of the site visits, the five states in which the schools were located had established timelines for the integration of a four-unit mathematics requirement, including Algebra II. However, all of the schools had to direct considerable resources to students with basic math skills. Of the district-accountable schools, Remus, Onye Nkuzi, and ACA cut the fourth year of mathematics for students not tracked into calculus. Of the charters, all but Beta cut the fourth mathematics unit for students not ready for calculus due to budget constraints. This pattern of only offering advanced math to the most

advanced students is consistent with historical trends. However, at the time of the visits, the approaching state deadlines for increasing graduation requirements would require schools to make the fourth unit of mathematics available to all students.

Partnerships/Dual Enrollment. The dual/concurrent enrollment option was available for students in three of the charter schools and one of the district-accountable schools. This provided an option for capacity building for offering advanced mathematics courses for urban schools that were facing difficulty in providing support to students who enrolled with limited basic math skills. However, there were a number of challenges noted in the cases. First, the majority of the students who took college courses did not place into college mathematics. This was particularly true at Kappa where the high school mathematics teacher was simultaneously hired by the credit-granting college as an adjunct instructor. Mathematics courses offered to Kappa students are special extended hybrid high school courses that integrate concepts from the college syllabus. It is unclear how much interaction there was between the mathematics departments in the high school and at Sigma Community College. There may be discontinuity in expectations, learning goals, and pedagogical methods influencing the effectiveness of Kappa's model.

A second problem involves transfer of credit. When students at the eight schools transfer to partner colleges, established articulation agreements protect the students' credit. However, many students find that when they attempt to transfer their credits outside of the partnership sphere, the credits are not accepted. Students do have the option of testing out but do not receive credits toward college graduation for the course.

Finally, there is the potential of exposing high school students to unnecessary risk by placing them in college classrooms with adults. Sigma Early College High School is

on the campus of Sigma Community College. Sigma students take dual enrollment courses with adults and share computer labs. A Sigma counselor mentioned concerns when there were sex offenders enrolled at Sigma College, although there were no incidents. Kappa started out on a college campus and moved its location to an empty Catholic school building because of difficulties they experienced trying to integrate an adult population with less mature high school students.

Response to Question 2 Sub-question: Analysis of the Data

All of the eight schools were required by policy mandates to institute higher graduation requirements and to use more rigorous state standards in planning curriculum and instruction. Further, the schools were also mandated by public policy to prepare students for high-stakes standardized testing to demonstrate learning outcomes as defined by the states in which the schools were located. To fail to do so would result in sanctions.

In Chapter IV, I discussed ways in which governance, management, and administrative structures affect the strategic orientation of schools. In closed strategic environments, for example, decision-making and adaptation occur "within an organization hierarchy that functions in a tight system of control" (St. John, 2009a, 198-99). This assumption was tested from the interview data as it pertains to change in math education as a response to challenges in the eight schools. I learned that teachers and administrators in the case schools operating in closed strategic environments had to find opportunities to innovate within the confines of the centrally controlled structure. This was true in the Metropolis schools, where principals found it difficult to meet policy mandates due to students enrolling with limited basic math skills that exacerbated capacity building challenges to offer advanced courses. They were unable to change the

curriculum, as those decisions were made at the district level, but instead adapted by emphasizing increased instructional time in mathematics and building capacity for advanced courses through partnership arrangements with colleges and universities.

The charter schools varied in the ways in which administrators and practitioners were able to participate in developing and implementing solutions to problems. St. John (2009) found that the open strategic frame included "adding focus on engaging with colleagues in setting goals and designing strategies; engaging in action projects that test new approaches to organizational practices" (p. 202). The most open of the four charter schools was Beta, where adaptation was curricular and structural. That is, teachers and school-level administrators led efforts to redesign the curriculum to meet the basic math needs of some entering students. They also expanded the school to include earlier grades. The small size of Beta's high school allowed it to offer individualized instruction. It also leveraged the partnerships with colleges made possible by its early college design to build capacity for offering advanced courses.

Alpha's hierarchical, administrative structure created a more closed strategic environment than Beta's in spite of the fact that both schools had decentralized governance structures and no external management. Alpha's administrative structure was such that strategic initiatives were centrally controlled, but teachers and administrators were provided with opportunities to innovate in ways that supported those initiatives. For example, change in mathematics education at Alpha was focused on supplemental instruction and bridge programs. Teachers and administrators were able to participate in designing these programs. A quality control administrator assessed outcomes and

152

provided feedback to the administrators and teachers, who were able to participate in designing necessary changes.

The positioning of the new president of Sigma's college partner on the Board created a tightening of the relationship between the college partner and the high school. It also created a power struggle for control of oversight of curriculum and instruction at Sigma Early College High School. The result was that an initiation of mathematics education reform came forcefully from the top. However, although the momentum for and oversight of change came from the top, the high school teachers and administrators were able to design the new curriculum at the school level. The small size of the high school population facilitated knowing each student's strengths and weaknesses and offering individualized instruction. The strengthened relationship between the community college and the high school served to increase capacity for the high school to offer advanced courses to its students through dual enrollment opportunities.

Kappa was oriented toward a highly centralized approach to managing change. The management company led reform initiatives and relied upon upper level school administrators to communicate changes. Kappa addressed the challenge of basic math skills by (a) trying to avoid admitting students who were behind through admissions strategies such as retaining students or redirecting students to other schools; (b) expansion to include lower grades, in the hope of providing better instruction earlier; (c) integrating the CSP and mandating it as the core of the Kappa district curriculum; and (d) providing opportunities for dual enrollment with college partners. Although Kappa is a technological high school, the mini-schools model allowed the school to focus its resources for advanced mathematics (beyond the Algebra II course required by the state)

on those students with a STEM concentration. This process mimics historical tracking

processes for mathematics education in urban schools.

Table 18 Adaptation to Challenges With Strategic Orientation

School	Challenge	Adaptation	Strategic orientation
Alpha	Basic math skills Pre-Algebra Eliminated	• Time and focus on specific topics • Bridge Program • After school tutoring • Test preparation • Employs Quality Assurance Manager	Closed: Decisions made within the school's administrative hierarchy. However, teachers and administrators were able to adapt practice, including the curriculum, within the confines of Alpha's strategic orientation.
	Capacity building for advanced courses	Not addressed Offer courses as budget allows	
Beta	Basic math skills Pre-Algebra eliminated State exam included Algebra II Capacity Building for Advanced Courses	• Innovative curriculum • Dual enrollment with college partners	Open: Initiatives to adapt mathematics education to address challenges occur at the school level
Kappa	Basic math skills Pre-Algebra eliminated	• Retain students in middle school • Encourage students to enroll elsewhere • Water down advanced courses • Integration of multidisciplinary CSP • Afterschool Title I funded supplemental instruction • Teaching to the test	Closed: Decisions made by the EMO and supported by the Board. Upper-level administrators communicate and oversee implementation. District mandated CSP curriculum. Opportunities for groups within the school to innovate in response to challenges are minimal.

School	Challenge	Adaptation	Strategic orientation
Sigma	Basic math skills	• Redesigned curriculum, instruction, and assessment Teaching to the test	Mostly Closed: Strategic initiatives set by board. Tightened early college structure. School-level adaptation of curriculum, instruction, and supplemental instruction supports strategic initiatives.
	Budgetary and staff restrictions on offering advanced courses	• Individualized instruction in math • Dual enrollment	
Remus	Basic math skills	• Offer Pre-algebra • Tutoring • Teaching to the test • Dual enrollment	Closed: Central control of initiation of reforms. District mandated curriculum. Some localized adaptation to address challenges. School was able to decided which courses to offer, to develop support systems, and structures that support advanced course taking through partnerships
	Budgetary restrictions on offering advanced courses		
Onye Nkuzi	Basic math skills	• Double block scheduling • Tutoring • Teaching to the test	Closed: Central control of initiation of reforms. District mandated curriculum. Some localized adaptation, e.g. double curriculum blocks and tutoring.
ACA	Basic math skills Difficulty with new curriculum sequence	• Tutoring • Teaching to the test	Closed: Central control of initiation of reforms. District mandated curriculum. College prep theme requires advanced math. Some localized adaptation of changes, e.g. tutoring

School	Challenge	Adaptation	Strategic orientation
TFCTA	Basic math skills	- Tutoring - Transfer - Teaching to the test	Closed: Central control of initiation of reforms. District mandated curriculum. STEM theme requires Calculus. Some localized adaptation, e.g. double curriculum blocks and tutoring. Encourage students who cannot keep up to transfer
	Students struggling in advanced courses	- Double block scheduling - Tutoring	

Effects of Change in the Eight Schools

New policy mandates have influenced mathematics curriculum, assessment, and accountability in the eight schools. Continuous assessment, students with limited basic math skills, and the deletion of basic math courses were common threads in all eight schools. Three of the charter schools and the district-accountable schools had some flexibility to adapt the way in which mathematics education was delivered. However, they have not yet found innovative and effective strategies for helping all students navigate the array of new standards and requirements.

For example, teachers and administrators report that students do not retain knowledge from course to course and have to retake dual enrollment courses again in college. One problem appears to be that schools are constrained by a Catch 22. They can choose to teach to standardized tests, which over-simplify knowledge and do not test higher order thinking skills (Wang, Beckett, & Brown, 2006). The Beta teacher, for example, referred to students who could not solve problems but could spit out formulas. Conversely, they can choose not to teach to standardize tests and risk sanctions if students do not perform well. Or better yet, schools can consider more innovative ways to help students with limited basic skills, including an evaluation of their teaching strategies. Also, in view of the budget issues and the effect on providing help for students with basic math skills, the charter schools might want to use their freedom to seek other sources to increase their budget.

One school, TFCTA, has chosen to essentially give up and transfer some students on to other schools. In such a case, culpability for those students dropping out may

158

appear to fall on the transfer school, thus maintaining TFCTA's reputation and graduation rates. Data on the number of students who transferred or dropped out was not available.

The situation begs the questions of whether or not the schools are recruiting teachers with the skills to address the needs of all students and whether colleges and universities are adequately preparing these teachers. We must also question whether high schools are providing the kinds of continuous in-service training to keep up with the effort. This is further complicated by the corporate approach to running schools, which includes the common charter school practice of paying below union wages and requiring extended hours for tutoring and advising. This situation also begs the questions as to whether the goals and practices of NCLB are negatively influencing outcomes for students or whether it is too late for students to catch up when entering high school so far behind.

CHAPTER VI. SOCIAL LEVEL

I personally feel like regardless of how important people see academics, a student can't be academically successful until they have that support and that stability in their life.
Onye Nkuzi Teacher

This chapter focuses on social support interventions in the eight schools. An analysis of the interview and organizational data responds to Research Question3.

Question 3: How do social interventions, such as those facilitated by partnerships with non-profit organizations, support academic capital formation in the eight cases?

Sub-question: How do the governance and management structures of the eight schools impact their ability to offer programs that support academic capital formation?

Analysis of the Data: Social Support Interventions Present In Eight Schools

All eight schools in the study face essentially the same challenges, which are those of the urban poor. Although facing the same challenges, the eight schools have taken different approaches to address them. The four charter schools are using a variety of social interventions to meet the challenges. The four district- accountable schools are addressing them through the three core practices of CFES: pathways to college, mentoring, and leadership through service. Thus, for purposes of the analyses of data, the

eight schools are divided into two groups of four each: (1) the charter schools and (2) the district-accountable schools.

Charter Schools

Although the charter schools are not CFES schools, they are all committed to preparing their students for and facilitating access to college. The following describes, school-by-school, how the charter schools are providing social support interventions geared toward motivating students toward college going. It describes how they do so while dealing with the issues of socio-economic class, which carries with it helplessness, hopelessness, drugs, crime, and despair.

Alpha. When Alpha was established by the street law clinic, the goal was to offer a safe, college preparatory alternative to the existing public school, which had high dropout rates and low graduation rates. Parents and community members perceived the public school as a dangerous place. An Alpha teacher stated that the Alpha school building provides a safe haven for students who want to escape chaotic home lives and find a quiet place where they can do their schoolwork. Students often stay after school and into the evening. The teacher also mentioned that although school opens at 8:00 a.m., there are students who come at 7:30 a.m. or earlier, hoping to get into the school. The ability to stay after school or to come in early for tutoring is a benefit for serious students.

However, a constraint of the extended school hours is lack of personnel to supervise students in the building. There are students who come because they do not want to be at home but do not want to study, either. An Alpha English teacher indicated that some students use the building as a substitute for the mall; it is a place where they can hang out. She said they are disruptive. This puts teachers in the position of having to stop

planning or teaching to police students. In his oft-cited article *Urban Schools, Forced to Fail* (1999), Emeral Crosby, a principal in an urban Midwestern high school, identifies overtaxing teachers with non-teaching functions as a significant problem for urban schools. His words bear repeating here:

> Every time teachers serve on hall duty or lunchroom duty, their talents are being misused. Teachers could be tutoring students or mentoring other teachers. They could be conferencing, sharing, and doing observations. But urban teachers are denied professional renewal during the course of the school day. The only time they can engage in professional activities is after school - after they have already taught five classes and performed many other mentally and physically exhausting duties. At the end of the day, their minds are not fresh, their energy is low, they are fatigued, and their spirits are depleted. How much professional renewal can we expect? Such abuse of teacher talent is a crime against the profession, but its ultimate victims are the students. When teachers are forced to fail, then the urban schools themselves are forced to fail. (1999, p. 302).

Of course, Alpha is not unique in requiring its teachers to take on non-teaching roles, as the case-by-case analysis will soon reveal. However, Alpha students could benefit if the school would hire adults to supervise students during extended hours to free teachers from those duties. Alpha students might also benefit if teachers could focus their energy on teaching during normal hours and not be required to do non-teaching tasks outside of the school day.

College pathways integrated into college preparatory curriculum. Alpha has integrated tasks into the curriculum and graduation requirements in order to help students develop college knowledge and navigate systems such as the application process and financial aid. Alpha students are all required to apply for college. Completed college applications become part of a portfolio requirement, which must be completed for the student to qualify for graduation.

School personnel leverage community partnerships to assist students in completing college admissions and financial aid applications (including scholarship applications). In one example, the school organized a college scholarship day to coincide with a visit from the U.S. Secretary of Education, who delivered a motivational speech to the students on the importance of going to college. Fifty volunteers worked one-on-one with seniors to fill out college scholarship applications. The director of programs reflected, "Whenever there is a big event happening, whether it's the SAT or different scholarship applications, we always try and communicate that with our partners and our volunteers." She also indicated that the school provides materials and discussion about summer programs that colleges offer for high school students, takes students on college visits, and introduces them to a network of people who can mentor, tutor, and write references.

The school provides SAT preparation for the students; very few students take the ACT. The college counselor, however, encouraged students to take both exams, as he believed some students perform better on one than on the other.

College counselor. The school had not established formal liaisons with college counseling offices as of the site visits; however, Alpha employs one college counselor. The college counselor's job is to assist students in learning about college and how to get there. He or she helps students make connections with college through experiences such as visits. In one example, the college counselor and Alpha teachers organized two different college application nights in the school library with dinner provided that year. Alpha personnel mailed the applications for the students the next day. In addition to these

two nights, the college counselor told the interviewers about the ongoing support

provided for the students in navigating systems:

> We typically help them with, through every stage, so they complete the
> application process with us. We will mail off the information, we will
> write the recommendations. We will make sure that the transcript and the
> SAT scores are forwarded. We make sure that they get a free waiver for
> the application. We try to make sure they get a fee waiver to take the SAT.
> We pretty much go through everything. The school has also been paying a
> lot of enrollment fees for students this year. Ah, so we will help out
> financially. And also, I was told the school was willing to give book
> money to the parents once they [the students] graduated… And you know,
> basically we try to support them through the whole gamut.

There was no data on how or if any parents are brought into this effort. Further, as

teachers and staff must contribute to the effort, it seems that the job is too much for one

counselor.

Alpha's college counselor discussed the effects of low-income, first

generation status on students' educational aspirations and the accuracy of the information

they and their families have about college. He stated,

> I think the income level affects that because income is directly related to
> education level. If you don't get the education, then you are not going to
> have a certain income. The lower income kind of forces people to miss out
> socially and somewhat academically. So, they get a lot of misinformation
> and they just don't know.

He described having difficulty convincing students that there is a connection

between college and their future economic well being. In one example, he stated: "They

always have stories about friends who didn't go to college but are quote unquote, as they

say, doing well." He added that students are shocked when he tells them the average

income in the part of the city in which they live is below the poverty level. In a third

example, students express fear of the unknown. They also have stories about friends who

have had bad experiences in college. As a result, part of the college counselor's role in

creating a college-going culture at the school has been to help students overcome these

and other preconceived (and incorrect) notions.

The college counselor has also observed that low-income, first-generation

students and their families who are interested in college do not have access to reliable

information or experience about navigating college systems. He has observed that a lot of

the parents are not sure how to advocate for their children, and they get frustrated trying

to negotiate systems and ensure that their children complete the application process. He

sees one of his roles as helping families to navigate those pathways. He provided several

examples of his efforts at outreach:

> Well, what we try to do is let parents know . . . about admissions deadlines.
> We try to let them know about the financial aid, FAFSA, Free Application
> for Financial Aid deadlines, about what scholarships are available, and
> what free money is available. . . Also, we are constantly calling parents
> and asking them for information. . . and giving constant reminders. We
> have tax preparation workshop for parents to come in and complete the
> FAFSA and also get their taxes done free of charge.

Unfortunately, as no parents were interviewed, it is unknown whether that

outreach is successful.

Concerns about costs. According to the counselor, the fact that low-income, first-

generation parents lack college knowledge puts them in a position where they not only do

not know how to navigate systems but also cannot make informed decisions about

college. Consequently, they often make college decisions purely on cost:

> The first thing they say to you is, "I don't want to take out any loans."
> That's the first thing the students will say. Or they will say, "How much
> does my parent have to pay out of pocket?" And if the school has charged
> a lot of money for the enrollment fee or for the housing deposit, I have
> seen students' parents switch them to other schools because of that fee was
> lower at another place.

While going to an expensive college may not be essential for a student to realize the social and economic uplift a college education can afford, the availability of programs in the student's desired major and other considerations are important in the student's selection of a college. Alpha's college counselor, teachers, and administrators try to mitigate parents' concerns about costs by helping students find scholarships through the city's scholars program for low-income, first generation students, in addition to other sources. As parents were not interviewed, it is unknown how successful these efforts at outreach are.

Of course, providing information about the availability of funding for college may not sufficiently allay parents' concerns about costs, particularly when part of the funding includes student loans. Although repaying student loan debt is largely the responsibility of the student (Parent Plus loans would be an exception), many of the students come from traditional families where the parents still hold decision-making power over young adults. The adult interview participants shared an additional complication related to costs. Students from low-income families are often required to contribute to the family's financial well being through working part-time jobs and providing childcare. The potential loss of these contributions is significant for families, and this influences many students' decisions to remain close to home when attending college.

Partnerships. After the partnership with the street law clinic dissolved, the school formed new community partnerships with law firms. These relationships connect students with legal professionals who act as mentors and tutors. They help students with homework. They assist them in working through college information, SAT and ACT preparation workbooks, and scholarship applications. Law firms sponsor law days at the

school where students can learn about the legal profession. Volunteer legal professionals also contribute to the development of curriculum units based on law-related themes.

Alpha has also established non-legal community partnerships. Religious organizations in the community collaborate with Alpha to provide supportive networks for students. Lutheran, Mennonite, Jesuit, and Jewish organizations were specifically mentioned as resources for volunteers to mentor students. These religious organizations not only provide direct service but also underwrite positions for Alpha staff members who support students.

***Summer internship: Develop leadership skills*.** Alpha students have a unique opportunity to continue developing their voices and the skills necessary to actively participate in society after high school. Their city offers a summer scholars program that provides opportunities for Alpha students. They receive hands-on experience with the federal government, attend a weekly speaker series with senior staff members, interact with college-aged interns, meet regularly with a mentor, and participate in summer service projects. This summer program is intended to prepare students for a career in public service. There is no indication how students are prepared to participate or how these internships train students to be leaders in public service. The preparation would be expected to include descriptions of goals and objectives of leaders, leadership skills needed to be an effective leader, and strategies effective leaders use to carry out their duties.

Beta. Beta's principal was enthusiastic about the experiences the school provides to help students prepare to go to college. She explains:

> They take the ACT twice, an ACT prep course, of course you've passed
> the [names the state] graduation test, you've made three college visits, and

167

you've submitted at least three college applications and at least four or five for scholarships. You've written an autobiography of 25 pages and, you know and will work very hard to make that a finished publishable piece of work. You've passed three, at minimum, three college classes.

However, the road to achieving these goals is not easy. The adjustment to the college preparatory environment at Beta is difficult for many of students during their first year. According to a Beta teacher, the students' preparation to come to school and learn is affected significantly by poor academic backgrounds. The principal shared that in addition to what can be described as challenging home situations, the previous school environment (e.g., whether there were high expectations for behavior and achievement) plays a role in the adjustment process. The teacher provided several examples of issues students and their families had faced:

> I have a little girl who had to go to the other parent's home last night because power was cut off where she was staying. I have another one whose mom's a crack addict and you know, money goes toward that and there are other children in the house and there is sometimes no food in the house and you know, she was over at my house doing laundry on Saturday because the washer and dryer isn't working, and doing laundry in the bathtub stinks. How can you concentrate on school when you've got all that stuff going on?

It is sometimes difficult for the students to recognize that the teachers care about them and their progress. She credits the dedication of the teachers for the students' adjustment to the culture. In fact, the school's recognition of these issues for students has led to the development of a teacher-advisor model geared toward providing supplemental academic and social support for students. This is a role for which the teacher-advisors received little preparation.

Supportive networks: teacher advisors. Beta's principal believes that finding academically and pedagogically qualified teachers, who are also willing to serve in an

advisory role, is critical to mitigating the problems of poverty and chaotic home

situations. She states: *"I think the first thing before, it's even before science, is finding

the teachers. I think that's a big reason [for] the, the success of this school."* She added:

"The content and stuff will come, but if those kids know that the teachers are there and

have their best interests at heart and develop that rapport, you can tell that purple is green

and they'll believe you.*"* The principal added that part of the Gates reform effort is to

create supportive relationships, and this is a rationale for assigning every student to a

teacher-advisor.

A Beta teacher described the Beta teacher-advisor model as follows:

All teachers here have a job description that's very clear. It is a teacher,
hyphen, advisor role. And we have to be very selective about who comes
to teach here because you have to want that guardianship, uh, we take in
loco parentis very seriously here. So, as a teacher I am highly qualified in
my content area. We don't have any waiver from that. But in addition to
that, I have somewhere between 12 and 17 kids that I am their surrogate
parent. I [an advisor] start the year by visiting in their homes; I put the
parents' phone number on speed dial. All our teachers get cell phones and
I begin this relationship where I'm [the advisor] the point of contact at the
school.

Sometimes, the teacher's role extends beyond surrogate parent. The principal

explained, "The teachers here are dedicated. I mean we had one teacher actually adopt a

child. I basically semi-adopted a child, but it's the teachers." This approach presents an

adjustment for students regarding what happens if and when they go to college, and this

kind of "surrogacy" or "adoption" is no longer available.

In addition to being a surrogate parent, teacher-advisors assist struggling students

with study sessions outside of regular class periods and help them pass tests. The

principal said: "This faculty is so vested in the progress of the kids if, if you give an exam

and the kids don't do well, they do study sessions before school, lunch and after school

and then you can retake the test." This raises the issue of teacher workload. There was no

data on how much extra time teachers invest in these activities. However, it also raises

the issue of how this retake policy affects students. There is also no data on (a) how many

students have to retake tests, (b) how often teachers give students retakes, (c) whether this

affects pass rates or (d) whether students who consistently have to retake tests go on to

college. To retake failed tests will certainly not be a consistently available option when

they get to college.

Those who were interviewed stated that the time the teacher-advisors invest is

tremendous. The administrators admitted that they were concerned about burnout of

teachers and others who provide support services to Beta students. This comment by the

assistant principal-dean of students acknowledges that concern: "You know, we need to

make sure that we're giving the advisors the support they need so they don't burn out and

quit. And so that's kind of why a lot of us are kind of on the outside giving them what

they need." The assistant principal-dean did not say anything about the school providing

key personnel to help the teacher-advisors do their job. There was no data on how many

hours above and beyond teaching the advisory role requires and how teachers are

prepared or compensated for the additional work. The example harkens back to Crosby's

(1999) concerns about overburdening teachers in ways that do not allow for reflective

practice (discussed above) or even rest from a day's work. It begs the question as to why

Beta has not hired support staff such as school psychologists, social workers, remedial

specialists, and other staff trained to provide these services to both students and teachers.

Charter schools can hire non-union teachers, which takes away the teacher protection

against requirements to take on roles for which they are neither prepared nor even

170

capable of assuming. Of course, if a school does this, it saves them money by not having to pay for the needed personnel.

Supportive networks: college counselor. The school has one full-time college counselor on staff. The principal stated that this person's entire job is to "schedule them [students] and monitor their progress in their college classes while in high school. And to make sure they do what they need to do to get accepted to a college where they can be successful." The college counselor also arranges for students to go on college visits, including overnight visits, and brings in alumni and motivational speakers. The interviews did not reveal how many students participate and how they are selected; how these activities are funded, and what preparation is made for the students to profit from the experiences. It is also unclear how or whether families are involved and whether or not teachers are expected to participate in these activities in addition to their teacher-advisor responsibilities. Finally, it is questionable whether one college counselor can adequately provide all the necessary services.

Navigating systems. As most of Beta's students are first generation students, parents do not know how to help their children build college knowledge or to navigate systems. A Beta teacher said: "A lot of our parents are non-educated people and this is, you know, especially on a college campus, a little intimidating." For this reason, the school provides a seminar for parents where school personnel help parents complete the FAFSA. They also provide that information about colleges, walk them through the application process, and provide other information parents who did not attend college might find difficult to obtain. The teacher explained, "So it's pretty overwhelming and the bureaucracy of colleges you know they're not terribly warm and fuzzy a lot of times."

171

The school did not provide information about the number of parents who participated in these events or what percentage of families submitted FAFSA forms. In addition, parents were not interviewed.

Parental engagement. Parental engagement is often difficult for the Beta school community. The principal indicated that many of the parents would like to be more involved, but the challenges of the working poor create obstacles. She stated: "Now, most of our parents are remarkably inspiring. They work two jobs cleaning uh, they, they work in a fast food place and then they go clean a nursing home. We really have working poor people here." However, parents face other challenges to being involved in their children's education. The principal added: "And we also have a number of parents that are incarcerated or habitually in and out of drug and alcohol treatment." She added that she believes these issues help explain the disproportionate number of Beta students who suffer from mental health issues. There is no school psychologist, social worker, or school counselor to assist students and their teachers with these issues. Teachers provide services typically and more effectively provided by these professionals. It is unknown what type of formal or informal training, if any, teachers received to prepare them to deal with these issues.

Aside from college nights and assistance with FAFSA and other college application materials, the school community tries to engage parents through the Gateway curriculum. The principal established a Gateway requirement whereby parents must come to a meeting to learn about the curriculum. Another part of the requirement is that parents be involved in 80% of designated activities. That is, there are certain activities in which parents must participate for the student to receive credit. The data does not explain how

172

the school works to engage the parents in these activities. Family advocates can act as proxies for parents who are unavailable due to incarceration, drug addiction, etc., and can complete the Gateway requirement in place of a parent. They also function as a responsible adult contact person for the student. In one example, a teacher related a story of a student whose mom is a crack addict. She indicated, "I'm her family advocate. And mom knows me. Mom calls me." Thus, this system allows the students to complete their requirements even in the absence of their parents.

It should be noted that students who are unable to complete the Gateway requirements cannot graduate. As parent or parent proxy participation is a requirement for completion of the Gateways, it is conceivable that students may be held back based on the behavior of their parents or the school's failure to engage the parents. Keeping the students from graduating based on parental or school failure is a solution that serves no one: not the students and not the community.

Partnerships. Beta's college partnerships have facilitated Upward Bound programs. Upward Bound is one of eight federal TRIO (see Chapter I, pp.27-28) programs that provide funding to support college preparation programs for low-income, first generation students. Each project is required to provide supplemental instruction in mathematics, laboratory science, composition, literature, and a foreign language. Upward Bound programs also provide information on financial aid, school reentry, alternative education, GED programs, and postsecondary education (U.S. Department of Education, 2012). Beta's Upward Bound program office is located on its university partner's campus, and a community college partner offers an Upward Bound Young Scholars' program.

The data does not indicate how the supplemental curriculum is linked to or supports the regular school curriculum.

Additional opportunities outside of Upward Bound are available to Beta students. A state university partner provides a social support program that students can enter as early as sixth grade; students who complete the full program can earn a tuition scholarship that pays for four years of college. Beta's college liaison is the coordinator for that particular program. A flagship public state research university also has a Young Scholars program that provides tuition scholarships for students who complete its college readiness programs. The data does not reveal what is involved in the college readiness program or how it is linked to the school curriculum.

Beta students also participate in college fairs sponsored by the Southern Christian Leadership Conference and the Urban League.

Concerns about costs. Beta students and their families have concerns about paying for a college education. The principal told the interviewer that the students have been able to obtain a lot of need-based scholarship dollars because they are so poor. However, the scholarships do not always cover the total costs of college, and convincing poor families to take on debt for college is difficult. The principal explained,

> The extent to which we work with families to get them to be willing to cosign for loans is huge. I mean just you know, our families aren't used to taking on debt for something that they can't carry home. The notion of a long-term investment for people who don't have a checking account is a quantum leap.

The college counselor reported encouraging students to work summer jobs and to take out loans to cover the costs of college. She indicated that most Beta students make

their decision on where to attend college based on the amount of financial aid they can

receive. She noted:

> Our kids, as first generation college students, in most cases do not have
> the luxury of saying, "I'm going to [names Catholic university partner]
> and I have a $17,000 balance, still [beyond their grants and scholarships]."
> They don't have that luxury. And, and most parents are not going to go out
> and say, number one, they're not going to go out and, and take the loan.
> And then number two, they, they may not even have the ability to take the
> loan. So, financial aid is definitely the driving force.

Because of the concerns about costs, Beta students do not always attend their first

choice college or the most selective college that accepts them. They are encouraged to

have back-up plans to attend their second or third choice school if that school costs less to

attend or offers them more in scholarship money. While this system does have

disadvantages for low-income students who qualify to attend brand name universities, it

may still allow them to attend a college where they can obtain a good education.

Beta tested a modest financial aid program for college-going members of its first

graduating class. It could not continue to provide that aid on an ongoing basis because

they found that their limited funding could not sustain such a program.

Attrition. Despite its efforts to support students, attrition is a chronic problem.

The principal believed the problem was, in part, related to people choosing Beta for

safety rather than for college preparation. She reflected:

> . . . people who bring their kids here are looking for safety, first and
> foremost. They don't want their kids in what they perceive to be big,
> crime-ridden high schools. So they'll do almost anything we ask to keep
> their kids here. . . They may not have any intention of having; the kid may
> have no intention of going to college. So it's our challenge to get them to
> start to think that way.

In other words, in this principal's experience, families who seek enrollment in

schools like Beta simply because they provide safer environments often find their

students are overwhelmed by the rigorous curriculum and strict disciplinary policies. They want to leave and go to schools they perceive as being easier. It is up to the school to convince the student that he or she is college material and that the academic rigor and strict disciplinary policies serve valid purposes for their development. There was no information about what the school was doing to identify and address the issues contributing to the attrition problem.

Kappa. Kappa is the only one of the charter schools run by a for-profit management company.

At the time of the site visit, Kappa had no formal partnerships with federally funded social support intervention programs or non-profit organizations in place. An interviewer specifically asked whether or not Kappa had organizations come in to work with the students in programs such as TRIO or GEAR-UP, which are examples of social support interventions described in Chapter 1. The principal of the school responded: "Well, no. We're looking at some of those right now." However, she also indicated that the school had found other means of providing support: " . . . what we also do with the Business Education Advisory Council, we have various people bringing experiences to our students." The principal and other interview participants did not indicate what goals and objectives had been developed for the support services the Business Education Advisory Council delivered. He did not describe how the teachers or the people brought in were prepared to work together to deliver programs or curriculum.

In addition to the community-level support provided by the business advisory board, Kappa claims that their partnerships with colleges and universities have facilitated programs that help students develop college knowledge and the ability to navigate

systems. For example, the remote public state university has facilitated the establishment of summer camps on the university campus. The CEO of Kappa's EMO told the interviewers:

> We take all of our kids to [remote state university partner], three summer camps for a week. We pay for that. They go to business camp, engineering camp, or healthcare camp. We also bring them to [local university partner] for camps there. And we take the whole junior class up to [remote state university partner] and we take the senior class up to [remote state university partner]. They spend the night over there. And, now we just added [local university partner]; we take them, all the seniors.

The participant did not state how many students go, in which activities they participate, the things schools do to help students develop college knowledge and ability to navigate systems. Additionally, there is no indication of how the administration evaluates these programs, i.e., how much impact one week at a summer program can have on students' educational aspirations.

The EMO of Kappa facilitates college nights and other events. The purpose is not only to help students develop college knowledge but also to create networks that facilitate admissions for Kappa students. The CEO of the EMO related: "We had a college night here . . . um. . . last Friday, was it? And we had fifteen colleges and universities here. So, let's say that before you'd get one or two. Now, I have [names university] come up here [because] . . . they said all of our kids get accepted [to college]." There was no data available on how many of these events are held each year; how many students and families participate; whether the students applied to any of those colleges; or which colleges accepted Kappa students. For example, it is unknown whether colleges beyond those in direct partnership with Kappa are accepting Kappa students and whether students enroll and persist.

Family engagement. Family engagement at Kappa is parent-driven. That is to say that parents initiate communication rather than the school. Kappa administrators described an open-door policy where parents could check in with questions or concerns at any time. It is unknown how Kappa encourages parents to open the door or what they are free to ask. An administrator described outreach to parents and families as an area for improvement. The fact that Kappa is a commuter campus was a barrier. She told the interviewers, "It's not like we're in the backyard of where our parents live." At the time of the site visit, Kappa was in the planning stage for opening a university center where parents could make use of a technology lab and take classes. They have also been studying parent-school partnership models. For example, the same administrator told the interviewers:

> So what we did last year, was we'd look at Joyce Epstein's model on how we could involve parents in those, those six areas; communication, student achievement, volunteer parenting [he did not mention what the other three constructs were]. So within each discipline, each content area, we have the teachers look at how do they reach out to it.

Other than saying that the administration studied the Epstein model and the teachers looked at it, he did not say how the model was pilot tested and what the results of the study were. It is unclear whether there were plans for widespread implementation of the model.

At the time of the site visit, the school was waiting to hear the results of a state "at risk" funding grant earmarked to fund a parent program coordinator position. This raises the question of whether this is actually a priority for Kappa: Why did the management company of this for-profit charter school not provide funding for such key personnel while awaiting the outcome of its grant proposal?

178

Kappa does not employ a college counselor or have college liaisons at partner colleges who work directly with students. When asked if the school had a college counselor, the principal stated, "Well we have counselors. I mean they take care of everything, really." However, it is not clear what *everything* means. It is also unclear how Kappa counselors help students who are not interested in going to college at one of Kappa's partner schools make connections with other colleges. It is also unclear what training the counselors have in modeling behaviors or in listening skills.

Discipline. An explanation for the absence of social support interventions may be found in Kappa's disciplinary policy, which embraces a "no excuses" philosophy. The principal indicates that Kappa emulates the Amistad Education Model[63] (Delisio, 2010), which includes long hours spent on task, a rigorous curriculum, continuous assessment, and tough discipline. Kappa administrators reported that the school provides a safe environment in which its students can learn because of this strict disciplinary policy. Kappa's policy comprises three levels of violations and associated responses. For example, Kappa students may be expelled for physical assault, a level-three violation. Loitering or violations of Kappa's strict dress code are level-two and level-one violations, respectively, and will elicit prescribed responses. Even small infractions, such as slouching, having one's shirt not tucked in, or not making eye contact when spoken to by adults, have consequences. A Kappa administrator, who is a former police officer, is in charge of upholding the policies. Kappa's administration and management state that this

---

[63] Amistad is a charter school often reported as a model school located in New Haven, CT.

discipline policy not only provides a safe environment but is also an important part of

learning social skills and becoming a good citizen.

Kappa's disciplinary policy, however, does nothing to address the causes of

antisocial or generally disruptive behavior. The absence of a school psychologist, a

school social worker, and other support personnel is another example of the for-profit

management company not paying for key personnel to address problems, effectively

putting responsibility for solving the problems on the students. There was no data on

dropouts or expulsions available. No students or parents were interviewed about their

views on dealing with discipline in this way. However, according to Amurao (2013),

> Students who are forced out of school for disruptive behavior are usually
> sent back to the origin of their angst and unhappiness—their home
> environments or their neighborhoods, which are filled with negative
> influence. Those who are forced out for smaller offenses become hardened,
> confused, embittered. Those who are unnecessarily forced out of school
> become stigmatized and fall behind in their studies; many eventually
> decide to drop out of school altogether, and many others commit crimes in
> their communities. (para. 2)

Concerns about costs and careers. According to Kappa administrators, Kappa

parents are concerned about the cost of going to college. Kappa administrators report to

the parents on the amount of money they are saving on college courses based on the

number of dual enrollment courses students have taken. The principal stated the parents

are pleasantly surprised. Since no parents were interviewed, these statements made by

Kappa administrators could not be corroborated.

The students and their families are also concerned about how education will lead

to a middle class job. The principal told the interviewer that due to significant changes in

local industry, student interest had changed from engineering to business and healthcare.

The school adapted to add the healthcare track to accommodate this interest. It is

unknown whether Kappa hired additional faculty to teach a healthcare curriculum or how Kappa staff developed the curriculum.

      Sigma. Many Sigma students and their parents speak Spanish as their first language. Therefore, Sigma employs a bi-lingual Spanish-English parent program coordinator funded through Title I. Her primary role is communication. She indicates that she speaks with parents on the phone daily, or they come in to speak with her. She plans activities; an ice-cream social was on the calendar at the time of the site visit. She sponsors student organizations, such as the Dream Act Club. She also offered a bi-lingual basic computer course and translates communications to parents. While the parent program coordinator's primary role is communication, she acts as a support person for Sigma families as well; parents reach out to her for help with teen pregnancies and other problems. There is no school social worker or other supportive personnel to assist the parent program coordinator.

      State laws require that students learn in English. Sigma English Language Learners (ELL) are tested when they enter the school. Those who do not demonstrate prescribed competency levels are required to take English language courses until they do.

      Many parents and students are undocumented. The state in which Sigma is located has very stringent laws prohibiting employers from hiring undocumented workers. Work is scarce, and parents often seek the assistance of the parent program coordinator in finding houses to clean, yards to take care of, and other informal work. Sometimes school staff members give families money from their own pockets to prevent utility shut offs. Students often come to school hungry. Although state law prohibits providing support to undocumented students, federal Title I funding enables the school to provide free

breakfast and lunch. The parent program coordinator states that she is aware that sometimes the school provides the only food available to these students. Students also move frequently as parents look for work. Sometimes undocumented parents are deported, leaving students behind with relatives or friends. The parent program coordinator works tirelessly to track the whereabouts of these students and their families and offers what help she can.

State immigration laws prohibit the use of public funds to provide financial aid for undocumented students. Therefore, the parent program coordinator and school counselor help undocumented students find private colleges that will offer them admission and scholarships to pay for their education. Undocumented students who go to public state colleges must pay out-of-state tuition in this state, which is often as high as private school tuition. The English Language Learner/English Language Development (ELL/ELD) coordinator stated:

> It's horrible, you know, working with these kids this year. They're super bright, they have like close to 4.0s. They have over a hundred hours of community service. But, they're undocumented, and all you can say is, "Well, you know, let's apply to private schools and see what kind of scholarships we can get", and but it's really, you know, they're crestfallen after you have these conversations because it's just now hitting them.

The staff indicated that, faced with this reality, students sometimes consider returning to the countries of their birth (or their parents' birth) for college, even though they may not speak and write the language fluently. There is no information on the number of students who leave for this reason.

Charter School Summary

The analysis of the data shows that the charter school administrators and teachers have various social support mechanisms in place that are intended to provide for the

182

development of social, cultural, and human capital (all of which comprise academic capital) for students and their parents.

Those interviewed from the schools spoke to the issue of creating safe environments. Alpha and Beta participants spoke about the alternative the school provided to chaotic homes or dangerous school environments. Beta teachers are often called upon to rescue students when there are problems at home. Kappa believes it provides a safe environment for students to learn by enforcing a strict "no excuses" disciplinary policy with a focus on hard work and zero tolerance. (However, one cannot learn very much when expelled from school). Sigma provides a sympathetic and safe environment for undocumented students living in a state whose population and enacted public policies are hostile to them. However, problems arise when parents enroll their children in college preparatory programs solely because these schools provide safe environments. Students are often unprepared for the expectations they encounter at Sigma, and parents may be ill equipped to support their students in meeting those expectations. Without a student and parent commitment to the rigors of college preparation, the safe school environment may not ultimately translate into academic success.

Partnerships were an important part of supportive networks for students in the four charter schools. Alpha relied on community partners and federal and city programs. Beta relied on federal programs, such as Upward Bound. Beta, Kappa, and Sigma all had university and college partners. Kappa also relied heavily on corporate partnerships such as the one that provided the Corporate Sponsored Program (CSP). These partnerships provided resources such as scholarships and experiences for students where they could

develop college knowledge and learn how to navigate college pathways. The partners also provided mentoring and tutoring for students to help them stay on track academically.

Alpha and Beta employ college counselors. Kappa and Sigma have counselors on staff, but they deny being college counselors, per se. Rather, their job description is broader. It includes more traditional aspects of guidance counseling, such as assisting students with scheduling and connecting students with academic and social support resources. It is unclear what preparation these counselors have for advising students or helping them to develop college knowledge.

All four charter schools had difficulty in facilitating effective programs in parent engagement. Three of the four schools (Alpha, Beta, and Sigma) have parent outreach programs in place. However, most of Alpha and Beta's programs seem mechanical, consisting of one-time experiences. Sigma has employed a bilingual parent program coordinator. While this person seems to be very helpful, the task seems too large for one person. Also, while the parents come to Sigma for assistance with issues such as finding employment, there was no discussion of the extent to which the parents participate in activities geared toward building college pathways. At the time of the site visit, parent involvement at Kappa was parent-driven. There was no data provided as to the extent that their "open door" policy was being used. However, there was talk of some plans to engage parents. None of these plans had been completed or activated. As no parents were interviewed, it is unknown how any of these outreach programs were effective in the four schools.

Attrition is an issue for all of the charter schools. One explanation that was offered for this problem was the fact that some families send their children to these

charter high schools because they offer a safe environment rather than because of the college preparatory curriculum. In these cases, the demands of the curriculum or the disciplinary policy may be unexpected and overwhelming. Economic disadvantage can also lead families to move frequently. In Metropolis, it is expected that the students attending public schools may travel far from home to attend school via public transportation. This option may not be available in the cities where the charter schools are located. That is certainly true for Kappa, which is located in a city with very unreliable systems of public transportation.

Kappa is the only school in the study that is for-profit. There is no evidence that the school is using profits, for example, to provide staffing to help deal with the students' many issues. They are not using the profits to pay for college visits. They are, in general, doing the same things that the not-for-profit schools are doing. This begs the question of how being "for-profit" benefits students.

At all four charter schools, students and their families were concerned about the cost of college. The availability of adequate financial aid and scholarships were important considerations for college going and college choice. Low-income families were reluctant or unable to borrow money for college. Students who are undocumented due to their families' decisions to enter the United States illegally experienced additional difficulties where state laws prohibited them from receiving public funding for college. There is no information on how many students go to college and complete it.

District-accountable Schools

The district-accountable public schools selected for the study all had established partnerships with the non-profit CFES program, which fosters participation of CFES

185

Scholars in interventions that are the core practices of the CFES program model. These are *pathways to college*, *mentoring*, and *leadership through service* (CFES, 2013). The three core practices, when implemented as a whole, are ". . . a coherent and cohesive set of strategies that program directors use to engage schools and their college partners in mentoring, building social networks, and generating trustworthy information that builds college knowledge and supports first-generation college-going and a process of uplift in. . . communities" (St. John & Milazzo Bigelow, 2010, p. 27). These three core practices are defined as follows:

> **Pathways to college** is a practice in which CFES schools partner with colleges to provide opportunities for Scholars to visit college campuses, interact with college students and faculty, and gain exposure to admissions, financial aid, and other higher education components.
>
> **Mentoring** fosters academic and personal growth among CFES Scholars by providing an older, more experienced individual who can serve as a role model and with whom they can develop a supportive relationship. All CFES schools have mentoring programs for Scholars that utilize peers (including other Scholars), adults, teachers, and/or college students as mentors.
>
> **Leadership Through Service** activities are designed to help CFES Scholars identify and express their leadership potential by improving their school, neighborhood, and/or the global community. CFES schools create meaningful opportunities for CFES Scholars to develop leadership skills through service activities. Gaining leadership skills and taking responsibility for others contribute to Scholars' self-confidence, stimulating greater personal aspirations for college and building resilience that leads to college success. (CFES, 2013)

CFES operates on the premise that the enactment of its three core practices helps raise the academic aspirations and performance of underserved youth so that they can prepare for, gain access to, and succeed in college (CFES, 2013).

The administrators interviewed felt that an advantage of the CFES program was a flexible implementation design. That is, each CFES school is able to adapt the program to

best suit its institutional model, curriculum, staff, students, and parents and to take advantage of the school's strengths and opportunities. When commenting on the benefits of program flexibility in urban high schools, the program director for Twenty-First Century Technological Academy (TFCTA) and Acme Collegiate Academy (ACA) echoed the expressed sentiments of the principals:

> What I found to be the best part of CFES is they allow schools to do what's best for the school. It's not rigid where you have to do A, B, C and D or else you lose the grant. You do what's best for you. You pick and choose which pieces you want. You select which aspects fit your school.

CFES allows schools to determine the selection criteria for CFES scholars, but the selection bias for participation favors the academic middle. An Onye Nkuzi teacher stated, "We recruit, sort of the idea is to recruit middle of the road, sort of average scoring students to try to get them to reach their potential to prepare them for college." The CFES program liaison added: "When the program first came. . . we originally targeted like those borderline kids that we were trying to really develop and get them to kind of go from being a mid-level kid to reaching their full potential." Because of the selection bias, higher achieving students are not selected for the program, and they sometimes protest. The liaison noted,

> It was good and bad in some ways. . . especially like with CFES trips to colleges some of the higher achieving students would be like hey that's not fair, how come I can't go? And they had a very valid point. And also over time you know those kids, some of them would look at it as like a day off from school, and even still some kids look at a field trip as a day off from school. But the reality is over time like at this point, we come in the beginning of the year, I just say has there's CFES applications, and I very much try not to turn anybody away. If there is a kid that is...like failing every class low then I'll go and talk to them and say hey listen, when you prove to me that you're being more responsible and taking your academics, your whatever it is, social issues more seriously, then I'll consider you for the program, but right now I need to see some progress.

187

This last point raises the question of how a student would demonstrate his or her commitment or improvement when specific criteria have not been established.

Although some teachers are concerned about students being taken out of class to participate, overall, the administrators and staff members who were interviewed in the four case schools were supportive of the program. This teacher and administrator buy-in made it possible to organize time off for college visits, mentoring, and service activities. In various ways, the CFES program was tied to a career theme, such as engineering, or was integrated into the curriculum. For example, one of the most frequent examples found was an assignment to write a college application essay in freshman English class. At Remus, students e-mail this essay to the vice-principal and CFES liaison for input.

In addition to peer and teacher-staff mentoring, students participate in leadership courses and Advancement Via Individual Determination (AVID) elective courses. Beyond the limited information provided by the interview participants, there is no information about the leadership courses. They report that participants work in leadership teams (undefined) and experience mentoring and the leadership skills (undefined) through participation in activities, including those that are part of the CFES and College Summit experiences.[64] The AVID elective course overlaps with CFES and College

---

[64] College Summit is a non-profit organization whose mission is to increase the college enrollment rates for youth from low-income communities. The organization serves 50,000 in twelve states through partnerships with high schools. College Summit aims to create a college-going culture in high schools. Toward that end, it offers a postsecondary planning course for students in grades 9-12. It provides educators with professional development and onsite coaching to successfully lead this class. College Summit programs have a peer mentoring component. Peer mentors are trained to assume that role in summer workshops and during school year activities. College Summit uses data to manage the school-wide postsecondary planning and college enrollment and college

Summit in its goal of motivating students and helping to make college attainable for the academic middle through mentoring and service activities. It was unclear from the data how all of these interventions were integrated and how and if they complement academic work.

In the section that follows, I more specifically describe the implementation of the CFES program at the four case schools. A difference between these analyses and those of the charter schools is that the interview data for the four Metropolis schools included student focus groups and one individual student interview. The charter school cases did not include any student interviews at all. TFCTA and ACA are combined for the purposes of the analysis because, although they are separate schools, they are located in the same building. As a result, the principals are close colleagues who have worked on the development of a college-going culture since the days when the TFCTA and ACA were part of a large comprehensive high school. Additionally, the schools share CFES resources, such as the program director. These administrators were interviewed together in focus groups, which made separating the schools for the purposes of the analysis difficult.

Remus Campus High School. Remus is a mini-schools model with four internal academies: engineering, medical, humanities, and academic professions. Remus has integrated the CFES program into the curriculum in addition to the extracurricular activities of its engineering house. The engineering house was chosen for the CFES program because, of the four houses, the engineering and medical houses have the

---

persistence process (College Summit, 2013). None of this data was provided to the interview team.

strongest students based on their middle school math and science standardized test scores, their grade point averages, their attendance, and how they ranked the school on their applications.[65] For example, students who wish to be admitted to Remus' engineering house must attain scores in the following ranges:

Metropolis State Test Scores
- English: (80-100)
- Math: (80-100)
- Social Studies: (80-100)
- Science: (80-100)

Standardized Test Scores
- Math Level(s): 3-4
- English Language Arts Level(s): 3-4

Metropolis State Test Scores are percentages. A level 3 is "meeting state learning standards," and level 4 is "exceeding state learning standards." Students' attendance records are also considered in the admission decision.

The CFES program director stated that originally, CFES functioned like an honors program for the engineering house. Parents were (and still are) provided with information and testimonials at orientation. Students with an 85 average or above in math were strongly encouraged to join CFES. A Remus student confirmed this: "I'm a senior and during my freshman year. . . one of my math teachers said we're going to have a program called CFES. He took the highest grades—the students with the highest grades and put them into CFES. And, so I was one of them." According to the program liaison:

> So, the first group of students were actually the top engineering, math, and science students, and then over the course of the years we've actually

---

[65] The medical house already had a partner that provided services that were similar to those CFES provides.

allowed any engineering house student that wants to be in it. And then, this year there was so much of a buzz about it that other students from other houses wanted to be in it so they've slipped in.

It should be noted here that when the liaison mentioned the other houses, she only listed the medical and humanities houses. No students from the academic professions house participate in CFES.

In addition, some students who had a lower grade point average wanted to join. For those students, CFES was held up as a reward or a goal: students were offered the opportunity to join if they were able to bring their grades up. This example shows the potential of CFES to motivate borderline students:

When I first came to school I was having a hard time. I wasn't really doing what I was supposed to do. I guess a couple of teachers saw my potential and they kept pushing. I wasn't in engineering and they kept pushing for me to join the program. I finally—it was more of—we had a standard before. You had to keep an 85 average. I think it was a way of them trying to get me to higher my standards. They kept pushing it on me. And I finally caved.

Although the program director and the liaison report that students have high interest in joining CFES, the percentage of non-participants in the engineering house is quite high. At the time of the site visit, there were about five hundred fifty in the engineering house. The program director and liaison thought there were more than a hundred students in CFES (grades 9-12) at the beginning of the school year. This means 89% of engineering students did not participate. It is not clear how many opted out and why or how many did not qualify. It was not reported what, if any, social support interventions are available for or elected by those students who do not participate in CFES. Furthermore, attrition from CFES was a problem reported by the program director and liaison. At the time of the site visit, which was in the spring, there were only between

forty and sixty students out of the original one hundred (9th-12th grades) still active. Despite the low percentage of initial participants and the problem with attrition, the CFES intervention is having positive outcomes for the students who do persist. For example, the program director is comfortable stating that 99% of seniors (exact number not provided) of the 40-60 still remaining in the program receive secure financial packages and will go to college. The school does not track the students' college enrollment, persistence, or graduation rates.

Pathways to college. College aspirations are part of the motivation for students who join CFES. That is, students have come to understand the importance of college for their futures, but they may come from families or communities where high school graduation is normative. There may be little information about or encouragement to go to college within the family. The CFES partnership with the school provides both. One Remus student aspiring to go to college talked about the value of CFES in providing information. "I knew for a fact that I really wanted to go to college and CFES would show me how to get to college. They show me what it takes to be in college and stuff." Another student talked about how CFES addressed his concerns about costs: "I joined because I didn't have any money to go to college. The teachers are there to talk about college and we visited colleges. And so I just joined."

CFES scholars at Remus make multiple college visits starting with their freshman year. The students are taken to small liberal arts colleges as well as to larger schools. Overnight trips are included in order to give students an opportunity to experience dorm living. A CFES team member who is a mathematics teacher at the school described some of the activities:

We go on college trips all the time, we've been, this year we took our ninth, tenth, and eleventh graders to [mentions multiple colleges and universities]. They've been to at least 30 different colleges, too many to name really.

Each one is different because last year we did an overnight trip to [college], so they got to actually see what it was like living in a dorm, they got to go off with a dorm mate - like four or five of them in one room and they got to see what that was like. We went to a movie theater just to see what the town was like, and you know of course you visit the college campuses: we had an orientation, they got to sit in on a lecture hall. And then in other places like we went to [college] two weeks ago, and they got to see a couple of different presentations from students and at [university] and at [college]. We are actually going back there May 13th to go into an actual tour of [college]. So each one looks different. When we went to [colleges] last year, that was during their April vacation, so we did two days, two colleges each, and they got to see a tour of each building there and one of the engineering programs specifically for them. So we got to see a jet engine on, and they got to press the buttons and turn it on, videos of all of that…We went to [college] and [college] and we got to taste the food at [college] they liked the cafeteria. And then in other places you know you get the college tour, and it depends on the college. Last year we got to see a nice student panel at [college], and one of the girls actually graduated from Remus. Yeah, that was a nice connection there.

A Remus teacher shared this reflection:

They have the experience now of meeting college representatives. They speak to them like young adults. They go up to the college representatives and now they start asking questions. If they want more information about the school, they start e-mailing the colleges themselves. They will pick up the phone now and call a college representative and ask them for information, whatever they can't find on the Internet that they researched.

This willingness of students to communicate with the colleges they visit is

significant in that a number of students described themselves as having been shy

as freshmen.

In taking students on these college visits and allowing them to familiarize

themselves with the college campuses, CFES provides the opportunity for students to see

themselves as college students on those campuses. The program also gives students the

chance to experience schools of different sizes and to imagine where they would fit best.

A student remembered:

> From the schools I visited with CFES, I sort of got a look at all kinds of schools because I took part in different types of programs. CFES gave me the bigger schools and I went to see the bigger schools. And I was in another program called, CCPI[66] with [names sponsor]. And he showed me the smaller schools, the Liberal Arts side of things. And I decided I was more into the Liberal Arts, small, community type of schools. That was the first thing and then I continued with the program and I continued here. The more I went to these schools, I found myself feeling more comfortable in those, small, Liberal Arts. The more I found out what Liberal Arts actually means and what it can get you there—that's how I decided I wanted to go there.

In addition to visiting schools of varying sizes, CFES takes Remus scholars to selective schools with higher admissions requirements so that students have something to compare to the city schools that are readily accessible to them. CFES also does this as a means of encouraging scholars to set a higher standard of achievement for themselves. A Remus student shared how eye-opening and beneficial visits to selective schools were:

> Yeah, the college visits too, once you start taking those college visits and see how competitive it is and how many people are trying to get into these really good schools. And the caliber of the schools too, we don't just go to any schools. I think that's a good thing, we go to high caliber schools. We set our bar really high.

Parents sometimes participate in college visits. A Remus scholar reflected on his mother's participation in a college trip. "My mother has been on several trips with us. And, she goes on celebration dinners that we have every year. . . She is actually proud that I'm engaged and I really want to do something with my life. And, she's actually

---

[66] CCPI is the College and Career Preparatory Institute. It offers workshops and sponsors performing arts groups for students with a 2.5 grade point average or higher.

194

happy that CFES is a program in this school." A Remus scholar described his mother's participation in a college visit as transformational:

> CFES gave my mom the opportunity of going to [university] with us. To be honest, it was a really great experience because my mom is totally outside. She didn't know what the college world was like. She had no idea. Once she made it to [university], it's a really big place and it was a big shocker for you. It was a big stepping-stone that sort of transformed her.

These trips appear to be meaningful in terms of helping students and their families learn about colleges and imagine college as a possibility. However, none of the people interviewed spoke about preparation for these trips regarding what the students should look for, and no one spoke about follow-up and sharing sessions after the trips. No data was available as to the percentage of parents who participated in college visits.

It is also interesting that activities included in the college visits had to do with the "college sales pitch" of dorm life, cafeteria food, etc. However, interviewees did not address whether these visits included information about academic issues such as how professors teach and what college course loads require. While college can be fun and games, the important thing is that students understand the teaching and learning occurs at college.

In addition to the college trips, Remus brings in speakers to talk to the scholars about college. These speakers include recognizable public figures that play prominent roles in business or popular culture.

Remus scholars discussed their concerns about costs. One scholar noted, "There's the financial part that I'm worried about. I'm not coming from the greatest household, financial wise." Another stated, ". . . my mom was constantly worried about money when I was visiting colleges. She said—be careful where you're going to go. And I would

always tell her when I'm going to college I'm not going to look at money. They're going to give us what we need. And she's always like—we don't have money." A third added: "The financial situation is big in my house because my mom is a housewife and my dad is the only one working in the house."

Although the state offers relatively generous financial aid packages, it is true that students from low-income families can find themselves in a position where they cannot afford to attend their college of choice, even with the right grades. Without properly informing students of this possibility, programs may lead students to believe they can go to any college that offers them an acceptance letter.

Through the CFES program, Remus faculty and staff connect students and their families with information about how to pay for college. A student reports: "[Teacher's Name] sends us all the time newsletters and scholarships in e-mails. We're constantly aware of financial aid. Yeah, and she e-mails the specific scholarships we should be trying for." Another scholar stated: "I was told when it comes to college, don't worry about the money and I didn't. And I got a scholarship through the Higher Education Opportunity Program (HEOP)." The CFES liaison shared that the scholars start with learning to look for scholarships and to complete Free Application for Student Aid (FAFSA) forms. She said "…and so when I hear these kids come to me and say, 'Miss, what's a W2?' Come into my office and this is a W2. When you do your taxes...and you start explaining it to them. FAFSA forms—we give them help with FAFSA." The students who were interviewed agreed that mentors do provide this type of support. Such information about financial aid is critical for low-income families concerned about the cost of college.

196

Mentoring. Remus students are mentored through several channels: peers, teachers, guidance counselors, and community members. Seniors and juniors are selected to provide peer mentoring and tutoring for sophomores and freshmen. For example, scholars who participated in the focus group interview at Remus spoke about being tutored in mathematics and science by their mentors and tutoring and mentoring others in return. Those interviewed saw the student-to-student relationship as a strength of the program. The CFES liaison shared: "The understanding [is] that you have a mentor— whether you are a mentee or mentor. You have people you can look up to." This seems very positive. However, none of the interview participants spoke about preparation to become a mentor or tutor or about ongoing support for the mentor or tutor role.

In addition to peer mentor relationships, the CFES liaison indicated that students knew they were able to go to teachers' and guidance counselors' offices and classrooms for support. She saw the availability of one-on-one help from adults as additional social support strength, a part of an "it takes a village to raise a child" philosophy enacted both as part of the CFES program and of community influence. They encourage students to believe that asking for help is a sign of strength, of knowing how to see developing a "family" of trustworthy relationships as a resource. The CFES liaison said:

> Even the seniors know that they have mentors within teachers, within people in their lives and within their parents. They know that they can have more than one mentor. You can ask people for help. It's okay. It's not a sign of weakness. It's a sign of strength. I think that's a very big positive. And you know getting the kids to know each other they become more of a family. Because they start to know each other. They even call

me Mommy[67] all the time. They know we're there to help them. We're there as mentors. If you have a problem, come and ask.

It is also possible that the close student-teacher interaction is partially a function of the schools-within-schools model, which promotes close relationships between students and teachers. It begs the question of what will happen when students go to college and they no longer have the luxury of a "mommy" for support.

The scholars interviewed confirmed that counselors and teachers were available to provide support, as needed, and there was a family atmosphere. However, only a small number of students were interviewed and they were pre-selected (rather than randomly selected from the whole Remus engineering population) by the liaison and the CFES team. None of the interview participants indicated how often students took advantage of the availability of adult mentors or whether the requests for help disrupted teaching and counseling activities.

One of the roles of adult CFES team members is to make sure students stay on track with their schoolwork. The CFES liaison explains:

> It's tough love because we will tell you need to do your homework. "I spoke to your teacher today and your teacher told me you were slacking off." You're on top of them. And they hate you sometimes but deep, down, they love you. They know you're still watching over them. You're making them do homework.

There is no data available, other than anecdotal, on how these strategies affect overall student performance.

---

[67] The liaison, who was a Hispanic woman, explained that it was culturally acceptable for young people to call adult women who were not their mothers "mommy." It is a term of respect and signifies a trusting, supportive relationship.

Leadership through service. Leadership Through Service takes many forms at Remus. CFES scholars do community service through participating in activities like toy drives, canned food drives, reading to elementary school children, and talking to younger children about college. Other activities include coaching sports teams, washing cars for a school fundraiser, volunteering at a school for special needs children (one scholar's sister has cerebral palsy), and working in a park cleanup drive sponsored by the city's largest volunteer organization. They also learn how to start a petition and make appointments with administrators. They attend CFES leadership summits where scholars from all over the state come together to make and listen to presentations, network, and receive awards. For these activities, students are required to learn about and wear proper attire (towards this end, boys may learn to tie a tie), speak in grammatically correct English sentences, and use proper etiquette. No information was provided about whether or not students learn skills such as listening for understanding or being considerate and respectful of others. Most important, then, is that there is no data on how the program translates service into leadership.

Onye Nkuzi. The CFES liaison is an energetic and popular physical education teacher. In large part due to his influence and the support of the principal, the CFES program has become an important element of school programming. At the time of the visit, there were about one hundred fifty students in the program, or slightly less than one fifth of the student body. It is unclear how the program would fare if the liaison were to leave.

The liaison selects most of the scholars with the help of his team leaders. He begins by making school-wide announcements about the program that include the

number of openings. Team leaders then select teams from the applications in what the liaison calls a mock draft process. There was no information provided about what criteria team leaders are instructed to use in making their choices. Team leaders are not trained to make these decisions. It appears that they are trying to make it fun by making it a draft. In a mock draft for sports teams, management studies players all year and weighs players' abilities against their needs. The liaison indicated that some of the applicants were unknown to him and to the team leaders. So, rather than a reasoned draft process or a learning experience in fairness for the students, the selection process appears to be a popularity contest or gym class team selection. For example, the liaison states: "We'd put all the applications out and let kids pick individually, like 'Oh, I want this kid on my team, I want that kid on my team." In the absence of training in the implementation of an unbiased and thoughtful selection process, it seems it would be much more fair to draw names out of a hat.

There are other avenues to joining CFES. Some students are encouraged to join directly by the liaison/physical education teacher. For example, one scholar, who is a student in this particular teacher's Life Skills class, reported having been asked to join because the teacher identified him as a "good student." Others found out about the program by word of mouth and asked to join. The interview team was not provided with selection criteria that the liaison/physical education teacher used to select students. He did allude to attendance and grades, but the selection criteria otherwise seemed to be very subjective. This begs the question of whether students who could benefit from the program are being left out.

Pathways to college. Onye Nkuzi is a high school with a teaching niche, and, theoretically, students in the teaching program are already college bound. Students in the teaching academy prepare for successful transitions to their eventual college major by taking education courses, one of which focuses on the problems of urban schools. They also complete some field experiences and full internships in city elementary schools. The teaching focus keeps a postsecondary goal in mind for students who enter the academy, and the CFES partnership supports that mindset. An English teacher stated:

> Well, we're also the high school of teaching, so. . . a lot of them [matriculate] with . . . a post-high school goal in mind. . . There's just so much focus on life after high school, between CFES and. . . the AVID program, that it's [college]. . . one of the main focuses of our school, it's like what are we preparing for after high school,. . . even coming in in ninth grade, they're already thinking about that.

This is well and good for students if teaching is their future occupation. However, as students are admitted to Onye Nkuzi through the education option, many students have other career goals. As discussed in Chapter IV, the principal has tried to address the needs of the students who are not interested in becoming teachers by creating a liberal arts academy. This is the same liberal arts core that the students in the teaching academy follow. It is typical of moderate-sized high schools like Onye Nkuzi to focus resources on providing a strong liberal arts core for all students (Lee & Ready, 2007). Like the teaching academy, the liberal arts academy offers elective courses related to careers that would require a college education. The Onye Nkuzi students who were interviewed and who were not part of the teacher academy aspired to careers that would require an education beyond high school, including lawyer, judge, Supreme Court justice, psychologist, criminal justice worker, computer programmer, physician, journalist, engineer, and accountant.

Although the liberal arts academy's program is not connected as directly to these careers, students in the liberal arts academy are able to broaden their knowledge through elective courses in humanities, business, and the arts. They are also able to explore various career paths through field trips to courthouses, design firms, and other businesses, as well as through mentoring and internship programs.

The CFES program and other social support interventions (Onye Nkuzi also has AVID and College Summit) complement the academic curriculum at the school by supporting the college-going culture. The principal told the interview team:

> One of the reasons why CFES succeeds so well here is I think we have a very strong sort of college umbrella. . . Through CFES we bring younger students in, the ninth and tenth graders. We start exposing them, motivating them to move to college. They get put within a structure where they're mentored by older students. Immediately the academic piece is brought in because you get involved in a GPA contest between the different, ten different teams. Then as they get older, as they become seniors we have College Summit, which is designed to, to lead them through the entire myriad college process.

The faculty, administrators, and students who were interviewed were positive about the influence of the CFES intervention on the students. Despite some concerns about taking students out of class to participate in events, they believed the program was a positive influence in terms of setting goals for themselves. Those goals included going to college and staying engaged in school. No parents were interviewed.

CFES activities at Onye Nkuzi include college visits, as funding permits. There is no specific data indicating how many visits the school is able to afford. Generally, CFES tries to take students beyond the city system. College visits are also arranged for scholars who have been accepted to schools that are at a distance so that they can test the fit before accepting and taking on the expense of a move. The students prepare for the visits by

doing research online ahead of time and by collecting information from college representatives who visit the school. Colleges sometimes share in the cost of visits to their campuses by covering transportation costs.

The scholars interviewed by the team were enthusiastic about the visits and felt they were beneficial. One scholar discussed the way he believed college visits helped him develop supportive networks that could facilitate college access: ". . . actually going to the college and visiting and meeting admission officers, having interviews—by the time you apply—you're no longer a name on a paper. They have a face attached to your name because they met you at some point." Although college admissions officers review hundreds of applications, the student felt an increased sense of confidence that by making visits to the college he hoped to attend, he had made important network connections that would make his application stand out.

Onye Nkuzi students were concerned about the cost of a college education. The Onye Nkuzi liaison explained the problem:

> But just the realities of a lot of these kids. . . goes back. . . [to] financial aid, they think, "Well, my parents didn't go to college so I can't go to college," or "You know we can't afford it." And it's a shame because even, they're aware that there's scholarship opportunities out there but they don't have the confidence to know that "I can get that."

Part of the CFES programming at Onye Nkuzi is to help students identify funding sources for college and to determine what schools they can afford.

Mentoring. In addition to the program director, there are several teachers who serve as CFES mentors. These individuals help to organize activities and are available to support students by listening to their problems, directing them to resources, and providing encouragement and advice.

The peer mentoring system is strong at Onye Nkuzi. The liaison has developed a system of CFES high school mentoring teams made up of students enrolled in the leadership course (an elective course) at the school. Each team has a college name. Team leaders, who are generally seniors, and co-captains, who are juniors, are accountable for the grades and performance of their team members. They have also tried having other team members act as peer mentors within the groups. There is no evidence in the data to demonstrate the presence of any initial or ongoing training for students assuming mentorship roles.

Most of the interview participants felt that the combination of leadership (among peers) and service (toward peers) was having a positive impact on school performance and educational aspirations. At the same time, the principal shared that there were issues with seniors becoming unmotivated and slipping in their own academic performance. This has caused them to lose credibility with their mentees. The administration and teachers have worked to help the students get back on track. They report having leveraged the resources available through social support programs, such as outreach from adult CFES team leaders and mentors, to do so.

CFES provides a mechanism for linking students to adults in the community who can serve as role models and mentors to Onye Nkuzi students. One adult mentor related having introduced his wife, who is an accountant, to a CFES scholar who aspired to go into accounting in college. CFES also links students to corporate partners where students can engage in internships and other opportunities.

Leadership through service. The leadership course provides opportunities for the planning of leadership and service activities. The timing of these activities is generally

204

after school or on weekends. The students speak in an animated, excited manner about

their community service activities, which, as with Remus, are facilitated through the

city's largest volunteer organization. The organization focuses on connecting volunteers

with projects and groups that need help. Onye Nkuzi students participate in these

activities once or twice a month. In one example, the students participate in a city-

sponsored park cleanup program that involves painting fences and picking up litter; they

also paint birdhouses and make paper flowers for people suffering from HIV/AIDS. The

annual coat drive is a favorite; it is a bonding experience for the students as they sort and

organize donated coats while listening to music. Students wear t-shirts of their own

design to these events to identify themselves as CFES scholars from Onye Nkuzi. When

speaking of the CFES community service efforts, one scholar stated,

> You've got to think about giving back to the community because recently
> the one I've gone to was building or painting birdhouses and making paper
> flowers with HIV and AIDS victims. They have a community home in
> Manhattan. When I went—I felt when I was giving back that they were so
> happy. I painted this woman a birdhouse and she was so happy when I
> gave it to her and that made me feel better.

Although these activities seem to be fun for the students and allow them to feel

good about themselves, it was unclear from the data how those in charge helped

the students to mentally translate these activities into leadership skills.

The CFES liaison has also organized a group, The Lounge, where scholars can

lead discussions about important issues of the day such as bullying. A CFES scholar from

Onye Nkuzi described The Lounge to an interviewer:

> It's when a group from CFES comes up with an event where all the people
> from school [are invited to] attend. You don't have to be in CFES. They
> come together and have a discussion on events in the world. And
> depending on the topic we all can—it's like an open circle where

everybody can put down their opinions without anybody judging anybody else.

Through this type of event, students can learn to engage in civic participation, which is a quality of leadership. There is no data on the number of students who participate or how often the projects occur.

The Onye Nkuzi scholars also participate in a GPA contest between the leadership teams and in the CFES statewide summit.

Again, there is no description of initial or ongoing training for students to transfer their service learning or extra-curricular activities into leadership skills and functioning.

TFCTA and ACA. CFES is well established on Educational Campus A. The principals of TFCTA and ACA were teachers at the original Educational Campus High School (ECHS), the traditional large high school from which these two small academies evolved. Both teachers were involved in CFES while working at ECHS. The former principal of ECHS handpicked these two teachers to be the principals of TFCTA and ACA when the split occurred. The ECHS principal retired and is now the CFES Director for ACA and TFCTA. As a result, the CFES team is intimately tied to the leadership and has a long history with the program.

Research has found that when large schools are broken down into smaller schools, student outcomes are not as good as when small schools are developed from scratch (Wallach, 2010). Scholars hypothesize that this is because it is difficult to change the culture from unengaged to college going. The fact that CFES was able to establish a strong foothold and a strong college-going culture even though ACA and TFCTA were originally internal academies (an SWS model) may be due, in part, to the strength of the relationships and the commitment to culture change of these key administrators.

206

At TFCTA, the head guidance counselor takes a lot of pride in the college-going rate[68] of her students and reports that she has worked diligently to develop a college-going culture, hiring and mentoring a junior counselor of color. The school encouraged her to hire this individual to continue her work once she retires. In other words, CFES is so important to the school culture that the head guidance counselor is planning for its continuance even after she retires.

At ACA, all students become CFES scholars in the ninth grade and are expected to participate until graduation. The principal at ACA stated "all the students in the entire school are exposed to different aspects of CFES. But Pathways to College, all of the students have a different exposure depending on what program that we are working with at the time." As she indicates, the program is available to all of the students, but not all students participate in all of the activities. For example, students who are interested in attending a particular college will participate in a visit to that college, while students not interested in that college may not participate.

Pathways to college. CFES at these two schools enjoys a strong relationship with an airline that flies up to 300 students a year to an adjacent state for campus visits at two different higher education institutions. The first of these is a large university that sponsors and pays for students and their parents to visit and offers full scholarships to students who are accepted. The second is a prestigious college, which has a small but steady trickle of applicants and a peer-mentoring program at both TFCTA and ACA. The CFES program director stated that because the university and the college have standing

---

[68] The data was not available.

relationships with TFCTA, ACA, and CFES, applications from borderline students from those schools who do not quite fit the admissions criteria are often given a chance.

Some parents participate in college visits. The number is unknown. A TFCTA scholar writes: "My mother came with me the day I went to [leadership summit] at Remus. We took the trip together and she enjoyed what she saw and she liked the videos that are presented by all the different schools and she was, she basically encouraged me to keep doing it." Another TFCTA scholar states: "My mom went on the [names state] trip. So she, she liked it how the student life is and she thinks it would be better for me." There was no feedback from the parents who participated, as none were interviewed.

TFCTA scholars discussed the tension between their parents' desire to keep them close and parents' growing trust in the idea of going to an appropriate college, even if it is far away. This tension is illustrated by the thoughts of two students, one of whom stated, "My mother isn't too thrilled about me going to a school far away but she understands that that's like, I really want to do, like if I find the best opportunity far away and to go there but she told me that she'll support me." The other student commented, "My parents want me to stay close but they said if I prefer that and I, and if I show that I will do better and it will be towards my benefit to go farther to get the major I want to get majored in then they will support me."

TFCTA and ACA students are concerned about the cost of college. "My main thing is financial aid. Last year when I was a junior and my main goal is just apply, apply, apply for scholarships, internships, so I can get some money to pay for my tuition and for my books. So my main thing is just apply, don't, don't lose the deadline. You want to beat the deadline." Another TFCTA scholar said, "I want to learn about financial aid and

how much will I get and will I still have to pay a certain amount. Will financial aid affect

if I can go there. Can I go to the kind that I want?"

The principal at TFCTA credits the CFES partnership with the school's ability to

find resources for its students:

> These opportunities—because of our connections with CFES—I mean if
> you look up at the walls—we are displaying some incredible things. . . the
> amount of scholarships that our children are getting. I mean it's only
> between eighty and one hundred children graduating and they're getting
> ridiculous amounts. The scholarships were four million dollars last year.
> That's because of the connections with the universities that take a special
> look at our children. At least [$200,000] and a full ride to [university] is
> two forty—it's actually two forty four. I mean these numbers are absurd.
> Who could afford these kinds of things? So our children are getting these
> opportunities and experiences. I credit CFES as the core.

Despite these efforts, students whose parents came to the country illegally face

more difficult challenges in finding funding for college, particularly where state laws

restrict undocumented students from receiving public funds. A TFCTA team member

stated, "So the two students that I am working with this year are both undocumented

students and it's heartbreaking." Often, the only option for these students is to find a

private school that will provide scholarships in the form of tuition discounting.

Mentoring. TFCTA and ACA have taken somewhat different approaches to

mentoring.

TFCTA scholars are provided with peer mentoring relationships with college

students. SocialGo, a social networking tool that can be controlled by an administrator, is

used to facilitate the exchanges between TFCTA and college students. This service is

available to students at school and at home, if the student has Internet service. Teachers at

TFCTA also serve as mentors to the scholars. One teacher interviewed by the team

reported that she mentored all the students in the college application process. Teachers

209

also take the scholars on field trips to places such as local restaurants and nature areas. It is expected that these activities help students to establish trustworthy relationships with adults. However, they do require teachers to work extra hours, possibly without pay. This is another example of overburdening teachers with non-teaching work that could lead committed teachers to burn out.

At ACA, peer mentoring is tied to the leadership class. At the beginning of the year, there is a mentor training process that includes role playing, a PowerPoint presentation on the importance of being a mentor, training in active listening, and other skills to support the mentoring relationship. The training ends with an induction ceremony in which mentors are matched with their mentees and given a plant to symbolize the relationship they are to nurture. There was no data that suggested continued follow-up training is included. However, team leaders check in with mentors regularly to see what experiences they are having with their mentees and whether or not they can provide support to their mentees. One team leader shared the following: "They'll have to check in, you know. We discuss, you know, if there's been any, um, positive outcomes based upon your relationship. Are you having any troubles?" The data provides no examples where teams of mentors and their leaders meet regularly in sessions where participants can learn from each other's experiences.

Technology is also being used to create supportive networks for CFES scholars and to extend relationships outside of school. Mentors and scholars talk about using Facebook and email to keep in touch, share information, and provide support as illustrated by this comment:

> She [a mentee] messages me on Facebook. Anytime she can get a hold of
> me—she can. And, I'm like that not only with my mentees but anybody in

210

the program. We are trying to expand the program. I wrote my Facebook information, my e-mail and my phone number on the board. 'If you have any questions, feel free to contact me. If I don't know how to help you, then somebody along my grade will help because we've gone through what you will.'

In the case of TFCTA, SocialGo was used to enable relationships between CFES scholars and college mentors.

Leadership through service. CFES scholars at TFCTA and ACA are active in community service. ACA students are required to complete fifty hours during the school year through efforts such as serving in soup kitchens, raising money for disaster relief, helping to find a cure for autism, and helping to combat diseases such as breast cancer and leukemia. TFTCA and ACA students also participate in the park cleanup program. Additionally, they have days of silence to support Lesbian Gay Bisexual Transgender (LGBT) rights.

The program director says this about the service program:

> The kids just do so much. They do so much in terms of community service work, fundraising, they run activities. They do the marches. Many of the kids...much of this is generated by the kids, led by the kids and planned by the kids. They'll say, 'we want to do something for Japan.' I'll use that as an example. I'll say, 'What do you want to do?' The kids come up with ideas and they plan it. The same thing down on this end. . . they will plan different activities. 'We want to do a march. We want to do a fundraiser. We want to do a cake sale.' They come up with the ideas. The staff who work with them know to let the kids run with it. They'll come back and check, but they're [the students] the ones who organize and do it.

In addition to community service, TFCTA and ACA, like Remus scholars, participate in CFES leadership summits. A TFCTA scholar told the interviewers:

> The education summit, leadership summits, we go to, we go to downtown and then there's other schools there – middle schools, they have a high school, and I think they have one elementary school that was new. And basically they, they, we make a poster of how we have CFES in our school and how they have theirs and then a poster board and then we was like

211

going around sharing ideas of how we can, like, share our ideas in our school and then they take some ideas and we talk about which ideas we like the most and we bring them back to our school and try to improve our CFES group. . .

Those interviewed felt that these activities help students to develop an ethic of service and the qualities and skills of leadership. However, there was no discussion about goal setting and how the development of an ethic of service or the qualities and skills of leadership occurred. There was no data to support the beliefs of those interviewed. In addition, there was no discussion of how they approached the translation of community service activities into ethics of service and the qualities and skills of leadership for the students.

District-accountable School Summary

CFES provides opportunities and financial support for Metropolis school students to engage in its three core practices. The schools identified students who showed motivation and were doing better than average academically to engage in their pathways to college, mentoring, and leadership opportunities. These included college visits, college days, mentoring, tutoring, and community service projects, and leadership activities. As reflected in the examples provided in the school-by-school summaries, the students who were interviewed (very few individually and most in focus groups) showed a positive attitude toward their involvement in CFES. They believed the program made it possible for them to experience college. Students and teachers who were interviewed saw the mentoring aspect of CFES as particularly positive insofar as encouraging students to persevere in school and go to college. Those interviewed also believed that the leadership aspect helped them to develop networks and the qualities and skills of leaders. On the other hand, college enrollment, persistence, and graduation by CFES students in the four

212

schools were not tracked. There was little data on initial and on-going training to support adults and students engaged in mentoring roles.

Many community service activities were described. However, there was very little information provided for what teaching and learning activities were used to translate community service experiences into development of the ethics of service and the qualities and skills of leadership in students. It appears that the focus is on the variety of community service activities rather than these values. Criteria by which program leaders measured the development of an ethic of service or the development of leadership characteristics in students were not identified.

CFES scholars who were interviewed reported that developed a sense of confidence through mentoring and leadership activities. As they reflected on their experiences, they talked about their desire to give back to the community. They also talked about concrete skills they had learned such as how to dress properly and communicate effectively with college representatives and at leadership summits.

Overcoming barriers. The CFES intervention has attempted to ease concerns about the cost of college for students from low-income families by providing families with information about available financial aid and helping connect students to it. However, although Metropolis students live in a state that offers more generous financial aid than many other states, students still find themselves coming up short in terms of paying for college, especially at more selective schools. CFES has been an important program for students in terms of helping them find resources such as scholarships. However, the plight of undocumented students remains a difficult one in terms of finding funding for college.

Metropolis students are generally the first in their family to go to college. They and their families express concern as to whether the time and effort they spend in going to college will translate into a career. The CFES scholars interviewed all attend themed Metropolis high schools (engineering, math and science, teaching, interdisciplinary college preparatory[69]). Themed schools have the potential of facilitating successful postsecondary trajectories by providing meaningful learning experiences connected to college majors and opportunities to begin to form networks. At the same time, the expectation that the students have entered a career pipeline at three of the schools leads to an additional concern: it limits the students' choices. This leads to the question of whether or not students are able to make life decisions, such as career path, at the age of fourteen.

There is lack of data on college majors and college success for students who attend themed high schools versus schools that provide a more general liberal arts curriculum. This precludes drawing any conclusions about how supportive and constructive declaring a major in high school is in terms of leading to a career.

Parent and family engagement is a major barrier in college going. Also, school administration seemed to ignore the possibility of parent engagement through input into building a college-going culture at school, evaluation of how schools were executing their plans, and assessment of how effective programming was. There is no evidence of parent engagement in any aspect of the program development or implementation process. Parents were merely allowed to participate in certain programs.

---

[69] College preparatory is typically not what would be called a theme, but the school self-identifies as a themed high school.

Cross-case Analysis: Academic Capital Formation Framework

I use the eight core constructs of Academic Capital Formation (ACF) to frame the

cross-case analysis and to respond to the research question. These constructs organize

thinking around how social support interventions can complement academic preparation

in terms of preparing students to go to college. They are abstracted from St John and

Milazzo-Bigelow (2011) and St. John, Hu, and Fisher (2011) and were outlined in

Chapter II. I restate them here for the benefit of the reader:

- *Concerns about college costs*, a social process of weighing the costs and benefits of educational choices, a central concept in human capital theory

- *Concerns about careers*, a concept derived from human capital research on economic returns of career choices

- *Supportive networks*, adapting the broader concept of networks from social capital theory to focus on the ways interventions like CFES provide support to students

- *Trustworthy information*, a focused approach to considering the ways prospective first-generation college students come to understand college as a realistic personal choice, a construct derived from the broader concept of information in social capital theory

- *Educational transitions*, the social process of social capital can either reproduce social class or enable uplift, a critical departure from the deficit emphasis in cultural theories of social reproduction (changing the habitual patterns of the family)

- *Navigational skills* to maneuver within and across educational transitions, a concept derived from reconstructing the "mutual obligation"[70] concept of social capital to focus on the social agencies of students who break through educational barriers

---

[70] Social capital is used here to describe a "network ties of goodwill, mutual support, shared language, shared norms, social trust, and a sense of mutual obligation that people can derive value from" (Huysman & Wulf 2004).
[70] Mutual obligation refers to the concept of reciprocity. Reciprocity is an important characteristic of a network.

- *Family habitual patterns*, a concept that adapts the concept of habitus from social reproduction theory to provide a lens for examining family influence on educational attainment

- *College knowledge*, a concept of learning the knowledge and skills needed for navigation of college and attainment of a degree, a concept derived from the reconstruction of the cultural theory of reproduction of social class (p.5)

Interventions and Social Processes Integral to Academic Capital Formation

Constructs from the theory of Academic Capital Formation will be used to discuss the effects of social support interventions on the development of the social attributes and processes that are integral to higher education attainment for low-income, first generation, minority urban students.

Concerns about costs. According to those interviewed, efforts were underway in the schools to assist students in finding financial resources to pay for college.

Alpha assists its students in researching college scholarships and encourages students interested in pursuing careers in service to participate in a pre-first-year internship. Beta teachers and the college counselor described the multiple pathways to scholarships that its network of partnerships and other associations had enabled. Kappa and Sigma also assist students in researching scholarships. Remus, Beta, Kappa, and Sigma students are provided with opportunities to take complete college courses while still in high school, which has the potential for considerable savings in college costs. Those interviewed believed that the implementation of CFES at the four Metropolis schools helped scholars prepare for college as they learned about things like financial aid, the college choice process, and college admissions.

Despite social support interventions and academic preparation, cost remains a significant barrier to college going for low-income students attending the eight schools.

216

Despite generous state aid packages and scholarships offered by target institutions, many students cannot afford to go to their schools of choice. This group includes students with the highest grades and test scores. In fact, many end up at community colleges, state systems, and other less selective colleges. Further, some may not go to college at all. This dynamic reinforces systemic inequality of opportunity to compete in the economy between the poor and those with greater financial advantages.

Concerns about careers. In addition to addressing concerns about costs, those interviewed described efforts to connect students to college majors and career pipelines. One way in which this connection occurs is through career-related themes associated with schools or subunits (academies or houses) within schools and the curricula and internships they provide. However, this begs the question as to whether or not most fourteen-year-olds can realistically be expected to choose a major that early, as some of these schools require.

Supportive networks. The interviews revealed that the eight schools were involved in creating and developing networks to support their students. Alpha's network includes community partnerships with law firms and religious organizations. Beta's teacher-advisor model provided one-on-one support for students. Its early-college network includes several colleges and a university. For CFES students in the Metropolis schools, the mentoring that occurs between adult staff and students is often identified as a key to the success of the program. For example, the CFES scholars who were interviewed typically mentioned that they made improvements in their outlook, effort, and GPA as a result of mentoring. Teachers and peer mentors who were interviewed believe that they support students in their efforts to achieve through constant follow up. College visits help

students develop college knowledge and networks on campuses. Of particular note is the fact that students from TFCTA and ACA benefit from a partnership with an airline that enables them to make connections with admissions offices at two university campuses. This relationship is especially beneficial to students because that particular university has shown a willingness to consider CFES membership in making admission decisions. This is an example of something that the other schools, particularly those with budget problems, might use.

Trustworthy information. The social support interventions present in the eight schools supported the development of college-going cultures and supportive networks and relationships for first-generation students. In these environments, students can begin to rely on the information they receive, for example, about colleges, college majors, and paying for college. They also develop an understanding of the grades they need to earn, the test scores they need to receive, and the kinds of activities in which they need to engage (e.g., sports, community service, and other extracurricular activities) in order to demonstrate to colleges that they possess an ethic of service and qualities of leadership. The charter school students were not interviewed, and these conclusions were drawn based on the accounts provided by the adults interviewed. CFES scholars who were interviewed in the four Metropolis schools exhibit college knowledge and are reflective about what college requires and what their own preparation needs to be. In this example, a student stated:

> I know that colleges look at everything, your extracurricular activities, your school. What I'd like to, boost my grades up a little bit more even though I do like sports and everything, I'd still like to get my grades up high so that might be the extra couple of points colleges look at to say they'll have me rather than somebody who has two points less than me.

218

Parental involvement in college trips and other activities can be valuable in providing information that parents see as trustworthy. This information has the potential to affect shifts in educational expectations that first-generation parents have for their children.

Educational transitions. It is not possible to discuss the impact of the social intervention of the eight schools on habitual patterns of families as a) none of the eight schools track their graduates' college-going patterns or the effect of college on parents, b) no parents were interviewed, and c) no students who transferred out of the schools are included in the attrition rates.

Navigational skills. Mentorship and social networks helped students and their families to develop knowledge and skills needed to make successful transitions from high school to college. For example, all of the schools except Kappa supported families through activities such as FAFSA assistance. At least four of the schools, Alpha, Beta, Sigma, and TFCTA, employed college counselors. Sigma supported undocumented families and helped students develop pathways to college despite a non-supportive public policy environment. CFES acted as a liaison between high school and college admissions departments for students.

Family habitual patterns. The sociological concept of *habitus* described by Bourdieu (1990 in St. John, Hu, & Fisher, 2011) focuses on a "tacit, replicating, internal patterning system that predetermines strategy" (p. 71). In other words, behaviors may occur as a result of culturally transmitted habit rather than intention. The majority of students attending the eight case schools are the children of working-class families in which high educational attainment, including college, has not been the norm. This

situation contributes to why many of these families are low-income. Those interviewed believe that the social interventions provided by the schools, in collaboration with partners, supported high aspirations and changed behaviors in ways that supported college going. If the students do make successful transitions to college and persist to graduation and into a career, this can have the net effect of supporting uplift across generations within an extended family rather than replicating the old patterns of low education attainment and poverty (St. John, Hu, & Fisher, 2010). However, as stated above, in the absence of student follow-up data and parent interview data, these beliefs cannot be substantiated for the eight schools.

Building college knowledge. The adults and students interviewed described activities intended to build college knowledge. These include college visits, interactions with college admissions officers and recruiters, and doing research on colleges with the help of mentors. The data provided scant evidence of patterns in CFES families that support educational uplift. The greatest barriers to providing this evidence are the lack of schools' tracking of the students into college and seemingly limited communication with parents.

A Missing Link: Parent Engagement

A constraint noted in all of the schools is a lack or limitation of parental involvement in the interventions. None of the school models or the programs they had to offer supported increased parental involvement. Parents influence college choice (Hossler & Gallagher, 1987; McDonough, 2004; Smith, 2009). Low-income underrepresented minority parents want their children to succeed but believe that high school completion is a more realistic goal than college completion for their children (Smith, 2009). Schools

can become partners in providing parents with trustworthy information about the importance of college for social and economic uplift. They can also mitigate concerns about the cost of paying for it (Smith, 2009). However, there is little parent participation in the programs and in the opportunities that the schools do offer for parents to get involved. Even Sigma, which has a college counselor and parent program coordinator on staff, engages with parents at a social level but not in terms of college going. Parents are also not given the opportunity to give input into what the schools might do or how they might do it, nor do schools include them in providing input into research that gives the opportunity to participate in the evaluation of the effectiveness of programs that the school offers to students. The lack of any input on the part of the parents in the evaluation is a major issue.
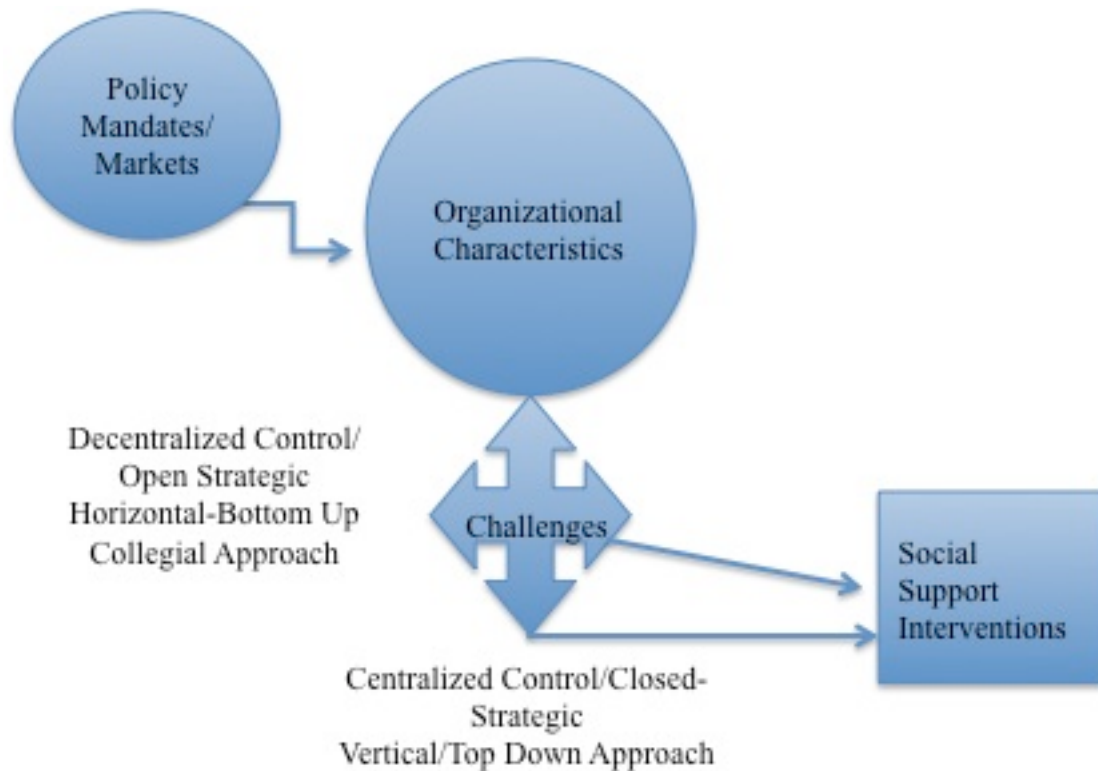
Response to Question 3: Sub-question

Social support interventions are provided in the eight schools to complement the college preparatory curriculum. These interventions are geared toward helping students overcome challenges and habitual patterns of low achievement through academic capital formation. Therefore, it is important to get a sense of how well the interventions are serving this goal. In the absence of data, the efficiency and effectiveness of the social support interventions cannot be determined.

The sub-question for Research Question 3 asks how the organizational characteristics of the eight schools impact their ability to offer programs that support academic capital formation. In Chapter V, the researcher observed that while the district schools operated in closed strategic environments and were unable to lead strategic initiatives relative to changing the mathematics curriculum, they were able to participate

in finding solutions that supported state and district initiatives, such as capacity building for advance mathematics through partnerships. The researcher also found that the Metropolis schools had the freedom to engage in capacity building to provide a social intervention that supports college and career themes. The partnership with CFES is a prime example. It is interesting that even though the district tightly controls the technical work of the Metropolis schools and, for example, the schools were handed a math curriculum, the Metropolis schools were able to select the CFES program. This was not a prescribed program. I believe the reason there is freedom to choose in one situation and not another is because on the one hand, mathematics outcomes are tied to AYP and the reward and punish system imposed by NCLB. On the other hand, there is no policy lever related to college going rates.

Figure 4 is provided to remind the reader of the influence of organizational characteristics on the strategic orientation toward school change geared toward providing social support interventions for students. The horizontal arrow represents school-level adaptation and the vertical arrow represents a centralized-top down orientation to meeting challenges.

Figure 4 Conceptual Model: Adaptation to Provide Social Support Interventions

Social support interventions are provided in the eight schools to complement the college preparatory curriculum. These interventions are geared toward helping students overcome challenges and habitual patterns of low achievement through academic capital formation. Therefore, it is important to get a sense of how well the interventions are serving this goal. In the absence of data, the efficiency and effectiveness of the social support interventions cannot be determined.

The sub-question for Research Question 3 asks how the governance and management structures of the eight schools impact their ability to offer programs that support academic capital formation. In Chapter V, the researcher observed that while the district schools operated in closed strategic environments and were unable to lead

strategic initiatives relative to changing the mathematics curriculum, they were able to participate in finding solutions that supported state and district initiatives such as capacity building for advanced mathematics through partnerships. I also found that the Metropolis schools had the freedom to engage in capacity building to provide a social intervention that supports college and career themes. The partnership with CFES is a prime example. It is interesting that even though the district tightly controls the technical work of the Metropolis schools and, for example, the schools were handed a math curriculum, the Metropolis schools were able to select the CFES program. This was not a prescribed program. I believe the reason there is freedom to choose in one situation and not another is because, on the one hand, mathematics outcomes are tied to AYP and the reward and punishment system imposed by NCLB. On the other hand, there is no policy lever related to college-going rates.

A comparison of the charter schools with the district-accountable schools revealed that despite their freedom and flexibility, charter schools do not always use those assets. Both the charter schools and the district-accountable schools leveraged partnerships to provide their students with opportunities and services. However, other than Beta and Sigma, whose early college models provided opportunities to accelerate learning and create linkages between the high schools and their partner colleges, the interview participants did not provide data explaining how they leveraged their freedom and flexibility to seek additional sources of funding or programs. The district schools appear to have done more capacity building for providing social support intervention by partnering with CFES.

224

Despite the reported successes of the CFES program, there are challenges. For example, funding is limited, which restricts the activities of the program and college visits in particular. Funding also limits the number of students the intervention can reach and limits the program to niches of borderline students. Scheduling is another challenge. Although the staff supports the overall goals of the program, they have some difficulty with taking students out of academic classes to go on college visits. When the activities are planned after school or on weekends, they may conflict with sports, service activities, or tutoring sessions. They may also pose transportation issues. The opt-out option is yet another challenge that puts CFES benefits out of reach for some students. Finally, the necessity to contribute to the family income through contributions such as employment or caring for siblings while parents work makes going away to college difficult for some students. The data did not specifically reveal how the program deals with these challenges.

In addition to capacity building, teachers and other adults interviewed in the eight schools believed they provided supportive networks and trustworthy sources for first-generation students who may come from chaotic homes. Because Beta is a charter school and its teachers are not protected by union contracts, the school administration developed a rather extreme social support system based on an *in loco parentis* model for students. However, this model, which requires teachers to be available by cell phone 24/7 and provide social services in addition to teaching all day, all for no additional compensation, could lead to burnout. In fact, the school does report high teacher turnover. There is also no evidence that training is provided for teachers who assume advisory roles.

Kappa's tight system of managerial control restricts participation in decision making about social support initiatives to the EMO and the Board. They have decided that the Amistad system is adequate. Upper-level administrators, one of whom is a former police officer, enforce this system. Otherwise, Kappa encourages its students to develop college and career knowledge by participating in college visits, engaging with the Corporate Sponsored Curriculum (CSP), and consulting with business advisory board members. The management company had plans to develop a technology center for parents but had no plans to strengthen parental participation.

Additional Findings: Chapter VI

This chapter focused on comparing capacity building for social support interventions in the eight schools. However, the analysis of the data revealed additional findings.

Lack of Follow-up Data

No data was available as to how many students do go to college or how many of them complete college. In the absence of this data, the efficiency and effectiveness in the eight schools cannot be determined.

Social support interventions in the eight schools are believed by those interviewed to have created supportive networks and raised community norms. This included changing typical patterns of behavior by raising educational aspirations for low-income, first-generation underrepresented minority students. They also believed that these interventions enabled students to access resources and promoted high academic achievement by helping students stay on track. For example, students were able to study in safe environments. They were provided with mentoring and tutoring, both as a result of

programs enabled by partnerships and relationships with teachers and other caring adults or peer mentors in the schools. In some cases, counselors and teachers followed up with students who were falling behind or who had family problems. College experiences helped students to develop knowledge about the grades needed to get admitted to college and obtain college scholarships. A multitude of community service projects was described that provided opportunities for students to develop a civic participation ethic. However, very little was offered in the way of providing a cohesive training program to help students translate their community service activities into leadership skills. None of the schools reported having school psychologists or remedial specialists on staff to help students with social and psychological problems or with academic gaps. Three of the charter schools and only one of the district-accountable schools reported having college counselors. Remus had counselors on staff, but the research team was not told whether the counselor was a typical guidance counselor or a college counselor.

There was little training available to students and faculty to provide mentoring and leadership development. Also, there was no cohesive training and follow-up program for students and faculty to develop mentoring skills. The training that is offered appeared to be very short-term.

The eight core constructs of Academic Capital Formation (ACF) were meaningful in organizing the thinking around how social support interventions can complement academic preparation in terms of preparing students to go to college. However, the data from this multi-case study suggests that another construct needs to be added to the thinking and the analysis. That is, parent engagement. Parental engagement clearly plays a significant role in ACF as a stand-alone construct, but it also influences across all the

other constructs. This case study suggests that all eight schools have recognized that the lack of parental engagement influences is problematic and influences the eight constructs of ACF. However, most of the attempts to deal with it have been insufficient and ineffective. It is this researcher's belief that unless ways are found and implemented to gain parental engagement, only meager results will be found in ACF and CFES. Above all, no research on parental engagement can be meaningful or effective without parent input into what to do, how to do it, and the data used to evaluate programs.

CHAPTER VII. CONCLUSIONS

We really are in a massive effort to stop the cycle of generational poverty. We've had
some wonderful successes and great challenges.
Beta Principal

I began this dissertation with background information on the policy landscape and

the challenges it created for urban education today. In particular, I focused on capacity

building for mathematics education in urban schools and the challenges of closing

achievement gaps, particularly in the face of non-cognitive barriers to learning related to

issues such as poverty. I described urban school reform models that have developed and

been tested over the last few decades.

One of the challenges for the study was to explore the complexity of

organizational characteristics of those reform models and to determine how the interplay

of those characteristics resulted in an open or closed strategic environment. This

orientation toward goal setting, decision-making, and communication affected the ways

in which schools (a) adapted to challenges driven by changes in the policy landscape,

including higher graduation requirements, and (b) determined who had a voice in

designing reform initiatives. My goal was to apply what I learned to a study of math

education reform and social support interventions in the eight schools. My exploration

revealed that there were multiple characteristics involved including centralized or

decentralized governance structures, management type, and internal administration at play.

Centralized or Decentralized Management of Change: It's Not Just About Governance

One of the surprises for me as I analyzed the data in this study was that it demonstrated how a closed strategic orientation with centralized control over goal setting, decision-making, and communication could be achieved even where governance of a school was decentralized. Studies on charter schools (like Lubienski, 2003) discuss how charters are supposed to be able to find more freedom to innovate at the school level because they have been freed from districts typically characterized as bureaucratic, hierarchical, and centrally controlled. However, internal administrative structures exert centralized control. The management companies hired by charter boards and school districts to run charter schools can and do exercise tight control over the technical work of schools and impose strict corporate-like vertical hierarchies through which to manage and communicate change. Kappa was the clearest example of this orientation of the eight schools studied.

Corporate Model School

Kappa is unique among the eight schools in that it is a corporate, for-profit model school. The data in the study indicated that the Kappa top administrators felt this model supported greater technical efficiency. Kappa is accountable to its charter school board for meeting the terms of the charter agreement, but a management company directs its day-to-day operations. The relationships between management, specifically the very entrepreneurial CEO, and those who do the technical work of the school, are very tightly

coupled. Management is top down and everyone reports to the CEO, with even professional learning activities being internally driven. For example, the subject-area chairs, curriculum coordinator, and principal direct the activities for the professional learning communities. The principal is the local expert in the project-based learning curriculum modules provided by the manufacturer. All report to the CEO. Although professional learning communities are intended to support social and human capital formation, the culture does not support this. The department chairs at Kappa function like middle management. Teachers are treated like worker bees rather than peer professionals and have little agency. For example, they are given one-year contracts and the school sets its own pay schedule. There are no unions, no tenure, and no job security. It is unclear how teachers are evaluated. I cannot draw conclusions about teacher satisfaction or morale at the school. The team was only given one opportunity to interview a teacher (who was not a department chair). She and a non-managerial level staff member declined to be tape-recorded. We did not experience this at any other school. What we were able to learn is that there is higher teacher turnover at Kappa and many of the teachers are inexperienced teachers right out of college. The turnover rate might constrain efforts to develop true learning communities where knowledge is shared.

While Kappa's management is tightly coupled to the technical work of schools, the relationships between Kappa and its partners are loosely coupled. In Chapter V, I discussed the dual enrollment process for the school. Kappa teachers are hired as adjuncts by the partner college. However, the mathematics courses are not taught over one semester as they would be or probably be in college. They are also *watered down*. I

cannot infer a relationship, but Kappa students do very poorly on the high school

mathematics test and the math portion of the ACT test (Table 19).

Table 19 Comparison State ACT Scores With Kappa ACT Math Scores

Year	ACT Math Score	% College Ready	Year	State Test (11th grade)	% Proficiency
2012	16.3	5%	2010-2011	Proficient	5%
2011	16.2	7.2%	2009-2010	or Above	5%
2010	16.2	5.4%	2008-2009		5%
2009	16.3	2.7%	2010-2011	Partially	24.3%
			2009-2010	Proficient	31.2 %
			2008-2009		36.6%

Despite these findings, for 2009-2010, 82.81% or 53 out of 64 of Kappa graduates

enrolled in college. It is suspect that students at these levels of proficiency could possibly

be accepted in college, let alone complete college. My assumption is that they are taking

advantage of open enrollment at community colleges and non-selective four-year

institutions.

Unfortunately, since states vary in what they publish on their department of

education websites, exact comparison tables were not available for the other seven

schools. However, Kappa students did worse in mathematics than the state average. In

addition, the data collected into Table 19 shows that Kappa students demonstrated lower

proficiency than the other charter schools, particularly Beta. Beta was the school studied

with the most decentralized environment and the most open strategic orientation.

Certainly, no inferences can be made, but perhaps this could mean that having teachers

participate in curriculum design for their students is a good idea.

The four Metropolis schools also provided examples of corporate-like highly centralized hierarchical control over the technical work of schools and a closed strategic environment. Metropolis offers a very complete web site for their department of education where data is readily accessible. Table 20 contains information found in Metropolis school report card data. It reveals that students are passing state tests in mathematics. However, the percentage of students deemed college ready based on their state test and ACT scores and who actually enroll in college is low, even for ACA and TFCTA, the schools given B and A ratings (respectively) by the state. The importance of this data is that it demonstrates the ineffectiveness of the four Metropolis schools in meeting college readiness and access goals articulated in NCLB and in the Small Schools Initiative.

Table 20 College Readiness Index with College Enrollment 2010-2011 Metropolis

School	College Readiness	College Enrollment
Remus	37.2%	70.1%
Onye Nkuzi	19.2%	47.1%
TFCTA	46.6%	64.3%
ACA	31.8%	57/7%

This includes enrollment in four-year colleges (selective and not selective) and in community colleges, which are not selective and have open enrollment.

Unfortunately, this type of data was not available for the charter schools, which were located in four other states.

Overall Academic Findings

Table 19 provides descriptive statistics for each of the schools. It describes school types, enrollment statistics, mathematics achievement, and graduation rates. The information was gathered from state and city department of education resources, such as web sites, and from the schools themselves. The table is not intended to set up a comparison of the eight schools, as no such comparison is possible. Although the schools enrolled similar populations in terms of race and socio-economic status, there were key differences. Notably, ACA and TFCTA had no special education students and few English Language Learners enrolled at the time of the site visits. While ACA and TFCTA appear to be the most successful in terms of graduation rates and test scores, the fact that special education students were not included should be considered when comparing school outcomes. Kappa, which does enroll special education students, has struggled to meet the needs of that population and this has affected their outcomes.

It is important to note here that the graduation rates listed in the table are calculated based on the requirements of the federal NCLB law (2002). The rate is based on the trajectory of cohorts of students who enroll in the ninth grade in a given year. It calculated the number of students from that cohort who graduate within four, or in some cases, up to six years. Students who continue to enroll but transfer from school to school are considered transfers and not drop outs.

Table 21 The Eight Case Schools By Type, Enrollment, Mathematics Achievement, and Graduation Rates

School	Type	Enrollment-09/10	Mathematics Achievement	Completion 09/10
ACA	Small themed high school (college prep-motivating kids for higher education) within large comprehensive high school (Educational Campus A)	506 students; 1% American Indian or Alaska Native; 41% Black or African American 91% were enrolled at ACA previous school year 64% free lunch; 11% reduced-price lunch 3% limited English 71-80% of families received public assistance No special education students	**2010/2011** 268 students 90.6 Peer School 90.1 City **2009/2010** 119.6% Peer School 113.2% City 196 students	4-year graduation rate for ACA was 91.8%; (state average 4-year graduate rate was 80%, 6-year graduation rate for the state was 89.9%) 84.8% of 1st year students earning 10+ credits 90% attendance
Onye Nkuzi	Small themed (teaching) public high school	616 students; 1% American Indian or Alaska Native; 36% Black or African American; 58% Hispanic or Latino; 3% Asian or Native Hawaiian/Other Pacific Islander; 2% White; 0% Multiracial 72% eligible for free lunch; 4% for reduced lunch 29% were enrolled at RRG during previous school year 6% Limited English Proficient 71-80% families receive public assistance	**2010/2011** **225 students** 81.7% Peer School 85.2% City 4.13/5 points **2009/2010** 306 Students 103.5% Peer School 91.6% City	4-year graduation rate=67.6% 6-year graduation rate=64.8% % 1st year students earning 10+ credits=68.6% (2011-74.4%) 88.4% Attendance Rate

School	Type	Enrollment-09/10	Mathematics Achievement	Completion 09/10
TFCTA	Small themed high school (math and science) within large comprehensive high school (Educational Campus A)	486 Students; 1% American Indian or Alaska Native; 40% Black or African American; 47% Hispanic or Latino; 7% Asian or Native Hawaiian/Other Pacific Islander; 6% White; 0% Multiracial 95% of students were enrolled in CIMS during the previous school year 71-80% students from families receiving public assistance No special education students	**2010-2011** 259 students 100% Peer 100% City 5/5 points **2009/2010** 265 Students 115.7% Peer 104.2% City	4-year graduation rate of 75.8% 6-year graduation rate of 90.8% 91% of 1st year students earning 10+ credits =91.0% 91.8% attendance
Remus	Campus High School (SWS Model-large comprehensive high school comprises special houses/academies-screened entrance)	1478 Total Students; 0% American Indian or Alaska Native; 34% Black or African American; 62% Hispanic or Latino; 3% Asian/Native Hawaiian/Other Pacific Islander; 0% White; 0% Multiracial 75% Eligible for free lunch; 0% for reduced lunch 3% Limited English Proficient 99% were enrolled at Remus the previous year 71-80% students families receiving public assistance	**Mathematics 2010/2011** 551 students 71.2% 72.8% **2009/2010** 684 students 85.5% Peer School 82.6% City	4-year graduation rate of 77.4% 6-year graduation of 76.9% 85.7% of 1st year students earning 10 credits 89.4% attendance

School	Type	Enrollment-09/10	Mathematics Achievement	Completion 09/10
Alpha	Charter School Law theme Open enrollment	100% African American 77% Economically Disadvantaged 300-325 Students	**Math Proficient or Above State Test** 2010-2011: 75% 2009-2010: 71%	2010-2011 Graduation rate-89% Attendance-89%%
Beta	Charter School- Early college high school model	2010-2011 76.5% African American, 2.8% Hispanic, 5.7% Mixed, 12.1% White, Non-Hispanic Economically Disadvantaged 78.4% 390 students 2009-2010 78.4% African American, 5.4% Multi-Racial, 11.6% White, Non-Hispanic Economically Disadvantaged 67% 366 students	**Mathematics Proficient or Above First offered in spring of sophomore year** 2010-2011 10th grade=100% 11th grade=100% 2009-2010 10th grade=100% 11th grade=100%	2010-2011 4-yr Graduation Rate 71.4% 5-yr. Graduation Rate 86.1% Attendance Rate 96.8% 2009-2010 Graduation Rate 85.7 % Attendance Rate 96.4 % 2008-2009 Graduation Rate 86.4% Attendance Rate
Kappa	Charter School- High School Academy	Total High school (2011) 495 Total seniors 87 **2012 ACT Math 16.3-5% College Ready 2011 ACT Math 16.2-7.2% College Ready 2010 ACT Math 16.2-5.4% College Ready 2009 ACT Math 16.3 -2.7% College Ready**	**Mathematics State Test (11th grade)-111 students Proficient or Above** 2010-2011 5% 2009-2010 5% 2008-2009 5% **Partially Proficient** 2010-2011 24.3% 2009-2010 31.2 % 2008-2009 36.6% **NOT PROFICIENT**	**Graduation Rate** 2011-2012-92.0% 2010-2011-91.5%

School	Type	Enrollment-09/10	Mathematics Achievement	Completion 09/10
			2010-2011 72.1% 2009-2010 67.7% 2008-2009 60.6% **ACT Composite** 2012-16.3 1% college ready	
Sigma	Early college high school	2010-2011 252 students 84% free and reduced lunch 1 American Indian/Alaskan, 4 Asian Pacific Islander, 28 African American, 197 Hispanic, 17 White, 5 Two or More Races 2009-2010 243 students 90% minority 89% economically disadvantaged	**Mathematics State Test (Grade 10) Proficient or Above** 2011-2012 56% 2010-2011 76% 2009-2010 59% 2008-2009 79%	**Graduation Rate** 2011-2012 91.3% 2010-2011 95% 2009-2010 89% **Attendance Rate** 2011-2012 95.1%

Additional Findings

On analyzing the data to respond to the three research questions, other issues of relevance of a cross-question nature need to be reported. The issues and conclusions drawn from these issues are as follows:

Tracking and Student Selection

In Chapter One, I discussed the historical trend of tracking students into college preparatory versus vocational, business, and general programs based on standardized tests, past performance, educational aspirations, and career focus. Tracking, along with institutional resources (many urban schools lack the resources to offer advanced mathematics), determined who would take advanced mathematics and other college preparatory courses in urban high schools. This study revealed that tracking continues to play a role in urban education. Only the process has changed. Historically, tracking systems were managed by school guidance counseling offices. Today, as within the eight schools, tracking occurs both within schools and, more broadly, within districts.

In Metropolis, for example, the public school concept of open enrollment does not mean that students can enroll in any particular program track or school. It means only that every student will be offered a seat in a public school. Within the Metropolis district, middle school testing, attendance rates, auditions and portfolios, and the ability to jump through application hoops are transparent determinants of a screening process for student placement. Remus screens the students entering its engineering academy based on attendance and seventh grade test scores in mathematics and English Language Arts. Of the Metropolis schools, Remus' engineering academy is the most screened and Onye

239

Nkuzi, the least screened. All sought to select students with high potential to succeed in a career or college related curricular area. This allows schools to select a population of students they believe will best stand to benefit from their thematic and/or college preparatory programs under the guise of open enrollment.

Lotteries now play a major role in facilitating the tracking process in Metropolis, and to a lesser extent in the charter school districts, as well. Unfortunately, the lottery system may serve to further marginalize groups of students. Students who were not well served by their elementary and middle school experience may not perform well enough on standardized tests to be accepted into even a screened school. Some students may be excluded due to attendance issues that occurred due to issues related to poverty including family mobility, domestic violence, transportation problems, and homelessness. Conditions such as homelessness, language barriers for English Language Learners, and lack of technology access can create communication gaps so that some students and their families are cut off from enrollment information. They may also be excluded from receiving notices about informational meetings, which provide an opportunity for the schools to communicate expectations to the parents. Two of the Metropolis schools, ACA and TFCTA, for example, required attendance at an informational meeting for students to be considered for admission. Students who do not apply for or who are not accepted to a particular Metropolis school of choice are lumped into the education option category. There is still an opportunity for them to be picked up by a higher performing school. However, many are not so fortunate. Many are enrolled in failing schools and are moved into education options in other schools once their schools have closed. This was particularly evident at Remus and Onye Nkuzi, which ultimately developed liberal arts

academies to absorb education option students who either did not qualify to participate in or were disinterested in their themes.

All of the schools require application materials be submitted. The charter schools in particular relied on this process to manipulate the student selection process. For example, Sigma requires that the students write an admissions essay. Sigma serves a part of the state demographically rich with ELL students. There are also many students in the district who have attended under-resourced urban elementary and middle schools. Interview data reveals that this essay is a deterrent for many students who might otherwise apply to Sigma. This is due to the fact that many potential applicants speak English as a second language and have parents who are also English Language Learners.

Post application, students who score below grade level on entrance exams may be encouraged directly or indirectly to look elsewhere. This was particularly evident at Kappa where freshmen applicants with severely limited math skills were offered enrollment in lower grades than the ones they last completed. Alpha and Kappa interview data revealed that post enrollment, students who continue to perform below grade level or find either the curriculum or disciplinary policies too challenging are encouraged to self-select for transfer.

Basic Math

Basic math remains a complex and unresolved issue for the schools. Notably, the majority of the students admitted to the eight schools were several grades behind in mathematics. Remus students, who tested into the engineering academy based on middle school math test scores, and ACA and TFCTA students were not on grade level. However,

they were generally further ahead in mathematics attainment than the students in the six other schools.

The problem of limited math skills posed significant challenges given the mandate for all students to achieve passing scores on high stakes state tests as well as complete Algebra II and four years of mathematics in order to graduate from high school. Students could not take basic math courses and still be prepared to take state-mandated assessments on time and graduate in four years. They had to begin with Algebra I in the ninth grade whether they were ready or not. Therefore, all of the schools except Remus removed pre-algebra from the curriculum.

The schools took different approaches to assisting students who needed to catch up. Beta addressed issues of students with limited basic math skills by using its freedom to innovate. That is, they developed an inquiry-based curriculum where students use math skills to solve real world problems. Students in the ninth and tenth grades follow this curriculum. Kappa decided to partner with a corporation and use their module-based curriculum. However, it was unclear how thoroughly the curriculum was integrated into the courses. Several of the schools, including Onye Nkuzi and even TFCTA addressed the issue of basic math skills by offering double curriculum blocks in mathematics for ninth and, sometimes, tenth graders. Unfortunately, this was at the expense of removing other parts of the traditional liberal arts curriculum, such as art, grammar, music, etc. Kappa took the approach of requiring students who applied with limited math skills to repeat middle school grades. Beta and Kappa added middle schools in order to have more control over curriculum and pedagogical practices. Available data did not show marked improvement in student outcomes as a result of these efforts. This researcher believes that

242

this issue will not be resolved or even improved upon without collaboration of those who contribute to this major issue. See recommendations for future research (p. 245).

Availability of Advanced Math

One consistent criticism of traditional high schools has been unavailability of advanced mathematics courses for students of color, either due to tracking or lack of resources to offer the courses at all. Examining the innovative models, we learn that because of budgetary constraints and the need to focus on students with basic skills, none of the schools except TFCTA consistently offer calculus to students. Pre-calculus is not consistently offered, either. This begs the question of whether even fewer students of color are being given the opportunity to study advanced mathematics in high school because of the requirement that all students must complete four years of mathematics including Algebra II.

Not offering calculus has implications for students who wish to enter STEM or other fields requiring advanced mathematics, as it means students would have to enter college with no calculus experience, and, perhaps, no pre-calculus experience. Remus' engineering academy students are among those who were not regularly offered calculus courses (some were able to take calculus for concurrent credit at the local community college) because the administration needed to focus its resources on large numbers of Remus' students (across all academies) who have basic math skills. Completing high schools with no calculus experience puts Remus' engineering academy students at a considerable disadvantage in terms of accessing and succeeding in college engineering programs. College engineering programs generally require four levels of calculus. Tyson (2011) found that high school calculus achievement is the strongest predictor of grades in

college physics and calculus courses and both sets of factors influence engineering degree attainment. Also, there is the consideration of cost. Having to complete courses not required for the degree, i.e. developmental courses or repeated courses, increases the cost of an education.

Dual enrollment. Dual enrollment was a means of capacity building for offering advanced mathematics coursework. It was an option for students at three of the four charter schools, two of which are early college schools. It was also an option for Remus students, as noted above. However, there were issues with students taking college mathematics courses for dual enrollment not placing into the next level in college placement examinations. This was particularly true at Kappa, where high school teachers who have been hired by the partner college as adjuncts teach the courses over two semesters instead of one in the high school classroom. The interview data revealed that despite dual enrollment opportunities and the availability of AP courses, students at the eight schools are placing into developmental mathematics courses in college. An Alpha mathematics teacher noted:

> Students still end up in remedial courses because, while they have grades on their report cards and courses on their transcripts, they still don't have deep knowledge. They missed out on foundational learning of basic skills and Algebra I in elementary and middle school and also didn't learn to be self motivating, independent learners. They did what they did to get by.

There were also issues with credits being transferrable to other colleges.

Academic Capital Formation (ACF)

The constructs of ACF (St. John, Hu, & Fisher, 2011) (a) concerns about costs, (b) concerns about careers, (c) supportive networks, (d) trustworthy information, (e) educational transitions, (f) navigational skills, (g) family habitual patterns, and (h)

building college knowledge provided a framework for the examining ways in which social support interventions were experienced in the eight schools.

The aspects of academic capital formation related to human capital formation, specifically, concerns about costs and careers, were important for the low-income, first generation student population attending the eight case schools. There was a tension between the students' families and the schools at times because the schools wanted the students to apply to most selective colleges for which they qualified, while families were concerned about paying for such an education. Loans were generally unwelcome, as poor families could not imagine being able to pay them back. Schools and their partners, such as CFES, provided information to students about how to apply for financial aid that did not have to be repaid.

The schools worked to help students develop college knowledge through college visits, meeting with college advisers and admissions officers, and college events at the schools. There was very little parent participation in these events.

Mentoring and advising programs were prominent in the case schools, except Kappa, which does not provide peer or adult mentoring. Alpha, Beta, and Sigma offered adult support from college counselors and teachers, while the Metropolis schools offered adult and peer mentoring programs. They were a source of information and support for students.

Parent engagement. The eight core constructs of Academic Capital Formation (ACF) were meaningful in organizing the thinking around how social support interventions can complement academic preparation in terms of preparing students to go to college. However, the data from this multi-case study suggests that another construct

245

needs to be added to the thinking and the analysis. That is, parent engagement. Parental engagement clearly plays a significant role in ACF as a stand-alone construct, but it also influences across all the other constructs. This multi-case study suggests that all of the eight schools have recognized the problems that the lack of parental engagement brings to bear on motivating students to do well in school and to prepare for college. However, most of the attempts engage parents have been insufficient and ineffective. It is this researcher's belief that unless ways are found and implemented to gain parental engagement only meager results will be found in ACF and CFES. Above all, no research on parental engagement can be meaningful or effective without parent input into what to do, how to do it, and the data used to evaluate programs.

Drop Out and Attrition

Descriptive statistics for the eight schools reveal low drop out rates. In each of the states, this is considered a marker for school success. Dropout is defined as "a student who was enrolled at any time during the school year, was not enrolled at the end of the school year and did not transfer to another school, graduate, or die" (p. 1). While the dropout rates are low, several of the schools had problems with attrition through transfer. Attrition is a challenge for Alpha, for example. At the time of the site visit, the rate was high, 50-55%. Reasons cited were the rigorous curriculum requirements, the strict disciplinary policy, and students not being engaged by the school theme. For those who remain, the graduation rate is 94.0 percent. However, the 94% does not take into account those who left. There is no way of tracking the rate of progress for these students. An estimate of value added in terms of yearly progress that included cohort students who transferred might provide a clearer picture of student learning trajectories than graduation

rates alone. It would also be useful to know whether or not students persisted to graduation after transfer.

There is a question regarding why school attrition patterns are not analyzed. Transfer can be a code for a number of things and by not thinking about the complexities involved, we may be missing critical information. If a student transfers out of a school, it may be because he or she moved out. It could also be due to homelessness or other issues affecting student success. Students may also choose to drop out of a particular school because they are unhappy with the programs the school offered, or the school was too difficult, or they decided they did not wish to pursue the career associated with the school, etc. In these cases, it would seem that they would be classified as a dropout (at the school level) rather than a transfer. This would allow the original school to have valuable data to help them evaluate the effectiveness of their programs.

Credit Recovery

Finally, until the 2012-2013 school year, Metropolis allowed an accommodation for its graduation requirements called "credit recovery." This has muddied the interpretation of the effect of interventions on outcomes at the school. The practice of credit recovery involves allowing students to do extra work to make up classes they failed. A whistle-blower at Remus contacted the Board of Education about a perceived lack of integrity in the credit recovery process. This resulted in an audit, which triggered the resignation of the principal. Ultimately, this problem led to a citywide review. A decision was taken to revamp the credit recover process. Students may now only earn three credits through credit recovery and only in situations where they attended two-thirds of the class.

Since the audit, Remus' graduation rates have suffered. The fact that credit recovery is not available at the college level could be a serious issue for students.

Overtaxing Teachers

Researchers assert that social relations and social climates are better in smaller schools and in schools within schools, as students encounter the same teachers and classmates more frequently during their high school years. These repeated interactions give students opportunities to develop positive relationships that support student engagement and motivation (Dillon & Moje, 1998; Lee & Smith, 1997; Lee & Ready, 2007). St. John, Hu, and Fisher (2011) also described the development of trustworthy relationships as being an integral part of academic capital formation and pathways to college for first generation students.

However, in studying social support interventions in the case schools, I found that teachers are sometimes called upon to go beyond the teaching role and to take on responsibilities of advisers, school social workers, and school psychologists. Teachers have not been trained to assume these roles. In addition, they are not paid to assume them. The pay issue is disturbing, because in the charter schools, teachers are paid below scale and have no job security. Further, taking on additional work may compromise teachers' ability to focus on their main role and lead to burnout. Most disturbing, however, is teachers' taking on the roles normally assumed by other trained professionals. This is more egregious the considering strong possibility that teachers would be unable to provide students with the kind of support that they need because they are not prepared to assume the roles. Some of the scenarios described in the interviews, particularly at Beta,

248

were dire. This problem is most evident in the charter schools where teachers are not protected by union contracts.

Parent Engagement a Major Problem

The lack of parent engagement is an issue for all of the schools. The interviews revealed that parents are involved in a very limited way. When discussing college visits, the interview participants indicated that the parents occasionally went on college visits but were not regularly included. All of the schools except Kappa offer college nights where families can complete FAFSAs and college applications. However, it appears that students often participate without their parents. This is unfortunate, as parents play significant roles in college decisions.

Beta and Sigma have made the most significant strides in including parents. Both schools require parents to participate in activities that fulfill portfolio or Gateway requirements. Students must complete these portfolios or Gateways in order to graduate. Sigma also has a parent program coordinator on staff. This person is bilingual and is very active in terms of reaching out to parents who are English language learners and who may be undocumented. However, it is uncertain how many parents she is able to reach.

What is most significant is that parents do not play any significant role on the charter boards for the four schools. It is unclear what kind of role might be available for parents to play in the district-accountable high schools that would empower them and otherwise make them feel included.

Recommendations for Future Study

This study revealed interesting insights into the ways in which various non-traditional school models were responding to public policy mandates and a market system of consumer choice and competition. It also provided insights into how charter and district-accountable schools were adapting mathematics education and providing social support for students. However, it is impossible to draw any conclusions about the effectiveness of school models or school-level responses due to the lack of data that would support such conclusions.

Use of Freedom and Flexibility

Charter schools were founded in order to provide freedom and flexibility to adapt to the policy mandates and the needs of students by freeing schools from the bureaucracies of school districts. The four charter schools studied in the cases used their freedom and flexibility in various ways. In one example, Alpha restructured its administration in the guise of removing what some perceived as bureaucratic tangles impeding communication. Some argued that this improved the technical efficiency of the school, while others argued that it gave the executive director and founder too much power.

Beta and Kappa used their freedom and flexibility to expand. First middle schools were added and then primary grades. The purpose of these expansions was to achieve greater control over the instruction and, in Beta's case, social support interventions that students received prior to coming to high school. While both schools claimed that the expansions served the intended purpose, it was unclear from the data whether or not this

was the case. Beta's outcomes were already reporting positive results and Kappa's did not improve.

At least one of the charter schools and all of the district-accountable schools were required to follow the mathematics curriculum set down through central control. For the charter school, its for-profit management company exercised this central control. For the district-accountable schools, it was the central office of the district. However, none of the schools seemed to be doing anything that the other schools could not do if given the freedom to do so. It does appear that charter schools have a greater opportunity to innovate. That is, more freedom and flexibility than do the district-accountable schools. Notably, Beta and Kappa both developed inquiry-based methodologies for teaching math, although Kappa's curriculum was constrained by the partnership between Kappa's for-profit board and the corporation. The Metropolis schools were more constricted in the mathematics curriculum they used, as they were required to follow the texts and methodologies prescribed by the district. However, they were able to be flexible in adding electives, internships, and other opportunities related to career themes.

Although the examples provided above demonstrate some exercise of freedom and flexibility in the charter schools, the reality is that they face some of the same bureaucratic challenges that impede change in the district-accountable schools. Kappa provides the most glaring example. The CEO and the for-profit board must approve any changes the faculty wants to make.

The charter schools were not particularly innovative in using their freedom and flexibility to attract additional funding. This is apparent in their inability to pay teachers

wages comparable to those of unionized teachers and in their requirements that teachers

take on roles typically assumed by school psychologists, school social workers, etc.

For example, the goal for all eight schools is to prepare every student to access

and succeed in college, but neither the schools nor their districts collected data on how

many students went to college or persisted to graduation. In another example, it would be

helpful to continue the work of Lubienski (2003), who has studied how charter schools

use the alleged freedom to innovate and to test the effects on student outcomes.

Parent Engagement

There is a need to find ways to drastically increase parent engagement. Little has

been done in this area and a major effort needs to be developed to focus on ways to

address this critical issue. A first step could well be finding out from parents what they

think schools might do to get their engagement. Another might be to also find ways for

them to have input into why the present efforts to engage them are not working and what

can be done to change that.

Dealing With Problems One at a Time

The problem faced by schools is multi-faceted. It cannot be fixed by addressing

the problems one at a time. Schools, colleges, and universities, along with parents, need

to work together to identify the problems and address how to solve them in a multi-

faceted approach. For example, schools cannot just increase mathematics achievement

simply by increasing graduation requirements and making standards more rigorous.

Increasing achievement also requires dealing with a multiplicity of problems and issues

such as basic math skills, providing support personnel, and funding. It also requires

finding more effective new ways to approach the new requirements and finding teachers

and administrators who have been effectively trained to do so. Finally, schools need to be ready to let teachers focus on teaching instead of assuming roles for which they are untrained and that distract them from teaching.

Mentor and Leadership Training

Mentor and leadership training were lacking in the case schools. Mentors need to be trained to be mentors in order to be effective. Doing service for the community is great and can contribute to a sense of civic engagement. However, specific training is needed to help translate community service and other activities into leadership skills.

Students Left Behind

Schools must also address the needs of special education students. Ignoring them or passing them off to other schools is not the answer. This is part of the selection bias problem inherent in the admissions process, particularly in Metropolis. It is also part of the larger issue of the school accountability movement, enacted as a result of NCLB. Schools are held responsible for the test scores and graduation requirements of special education students. It appears they are afraid of this. This opens the possibility of cheating to hide the fact that they are unable to serve the needs of special education students as required by NCLB. This can occur through methods such as credit recovery. It can also occur when students whose individual education plans (IEP) allow them to study Algebra II as adapted for second grade mathematics ability (because every student must now take Algebra II) the same credit for the course as someone who took it as prescribed by the state benchmarks and standards required by NCLB.

Lack of Follow-up Data to Determine Effectiveness

None of the eight schools made any data available upon which to determine the effectiveness of their programs in doing what they were expected to do. They were either not collecting the data on college access and success or related data, or they just chose not to share it. Those who take on the responsibility of improving the education of our young people must be held accountable in more than just test scores, which are constructed for diagnostic purposes rather than for firing teachers and closing schools. This researcher believes that it is critical that government and private agencies who provide funds for educational research be required to include a plan for how they intend to determine the proposal's effectiveness and be monitored in carrying out the plan, if approved.

Need for a Collaborative Effort of Schools, Colleges, and Community

A good starting point for this collaboration would be on the issue of students entering high school with basic math skills. It is well known, and this study has provided additional examples, that many urban students come from middle schools to high schools unprepared for high school academics. Some become high school dropouts and sizeable numbers do not make it to colleges. Still others do not graduate from them. In all likelihood this chain of events actually begins with elementary school. Yet, most of the responsibility for attenuating the effects is laid in the lap of the high schools. This researcher suggests that the reality is that high schools cannot solve this issue by themselves. It must be comforting to some to point to the high schools and say, "Let them fix it." However, they are not the sole contributors to this major, costly issue of the widespread need to improve math skills. The elementary schools, the middle schools, and

the high schools along with the colleges and universities, and the community (parents) have all made their contributions to the existence of this issue. All should contribute to the solution.

It is believed that it is way past time for the contributors to this serious problem to now come together to focus on finding, implementing, and testing solutions. Is there a school system out there somewhere that would have the commitment and the courage to kick off this effort by bringing together a group made up of committed, unbiased teachers, administrators and remedial specialists from elementary, middle schools, high schools and college, along with students (dropouts and recent graduates), and parents to take on this challenge?

Yes, such an effort would be difficult, time consuming, and be expensive. It would be difficult, because it would require bringing together people who are not used to collaborative efforts. They tend to protect their domains, get involved in playing politics, and do not really trust each other. It would take time to facilitate such a group to be able to learn to communicate and work together productively toward solving a problem that is contributed to by all members. It would be expensive for obvious reasons. But, the cost would be miniscule in comparison to the cost of all the piecemeal research spent to find a quick fix. It seems by now it is abundantly clear that taken one at a time and considering all of the issues created by first-aid quick fixes, like small schools initiatives, or organizing schools by themes, or by managing schools in the style of profit-making businesses, that are not making a difference. It would be interesting to see what would happen if local, state, and federal agencies, along with private foundations would also collaborate in funding this recommendation for future research.

Reference List

Achieve: American Diploma Project Network (2011a). *Closing the expectations gap 2011: Sixth annual 50 state progress report on the alignment of high school policies with the demands of college and careers*. [Electronic version]. Retrieved from http://www.achieve.org/files/AchieveClosingtheExpectationsGap2011.pdf

Achieve: The American Diploma Project Network (2011b). *State college-and career-ready graduation requirements.* [Electronic version]. Retrieved from http://www.achieve.org/state-college-and-career-ready-high-school-graduation-requirements-comparison-table

Acosta-Iriqui, J.M., Civil, M., Dize-Palomar, J., Marshall, M.E. & Quintos-Alonso, B. (2011). Conversations around mathematics education with Latino parents in two borderland communities: The influence of two contrasting language policies. In K. Telez, J. Moschkovich & M. Civil (Eds.), *Latinos/as and mathematics education: Research on learning and teaching in classrooms and communities* (pp. 125-147). Greenwich, CT: Information Age Publishing.

ACT, Inc. (2010). *Mind the gaps: How college readiness narrows achievement gaps in college success.* Retrieved from http://www.act.org/research/policymakers/reports/mindthegaps.html

Adelman, C. (1999). *Answers in the toolbox: Academic intensity, attendance patterns, and bachelor's degree attainment*. Washington, DC: U.S. Department of Education.

Adelman, C. (2006). *The toolbox revisited: Paths to degree completion from high school through college.* Washington, DC: U.S. Department of Education.

Allensworth, E. M. & Easton J. Q. (2007). *What Matters for Staying On-Track and Graduating in the Chicago Public High Schools.* Consortium on Chicago School Research at the University of Chicago.

Allensworth, E., Nomi, T., Montgomery, N., & Lee, V. E. (2009). College preparatory curriculum for all: Academic consequences of requiring algebra and English I for ninth graders in Chicago. *Educational Evaluation and Policy Analysis*, *31*(4), 367-391.

Amurao, C. (2013) *Fact sheet: How bad is the school-to-prison pipeline.* http://www.pbs.org/wnet/tavissmiley/tsr/education-under-arrest/school-to-prison-pipeline-fact-sheet/

Ancess, J. & Allen, D. (2006). Implementing small theme high schools in New York City: Great intensions and great tensions. *Harvard Educational Review, 76*(3), 401-416.

Aud, S., Fox, M. A., & Kewal Ramani, A. (2010). *Status and trends in the education of racial and ethnic minorities.* Washington, DC: National Center for Education Statistics.

Aud, S., Hussar, W., Kena, G., Bianco, K., Frohlich, L., Kemp, J., & Tahan, K. (2011). *The Condition of Education 2011*. NCES 2011-033. National Center for Education Statistics.

Baxter, P. & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report, 13*(4), 544-559.

Becker, G. S. (1993). *Human capital: A theoretical and empirical analysis, with special consideration of education* (3rd ed.). New York: National Bureau of Economic Research.

Blackburn, B.R. (2008). *Rigor Is NOT a Four-Letter Word.* Larchmont, NY: Eye on Education.

Bloomberg, L. & Volpe, M. (2008). *Completing your qualitative dissertation: A roadmap from beginning to end.* Thousand Oaks, CA: Sage Publications.

Bonsangue, M. V. and Drew, D.E.(1993). Increasing minority students' success in calculus, *New Directions for Teaching and Learning (61),* 23-33.

Bourdieu, P. (1977). *La reproduction*. Paris: Les Éditions de Minuit.

Boyd, Carol (2011). Quality and equality in the NYC high school choice process. *Posts from the Truths: The DOE in our eyes' category.* Retrieved from: http://edvoxny.wordpress.com/2011/05/03/quality-and-equality-in-the-nyc-high-school-choice-process/

Boyer, Ernest L. 1983. *High School: A Report on Secondary Education in America.* New York: Harper and Row.

Bozick, R., Lauff, E., & Wirt, J. (2007). Education longitudinal study of 2002 (ELS: 2002): *A first look at the initial postsecondary experiences of the sophomore class*

of 2002 (NCES 2008-308). Washington, DC: National Center for Education
Statistics, Institute of Education Sciences, U.S. Department of Education.

Brennen, A.M. (2002). *Centralization vs. decentralization*. Retrieved from:
http://www.soencouragement.org/centralizationvsdecentralization.htm.

Burns, T., Stalker, G. Macpherson. (1961). *The management of innovation.* London:
Tavistock Publications.

Cameron, K. S. (1984). Organizational adaptation and higher education. *Journal of
Higher Education, 55*(2), 123-144.

Carnegie Unit and Student Hour (2012). In *Wikipedia*. Retrieved March 24, 2012 from
http://en.wikipedia.org/wiki/Carnegie_Unit_and_Student_Hour

Carnevale, A. P., & Desrochers, D. M. (2001). *Connecting education standards and
employment: Course-taking patterns of young workers*. U.S. Department of
Education.

Children's Defense Fund. (August 26, 2008). *Child poverty in America*. Retrieved July
17, 2011 from http://www.childrensdefense.org/child-research-data-
publications/data/child-poverty-in-america.pdf

Chubb, J. E. & Moe, T. M. (1988). Politics, markets, and the organization of schools. *The
American Political Science Review, 82*(4), 1065-1087.

Chubin, D.E. (2011, September 23) *Building capacity for broadening participation (in
STEM and beyond.* Presentation given to the University of Michigan Center for
Engineering diversity and Outreach. Ann Arbor, Michigan.

Clune, W. H. & White, P.A. (1992). Education Reform in the Trenches: Increased
Academic Course Taking in High Schools With Lower Achieving Students in

States With Higher Graduation Requirements. *Educational Evaluation and Policy Analysis, 14, 2-20.*

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology,94*, S95-S120.

College for Every Student (CFES). (n.d.). *Core Practices*. Retrieved from http://www.collegefes.org/resources/resources/#.UivZuGRMTmM

Creswell, J. W. 2003. *Research Design: Quantitative, Qualitative, and Mixed Methods Approaches*. Thousand Oaks, CA: Sage Publications, Inc.

Crosby, E. A. (1999). Urban schools: Forced to fail. *Phi Delta Kappan*, *81*(4).

Dahill‑ Brown, S. E., & Lavery, L. (2012). Implementing federal policy: Confronting state capacity and will. *Politics & Policy*, *40*(4), 557-592.

Dalton, R., Milazzo-Bigelow, V.J., & St. John, E.P. (2012). College for every student: A model for postsecondary encouragement in rural communities. *Readings on Equal Education, 26.* New York: AMS Press Inc., 181-204.

Darling-Hammond, L. Ancess, J. & Wichterle Ort, S. (2002). Reinventing high school: Outcomes of the coalition campus schools project. *American Educational Research Journal, 39*(3), 639-673.

Darling-Hammond, L. (2010). *The flat world and education: How America's commitment to equity will determine our future*. New York, NY: Teacher's College Press.

Daun-Barnett, N., & St. John, E. P. (2012). Constrained Curriculum in High Schools: The Changing Math Standards and Student Achievement, High School Graduation and College Continuation. *Education Policy Analysis Archives, 20*(5). Retrieved from http://epaa.asu.edu/ojs/article/view/907

Delisio, E. R. (2010). Who are we proud to be? Amistad Academy. *Education World*.

    Retrieved from

    http://www.educationworld.com/a_issues/schools/schools022.shtml

Dillon, D. R., & Moje, E. B. (1998). Listening to the talk of adolescent girls: Lesson

    about literacy, school, and lives. In D. A. Alvermann, K. A. Hinchman, D. Moore,

    S. Phelps, & D. Waff (Eds.), *Reconceptualizing the literacies in adolescents' lives*

    (pp. 193-224)*.* Mahwah, NJ: Lawrence Erlbaum Associates.

Drucker, P.F. (1994). *Managing in a time of great change. New York: Truman Talley*

    Books.

Duderstadt, J. J. (2000). *A university for the 21st century*. Ann Arbor, MI: University of

    Michigan Press.

Edmunds, J.A., Bernstein, L., Glennie, E, Willse, J., Arshavsky, N. , Unlu, F., Bartz, D.,

    Silberman, T, Scales, W. D. & Dallas, A. (2010) Preparing students for college:

    The implementation and impact of the early college high school model. *Peabody*

    Journal of Education, *85*(3), 348 — 364.

Ennis, S.R., Ríos-Vargas, M., Albert, N.G. (2011, May). *The Hispanic population 2010*:

    2010 Census Brief No. C201BR-04 Retrieved August 10, 2011 from

    http://www.census.gov/prod/cen2010/briefs/c2010br-04.pdf

Eddy, P. L. (2010). Special issue: Partnerships and collaboration in higher education.

    ASHE higher education report. Wiley & Sons. doi:10.1002/aehe.3602

Farrell, C., Wohlstetter, P., Smith, J. (2012). Charter management organizations: An

    emerging approach to scaling up what works. *Educational Policy, 26*(4), 499-532.

Fass, S. & Cauthen, N.K. (2006). *Who are America's poor children*? National Center for

the Children in Poverty [Publication 684]. Retrieved from

http://nccp.org/publications/pub_684.pdf

French, R, Rayner, C, Rees, G, Rumbles, S. (2011). *Organisational behavior*. 2nd Ed.

New York, NY: Wiley & Sons.

Fusarelli, L.D. (2002). Tightly coupled policy in loosely coupled systems: institutional

capacity and organizational change. *Journal of Educational Administration,40*(6),

561 – 575.

Gewertz, Catherine. (2010). High school rigor narrows college-success gap; Rigorous

high school study boosts chances, ACT finds. *Education

Week 30.07*(8). Retrieved from

http://www.edweek.org/ew/articles/2010/10/13/07readiness.h30.html

Gleason, P., Clark, M., Tuttle, C. C., & Dwoyer, E. (2010). *The Evaluation of Charter

School Impacts: Final Report* [NCEE 2010-4029]. Washington, DC: National

Center for Education Evaluation and Regional Assistance, Institute of Education

Sciences, U.S. Department of Education.

Gonzales, P., Williams, T., Jocelyn, L., Roey, S., Kastberg, D., and Brenwald, S. (2008).

*Highlights From TIMSS 2007:Mathematics and Science Achievement of U.S.

Fourth- and Eighth-Grade Students in an International Context* (NCES 2009–

001Revised). National Center for Education Statistics, Institute of Education

Sciences, U.S. Department of Education. Washington,

DC.

Goodlad, John I. (1983). *A Place Called School: Prospects for the Future.* St. Louis, MO: McGraw-Hill.

Harris, L. (2000). A theory of intellectual capital. *Advances in Human Resources, 2*, 22-37.

Hechinger Institute on Education and the Media. 2009. *Understanding and Reporting on Academic Rigor: A Hechinger Institute Primer for Journalists.* 2009. New York, NY: Hechinger Institute on Education and the Media. Retrieved from http://hechinger.tc.columbia.edu/primers/Hechinger_Institute_Rigor_Primer.pdf

Hixon, L., Hepler, B.B., & Kim, M.O. (2011, September). *The white population: 2010.* 2010 Census Briefs No. C2010BR-05. Retrieved from http://www.census.gov/prod/cen2010/briefs/c2010br-05.pdf

Hochschild, J. L. (2003). Social class in public schools. *Journal of Social Issues. 59*(4):821-840.

Hossler, D. & Gallagher, K.S. (1987). Studying student college choice: A three-phase model and the implications for policymakers. *College and University, 62*(3), 207-21.

Huysman, M. & Wulf, V. (2004). *Social capital and information technology*, MIT Press, Cambridge, Mass.

Kirst, M. W., & Bracco, K. R. (2004). Bridging the great divide: How the K-12 and postsecondary split hurts students, and what can be done about it. In M. W. Kirst & A. Venezia (eds.)*, From high school to college: Improving opportunities for success in postsecondary education.* (pp. 1-30). San Francisco, CA: Jossey-Bass.

Klein, D. (2003). A brief history of American K-12 mathematics education in the 20th

    century. In J. M. Royer (Ed.), *Mathematical cognition.* Greenwich, CT:

    Information Age.

Kozol, J. (2005). *The shame of the nation: the restoration of apartheid schooling in*

    America. New York: Crown Publishers.

Lee, M. & St. John, E.P. (2012). Academic capital formation among Hmong students: An

    exploratory study of the role of ethnic identity in college transitions. *Expanding*

    postsecondary opportunity for underrepresented students: Theory and practice of

    academic capital formation (Readings on equal education series, Vol. 26). New

    York: AMS Press Inc, 117-150.

Lee, V. E. & Ready, D.D. (2007). *Schools within schools: Possibilities and pitfalls of*

    high school reform. New York: Teachers College Press.

Lee, V.E. & Smith, J. B. (1997). High school size: Which works best, and for whom?

    Educational Evaluation and Policy Analysis, 19(3), 205-227.

Lincoln, Y.S. & Guba, E. G. (1985). *Naturalistic inquiry.* Newbury Park, CA: Sage

    Publications.

Lippman, L., Burns, S., McArthur, E. (1996). *Urban schools: The challenge of location*

    and locale. Washington, D.C. U.S. Department of Education, National Center for

    Education Statistics. Retrieved from http://nces.ed.gov/pubs/96184all.pdf

Lowell, B.L., Salzman, H., Bernstein, H. & Henderson, E. (2009). Steady as she goes?

    Three generations of students through the science and engineering pipeline. Paper

    presented at the Annual Meetings of the Association for Public Policy Analysis

    and Management, November 7, 2009, Washington, D.C.

Lubienski, C. (2003). Innovation in education markets: Theory and evidence on the impact of competition and choice in charter schools. *American Educational Research Journal, 40*(2), 395-443.

Martin, D.B. (2006). Mathematics, learning and participation as racialized forms of experience: African American parents speak on the struggle for mathematics literacy. *Mathematical Thinking and Learning, 8*(3), 197-229.

Martinez, M. and Klopott, S. (2005). *The Link Between High School Reform and College Access and Success for Low-Income and Minority Youth*. Washington, DC: American Youth Policy Forum and Pathways to College Network.

Marra, R. M., Shen, D, Rodgers, K.A., Bogue, B. (2009, April). *Leaving engineering: A multi-year single institution study.* Paper presented at the annual meeting of the American Educational Researcher's Association, San Diego, CA. Retrieved from www.engr.psu.edu/awe/misc/.../LeavingEngraera09final.pdf

McClafferty-Jarsky, K., McDonough, P. M., & Núñez, A. M. (2009). Establishing a college culture in secondary schools through P-20 collaboration: A case study. *Journal of Hispanic Higher Education*, *8*(4), 357.

McCarron, G. P. Inkelas, K. K. (2006). The Gap between Educational Aspirations and Attainment for First-Generation College Students and the Role of Parental Involvement. *Journal of College Student Development*, 47(5), 534-549.

McLeod, J. (1995). Ain't No Makin' It. Boulder, CO. Westview Press.

McDonough, P.M. (1997). *Choosing colleges: How social class and schools structure opportunity*. Albany, NY: State University of New York Press.

McDonough, P. M. (2004). *The school-to-college transition: challenges and prospects.* Washington, DC: American Council on Education, Center for Policy Analysis.

Menaker, J. (1975). *From school to college: Articulation and transfer*. Washington, D.C.: American Council on Education.

Meyer, J.W. & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *The American Journal of Sociology, 83*(2), 340-363.

Meyer, J.W. & Rowan, B. (1978). The structure of educational organizations. In M.W. Meyer, (Ed.) *Environments and organizations.* San Francisco: Jossey Bass, 78-109.

Meyer, H. & Rowan, B. (2006). Institutional analysis and the study of education. In H. Meyer & B. Rowan, (Eds.). *The new institutionalism in education.* New York: SUNY Press. 1-14.

Miron, G. & Urshel, J. L. (2010). *Profiles of nonprofit education management organizations: 2009-2010.* Boulder, CO: National Education Policy Center. Retrieved from http://nepc.colorado.edu/files/EMO-NP-09-10

Morgan, G. (1986). *Images of organization*. Newbury Park: Sage.

National Association of Charter School Authorizers (NACSA). (2009). *Principles & standards for quality charter school authorizing*. Chicago, IL

National Commission on Excellence in Education. (1983, April). *A nation at risk: The imperative for educational reform.* [Electronic version]. Retrieved from http://www2.ed.gov/pubs/NatAtRisk/title.html

National Council for Teachers of Mathematics (NCTM). (2000). *Content and standards*

    for teaching mathematics. Retrieved from NCTM (2012)

    http://www.nctm.org/standards/content.aspx?id=26836

National Science Board (NSB). (2010). *Preparing the Next Generation of STEM*

    Innovators: Identifying and Developing Our Nation's Human Capital. [NSB

    Report 10-33]. Adington, VA: National Science Foundation. Retrieved from

    http://www.nsf.gov/nsb/publications/pub_summ.jsp?ods_key=nsb1033

No Child Left Behind (NCLB) Act of 2001, Pub.L. 107-110, 115 Stat. 1425 (2002).

Oliva, M. (2008). Latino access to college: Actualizing the promise and potential of K-16

    partnerships. *Journal of Hispanic Higher Education*, *7*(2), 119-130.

Partnership for 21ˢᵗ Century Skills (2011). Overview: FAQ. Retrieved from

    http://www.p21.org/overview/p21-faq#what_21st

Patton, M.Q. (1990). *Qualitative evaluation and research methods* (2nd ed.).

    Thousand Oaks, CA: Sage Publications, Inc.

Payne, C. M. (2010). *So much reform, so little change: The persistence of failure in*

    urban schools. Cambridge, MA: Harvard University Press.

Payne, C.M. (March, 2012). *Urban school reform: The state of the debate.* Presentation

    for National Center for Institutional Diversity Center for Educational Outreach.

    University of Michigan, Ann Arbor, Michigan.

Perna, L. W. (2000). Differences in the decision to attend college among African

    Americans, Hispanics, and Whites. *The Journal of Higher Education, 71*(2), 117-

    141.

Perna, L.W. (2005). The key to college access: Rigorous academic preparation. In W.G. Tierney, Z.B Corwin & J.E. Colyar (Eds.), *Preparing for college: Nine elements of effective outreach* (pp.113-134). Albany, New York: State University of New York Press.

Porter, A.C. (1998). The Effects of Upgrading Policies on High School Mathematics and Science. In D. Ravitch (ed.) *Brookings Papers on Education Policy*. Washington, DC: Brookings Institution Press.

Porter, A., McMaken, J. Hwang, J. & Yang, R. (2011). Common core standards: The new U.S. intended curriculum. *Educational Researcher, 40*(3), 103-116.

Rastogi, S., Johnson, T.D., Hoeffel, E.M, & Drewery, Jr., M.P. (2011). *The black population, 2010.* 2010 Census Brief No. C2010BR-06. Retrieved from http://www.census.gov/prod/cen2010/briefs/c2010br-06.pdf

Ravitch, D. (2010). *The death and life of the great American school system: How testing and choice are undermining education*. New York: Basic Books.

Raywid, M.A. (December 1997-January 1998). Small schools: A reform that works. *Educational leadership, 55*(4), 34-39.

Rigorous. (2012). In *Oxford dictionary of American English online*. Retrieved from http://oxforddictionaries.com/us/definition/american_english/rigorous?q=rigorous

Ritzer, G. (2003). *Contemporary sociology theory and its classical roots: the basics.* Boston: McGraw-Hill.

Rowan, B. (2006). The new institutionalism and the study of educational organizations: Changing ideas for changing times. In H.D. Meyer & B. Rowan, (Eds.). *The new institutionalism in education.* New York: SUNY Press, 15-32.

Sable, J., Plotts, C., and Mitchell, L. (2010). *Characteristics of the 100 Largest Public Elementary and Secondary School Districts in the United States: 2008–09* (NCES 2011-301). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office. Retrieved August 11, 2011 from http://nces.ed.gov/pubs2011/2011301.pdf

Schiller, K.S. & Muller, C. (2003). Raising the bar and equity? Effects of state high school graduation requirements and accountability policies on students' mathematics course taking, *Educational Evaluation and Policy Analysis,25*(3), 299-318.

Silva, C. M. & Moses, R. P. (1990). The algebra project: Making middle school mathematics count. *Journal of Negro Education, 59*(3), 375-391.

Smith, M.J. (2009). Right directions, wrong maps: Understanding the involvement of low-SES African American parents to enlist their involvement in college choice. *Education and Urban Society, 41*(2), 171-196.

Solomon, R.P. Allen, A.M.A. & Campbell, A. (2007). The politics of advocacy, strategies for change: Diversity and social justice pedagogy in urban schools. In R.P. Solomon & D.N.R. Sekayi (Eds.), *Urban teacher education and teaching: innovative practices for diversity and social justice.* Mahwah, N.J.: Lawrence Erlbaum Associates.

Spillane, J. & Burch, P. (2006) The institutional environment and instructional practice: Changing patterns of guidance and control in public education. In H.D. Meyer & B. Rowan, (Eds.). *The new institutionalism in education.* New York: SUNY Press. 87-102.

Sporn, B. (1999). *Adaptive university structures*. London: Jessica Kingley Publishers, Ltd.

St. John, E.P. (2006). *Education and the public interest: School reform, public finance, and access to higher education*. Dordrecth, The Netherlands: Springer.

St. John, E. P. (2009a). *Action, reflection, and social justice: Integrating moral reasoning into professional development*. Cresskill, NJ: Hampton Press, Inc.

St. John, E.P. (2009b). *College organization and professional development: Integrating moral reasoning and reflective practice.* New York: Routledge.

St. John, E.P. (2013). *Research, actionable knowledge, and social change: Reclaiming social responsibility through research partnerships*. Sterling, VA: Stylus Press.

St. John, E.P., Hu, S. & Fisher, A.S. (2011). *Breaking through the access barrier: How academic capital formation can improve policy in higher education*. New York: Routledge.

St. John E. P., McKinney, J. S. and Tuttle, T. (*2006*), Using action inquiry to address critical challenges. *New Directions for Institutional Research, 130*, 63-76.

St. John, E. P. & Milazzo-Bigelow, V.J. (2011a). *CFES Urban High Schools: Strategies for School-College Partnerships.* CFES Working Paper 1. Ann Arbor, MI, University of Michigan.

St. John, E.P. & Milazzo-Bigelow, V.J. (2011b). *Academic capital Formation by urban high school students in CFES: The economic, social, and cultural dimensions of student academic success*. CFES Working Paper 2. Ann Arbor, MI, University of Michigan.

St. John, E.P., Milazzo-Bigelow, V.J., Masse, J.C., Callahan Lijana, K., (in review). *College Prep: Transforming Urban High Schools, Overcoming Failed Public Policy, and Preparing Students for Higher Education.* Baltimore, MD: Johns Hopkins Press.

St. John, E. P. & Musoba, G. (2006). Academic access. In E.P. St. John (2006) *Education and the public interest: School reform, public finance, and access to higher education.* Springer Verlag, p. 57-79.

Stake, R.E. (2006). *Multiple case study analysis*. New York: The Guildford Press.

Suresh, R. (2006). The relationship between barrier courses and persistence in engineering. *College Student Retention: Research, Theory and Practice, 8*(2), 215-239.

Tierney, W. G. (1999). Models of minority college-going and retention: Cultural integrity versus cultural suicide. *The Journal of Negro Education, 68*(1), 80-91.

Tierney, W. G., Bailey, T., Constantine, J., Finkelstein, N., & Hurd, N. F. (2009). *Helping students navigate the path to college: What high schools can do.* IES practice guide. NCEE 2009-4066. *What Works Clearinghouse*.

Tigges, L. M., Browne, I., Green, G. P. (1998). Social Isolation of the Urban Poor: Race, Class, and Neighborhood Effects on Social Resources. *The Sociological Quarterly, 39*(1), 53-77

Tyson, W. (2011). Modeling engineering degree attainment using high school and college

    physics and calculus coursetaking and achievement. *Journal of Engineering*

    Education, 100(4), 760-777. Retrieved from

    http://search.proquest.com.proxy.lib.umich.edu/docview/902631083?accountid=1

    4667

U.S. Department of Education. (2011, February 24*). Statement by U.S. Education*

    Secretary Duncan on 'The Nation's Report Card: Trial Urban District Assessment,

    Science 2009'* Retrieved from http://www.ed.gov/news/press-releases/statement-

    us-education-secretary-duncan-nations-report-card-trial-urban-district

U.S. Department of Education, Institute for Education Sciences, National Center for

    Education Statistics, National Assessment of Education Progress. (2009). *2009*

    Mathematics Assessment. Retrieved from http://nces.ed.gov/nationsreportcard/

Walberg, H. J. (2000). Market theory of school choice: Why it troubles both political

    parties. *Education Week*, 19(42), 46-49.

Wang, L., Beckett, G., & Brown, L. (2006). Controversies of standardized assessment in

    school accountability reform: A critical synthesis of multidisciplinary research

    evidence. *Applied Measurement in Education, 19*(4), 305-328.

Warburton, E. C., Bugarin, R., Nuñez, A. M. (2001). *Bridging the gap: Academic*

    preparation and postsecondary success of first-generation students. U.S. Dept. of

    Education, Office of Educational Research and Improvement, National Center for

    Education Statistics.

Weick, K.E. (1976). Educational organizations as loosely coupled systems.

    Administrative Science Quarterly, 21(1), 1-19.

Weinstein, M. (2006). TAMS Analyzer: Anthropology as cultural critique in a digital age. *Social Science Computer Review, 24*(1), 68-77.

Winkle-Wagner, R. (2012). Academic capital formation: Can it help untangle the confusion about social stratification in the study of college students. *Expanding postsecondary opportunity for underrepresented students: Theory and practice of academic capital formation (Readings on equal education series, Vol. 26). New York: AMS Press Inc*.

Wohlstetter, P., Wenning, R., & Briggs, K. L. (1995). Charter schools in the United States: The question of autonomy. *Educational Policy*, *9*(4), 331.

Yin, R. K. (2009): *Case Study Research: Design and Methods*, (4th ed.). Applied Social Research Series, Vol. 5. Thousand Oaks, CA: Sage Publications, Inc.