THE MASTER SCHEDULE: BRIDGING ACCESS TO OPPORTUNITY FOR EACH STUDENT

by

MARKITA T. SPIKES

(Under the Direction of Karen Bryant)

ABSTRACT

The school master schedule is a structure that, when intentionally designed, can promote student access to opportunities. However, complex factors often promote the schedule as a technical process instead of one that is vital to school improvement and equity work. As student needs change, fostering leadership capacity in understanding the processes and structures that create inequality and minimize opportunity access is vital. This Action Research study examined how district-designed master scheduling interventions impacted the scheduling approach of college and career academy high school leaders. The findings from the study highlighted internal and external factors that impact the method local school leaders use for creating a master schedule, the need for collaborative master scheduling practices, the importance of using expert district voices to support data richness, and customized interventions to move learning from compliance to practical and applicable. These findings show the importance of collaboration between school and district leaders to prevent stagnant practices.

KEY WORDS: Action research, college and career academies, master scheduling, opportunities and access, school improvement

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DEDICATION

Carlos, Caleb, and Caden, thank you for loving and supporting me. You always praised, no matter how small or large, the accomplishment. You were amused when I attended baseball and lacrosse games with a laptop, books, highlighters, pencils, and pens. You reminded me that quitting would never be an option. I finished this dissertation because of your sense of humor, support, love, and steadiness. You all make me feel like I can do and be anything I choose. Thank you for being okay with me drifting for a few years. **Caleb and Caden**, I pray you move toward your aspirations and purposes with faith, grit, reflection, and wonder.

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"Every worthwhile accomplishment, big or little, has its stages of drudgery and triumph: a beginning, a struggle, and a victory." ~Mahatma Gandhi

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CHAPTER 1

INTRODUCTION

The school master schedule is a complex system reflecting factors such as teacher experience, student needs, curricula, planning times, course offerings, space, and timing, all of which influence school operational and instructional components (Parker, 1974). The school schedule maps the "inner workings of a school" by organizing "the movement of people through time and space" (Clay et al., 2021, p. 1). One of the most important duties and responsibilities a high school principal performs is engaging with the school scheduling system (Devilbiss, 1947). The schedule reflects the ability of a leader to express a philosophy, communicate the objectives of secondary education, establish the values in the school program, exhibit human understanding, and efficiently allocate and utilize core resources that serve and benefit many students, such as time, space, human and materials (Devilbiss, 1947). The school schedule also outlines the instructional program, high schooling curriculum, course offerings, and teacher placement, all requiring school administration oversight (Kruse & Kruse, 1995).

The Education Commission of the States (2016) suggested that a well-designed master schedule could improve student achievement, increase teacher collaboration, and promote overall school effectiveness. Chenoweth (2016) identified the comprehensive school schedule as the system structure educators should consider most when implementing the Every Student Succeeds Act of 2015 (ESSA) provisions for serving students with the highest needs through opportunity and access. However, despite the value and ability to strategically support school improvement, the scheduling structure is often overlooked as vital in driving school equity work and instead

viewed as a technical, logistical process (Canady & Rettig, 1995; Clay et al., 2021; Kruse & Kruse, 1995).

Pisoni and Conti (2019) contended that for a school master schedule to be effective, school leaders must understand the processes and structures that systematically create inequality and prevent students from having access to opportunities, thus hindering student achievement and school improvement. However, limited research focuses on organizational management for school leaders, specifically master scheduling (Pittman, 2022). Parker (1974) once contended that administrators and teachers with a "special knack for scheduling are scarce" (p. 80) and, therefore, recommended establishing guidelines to identify "persons with an aptitude for creative scheduling" (p. 81). He also found that future administrators would benefit from realistic scheduling training programs and a scheduling theory that incorporated "tangible (resources and curriculum) and intangible (needs and desires) aspects of the school program to support school scheduling improvement efforts (Parker, 1974, p. 81).

The purpose of this study was to examine how district-designed master scheduling interventions impacted the way in which school leaders use the master schedule to meet the needs of each student. The study took place in a college and career academy high school, which consisted of small learning communities that provided students with opportunities and access through industry partnerships and a curriculum blending traditional and technical courses with specific goals of increasing achievement (Hackmann et al., 2018). The researcher chose this setting because limited research examined the decision-making approach college and career academy high school leaders used to address sustainability challenges, such as scheduling multiple student needs in college and career academies (Herlihy & Quint, 2006; Hernandez-Gantes et al., 2019).

Statement of the Problem

Research findings showed that school districts keenly focused on the technical aspects of master scheduling while discounting the leadership processes of the master schedule (Clay et al., 2021; Kruse & Kruse, 1995). Northeast County Public Schools, the district in which this study took place, had historically only offered technical training associated with master schedule data entry into the student information system. The district did not provide school leaders with established and targeted master scheduling interventions that leveraged the school schedule to meet the needs of each student. During the implementation of college and career academies, school leaders received abstract master scheduling training from various national conferences. As school leaders transitioned to principalships and assistant principals for scheduling and state reporting data processes changed, it became imperative to examine how district-designed master scheduling interventions could support the efforts of school leaders in meeting student needs proficiently.

Overview of the Research Site Context

Northeast County Public Schools (NCPS) is a large urban school district in the United States. In 2014, NCPS restructured seven traditional high schools into college and career academies to create smaller learning communities, opportunities, and access in response to persisting low achievement in high-poverty, high-needs traditional high schools. Hernandez-Gantes et al. (2019) found that school restructuring historically occurred in response to a crisis. The school district used a full-scale, wall-to-wall implementation model approach at each school. The schools continued to serve its current student population, including students receiving exceptional education services. In addition, the school district tasked the schools with enhancing opportunities and access through advanced placement, career and technical courses, and dual

enrollment. Beaver High School, one of the seven academy schools, served as the research site for this study.

The conversion to the college and career academy model, specifically the smaller learning communities, required changing school scheduling processes. These changes included transitioning to a modified block schedule, teacher assignments based on academy needs, student academy selections, and course scheduling sequences. Although college and career academy school leaders underwent initial training focused on modified block scheduling and scheduling best practices for a college and career academy, the training was an isolated experience that focused heavily on the technical scheduling process with limited attention to how leaders reconcile student needs with vision, mission, and resources in the master schedule. Despite leadership turnover at the schools, targeted scheduling support systems remained insufficient. The support limitations did not align with Hernandez-Gantes et al. (2019) research findings that college and career academies' viability and relevance required complex organizational support, including administrative support for scheduling.

Purpose of the Study

The purpose of this study was to examine how district-designed master scheduling interventions impacted the scheduling approach of college and career academy high school leaders. The researcher considered perspectives from principals and assistant principals responsible for supporting a part of the local school master schedule. The researcher worked with an Action Research Design (ARDT) and Implementation Team (ARIT).

Research Questions

To address the purpose of this action research study, the following research questions guided this inquiry:

1. What factors impacted how school leaders use the master schedule structure to meet the needs of each student equitably in a college and career academy setting?
2. How did college and career academy leaders describe the impact of district-designed interventions on their approach to master scheduling for student equity?
3. What did an action research design team learn from creating and facilitating master schedule interventions for college and career academy leaders?

The researcher used specific terms to define the key concepts that examined master scheduling interventions in Northeast County Public Schools (NCPS). The following section discusses the specific critical terms and definitions associated with this action research study.

Definition of Terms

For this study, the following key terms are defined:

- "Site-based leaders" in Northeast County Public Schools are school principals and assistant principals.
- "College and Career Academy High School," in the context of Northeast County Public Schools, is a school within a school model designed to create smaller learning communities that connect students to peers, teachers, and community partners in a structured academic environment.
- "Access" in the context of Northeast County Public Schools requires expanding student opportunities to access high-quality, rigorous, and culturally relevant curricula, advanced coursework, and enrichment activities through engagement.
- "Master Schedule" in the context of Northeast County Public Schools is a comprehensive school schedule that designates student and teacher placement and time allocation.
- "Quality Basic Education (QBE Formula)" is the state law that funds public schools.

The following section provides an overview of the theoretical framework, which further situates the study by providing a conceptual review of concepts and definitions used in this study.

Theoretical Framework

Betts (1992) stated, "the improvement of quality involves the design of an educational system that not only optimizes the relationship among the elements but also between the educational systems and its environment" (p. 40). Thornton et al. (2010) asserted that educators have only sometimes associated the interconnection of education system components with school improvement. Betts (1992) described this lack of connection to a historical piecemeal approach to school improvement, concentrating only on the symptoms of elements and not the root causes of the whole.

A school master schedule is a system structure representing a "set of elements that function as a whole to achieve a purpose" (Betts, 1992, p.3). According to Parker (1974), the school-wide schedule "synthesizes and integrates the various components of the school program, i.e., students, teachers, administrators, the curriculum, space, and time," all tangible elements of a school (p. 79). In addition to the concrete aspects, the master schedule comprises intangible components such as student and teacher needs and desires, vision, mission, and philosophy (Clay et al., 2021). All these tangible and intangible elements function together to achieve the goals set forth by school leadership (Betts, 1992). Recognizing the impact of the master schedule on the whole school, the primary researcher elected to use Systems Theory as the theoretical framework for this study.

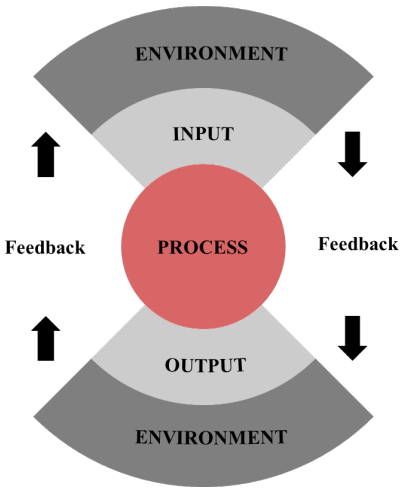
Systems theory promotes viewing a system through organizational structures, people, policies, processes, and tools, as these components create complexity in the system and manifest

unintentional behaviors (Bryk et al., 2015). Systems theory studies how complex elements form the whole organization, function, and interrelate within an environment to produce outcomes (Mele et al., 2010; Thornton et al., 2010). The collective interaction of system elements creates structures that influence the types of outcomes in an environment. Talib (2013) describes this relational function as a system creating intentional results based on the system design. In the case of a school master schedule, the interaction between tangible and intangible elements creates purposeful student experiences in a school.

Figure 1.1 illustrates the relational interaction between elements, including the environment, input, process, output, and feedback (Mele et al., 2010; Kast & Rosenzweig, 1972; Thornton et al., 2010). As the figure denotes, the input flows continuously through the system, informing the other elements.

Figure 1.1

Systems Theory



Note. Adapted from Kast and Rosenzweig (1972).

This study required practicality to examine how district-developed interventions affected how school leaders used the master schedule structure to leverage student equity. The

interventions required district and school leaders to use a systems perspective to understand how each decision in implementing the master schedule impacts organizational goals to improve student outcomes (Thornton et al., 2010). Systems theory and the practicality of systems thinking influenced an intentional, systemic approach to change (Betts, 1992).

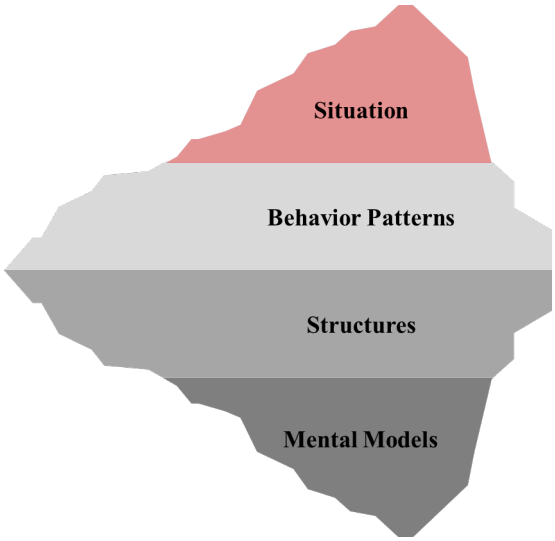
Systems thinking is a skillset of systems theory that allows for pragmatism through analyses, creation, and inquiry into systems (Boardman et al., 2009). Ndaruhutse et al. (2019) suggested that the application of systems thinking shifts from a cause-and-effect thought process by holistically considering the complex nature of element relationships and their impact on actions and outcomes. Systems thinking requires educators to be more aware of connections, the role of structures, and the hidden consequences of our actions (Goodman, n.d.). This awareness allows leaders to examine problems precisely and thoroughly with a disciplined approach before acting or reacting (Goodman, n.d.).

Figure 1.2 is an adaptation of Michael Goodman's system thinking iceberg framework, which divides systems thinking into four approaches: situation, patterns, structures, and perspectives (Karash, n.d). The red iceberg tip in the figure, identified as the situation, reflects the view from above the surface. The situation probes what is happening in the system, underscoring more of a symptom than a cause. This level often creates a react-and-respond approach (Karash, n.d). The gray structures of the iceberg, identified as the behavior patterns, structures, and mental models, represent what is below the surface, where leaders will find the root cause of their system challenges. Behavior patterns are historical happenings, trends, and changes over time. Structures represent influences such as policy and procedures and the relationship impact among the system's parts. Mental models uncover the values, beliefs, and assumptions people have about the system. Karash (n.d) states that when leaders can move past

the symptom stage (above the surface), they can begin to plan and prepare with anticipation for designing, creating, and transforming the system into the desired state.

Figure 1.2

Systems Thinking Iceberg Model



Note. Adapted from Goodman (n.d.).

Systems theory and systems thinking informed the logic model of this study. An overview of the model continues in the next section.

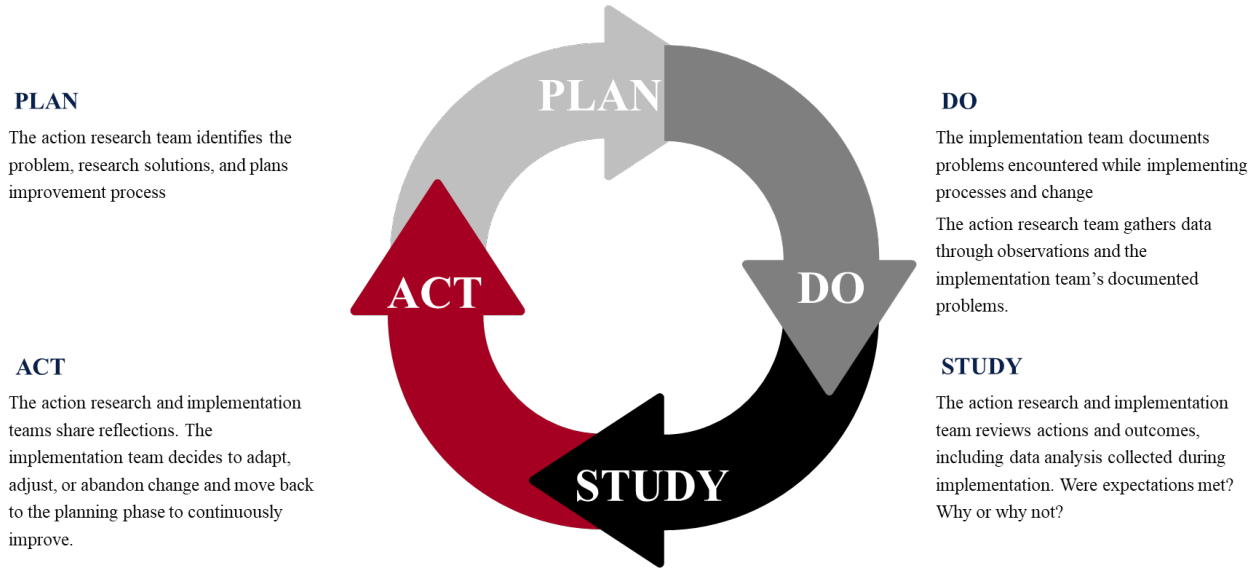
Logic Model

The Plan-Do-Study-Act (PDSA) Cycle represented an ongoing cycle of inquiry that included planning, implementing, assessing, and reflecting. This logic model aligned with the long-standing continuous quality improvement framework at NCPS. The school district implemented various improvement strategies aligned with Dr. W. Edward Deming's management method, which stressed the need to continuously improve programs and practices underpinned by policies, processes, and infrastructure (Walton, 1986). The work of Dr. W. Edward Deming advanced the value of training, retraining, leadership, and removing barriers

between staff areas, thus creating the PSDA Cycle (Walton, 1986). Figure 1.3 visualizes the PDSA Cycle.

Figure 1.3

Logic Model



The PDSA embeds a theory of change that details the process of change.

Theory of Change

This study examined how district-designed master scheduling interventions impacted the scheduling approach of college and career academy high school leaders. The PDSA Cycle embedded a theory of change that allowed the action research team to use a simple four-step process to identify the purpose or goal, implement a plan, monitor implementation outcomes, and integrate the learning from the process (Bryk et al., 2015). The cycle began with the action research team finding a lack of district-designed master scheduling interventions to support local school leaders with equitable scheduling practices. The Action Research Design Team (ARDT) recognized that site-based leader belief feedback regarding the barriers within the complex school scheduling system should influence district-designed interventions. The ARDT used

perception feedback to design and facilitate interventions. The ARDT also used site-based leader perceptions to indicate the change progress. Based on participant feedback data, the ARDT made necessary adjustments to the next cycle of interventions that informed the desired outcome of more impactful master scheduling interventions.

Overview of the Methodology

The action research process in an educational setting allowed practitioners to improve the field by solving school-based or district-level problems using literature and science methods (Corey, 1954). This study bridged research literature and practice to design district-developed master scheduling interventions that impacted scheduling practices in a college and career academy high school. The primary researcher and six district-level leaders served as the ARDT that supported and monitored the work of the site-based implementation team through resource provisions and opportunities for feedback. The ARIT encompassed a college and career academy high school principal and two assistant principals responsible for the school schedule. The ARDT and ARIT partnered to develop district-designed master scheduling interventions.

Action Research

Action research was chosen as the preferred methodology for this study because it created a system of mutual engagement that allowed for reflective action by all participants. The primary researcher leaned upon two of the basic themes identified by Masters (1995), "empowerment of participants and collaboration through participation" (p. 3). These themes helped to prevent fragmentation and isolation with the action research teams. They also helped create a culture of trust to avoid the rejection of ideas from district and school leaders.

The action research employed in this study was a cyclical process of planning, action, and evaluations of the action (Coghlan, 2019). The study began with the primary researcher and

action research design and implementation teams participating in a collaborative planning phase. The planning started with a questionnaire and interviews with each ARIT member to understand their perceptions of factors that impacted master scheduling for student needs. The primary researcher shared the questionnaire and interview results with the ARDT as these beliefs guided research learning and resource recommendations. The ARDT met monthly to discuss the research, review current and proposed structures collectively, and plan for district-designed master scheduling interventions.

The ARIT met bi-weekly to review current and proposed structures collectively. Members from the ARDT and other district leaders facilitated the master scheduling interventions for the implementation team. There were instances where the ARIT also met with their respective school leadership teams, non-participants of the study, to focus on their school needs. Although these meetings were not a part of the study, they were critical in supporting the study participants in diving deeper into their current structures and their impact on their perceived needs. The primary researcher and the ARDT observed, noted, and discussed the master scheduling interventions as part of the data collection process.

In addition to the action evaluation through observation, beginning with the first meeting, ongoing reflection with the action research design and the implementation teams was crucial to the action research process. Reflection allowed the teams to think about the current problem and how it came to be, allowing the dismantling of structures. The collective considerations also permitted for the quick adjustment of practices and procedures. Approaching and leading the work with regard also created a space for the site-based leaders to evaluate the current situations and share those outcomes. As Glanz (2014) stated, “Research, as a tool of an educational leader, is reflection in action” (p. 25).

Data Collection

Data Collection for this study incorporated six qualitative methods. These methods included:

1. Questionnaire – The researcher distributed an initial questionnaire to collect baseline perceptions from school leaders;
2. Individual interviews with the ARIT at the beginning of the research cycles;
3. Consultation groups with the ARDT and ARIT at the end of each research cycle;
4. Observation notes from intervention facilitation and master scheduling meetings;
5. Researcher journal notes based on observations during action research team meetings;
6. Documents, including district and site-based leadership artifacts, provided additional context about the focus of the study and corroborated observations and other data.

The researcher analyzed the qualitative data from each method using a coding scheme, examined these codes for an overall pattern, and then developed themes. The primary and action research team used some of the data collected to determine the type of interventions used in the study.

Interventions

The ARDT evaluated several district-leader-designed experimental interventions during the action research process. These interventions provided insight into the types of targeted master scheduling interventions college and career academy school leaders needed to leverage their master schedules equitably. District leaders who provided support in the areas of English Learners, school scheduling, Full-time Equivalent (FTE) student count, and data governance state reporting observed the experiences of local college and career academy leaders when

receiving district-created interventions. The district leaders learned from these experiences the support areas they needed to focus on strengthening to build better capacity in master scheduling.

The ARDT created the interventions based on qualitative data collected throughout the study. The assumptions that guided the ARDT in developing interventions included 1) if the school implemented a scheduling team and received direct, personalized support from district leaders in the areas of FTE and state reporting, the interventions would change the way the school leaders approached their master scheduling practices and 2) district leaders would learn that schools may benefit from more personalized, direct supports in specific areas that impacted the scheduling process. The interventions facilitated throughout the action research cycle included assembling a local school scheduling team, weekly scheduling team meetings, a Full-time Equivalent (FTE) and state reporting scheduling audit, scheduling coaching support, and monitoring for fidelity.

Significance of the Study

deGregory and Sommer (2021) recognized that local school leaders make decisions through organizational processes that impact how they design and implement their annual master schedules. By "implementing a deliberate and strategic system for scheduling high school students," school leaders can "shrink the opportunity gap and align school and district resources to strive for and achieve equity" (deGregory & Sommer, 2021, p. 8). However, Pittman (2022) found that scheduling guidance for school leaders is often limited to the local school level, technical training, and professional organizations that lack ongoing mentorship for schools. Pittman (2022) recommended future research that measured the connection between targeted master scheduling interventions, school site decisions, and instructional resource allocation.

This study looked specifically at the perceived impact district-designed master scheduling interventions had on school leader master scheduling practices at a local college and career academy in an urban school district. The study adds to the limited literature regarding how school district leadership supports local school scheduling processes that extend beyond technical support.

Organization of the Dissertation

This dissertation encompasses six chapters. Chapter 1 offers an introduction to the dissertation study, which includes an overview of the research questions, the problem of practice, and the methods for the study. Chapter 2 reviews the related literature for college and career academies, student opportunities and access, and school resources through the master scheduling lens. Chapter 3 describes the methodology involved in action research and the qualitative methods related to this study and expands the context of the study. Chapter 4 examines the action research case findings. Chapter 5 provides a detailed analysis of the action research case findings based on the action research cycles, including interventions and research questions that guided this study. Chapter 6 summarize*s* the study, discusses research questions and conclusions, and offers implications for school leaders and further research.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

Every Student Succeeds Act of 2015 (ESSA) reauthorized the commitment the Elementary and Secondary Education Act (ESEA) had to equal opportunity with an explicit focus on advancing a well-rounded education for disadvantaged and high-need students (U.S. Department of Education). Although policies regarding master scheduling were non-existent, a comprehensive school schedule structure supported the ESSA guidelines for serving students with elevated needs (Chenoweth, 2016). However, considering the impact the master schedule could have on improvement, Pittman (2022) found limited evidence of developing and implementing master scheduling best practices at state and school district levels.

The purpose of this study was to examine how district-designed master scheduling interventions impacted the scheduling approach of college and career academy high school leaders. The researcher considered perspectives from principals and assistant principals responsible for supporting a component of the local school master schedule. The researcher worked with an Action Research Design (ARDT) and Implementation Team (ARIT).

To address the purpose of this action research study, the following research questions guided this inquiry:

1. What factors impacted how school leaders use the master schedule structure to meet the needs of each student equitably in a college and career academy setting?
2. How did college and career academy leaders describe the impact of district-designed interventions on their approach to master scheduling for student equity?

3. What did an action research design team learn from creating and facilitating master schedule interventions for college and career academy leaders?

The researcher worked with an action research team to examine the impact of district-designed master scheduling inventions on college and career academy leaders. The team used questionnaires, interviews, consultation groups, observations, and field notes to inform the study. In addition, the researcher reviewed the literature on educational systems, structures, and resources to understand the overall girth and gaps in research.

The literature review proceeds with three sections, achieving the objectives of the dissertation study. The first section provides an overview of college and career academies, which is the setting in which the study takes place. The second investigates how local school structures support and hinder student opportunity and access. The third and last section examines the definition of school resources and the influence of allocation on school structures.

College and Career Academies

The desire for college- and career-ready students in the United States created a high priority for secondary schools (Fletcher & Tan, 2022; Hemelt et al., 2019; Hernandez-Gantes et al., 2019; Kemple & Willner, 2008). Although college- and career-ready preparation looks different nationwide, research showed that schools approached meeting the goal through reconceptualizing curricular and program structures (Fletcher & Tan, 2022). The college and career academy model, a widespread high school reform, is an example of revisioning school structures that support students accessing college- and career-focused curricula (Kemple & Willner, 2008). This literature review overviews college and career academies, including historical context and influence on student outcomes.

College and Career Academies Overview

The college and career academy model is a systematic, inclusive structure that addresses student preparation for postsecondary education and careers by developing competencies that support both (Fletcher & Tan, 2022; Kemple & Willner, 2008). The academy model addressed college and career readiness preparation through three distinct elements. The first element was small learning communities, essentially schools within a school. The second element focused on integrated academic and career and technical education curricula, allowing teachers to teach academics with a career theme to foster career and technical education skills. The third element required schools to partner with businesses, the community, and postsecondary institutions. These partnerships allow each entity to serve as advisors and providers in career awareness, work-based learning opportunities, and student dual enrollment opportunities (Fletcher & Tan, 2022; Kemple & Willner, 2008; NCAC, 2013). The foundational elements grounded the original start of the career academy model (Kemple & Willner, 2008).

Career academies have been a part of the education landscape for over 50 years, with the concept first appearing in Philadelphia in 1969 (Hackmann et al., 2018). The model gained popularity in the 1990s, with several states and cities sponsoring career academies (Stern et al., 2010). High schools faced multiple student concerns during that era, including student disengagement, high dropout rates, and a lack of skills needed to transition to postsecondary opportunities or the workforce (Herlihy & Quint, 2006; Kemple & Willner, 2008; Stern et al., 2010). Student data, including low attendance rates and grades, at the middle school level showed a higher chance of dropping out of high school or not pursuing postsecondary education opportunities (Kemple & Willner, 2008). Therefore, career academy implementation during that

period targeted low-performing schools that served a more significant population of black and Hispanic at-risk students (Hemelt et al., 2019; Kemple & Willner, 2008; NCAC, 2022).

Over time, the popularity of the model caused a rapid grassroots expansion to include more than 7,000 career academy high schools serving over one million students (Fletcher & Tan, 2022; Lanford & Maruco, 2019; NCAC, 2022). However, despite the rapid growth, the ever-evolving educational landscape that included shifting student demographics, changing legislation policies, and updated standards provided challenges (Hemelt et al., 2019).

The No Child Left Behind (NCLB) era of high-stakes accountability and common core standards was one policy implementation that influenced national educational priorities (Hemelt et al., 2019; Kemple & Willner, 2008). Kemple and Willner (2008) suggested that career academies came under pressure when NCLB focused on access to a rigorous curriculum and high-stakes accountability measures. These measures shifted the emphasis from career and technical skills to competencies needed to pursue post-secondary education (Hemelt et al., 2019; Mokher & Jacobson, 2021).

President Obama signed the Every Student Succeeds Act of 2015 (ESSA), renewing a policy push toward college and career readiness (Malin & Hackmann, 2019). The 2018 Strengthening Career and Technical Education for the 21st Century legislation (U.S. Department of Education) followed the ESSA adoption three years later. That bipartisan legislation reauthorized the Carl D. Perkins Career and Technical Education Act of 2006 (Perkins IV), thus becoming Perkins V. The legislation provided $1.3 billion in annual funding to continue improving middle, secondary, and postsecondary career education programs (U.S. Department of Education). The legislation sought to improve access to academic and technical opportunities by building and implementing programs of study, including career pathways. In addition to

expanding career and technical education offerings, the legislation also required provisions for schools to provide access to rigorous academic coursework (Strengthening Career and Technical Education for the 21st Century Act, 2018).

Perkins V aligned with the ESSA recommendations and the career and academy model objectives (Fletcher & Tan, 2022). Changes to legislation policies led to career academy advocates rebranding to model college and career academies with the National Advocacy Consortium for Career Academies, declaring the goal of academies to improve college and career academies for all students (Hemelt et al., 2019; NCAC, 2022). Despite the rebranding, the student outcomes remained similar.

College and Career Academies Student Outcomes

Hemelt et al. (2019) found that high-quality college and career academies improved high school graduation rates for male students. Kemple and Willner (2008) also found in their 15-year longitudinal study that the academy model benefited students with a substantial risk of dropping out of high school by improving attendance and increasing credits toward graduation, thus increasing graduation prospects. When students graduated from career academies, their high school transcripts reflected a combination of academic, career, and technical courses (Kemple & Willner, 2008). Bottoms (2022) described the combination as students showing "academic and technical readiness" (p. 21). Kemple and Willner (2008) also found that there was a correlation between interpersonal support levels from teachers and peers in the academy model. Findings showed reduced attendance rates and academic course enrollment resulting from low support (Kemple & Willner, 2008).

Kemple and Willner (2008) did not show that integrating academic, career, and technical education courses influenced curriculum or instructional strategies and practices. The findings

highlighted a lack of difference in the scope and sequence requirements of non-academy and academy schools as the reason for no influence (Kemple & Willner, 2008). They also suggested that because of the lack of effect on curriculum and classroom instruction, standardized testing did not increase (Kemple & Willner, 2008). Herlihy and Quint (2006) concluded that structural changes alone were insufficient for student achievement improvement.

Bottoms (2022) suggested that schools and districts needed a "well-designed and implemented accountability system" to measure instructional strategies and practices consistently (p. 18). Research from several studies agreed that curricula integration and changes also required ongoing content-specific teacher professional development beyond the traditional offerings and common planning time that allowed teachers to collaborate and plan coordinated career-related themes into lessons (Hemelt et al., 2019; Herlihy & Quint, 2006; Kemple & Willner, 2008).

Professional development and common planning time allow teachers to collectively design rigorous assignments that link interests to learning (Bottoms, 2022). Research suggests rigorous assignments foster skills such as "research, analysis, planning, evaluating, technical, technological, and self-reflection," demonstrating academic and career readiness (Bottoms, 2022, p. 74). In addition, weekly planning time also played a role in the case of high-quality career academies improving college enrollment for male students (Hemelt et al., 2019). Teacher planning is an integral part of the master schedule.

The implementation quality of career academies varies across the nation and local school districts (Kemple & Snipes, 2000). Implementing career academies with high, consistent fidelity on a large scale is challenging (Hernandez-Gantes et al., 2019; Kemple & Willner, 2008). Research suggests that the level of support by the school district determines the effectiveness of

implementation and sustainability (Herlihy & Quint, 2006). School district leaders must first buy into the need for more rigorous academic and career-focused courses (Bottoms, 2022). In addition, schools need skilled personnel capable of supporting the design, implementation, and monitoring of college and career academies (Herlihy & Quint, 2006; Lanford & Maruco, 2019).

Herlihy and Quint (2006) identified scheduling students and teachers as an implementation challenge. The challenge stems from the need to ensure students and teachers stay within the same small learning community while also trying to meet the needs of opportunities and access outside the academy. The level of support needed to provide successful access requires a conscientious effort by a team that oversees organization and scheduling practices (Bottoms, 2022).

Opportunity and Access

ESSA consisted of provisions that focused explicitly on advancing opportunity and access for disadvantaged and high-need students. The requirements included teaching high academic standards, supporting and growing locally developed evidence-based interventions, maintaining accountability and action expectations to effect positive change in the lowest-performing schools, and addressing resource gaps (U.S. Department of Education). Although the ESSA provisioned requirements for advancing opportunity and access, it allowed local schools and districts flexibility in advancing equity for their most critical populations (U.S. Department of Education). Cook-Harvey et al. (2016) insisted that these provisions could become pillars for creating student opportunities and access when strategically leveraged. Kostyo et al. (2018) resolved the four provisions as steps to ensure students in low-performing, high-poverty schools graduated with key competencies by expanding access to a college and career-ready curriculum.

Structuring Opportunity and Access

Cook-Harvey et al. (2016) defined access as the "policies and practices that provide every student access to an education reflective of meaningful learning" (p. 1). The lack of opportunity and access for students impacts student achievement, including graduation and postsecondary opportunities, by creating variation in a high-quality curriculum (Cook-Harvey et al., 2016). School leaders must understand the processes and structures that create gaps in student opportunities and access (Pisoni & Conti, 2019). The following section reviews the impact of systems on creating opportunity, access, and inequality.

Master Scheduling for Opportunity and Access

Kostyo et al. (2018) stated, "Putting forward a plan is the first step in the process of acknowledging and undertaking the work to be done to produce greater opportunity and equity for students" (p. 2). The overall schedule of a school is a valuable and strategic but often overlooked structure for driving equity work in school improvement (Canady & Rettig, 1995; Clay et al., 2021). Schools possibly dismiss the capabilities of the master schedule because it presents as a technical process that organizes the school day (Clay et al., 2021; Kruse & Kruse, 1995). However, the master schedule is not a technical process but a leadership process requiring a technical element (Devilbiss, 1947; Clay et al., 2021; Kruse & Kruse, 1995).

Research shows that the school leader is second only to classroom instruction in impacting student learning and achievement (Day et al., 2016; Grissom et al., 2021; Leithwood et al., 2004). The influence of the school leader supports the observation Devilbiss (1947) made that school schedule preparation is one of the most important duties and responsibilities of a high school principal. Devilbiss (1947) contended that the school schedule allowed leaders to express a philosophy, communicate the objectives of secondary education, establish the values in the

school program, exhibit human understanding, and efficiently utilize resources that served and benefited many students.

Canady and Rettig (1995) agreed with Devilbiss when reviewing schools that crafted master schedules skillfully. The results included more efficient use of time, space, and human and material resources and the ability to establish programs and instructional practices that lead to improved climate. A well-crafted master schedule allows the schedule to become a living structure that reflects the culture, environment, expectations, vision, and priorities of the school and district (Clay et al., 2021). School leaders communicate these attributes to stakeholders through time, location, course sequence, program offerings, student placements and grouping, and teacher assignments; these are the key areas school leaders work within to inform the master schedule process. (Clay et al., 2021; Kruse & Kruse, 1995).

Master Scheduling and the Time Resource

Time is a critical educational structure and resource due to its impact on learning (Donahoe, 1993). Time steers and controls several variables, including school oversight, parent schedules, and the curriculum pacing calendars that pace instructional deliverance and student course content comprehension and mastery (National Education Commission on Time and Learning, 1994). The historical criticality of time in education appeared in 1894, when U.S. Commissioner of Education William T. Harris, completed a published report on the relationship between time and learning by studying the negative impact a reduction in school days had on student learning (National Education Commission on Time and Learning, 1994). Exactly a century later, the National Education Commission on Time and Learning (1994) also studied the relational aspect of time and learning out of concern for student achievement. Despite being 100 years apart, the reports yielded nearly identical results: time is a barrier to learning, and

reductions in time equate to learning disruption (National Education Commission on Time and Learning, 1994).

The National Education Commission on Time and Learning (1994) declared that due to the standardization of time, it became "learning's warden" (p.5). Therefore, schools and students became "prisoners to time" (National Education Commission on Time and Learning, 1994, p. 13). Bates and Morgan (2018) described time as a "silent inhibitor and preventer of forwarding progress," thus making time one of the "constant competitors" in education (p. 131). Time is a fixed structure that continued to lack changes in the education system throughout the 20th and 21st centuries, including the rigid start and end times of the school day and year, despite the constant changes to expectations in providing students with more effective instruction (Bates & Morgan, 2018; National Education Commission on Time and Learning, 1994). Several researchers attributed time regulation to the Carnegie Standard Unit (Kruse & Kruse, 1995; National Education Commission on Time and Learning, 1994; Schroth, 2016).

The Carnegie Standard Unit, first implemented in the late 1800s, introduced a time unit allocated by specific minutes as class periods for a single subject (Schroth, 2016). Kruse and Kruse (1995) described the Carnegie Standard Unit, also known as the Carnegie Unit, as an extension of the industrial standardization reforms that sought to improve factory worker efficiency. Learning became a form of production with students who passed a course in a certain amount of time earning a Carnegie Unit applied toward graduation requirements (Kruse & Kruse, 1995). An earned Carnegie Unit fundamentally determined if a student mastered the content and demonstrated readiness for college.

Silva et al. (2015) believed the Carnegie Unit changed the educational landscape by influencing the design and delivery of education through daily school schedules, graduation

requirements, and teacher assignments. The Carnegie Unit required schools to assign students a set time, teacher, and space to complete their learning and mastery of content, effectively establishing a master schedule. A master schedule requires a bell schedule to determine the movement of students and teachers through time and space.

The school bell schedule is a time structure within the master schedule that supports opportunity and access or creates inequality, depending on the flexibility of the schedule. Although different bell schedule models exist, the bell schedule is limited only to the creativity of the school leaders and teachers (Daniel, 2007). School leaders may use a preexisting bell schedule as is or adapt it to meet the vision and purpose. However, CCASN (n.d.) recommended that when schools design a bell schedule, they should always start with learning first.

The Carnegie Standard of Time influenced the most common traditional bell schedules, the six-period, and the seven-period daily semester schedules (Schroth, 2016). The semester schedule design allows for 45 or 50-minute classes throughout 18 weeks. This schedule manages expectations that students will complete and master a subject by the end of the 18 weeks in the class time allotted (Kruse & Kruse, 1995). Considering the learning habits of students and the fact that not every student learns synchronized with one another, schools began to look for other ways to work within a six-hour school day (The National Commission on Education, 1994).

High schools began implementing flexible schedule models, such as block scheduling, in the mid-20th century (Canady & Rettig, 1995). The models allowed schools to have creative flexibility in determining how best to use their time to meet the needs of their students and teachers as opposed to the rigidness of a semester schedule (Daniel, 2007). Over time, schools

used various flexible scheduling models that promoted inventive flexibility. Those models included 4x4, trimester, and alternative block (A/B) (Canady & Rettig, 1995; Daniel, 2007; Schroth, 2016).

Zepeda (2006) recognized a splinter in the research regarding the impact and effect of block scheduling. Although the flexible scheduling models vary in time construction, they all increased instructional time to blocks of 75-150 minutes, typically by reducing the number of class transitions (Daniel, 2007). However, Thomas (2001) insisted that block scheduling did not simply abandon the prison of time theory with the increased instructional time but only changed the type of prison because students had more time to discuss but not necessarily master ideas and concepts. Arnold (2002) compared a traditional seven-period bell schedule to a seven-period A/B block schedule. He found that although schools with the A/B block schedule experienced increased student achievement during the implementation year, the increases diminished by the second year.

Daniel (2007) and Schroth (2016) suggested that the positive impacts of flexible scheduling, regardless of models, included grouping students by ability levels and the ability to optimize course offerings by adding popular and new courses. However, Thomas (2001) questioned if all subjects demanded the same allotted time and frequency when considering the course content delivery style for teaching the subject and students' learning styles.

Master Scheduling and the Student Experience

A master schedule can "structurally and systematically" create and hinder options for students (Clay et al., 2021, p. 13). Structurally, a school schedule can languish with few annual changes or flourish by becoming a living structure that evolves with student needs (Hibbeln, 2020). Systematically, the simplicity of coordinating movement and creating interrelation

elements can significantly impact student experiences. These experiences include access to opportunities, supports, and services, social interactions, interests, educational trajectory, graduation and college entry course alignment, and teacher assignments, including novice versus experienced (Pisoni & Conti, 2019). The construction of the master schedule can determine if leaders sort students into isolation by ability, expose students to experienced teachers, and provide an opportunity to engage in various academic programs and rich and rigorous coursework in advanced courses (Hibbeln, 2020; Pisoni & Conti, 2019). These determinants of the master schedule influence and impact how a student experiences school.

Devilbiss (1947) suggested that one criterion of a good schedule is flexibility to meet the everyday needs of students related to society. Although societal demographics have changed significantly since Devilbiss' research, this criterion describes what is now considered a student-centered schedule driven by the acknowledgment that students come to school with various needs to meet graduation requirements and prepare for postsecondary opportunities successfully (Clay et al., 2021). These needs include but are not limited to learning and other disabilities, language barriers, giftedness, talent, economic disadvantage, and academic, social, and emotional needs (Pisoni & Conti, 2019). These needs often add complexity to the student experience as leaders confront how to meet each demand best, markedly when they overlap and work within the barriers of other variables.

Unfortunately, a puzzle of various components often hinders the student experience by limiting the flexibility of the master schedule (Clay et al., 2021; Pisoni & Conti, 2019). The components, often bureaucratic, hinder specific student needs to function as the primary drivers of the master schedule (Clay et al., 2021). These components include graduation requirements, fixed school calendars, non-academic needs, scarce resources, and local, federal, and state

mandates (Clay et al., 2021; Pisoni & Conti, 2019). Hibbeln (2020) suggests that school scheduling processes are static despite demographic changes. However, the compliance nature of leaders satisfying the rules and components may cause the schedules to stay fixed and inadvertently create inequities for students (Clay et al., 2021).

Leadership helps ensure the master schedule is a living structure designed to mitigate restrictive components of the student experience by constructing the schedule as the foundation of the school vision (Clay et al., 2021). The master schedule should promote high-quality instruction by ensuring students access rich and rigorous coursework in advanced courses. TNTP (2018) completed a study that controlled for academic achievement and found that classrooms with more low-income students had fewer high-quality educational experiences than others. In addition, that same study found that some groups of students, specifically those from low-income, black, or Latino households, receive fewer opportunities to reach academic levels of success that, at the very least, place them on grade level (TNTP, 2018). Although TNTP (2018) concedes that more research is needed to determine the root of the opportunity inequities, they found a pattern in teacher expectations of student abilities.

Teachers do not always have the highest expectations for the highest-need students (TNTP, 2018). Nevertheless, nationally, students spend approximately 1,200 hours a year in school interacting with teachers and support staff through curriculum and instruction, advisement, social services, and non-academic activities (NCES, 2008). However, the highest-need students are not constantly interacting with the most experienced teachers (Hibbeln, 2020; Pisoni & Conti, 2019). Restrictive practices such as those in AP Programs also indirectly impact the opportunities for students to engage with highly experienced teachers since school leaders

often assign them to teach these courses (Cartagena & Slater, 2021). Hibbeln (2020) suggested that the master schedule can ensure this does not happen.

Managing the many leadership components that create student experiences is challenging, especially in establishing that the school schedule communicates the experience. If not approached strategically, teacher and student schedules can encourage disparities in access to rigorous coursework and experienced educators (Clay et al., 2021). Therefore, schools should not complete the master schedule in isolation from staffing due to the need to align data-driven student needs with teaching abilities strategically.

Master Scheduling and Personnel Resources

The master schedule structure regulates teacher daily experiences, including workload, class makeup, number of preps, and planning time (Hibbeln, 2020; Pisoni & Conti, 2019). Each of these components impacts how schools meet the needs of students. Historically, teacher preferences influenced what and whom teachers taught (Clay et al., 2021). When teacher preferences drive decisions about teacher assignments, experienced teachers may opt to teach more rigorous coursework (Cartagena & Slater, 2021; Clay et al., 2021). Conversely, how schools assign teachers to classes impacts the services students receive, including unequal access to specific courses and experienced teachers (Clay et al., 2021; Pisoni & Conti, 2019). For instance, research shows that high-needs students are often assigned teachers with the least experience, and these classes are frequently overloaded in size (Pisoni & Conti, 2019). The imbalance between inexperienced and experienced teachers can disadvantage students and teachers (TNTP, 2018). Strategically approaching the master schedule structure requires schools to evaluate if the schedule appropriately pairs students' needs with the best-fit educator.

In addition to the impact of teacher course loads, class makeup, and class size on student needs, the master schedule impacts teacher support needs. Teachers need adequate time within the schedule to improve their practice through collaboration with peers, self-reflection, and professional development (Clay et al., 2021; Hibbeln, 2020). Alverson et al. (2021) found that common planning times increased collegiality between teacher peers and promoted interdisciplinary instruction. Therefore, planning periods, specifically common planning periods, embedded within the schedule support teachers' need to learn collectively.

Chenoweth (2016) declared the master schedule as the "heart and soul of teaching and learning" (p. 41). This declaration creates an urgency to ensure the master scheduling process is indeed one of leadership and not logistical or technical. When schools construct the master schedule based on data-driven student needs as communicated in the school vision, mission, values, and priorities, the master schedule becomes valuable leverage in realigning and shifting financial and human resources to students who experience inequities, thus encouraging successful outcomes (Hibbeln, 2020; TNTP, 2018). Schools also need district-level commitment to allocating resources for equity improvement (Bottoms, 2022).

Education Resources

Adequate school resources work together to support the school improvement goals of the local school district and local schools by providing students an opportunity to learn (Knight, 2019). For resources to be impactful, they require efficient allocation and management to support learning and influence student outcomes effectively (Lee et al., 2021). Although the federal, state, and local governments fund most resources for districts and local schools to operate, they do not necessarily determine all fund usage, as that is typically at the discretion of the school

district or local school (Lee et al., 2021). Therefore, district and school leaders are vital in allocating and using school resources.

School leaders must understand how to allocate and effectively use school resources within the school schedule to ensure student success. Their understanding must include a clear definition of school resources, where they come from, how resources impact student outcomes, and how state and local government policies and policymakers influence the resources, including how much they receive.

Defining School Resources

Hanushek (1998) recognized differences in identifying and defining school resources and how researchers measured the impact of school resources on student outcomes, making understanding the research findings and implications difficult. Therefore, this section attempts to identify the most common school resources in the literature.

Categorizing School Resources

Grubb (2009) identified educational resources as measurable, including per-pupil expenditures, teacher skill and experience, and books. Hanushek (1998) did not define school resources; however, he identified the most recognized school resources as real, financial aggregates, and other resources. Real resources represented personnel, including the education level and experience of teachers and teacher-pupil ratios (Hanushek, 1998).

According to Hanushek (1998), the real resource category is a primary focal point in research because of readily well-measured available data that best summarizes resource variations at the classroom level. Hanushek (1998) suggested that because teacher education and experience both determined teacher salaries, combined with teacher-pupil, all three contribute to the resource variations at the classroom level. Economic resources aggregates included

expenditures per pupil and teacher compensation, while other resources included facilities, books, technology, and other tangible items (Hanushek, 1998). In research a decade later, Greene et al. (2007) recognized the other category as a real resource and categorized two school resources: financial and real, combining personnel and material. However, despite simplifying the types, research continued to develop and reclassify school resources over the succeeding years.

The Organisation for Economic Cooperation and Development (OECD) (2013) defined measurable resources as financial, human, material, and time. Usman (2016) included the community as a fifth school resource category. The addition stemmed from the belief that if schools leveraged their community by establishing local partnerships, schools might better understand the needs of their students (Usman, 2016). The OECD (2013) and Usman (2016) underscored the crucial impact a basic set of resources could have on creating student learning opportunities.

Romlah and Latief (2021) described these basic sets of resources as the "process of dealing with various problems within the scope of the school to be able to support school activities to achieve predetermined goals" (p. 39). In other words, school and district leaders must purposefully allocate school resources for adequate progress toward school improvement goals. The source of help, specifically financial resources, can often influence what schools use them for and how they use them to ensure they positively impact student outcomes.

Sources of Financial Resources

Literature on school resource sources in the United States consistently recognizes governmental financial support at the federal, state, and local levels (Al-Samarrai et al., 2020;

Murray et al., 1998). This section overviews those financial supports, including additional supplemental financial funding sources.

Greene et al. (2007) recognized financial resources as the dollar amounts schools acquire, allowing them to fund their school improvement goals, thus making financial resources the foundation of human, material, time, and community resources. Financial investments in education are necessary for a prosperous and quality society as education supports the health of an economy by providing a skilled and educated labor force (Hanushek, 1998).

Although the funding sources vary by country, state, and city, Al-Samarrai et al. (2020) identified government entities, households, and donors as the three significant educational funding sources worldwide. However, the OECD (2017) emphasized that although several sources contribute to education funding, public budgets provide the primary source of school funding. This conclusion holds in the United States, where although individual and organization donors may donate to schools, the federal, state, and local governments provide much of the aid for education (Murray et al., 1998).

Most school funding comes from the state and local governments; however, the federal government supplements a portion of the state and school districts' budgets through various grant programs that target specific student populations and educational objectives (Davis & Ruthotto, 2019). Title 1A and the Strengthening Career and Technical Education for the 21st Century Act (Perkins V) are two sources of federal funding significant to this study. Title 1A is a federal government grant program that provides financial assistance to districts and schools serving 35% or more children from low-income families to help meet academic standards (U.S. Department of Education). The Perkins V reauthorized the Carl D. Perkins Career and Technical Education Act of 2006. The bipartisan legislation provided $1.3 billion to support improving

secondary and postsecondary career and technical education programs that develop student academic, career, and technical skills (U.S. Department of Education). When considering these multiple federal, state, and local funding sources, school leaders must understand funding and budget structures to use school resources to ensure student outcomes reach the desired success.

Leaders at the federal, state, and local levels use the allocated public funds to address multiple policies that support the various needs of students and communities. With the financial resources, schools can hire staff, order instructional materials, or designate the necessary time to accomplish the goals of the school improvement plan (Green et al., 2007).

Allocating School Resources

The literature on school resources consistently focuses on financial resources and the impact educational dollars have on student outcomes with little consideration for other resources (Greene et al., 2007; Grubb, 2009). However, financial resources are the core from which the additional resources derive. According to Greene et al. (2007), the financial resources provide the dollars to fund the educational programs put forth by schools and purchase real resources, human resources (personnel), and material, all of which support student learning and produce outputs.

Lynch (2016) insisted that allocating resources goes beyond assigning dollar amounts to schools and programs and is best served when the dollars address educational goals through actions regardless of the governance level. Funding is only one educational resource and generally the source for which districts and schools advance their school improvement goals. How leaders use allotted money to make fundamental changes in their school communities based on the needs of their students is essential.

Impact on Student Outcomes

Research is conflicted when determining the impact education resources have on student outcomes (Lafortune et al., 2018; Rothstein & Schanzenbach, 2022). Older studies, such as the Coleman Report (1968), suggested that education resources do not increase student achievement, setting a tone for other subsequent studies to follow and substantiate. Hanushek (1997) analyzed several subsequent systematic conclusions to provide abridged evidence on the influence of various school resources. He found that 9% of the studies that considered teacher education level and 15% that investigated teacher-pupil ratios showed positive and noteworthy effects on student performance (Hanushek, 1997).

However, positives typically accompany negatives. Hanushek (1997) found that 13% of the studies investigating teacher-pupil ratios showed significant adverse results. These results led to Hanushek's (1997) analysis that there is little confidence that solely adding more specific resources to schools will increase student achievement. In addition, he found languid support for merely providing higher teacher salaries or more overall spending will lead to improved student performance.

Rothstein and Schanzenbach (2022) indicated that older studies that suggested resources do not impact student achievement were observational and contained biases, thus making them flawed. Rothstein and Schanzenbach (2022) believed the studies occurred when schools had low exposure to school resources, and segregation persisted. Archibald (2006) and Lafortune et al. (2018) recognized that state-level school finance reforms enacted during the adequacy era caused a shift in methodology for studying the impact of resources on student achievement. During the adequacy era, states faced court mandates determining if they provided adequate school resources.

Archibald (2006) defined a positive impact of school-level educational resources, specifically per-pupil spending, on student achievement related to standardized assessments. They found that because these reforms did not approach school funding by leveling down but rather by increasing expenditures, universally, low-income districts experienced a more considerable increase in financing. According to Lafortune et al. (2018), schools spent the added funding to increase real resources and improve capital expenses to advance student achievement on national assessment data.

Each state has a method for funding the educational system. This section reviews the funding system used in the state in which this study took place, including a historical overview of the past 50 years, status, and future needs.

Georgia's Educational Funding System

Georgia has a primary constitutional obligation to provide citizens with an accessible, adequate, and equitable K-12 public education (Ga. Const. art. VIII, § 1, para. 1). A mix of federal, state, and local revenues supplies the funding support needed to meet the constitutional requirement. The federal government provides additional funding to support the needs of specifically targeted student populations and educational objectives (Davis & Ruthotto, 2019). The state and local governments provide most of the financing by budgeting considerable financial resources sourced from taxation (Davis & Ruthotto, 2019). Georgia implemented two funding systems in the past 50 years: the Adequate Program for Education in Georgia (APEG) and the Quality Basic Education (QBE) Act (Brown, 1978; Harris, 1986).

The 1974 Adequate Program for Education in Georgia (APEG) law laid the first foundation for the educational funding system. APEG, according to Brown (1978), was a foundation program formed of 12 funded or partially funded calculated costs of instructional

services. Brown (1978) described those instructional services as salaries for classroom teachers and special education teachers, kindergarten, instructional media and equipment, maintenance and operation, sick and personal leave, travel, transportation, and isolated schools. The average daily attendance (ADA) pupil count determined the allotments for the foundation programs (Brown, 1978).

The state-funded the expenditures using "an unfunded district power equalizing formula applied to local leeway and enrichment" (Brown, 1978, p. 404). Rubenstein et al. (2000) described state funding as mostly grants provided to the local school systems for actual expenses only. The school systems equalized state funding through their ad valorem taxation.

The APEG law sought to accomplish a list of goals, including providing an "equitably financed public educational structure assuring each Georgian an adequate educational opportunity" (Brown, 1978, p. 402). However, parents, students, and school officials challenged the APEG program with a lawsuit that deemed the program unconstitutional due to a reliance on local property tax, considering some districts in the state had a lower tax base than others. According to Rubenstein et al. (2000), the plaintiffs argued that the reliance on the local property taxes did not sufficiently meet the constitutional obligation to provide an adequate education program, which they also believed included providing more significant equity funding across districts.

Although the court ruling upheld the APEG as constitutional, the court recognized the vast educational expenditure disparities across school districts. According to Rubenstein et al. (2000), this recognition led to an educational review committee appointed by the Governor to review APEG and make recommendations, which led to the passing of the 1985 Quality Basic Education (QBE) Act (1985). The QBE Act (1985) became the second state funding system and

passed the Georgia General Assembly nine years after the APEG law. At the time of this study, the QBE Act was still the current legal framework for providing free public education to Georgia citizens.

The QBE divides the funding structure into full-time equivalent students (FTE) and certified staff training and experience. The state uses a funding formula based on FTE student counts in 19 programs, with each program carrying weights that reflect assessed costs associated with each program (Davis & Ruthotto, 2019; Owens, 2022; Rubenstein et al., 2000). Student schedules served as the data source for determining the program counts. The least expensive program weighs 1.0, and the costlier programs weigh more. The QBE based the expensive programs such as special education and gifted on the costing components of each program (Rubenstein et al., 2000). Rubenstein et al. (2000) identified increasing teacher salaries as the only significant change between passing the QBE Act in 1985 and 2000. However, there have been substantial changes since 2000 in the form of budget cuts.

According to Owens (2022), the QBE allotted $5,751.10 per pupil spending in 2021. However, Davis and Ruthotto (2019) and Owens (2022) acknowledged a per-pupil decrease over the last two decades. Owens (2022) found that during FY2021 and FY2022, the state cut $383 million in both years, bringing total cuts to $10 billion since FY 2003. Interestingly, the reductions during FY2021 and FY2022 came at a heightened crisis with the Coronavirus disease (COVID-19) when schools needed additional funding due to pivots from in-person learning to digital learning and the learning loss experienced by students (Reimers, 2022).

Funding became critical as the state and school districts battled the ever-changing COVID-19 pandemic. Although there is limited research regarding the specific reasons for the state budget cuts, Al-Samarrai et al. (2020) suggested the shelter-in-place orders' economic

impacts and competing priorities in government budgets, including public health versus public education, as factors. Owens (2022) insisted that as a method for balancing the state budget, funding for education is often a casualty. However, the federal government responded to the economic outcome of COVID-19 by providing additional funding to mitigate pandemic harm.

The federal government issued Georgia $6.6 billion from the Elementary and Secondary Emergency Relief funds provided in the Coronavirus Aid, Relief, and Economic Security Act (CARES), Coronavirus Response and Relief Supplemental Appropriations Act (CRRSA), and America Rescue Plan Act (ARP) (Georgia Insights, 2022). The intent of the funds included supporting the efforts to safely reopen the school, mitigate learning loss, and efforts to reduce the COVID-19 impact on students and families (Georgia Insights, 2022). Although the additional federal funding provided significant support to states and local schools, Owens (2022) insisted that more stable state funding is needed.

In addition to the state funding, the QBE Act required local systems to contribute five effective mills as their local funding contribution to participate in the QBE program (O.C.G.A. § 20-2-164). Davis and Ruthotto (2019) described the mills as the equivalent of the property tax revenue the local school system would levy on the system tax digest. However, Owens (2022) suggested that, as with APEG, QBE local funding requirements still create equity issues amongst districts, with the wealthiest communities providing more funding than the poorer districts.

The Education Commission of the States (2021) corroborates Owens (2022) by recognizing Georgia as one of six states that do not provide additional funding to impoverished students through the funding system. There are calls for the state to consider adding an opportunity weight to the QBE formula based on student poverty, including a recommendation from the 2015 Education Reform Commission that a former Governor authorized (McKillip &

Farrie, 2019; Owens, 2022). The state appeared to heed those calls during the 2022 Legislative Session when Georgia adopted Senate Resolution 650.

Senate Resolution 650 (2022) reaffirmed state policy to provide every Georgia citizen an adequate and equitable education sourced through school funding by recognizing the need to review and evaluate the current funding mechanisms. The resolution established a Senate Study Committee to Review Education Funding Mechanisms. The Senate Study Committee comprised five members who studied the conditions, needs, issues, and problems stated in the resolution. Based on input from stakeholders and the results from the study, the Senate Study Committee identified priority areas to add as an update to the funding formula. Those areas included more school counselors and psychologists, added technology funding, and a poverty weight to provide additional funding for schools serving high-poverty areas (S. Res. 650, 2022). After the study committee, legislators introduced bills during the 2023 session with plans to fully debate and vote on the bills during the 2024 session (S. Res. 650, 2022).

Chapter Summary

College and career academies are established, popular high school reform models that provide all students access to integrated academic, career and technical curricula and applied learning opportunities (Hemelt et al., 2019; Kemple & Willner, 2008). The implementation and management of career academies have challenges that schools must overcome to ensure quality student learning opportunities (Herlihy & Quint, 2006). The research needs to be more extensive in offering guidance on how established college and career academies evolve to meet new crises that arise.

The school schedule is one of the most valuable yet overlooked structures for ensuring students, especially those disadvantaged and high-needs, have access to rigorous academic

content and career and technical education courses (Clay et al., 2021). The master schedule encompasses the vision, goals, and priorities of a school and communicates those attributes through time, space, course assignments, student groupings, and teacher assignments (Pisoni & Conti, 2019). Although the master schedule holds the potential to provide students with the equity they need in the classroom, it requires leaders to have a firm understanding of resources and how resource allocation impacts the vision, goals, and priorities of a school.

The impact of school resources on student outcomes is well-studied (Grubb, 2009; Hanushek, 1997; Hanushek, 2006). Although older research did not find that school resources positively impacted student outcomes, more recent research found that school resources matter in student achievement levels (Coleman, 1968; Jackson et al., 2021; OECD, 2017). Multiple sources of funding support school districts and schools. However, the most significant impact of resource allocation comes at the local school level, where local leaders decide how resources align with their visions and mission (Lee et al., 2021). However, research limitations exist on how leaders approach research allocation patterns.

Chapter 3 explains the action research methods, research study design, and interventions used in the study.

CHAPTER 3

ACTION RESEARCH METHODOLOGY

District and school policies, student choice over course selections, and restraints impacting course scheduling and teacher assignments create variations in organizational practices that often result in student inequities within schools (Lee et al., 2021; Wolf, 2018). These inconsistent organizational practices indicate that district and school leaders may benefit from additional learning centered on school scheduling processes that support creating equitable conditions for student access (Wolf, 2018). Master scheduling interventions focused on gradually allocating inputs, quality teacher assignments, and curricular structures support local school leaders in equalizing student learning opportunities (CCASN, n.d.).

The purpose of this study was to examine how district-designed master scheduling interventions impacted the scheduling approach of college and career academy high school leaders. The researcher considered perspectives from principals and assistant principals responsible for supporting a component of the local school master schedule. The researcher worked with an Action Research Design (ARDT) and Implementation Team (ARIT).

To address the purpose of this action research study, the following research questions guided this inquiry:

1. What factors impacted how school leaders use the master schedule structure to meet the needs of each student equitably in a college and career academy setting?
2. How did college and career academy leaders describe the impact of district-designed interventions on their approach to master scheduling for student equity?

3. What did an action research design team learn from creating and facilitating master schedule interventions for college and career academy leaders?

Chapter 3 provides a rationale for the qualitative research design, specifies the action research design, identifies the data collection and analysis methods, and addresses the reliability, validity, and limitations of the study.

Rationale for Qualitative Research Design

Education leadership requires "identifying, acquiring, distributing, coordinating, and using human, social, and material resources to create conditions for instructional innovation" (Spillane et al., 2001, p. 919). The master schedule provides school leaders the structure to allocate those core resources toward opportunities that pursue instructional innovation (Devilbiss, 1945; Pisoni & Conti, 2019). However, despite the purpose of the school schedule, Pittman (2022) observed that scheduling guidance and training is often limited to the local school level, technical training, and professional organizations that lack ongoing mentorship for schools. Pittman (2022) recommended future research that measured the connection between targeted master scheduling interventions, school site decisions, and instructional resource allocation.

Tracy (2010) concurred that "good qualitative research is relevant, timely, significant, interesting, and evocative" (p. 840). The Action Research Design Team (ARDT) chose qualitative research to address the "what and how" questions of scheduling practices and processes within the college and career academy setting. They used the candid perspectives and understandings of school and district leaders to establish a more profound knowledge through inquiry, exploration, and discovery (Glanz, 2014; Bloomberg, 2023). The perspectives from local site leaders gave the ARDT a better understanding of the factors that impacted the master scheduling process at these sites and how district-designed interventions influenced daily work

expectations and tasks. The study incorporated qualitative action research methods, including interviews, consultation groups, and observations. These methods permitted the researcher to answer the research questions (Mertler, 2020).

Overview of Action Research Methods

The primary purpose of this action research study was improvement through change and professional development. Action research allowed educational leaders in this study to use research principles and methodologies to target a problem of practice within their capacity for improvement (Glanz, 2014). The ARDT and ARIT pursued improvement by seeking answers and encouraging change using four themes: knowledge acquisition, empowerment, collaboration, and change (Ferrance, 2000; Mertler, 2020). This systematic approach to studying problems and advocating change in an organization requires active participatory cooperation and inquiry to encourage improvement, thus making practitioners the primary users of action research (Bloomberg, 2023; Coghlan, 2019; Mertler, 2020).

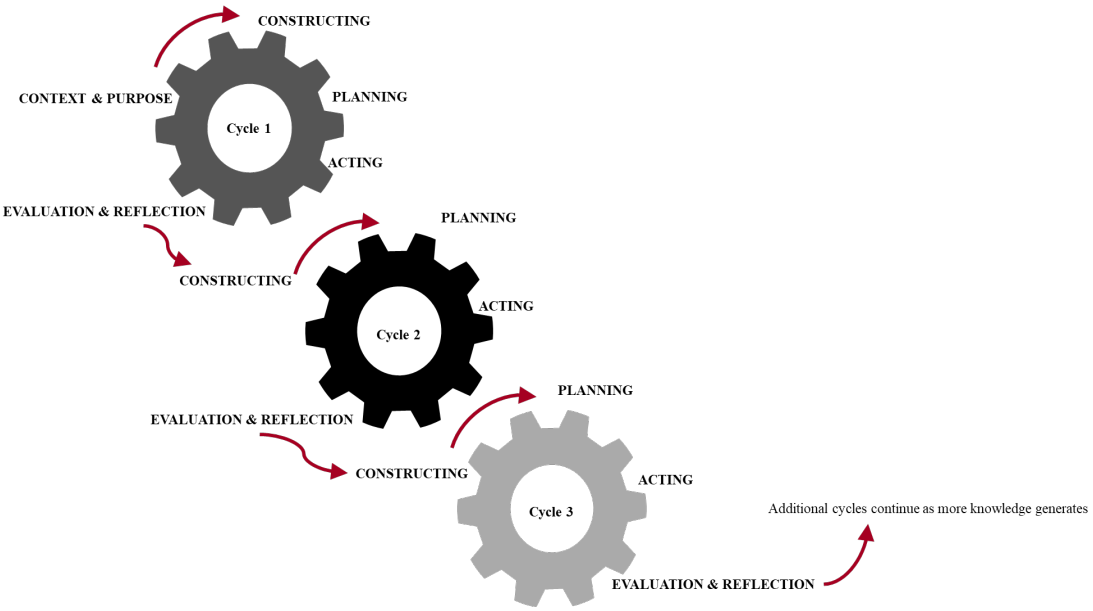
Action research supports improvement in an educational environment by generating new knowledge from reflection and implementing it through deliberate action (Bloomberg, 2023; Ferrance, 2000). The improvement cycle of the action research process spirals through multiple iterative stages (Mertler, 2020). This process promotes a deeper understanding of the problem of practice, leading to an increase in knowledge that enhances the collective decision-making skills of participants to inform future action (Bloomberg, 2023; Glanz, 2014).

The ARDT cycled through three steps of the action research process, as visualized in Figure 3.1. The cog gears represent an interpretation of the many moving parts of the action research cycle based on versions created by Glanz (2014) and Coghlan (2019). Each step in the progression, regardless of how small or large, is essential to achieving improvement and building

continuity in the process. Coghlan (2019) added context and purpose as a pre-step in the cycle. The pre-step serves the primary purpose of establishing a why, defining success, setting boundaries, and establishing collaborative relationships amongst participants before the process begins.

Figure 3.1

The Action Research Process



Note. Adapted from Glanz (2014); Mertler (2020).

The constructing step encourages participants to acquire new knowledge to examine research theories for best practices (Mertler, 2020). Glanz (2014) suggested that theory grounds everything an educator undertakes, even when unaware that they are using theory. However, action research does not directly contribute to theory development (Glanz, 2014). Instead, the knowledge generated by action research connects theory to practice by allowing participants to apply and assess theories, best practices, and tools identified in research (Bloomberg, 2023; Mertler, 2020). Bryk et al. (2015) described the bridge between theory and practice in action research as an improvement science that allows participants with different skill sets to

collaborate on improving practice by better understanding the current system and testing interventions to change that system.

This study depended upon the expertise of a diverse action research team. As the participants actively engage in the action research process, knowledge unfolded collectively, making action research intentional and collaborative participation (Bloomberg, 2023). Although the diverse perspectives potentially created a more significant variance in considerations due to participants understanding the problem from their purview (Coghlan, 2019), they were necessary. Action research should involve all those impacted by the identified problem to inform understanding and action (Bloomberg, 2023). The different perspectives, experiences, resources, and ideas lead to a better understanding of the problem and the best approach to providing interventions (Lewin, 1946). The subsequent sections provide information regarding the action research design the researcher used in this study.

Action Research Design

Master scheduling impacts organization components at a local school; therefore, the study incorporated Systems theory, which encouraged the study participants first to gain a deeper understanding of how the totality of tasks, processes, tools, policies, organizational structures, people, and norms impacted meeting the needs of each student (Bryk et al., 2015). The ARDT collected perspectives from local school and district leaders, which led to a more profound understanding of the system and the problem of practice within that system. The deeper understanding encouraged the participants to generate new knowledge, which led to developing and facilitating master scheduling interventions, reflecting on the perspective data collected after the interventions, and revising the interventions for the next phase of the intervention cycle, thus

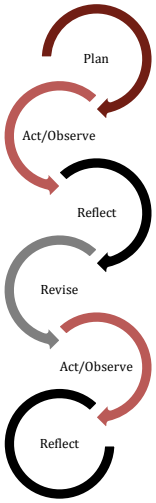
spiraling the ARDT through planning, acting, which included designing, creating, applying, and testing interventions that transformed the system into a desired state.

The Spiraling and Iterative Nature of Action Research

Action research supports change initiatives through an ongoing cycle of participant action and reflection (Coghlan, 2019; Glanz, 2014). Ferrance (2000) described this cycle as a "continuous confrontation with data" (p. 9). As visualized in Figure 3.2, the action research cycle requires participants and researchers to participate in a spiraling, iterative process addressed through planning, acting, observing, reflecting, revising, and repeating. Glanz (2014) described the reflective process as "reflection-on-action" because the process occurs as the actions and experiences unfold.

Figure 3.2

The Spiraling Nature of Action Research



Note. Adapted from Kemmis et al. (2014).

The spiraling effect of each stage created intentionality and responsiveness, permitting the researcher and action research teams to generate new knowledge through a deeper understanding of systems at the local school level (Bloomberg, 2023; Coghlan, 2019). The

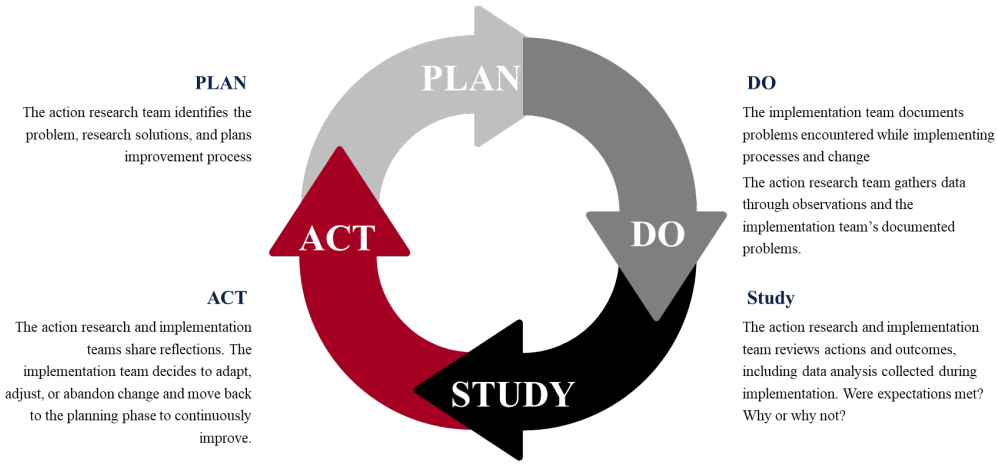
iterative process supported the researcher and participants in profoundly understanding the factors that impact meeting the needs of each student through the master schedule and how district-created master scheduling interventions can support mitigating those factors. The logic model defines the cycles of improvement that guided this study.

Logic Model

The action research team employed the Plan-Do-Study-Act (PDSA) Cycle as the logic model for the study. The action research team used the model to identify the conclusions that impacted school scheduling practices, establish the interventions to mitigate those factors, determine if the interventions produced the desired outcome to enhance scheduling practices, and adjust if the interventions did not have the desired results. The PDSA Cycle, envisioned in Figure 3.3, is a four-step continuous improvement process the action research team used to repeatedly interrogate new questions and reveal gaps in understanding by cycling through the steps multiple times (Bryk et al., 2015).

Figure 3.3

Logic Model



Theory of Change

The theory of change aligned the PDSA logic model cycle with the purpose of the study and research questions. As a part of the planning cycle, participants interrogated reality by analyzing the root causes of current master scheduling outcomes at the local school (Bryk et al., 2015). This examination generated perception feedback from the local school leaders, which resulted in identifying the problem of practice. Practicing self-reflection to fully understand the root causes of the problem permitted the participants to apply meaningful action to push the required change.

The ARDT used the perception data to design the interventions for the ARIT implementation. The participants transferred the intervention learning to their local school processes. Collaboration and reflection persisted throughout the entire change cycle. Due to the system context significance, the researcher used a case study approach.

The Case

A case study intensively explores a single bounded unit, including an individual, organization, subject, community, or event for a given time, by incorporating multiple perspectives (Bloomberg, 2023; Flyvbjerg, 2011; Mertler, 2020). The researcher specifically chose to explore the views of college and career academy leaders in a large public-school district that comprised over 20 high schools. The researcher designed this study to examine how district interventions influenced master scheduling processes at a college and career academy. At the beginning of the study, principals and assistant principals in six college and career academies engaged in initial data collection as their perspectives provided baseline data of shared commonalities among the schools.

After the initial data collection and considering the size and scope of the district, the researcher scaled the study down to competently focus on one college and career academy high school, Beaver High School. The researcher selected Beaver High School as the bounded research site due to the academy model structure, demographics, and the various student needs they served, thus allowing the ARDT and ARIT to utilize an actual phenomenon (Flyvbjerg, 2011). The study required interactions with and between the ARDT and ARIT to explore and analyze the factors that the school leaders identified, which promoted a deeper understanding of the phenomena that led to the creation of the interventions (Bloomberg, 2023; Mertler, 2020).

The Action Research Design Team

Action research requires collaborative participation among research participants (Masters, 1995). Therefore, the researcher in this study needed to foster trust, voice equity, and empathy between research participants to safeguard the "research with people and not on or for them" (Bryk et al., 2015; Coghlan, 2019, p. 5). The collaborative nature of this study consisted of work between Action Research Design and Implementation Teams.

The ARDT consisted of Northeast County Public Schools (NCPS) district-level staff. The team included diverse participants responsible for developing and administering interventions to an ARIT that transferred the knowledge to their local school site. The team members included the primary researcher, principal supervisor, executive directors, and directors from specific departments.

The primary researcher served the district as the school operations and support director. In this role, the researcher oversaw the scheduling processes in the school district and was dedicated to understanding and eliminating barriers that prevented schools from using their master schedules to elevate learning experiences. The principal supervisor had over 30 years of

experience at the elementary and district levels. The principal supervisor provided invaluable insight into the context and needs of BHS.

Two district executive directors served on the ARDT. Each of the executive directors had over 25 years of experience in education. The executive director of data governance, who once served as an assistant principal of curriculum and instruction, supervised the student information system and all student data reporting and protection aspects. The executive director of school operations and support had 15 years of experience at the district office, including serving as the school operations and support director for six years. Before serving at the district office, he was an assistant principal at Beaver High School.

In addition to the primary researcher, two other district-level directors participated in the ARDT. The director of data reporting had over 25 years of experience and provided valuable insight into the connection between school scheduling and funding impacts. She did not have local school-level expertise; however, she worked closely with principals on funding implications and the data governance teams on state and federal regulatory reporting to ensure truth in scheduling aligned with state and federal laws for funding purposes. The director of Multilingual Learners (ML), who previously served as a high school assistant principal, provided insight regarding compliance and instructional needs of students receiving English learning services. Table 3.1 lists team members with their primary role in the district and their action research roles.

Table 3.1

Action Research Design Team

Team Member	Primary Role at NCPS	Action Research Role
Primary Researcher	Director of School Operations and Support	Leads the ARDT in conducting research and data analysis Eight years of classroom experience, three years of local school leadership, eight years of district-level leadership
Dr. Odessa Peek	Principal Supervisor	Over 30 years of experience; Provided context regarding the local school needs
Dr. Isabelle Ransom	Executive Director of Data Governance	25 years of experience; Provides context regarding the student information system
Mr. Andrew Fulton	Executive Director of School Operations and Support	26 years of experience
Ms. Nora Dunn	Director of Multilingual Learners	20 years of experience; expertise in English Learner needs.
Ms. Mattie Alexander	Director of Data Reporting	25+ years of experience Provides expertise around Full-time Equivalent and funding

The ARDT determined the best interventions for the ARIT to test. The following section provides a detailed account of the ARIT members and their backgrounds

Action Research Implementation Team

Local site leaders with skill sets influencing the master scheduling processes made up the ARIT. The researcher first secured participation and informed consent from the Beaver High

School principal. Then, the researcher and principal used the selection criteria to identify the remaining potential ARIT members to invite. The primary researcher met with the potential members to explain the study and secure participation and consent. Of the three potential members recommended by the principal, one elected to refrain from participating.

Although the ARIT worked in the same school, this was the first time they worked collectively as a team. The opportunity to bring a novice group together allowed the study to consider diverse perspectives and expertise from individuals without previously established shared biases. These diverse perspectives permitted the team to approach the study with a fresh outlook. Table 3.2 provides details regarding each team member, including their primary local school role and years of experience in education.

Table 3.2

Action Research Implementation Team

Team Member	Primary Role at Beaver High School	Years of Experience
Primary Researcher	Director of School Operations and Support	17 years
Mr. Edd Oscar Ford	Principal	25 years
Dr. Nancy Carter	AP responsible for Scheduling	22 years
Ms. Lessie Stokes	AP responsible for Scheduling	19 years

The action research design and implementation teams adhered to a research plan and timeline that supported the spiraling and iterative cycles of action research.

Research Plan and Timeline

Coghlan (2019) described learning in action research as meta-learning anchored by reflection. Reflection-on-action is critical to developing a deeper understanding of a phenomenon as it unfolds (Glanz, 2014). Reflecting promotes progression toward actionable interventions and

evaluating their intended outcomes (Coghlan, 2019). Table 3.3 provides a brief account of the research plan and timeline for both the Action Research Design and Implementation Teams. Reflective practices guided the research timelines.

Table 3.3

Action Research Timeline

Date	Action Research Design Team (ARDT) Activities	Action Research Implementation Team (ARIT) Activities

February 2023	• Recruited targeted participants
	• Secured ARDT consent to participate in the study
	• Planning Meeting #1
	  ○ Member checked questionnaire questions
	• Planning Meeting #2
	  ○ Tested questionnaire to ensure software worked
		• Recruited targeted participants
		• Secured ARIT consent to participate in the study
		• ARIT Introduction Meeting
		• Electronic Questionnaire

March 2023	• Planning Meeting #3 ○ Analyze questionnaire data • Collect Artifacts • Researcher Journal Reflections/Data	• Individual Interviews • Scheduling Team Intervention - Bi-weekly meetings • Collect Artifacts • Researcher Journal Reflections/Data
April 2023	• Monthly Planning Meeting • Facilitate State Reporting Audit Intervention (3hrs) • Collected Artifacts • Researcher Journal – Reflections	• Scheduling Team Intervention - Bi-weekly meetings • State Reporting Audit Intervention (3hrs) • Focus Group • Collected Artifacts • Researcher Journal – Reflections/Data • Cycle I Wrap-up
May 2023	• Monthly Planning Meeting • Facilitate FTE Audit Intervention (3hrs) • Collected Artifacts	• Scheduling Team Intervention - Bi-weekly meetings

Date	Action Research Design Team (ARDT) Activities	Action Research Implementation Team (ARIT) Activities
	• Researcher Journal – Reflections	• FTE Audit Intervention (3hrs) • Focus Group • Collected Artifacts • Researcher Journal – Reflections/Data • Cycle II Wrap-up
August 2023	• Monthly Planning Meeting • Monitoring for Fidelity Intervention	• Scheduling Team Intervention - Bi-weekly meetings • Monitoring for Fidelity Intervention
September 2023	• Monitoring for Fidelity Intervention • Focus Group	• Monitoring for Fidelity Intervention
October 2023 Post-Study	• Follow-up activities as needed • Cycle III Wrap-up	• Final ARIT Follow-up conversations • Cycle III Wrap-up

The next section of Chapter 3 provides a comprehensive description of the context of the study. The section focused on various context features, including location and unique characteristics of the school and community that influenced the study.

Context of the Study

Northeast County Public Schools (NCPS) is a diverse urban-suburban school district in the suburbs of a major southern city. The once small school system significantly evolved into an organization serving a community of close to one million people. As a result of the rapid growth, the school system experienced significant student enrollment and staffing increases, changing demographics, varying student needs, and increased expectations. By 2024, NCPS was one of the largest school systems in the state and the top ten percent of the largest school systems in the

nation, serving over 175,000 students whose nationalities reflected over 100 countries and languages. Table 3.4 summarizes the richly diverse student demographics.

Table 3.4

NCPS Student Demographics

Sample Characteristics	*n*	%
Enrollment	180,394	
Elementary Students	78,662	44
Middle School Students	42,739	24
High School Students	56,394	31
Gender		
Female	87,930	49
Male	92,464	51
Race/Ethnicity		
Multiracial/Other	7,610	4
Pacific Islander	0	0.0
Hispanic or Latino	61,774	34
Asian	21,010	12
White	32,672	18
Native American or Alaska Native	309	0.2
Black	59,463	33
Student Subgroups		
English Learners	44,161	24
Special Education	25,749	14
Gifted Education	27,691	15
Economically Disadvantaged	84,895	46

Note. District Data Source: Northeast County Public Schools as of January 26, 2024.

In 2024, NCPS had approximately 24 high schools, which accounted for over 55,000 of the student population. The high schools consisted of 13 traditional schools, 7 college and career academies, and 4 theme schools focusing on math and science, STEM, healthcare science, or artificial intelligence, thus offering various student opportunities. This study takes place in one of the college and career academies.

College and Career Academies

Site leaders from six college and career academies provided initial baseline data identifying factors that helped determine the action research interventions. The schools included

Beaver High School (BHS), the primary research site, Middle Northeast High School (MNEHS), Exploratory High School (EHS), Brookmeadow High School (BMHS), Civil High School (CHS), and South Northeast High School (SNHS). The researcher chose these schools to collect the initial questionnaire data due to their demographic composition similarities, as visualized in Table 3.5.

Table 3.5

NCPS College and Career Academy Student Demographics

	BHS	MNEHS	EHS	BMHS	CHS	SNEHS
Total Enrollment	3,000	2,400	2,700	2,600	2,100	2,600
Multiracial/Other	1%	4%	2%	1%	3%	3%
Asian/Pacific Islander	7%	5%	8%	5%	4%	2%
Hispanic or Latino	72%	39%	56%	76%	27%	21%
White	2%	10%	4%	2%	3%	4%
Native American or Alaska Native	0%	0%	0%	0%	0%	0%
Black	18%	43%	29%	16%	63%	70%
English Learners	38%	19%	28%	43%	13%	9%
Special Education	14%	14%	15%	15%	15%	15%
Gifted Education	9%	12%	11%	8%	10%	9%
Economically Disadvantaged	82%	76%	78%	88%	75%	74%

Note. District Data Source: Northeast County Public Schools as of January 26, 2024.

As referenced in the table, BHS had the largest student population of all the schools and the second most prominent Hispanic or Latino population. However, other than those differences, the other demographic data showed similarities.

Beaver High School Overview

Beaver High School (BHS) is southwest of the school district. The city where BHS sits also has another high school that supports educating the students in the 15,000 residential community. Although the total population of the two schools ranged within 100 of each other,

representing a close to equal split of the community, internal demographics at BHS did not align with the external community. The White population in the community was 22% higher than the BHS (U.S. Census). In addition, the Hispanic or Latino population was 25.2% less than BHS (U.S. Census). The primary researcher selected BHS based on the significant percentage of high-risk student needs, including English Learners, exceptional education, gifted education, and transiency.

Beaver High School Opportunities and Access

At the time of this study, creating opportunity and access for historically underserved groups was an equity goal in NCPS. One way that BHS supported underserved groups was with an academy structure that included two college and career academies, a 9th-grade academy, and an academy dedicated to remediating students off track. The two college and career academies specialized in Construction, which earned industry certification, and Film and Digital Arts, a partnership academy with the local film industry. However, the college and career academies were not the only opportunities BHS afforded students, considering various student needs require plentiful access to opportunities.

In addition to the two college and career academies, BHS offered various pathways for students, including fine arts, and career and technical education pathways in STEM, culinary arts, business, and healthcare sciences, and 27 advanced placement courses. In 2019, 71% of students completed pathways, and 34% demonstrated college and career readiness. In 2023, the state Department of Education recognized the school as an AP Humanities school for having a minimum of five students testing in each AP Humanities course. The state also recognized the school as an AP STEM school for having a minimum of at least five students who tested in four AP STEM courses.

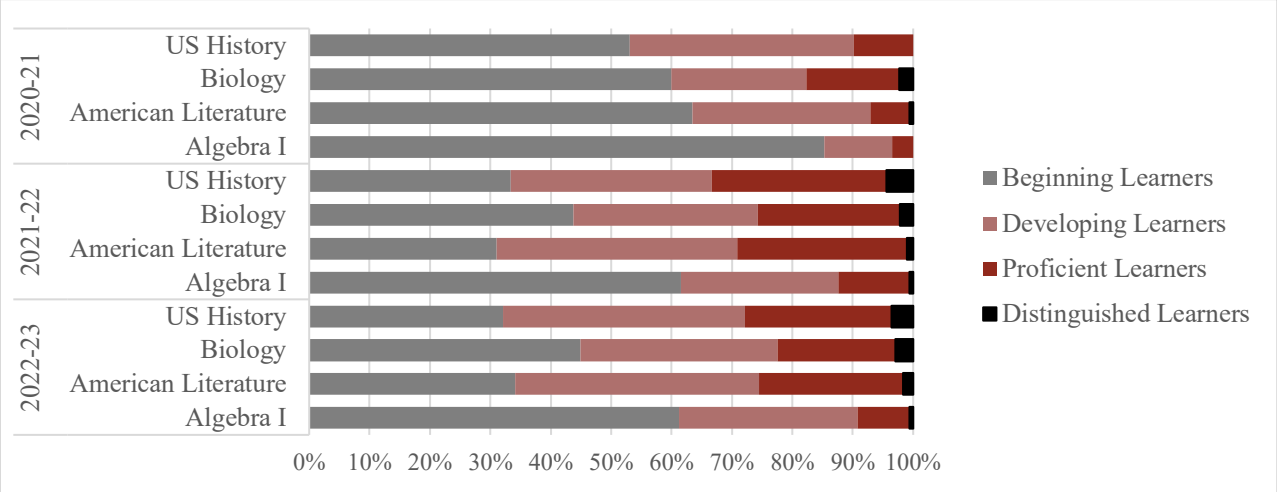
The school used a seven-period, 4-1 modified blocked bell schedule. Four days of the week, students met on an A/B block schedule with four periods on A-day and three periods plus an intervention and advisement period on B-day. One day a week, students met for all seven periods. The schedule allowed students to recover and earn more credit toward graduation. Teachers had two planning periods, which allowed them to have a planning time on each blocked meeting day. The planning times embedded space for teachers to collaborate on curriculum and instructional strategies.

Beaver High School Academic Performance and COVID-19

Northeast County Public Schools (NCPS) had a long-standing ethos of academic excellence. However, the onset of the COVID-19 pandemic in March 2020 prompted the state and NCPS to pause academic measurements, including assessments and College and Career Readiness Performance Indicator (CCRPI) calculations, as the instructional focus shifted to keeping students and staff safe by migrating to digital learning. The Milestones assessment resumed during the 2020-2021 school year. However, data limitations persisted due to reduced test participation and the impact of the ongoing pandemic on the learning environment. Figure 3.4 visualizes three years of milestone data from BHS, beginning with 2020-2021.

Figure 3.4

Beaver High School Milestone Data



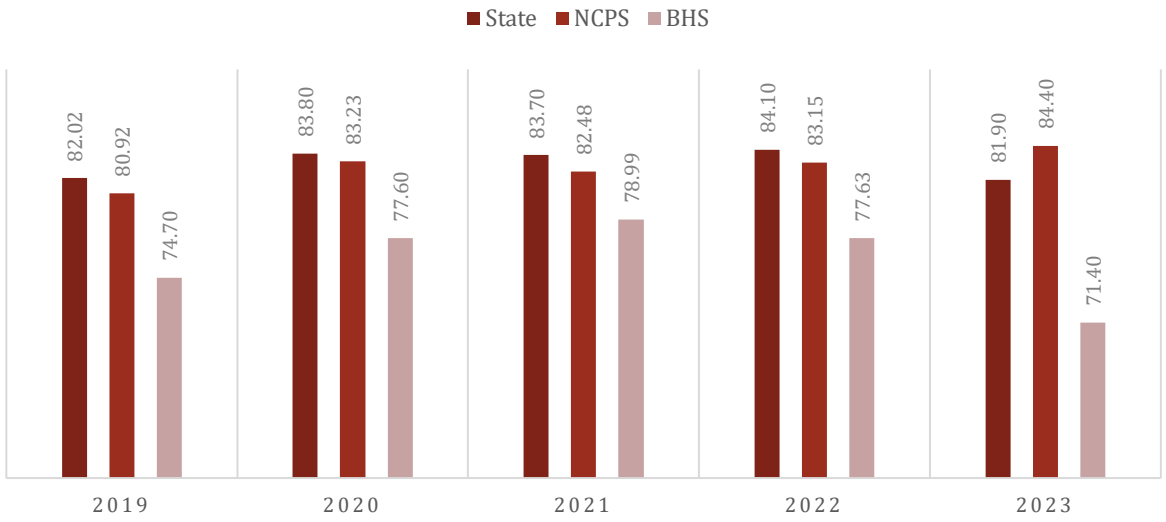
Note. State Data Source: Governor's Office of Student Achievement.

Prior studies completed by Kemple and Willner (2008), Hemelt et al. (2019), and Fletcher and Tan (2022) found that restructuring high schools into college and career academy models positively increased on-time graduation rates over time. The graduation rate at BHS has trended upward over the last seven years, reaching the highest graduation rate in 2021. The graduation rate decreased slightly for the 2021-2022 school year and dramatically decreased at the end of the 2022-2023 school year.

The COVID-19 pandemic may have contributed to the increase and regression, as most BHS students spent the 2020-2021 school year as digital learners. The 2021-2022 school year marked the first time most BHS students reentered the school building since March 2020. BHS continues to fall below the state and county graduation rates. Figure 3.5 provides 5-year graduation rate data for BHS, NCPS, and the state.

Figure 3.5

Beaver High School Graduation Rate Data



Note. State Data Source: Department of Education

The college and career academy model is one of many factors contributing to an increase in the graduation rate. Hernandez-Gantes et al. (2019) found that school leaders must organize college and career academy curricula coherently and emphasize applied strategies around which there is broad consensus among administrators, teachers, and other staff.

Beaver High School Staff Characteristics

Beaver High School (BHS) had 198 certified staff members. The staff members included a principal, 11 assistant principals, 10 counselors, and 176 teachers. Although the most significant category of teaching and counseling fell within the novice experience level of 1-10 years, over 50% of teaching and counseling staff had over 11 years of experience, representing an experienced staff. In addition to experience, 74% of the staff have a degree at or above the master's level, emphasizing education advancement. The racial and ethnic makeup of the staff did not mirror the majority Hispanic or Latino student population. Table 3.6 summarizes the staff

demographic breakdown, including the teacher years of experience, education level, and racial makeup of the certified staff.

Table 3.6

Beaver High School Staff Demographics

Variable	Administrators	Teachers
Years of Experience		
<1	0%	5%
1-10	0%	39%
11-20	50%	31%
21-20	42%	23%
>30	8%	2%
Highest Educational Level		
Bachelor's	0%	28%
Master's	25%	49%
Specialist	33%	15%
Doctoral	42%	8%
Gender		
Male	42%	37%
Female	58%	63%
Race/Ethnicity		
Black	50%	31%
White	33%	48%
Hispanic	17%	9%
Asian	0	8%
Native American	0	0
Multiracial	0	4%

Note. District Data Source: Northeast County Public Schools as of January 26, 2024. State Data Source: Georgia Department of Education as of School Year 2022-23.

This study relied on the expertise and experience of six college and career academy school leaders to collect initial data for this study. The school principal and assistant principals at Beaver High School (BHS) served as the primary data source for this study.

Data Sources

The school principal is responsible for all aspects of a school (Leithwood et al., 2004). However, other school leaders, such as assistant principals, teacher leaders, and counselors, have broad and specific leadership tasks that support a local school system, including the master schedule (Goldring et al., 2021). Examining how district-designed master scheduling interventions impacted master scheduling practices at a college and career academy school required the researcher to consider perspectives from the district-level and local school leaders. The local school leaders included principals and assistant principals responsible for supporting the local school master schedule process.

Participants

Bloomberg (2023) asserted that "when ideally executed, action research creates a fully democratic inquiry process, blurring the distinction between the researcher and participants to collaboratively question practice, make changes, and evaluate the impact of those changes" (p. 163). The researcher sought diverse participation and perceptions by including principals, assistant principals, and district-level leaders as study participants. The diversity fostered a deeper understanding of the factors leaders encountered in meeting the needs of each student through scheduling. Participants contributed to the study by providing initial baseline data, serving on the ARIT, or serving on the ARDT.

Selection Criteria

The selection criteria the researcher used to choose ARDT participants included job location, district-level leader role, and department/job responsibilities. The leading criteria for participants that provided perspectives to identify factors and those that served on the ARIT included the school setting, school bell schedule structure, local school role, and job responsibilities. The researcher recruited principals and assistant principals who supported the scheduling process at a college and career academy high school to provide initial baseline data identifying factors that impacted scheduling in college and career academies. These college and career academies operated on a hybrid, modified, or block schedule. The ARIT criteria required participants to serve as principal, assistant principal, teacher leader, or support staff that supported the scheduling process at a specific college and career academy that operated a hybrid, modified, or block schedule. Table 3.7 provides an overview of the job responsibility selection criterion for all members of the ARIT.

Table 3.7

Job Responsibilities Selection Criterion

Criterion	Description

• Member of the local school scheduling team **AND**;
• Provides school leadership **OR**;
  o Shape vision to establish culture and climate
• Manage people, data, and processes, including **OR**;
  o Organizational resource allocation (Human, Financial, Social, and, Time, Material)
  o Student Scheduling
  o Instructional programs such as special education, English learners, and gifted
• Providing technical support for student scheduling
	Job Responsibilities

The selection criteria and the voluntary aspect of action research created study limitations in determining the sample size of the participants.

The next section of Chapter 3 provides a detailed account of the data collection methods used in this action research study.

Data Collection Methods

This study used various qualitative research methods to collect data, including questionnaires, interviews, consultation groups, observations, and documents. These methods permitted the researcher to gain knowledge and understanding to answer the research questions (Mertler, 2020). In addition, these methods allowed the researcher to utilize triangulation by using multiple data sources for a single point (Glanz, 2014).

Data collection for this study involved a variety of qualitative methods. These methods included:

1. Questionnaire completed by participants at the beginning of the study;
2. Individual interviews with the ARIT at the beginning of the study;
3. Consultation groups with the ARIT after each intervention and the ARDT and ARIT at the end of the research cycle;
4. Observation notes collected from intervention sessions and scheduling meetings;
5. Researcher journal notes based on observations during action research team meetings;
6. Documents, including district and site-based leadership artifacts, provided additional context about the focus of the study, and the researcher used these documents to corroborate observations and other data.

Questionnaires

Questionnaires allow researchers to probe reactions to a situation, event, or issue (Glanz, 2014). Participants divulge the highs and lows of their account, description, and emotion of an experience, thus giving the researcher a deeper understanding of how experiences impact participants (Bloomberg, 2023). This study incorporated one open- and closed-ended questionnaire completed at the beginning of the study.

The researcher distributed the questionnaire to local school leaders at six college and career academies, including the primary research site. The initial questionnaire identified common factors that impacted scheduling capabilities at each college and career academy high school. The ARDT used the questionnaire to create interventions. The complete initial questionnaire is in Appendix B.

Interviews

Lived experiences and perceptions contain complexities that researchers can only learn through the point of view of the participants that make up the organization and execute processes (Glanz, 2014; Seidman, 2019). The researcher conducted one semi-structured interview focusing on individual ARIT perceptions (Seidman, 2019). The researcher incorporated questions and prompts that informed the work but also provided the flexibility to use intuition to follow hunches and include follow-up questions based on the candidness demonstrated by the participants (Bloomberg, 2023).

The interview expanded upon the questionnaire, thus allowing the researcher to develop a deeper understanding of the factors that site-based leaders experienced related to leveraging their master schedule to meet the needs of each of their students. The interview data answered and

substantiated the purpose of the study and the first research question. Table 3.8 aligns the interview questions and the first research question.

Table 3.8

Research and Interview Questions Alignment Sample

Research Questions	Interview Questions
1. What factors impacted how school leaders use the master schedule structure to meet the needs of each student equitably in a college and career academy setting?	• Please describe what an effective master schedule looks like in a college and career academy high school. • What are your top 3 concerns regarding the master schedule at your local school? • What support do you need from the district level to leverage your scheduling for equity? • To ensure all students at your school receive high-quality instruction, what decisions would you need to make on the SY23-24 master schedule?

Note. The complete interview protocol is in Appendix C.

Consultation Groups

Coghlan (2019) recommended considering participants collectively sharing diverse perspectives as consultation groups instead of focus groups due to the "interventionist nature of your interaction with them" (p. 136). The interactive sharing created a unique advantage over other data collection methods (Merriam & Tisdell, 2016). The ARIT collectively debriefed the action research design and facilitation process as a consultation group at the end of the action research cycles. The consultation group setting provided the ARDT space to share diverse perceptions of their learning from creating targeted master scheduling interventions. Table 3.9 highlights the focus group questions asked.

Table 3.9

Consultation Group Intervention Questions

ARDT Consultation Group Intervention Questions	ARIT Consultation Group Intervention Questions
• What are the key takeaways from this study? • How will the study impact how you approach local school interventions? • How can we scale the lessons learned from the study?	• What are the key takeaways from the session? • How will the session impact your work? • Who from the district office do you need to hear from next? • What do you need to move forward now?

Observation Notes

Merriam and Tisdell (2016) contended that observations allow researchers to see behaviors in real-time and provide context to a specific event, behavior, or action that the participant referenced in interviews. The researcher observed the ARIT during the intervention facilitation, scheduling meetings, and interactions between the ARIT and ARDT, and noted questions asked and conversations held. The researcher recorded the multiple observations using field notes, Microsoft Teams, and Otter.ai to capture conversations for future analysis (Merriam & Tisdell, 2016).

Researcher's Journal

The researcher practiced reflexivity by documenting all self-reflections, thoughts, and ideas in a researcher's journal. The ability to record these occurrences allowed the researcher to engage in ongoing inner dialogues that supported a sound awareness of what the researcher knew, assumed, and why (Watt, 2007). The researcher's journal provided a comprehensive account of knowledge construction, a tool to probe biases, assess feelings and thoughts, and

determine how each could potentially influence the study (Bloomberg, 2023; Watt, 2007). The researcher's journal promoted active, ongoing self-examination.

Documents

Bloomberg (2023) suggested that documents "provide a major source of data" (p. 290). Various forms of written and visual records, artifacts, and archival data count as documents. However, document data collection is often rarely used (Mertler, 2020). The analytical documentation process is arduous, requiring "finding, selecting, appraising, and synthesizing data contained in the document" (Bowen, 2009, p. 28). However, documentation mining can be worthwhile and requires an open mind and patience (Merriam & Tisdell, 2016).

This researcher incorporated document analysis as a secondary qualitative research method (Glanz, 2014). For this study, the documents collected were research-generated and produced independently of the study (Bloomberg, 2023). The documents included bell schedules, current and historical master schedules, course offerings, staffing allotment, and master scheduling reports. These documents contributed valuable insight and a knowledge base into the study site, participants, questions that needed asking, situations that needed observing, and processes (Bowen, 2009; Glanz, 2014).

Each data collection method provided insightful information that informed the action research study cycles. The initial questionnaire and interview determined the types of master scheduling interventions the ARDT developed and facilitated for the ARIT in cycle one. In contrast, the consultation groups, observations, researcher journal notes, and documents helped to determine the interventions developed and facilitated in cycle three.

Interventions

Action research promotes experimentation with mediation, commonly identified as a strategy, intervention, or treatment, to address a specific problem in a "practice-based setting" (Merriam & Tisdell, 2016, p. 4). When practitioners develop these intercessions intentionally, they aid environmental change by "doing or saying something that alters the status quo" (Coghlan, 2019, p. 191). Employing interventions requires practitioners to combine action and reflection with theory and practice to develop viable solutions and add value to a situation or an environment (Coghlan, 2019; Glanz, 2014; Merriam & Tisdell, 2016).

The ARDT developed and employed multiple mediations throughout the action research cycles. The team documented the progressions and results to determine what did and did not work (Merriam & Tisdell, 2016). In addition, when engaging with the cycles of interventions, the ARDT found that it was equally important to constantly ask – what is the problem, what is the proposed change action and why, and how does the team know the change improved the situation or environment (Bryk et al., 2015). These core questions aligned with systems thinking and supported the initial application of interventions and the modifications, elimination, or solidity that unfolded in each cycle.

Before the ARDT designed the master scheduling interventions, they used data to identify and become familiar with the factors school leaders believed impacted their ability to use their master schedule to leverage equity for all students. The researcher identified these factors through multiple sources, including an initial questionnaire and interview. These factors initiated the primary intervention of this study, establishing a scheduling team that met weekly to enhance their master scheduling practices.

The scheduling team, including the ARIT, met weekly to discuss various topics. The scheduling team intervention provided a continuous opportunity to understand the local school environment and inputs, including the status, historical status, trends, and adjustments to the master scheduling practices. The ARIT used the systems thinking process to identify behavior patterns that consisted of what was happening, what had happened, trends, and changes in the master schedule. The team assessed the current scheduling practices by identifying ongoing challenges, barriers, and positive components, creating an improvement plan, implementing secondary interventions, and monitoring improvement progress.

The ARDT and the ARIT identified several factors influencing the master scheduling patterns at BHS. The identified factors informed the ARDT of the secondary interventions, including data audit sessions, coaching, and monitoring for fidelity. The data audit sessions comprised two sessions concentrated on state reporting and Full-time Equivalent (FTE) and the relationship to master scheduling to meet the needs of all students.

The coaching interventions occurred during the scheduling team meetings with the primary researcher serving in the coach capacity. Coaching helped the team establish a relationship between FTE, student programs, and the other elements of the master schedule. The coaching intervention also helped to determine continued gaps in knowledge regarding FTE and scheduling student programs and state reporting, which led to modifications of those interventions.

The final secondary intervention, monitoring for fidelity, permitted both the ARDT and ARIT to determine how each intervention impacted the environment after the final output of the master schedule and if there was a change in how the scheduling team approached master

scheduling practices. Table 3.10 shows the connection between systems thinking and the ARDT interventions employed throughout the study.

Table 3.10

Study Interventions

Systems Thinking	Intervention	Frequency
Environment (Situation) *What is happening?*	Assemble a Scheduling Team	Once
	Scheduling Team Meetings	Weekly
Input (Behavior Patterns) *What has been happening?* *What are the trends?* *What changes have occurred?*	Scheduling Team Meetings	Weekly
Process (Structures) *What has influenced the patterns?*	FTE Scheduling Audit State Reporting Audit	Once
Output (Structures) *What are the relations among the parts of the system?*	Scheduling Team Meetings Coaching Support	Weekly Bi-Weekly
Environment (Mental Models) *What values, beliefs, and assumptions do people have about the system?*	Monitoring for Fidelity	End of Study

Collecting and analyzing data simultaneously allowed the ARDT to immediately act on emerging ideas by developing intentional interventions that addressed the needs of the ARIT. The researcher used the findings to create themes that provided a comprehensive insight into the experiences of each participant.

Data Analysis Methods

The qualitative research design approach requires researchers to collect and analyze data simultaneously, thus allowing the researcher to focus on how the findings emerged in stages over time (Merriam & Tisdell, 2016). This synchronized approach began early in the data collection

process by capturing early reflections and emergent themes, which led to acting on hunches and ideas throughout the study. Ferrance (2000) described this iterative and dynamic process cycle as a "continuous confrontation with data" (p. 9).

Collecting and analyzing data concurrently required the researcher to reduce copious quantities of data into manageable chunks (Bloomberg, 2023; Merriam & Tisdell, 2016). The researcher used a chunking process incorporating coding and thematic data analysis, resulting in a "detailed and rich description of related experiences associated with the research phenomenon" (Bloomberg, 2023, p. 325; Saldaña, 2021). This action research study applied four qualitative data analysis elements to the data analysis process, which Bloomberg (2023) identified as essential: data reduction, data categories, reorganizing data, and data interpretation and presentation.

Coding

Merriam and Tisdell (2016) and Saldaña (2021) acknowledged that the term coding presents a level of mystery and confusion surrounding data analysis, specifically when using emerging as a description for creating codes. However, when simplified, coding assigns words, short phrases, numbers, or letters to make "various aspects of data easily retrievable" during the data analysis phase (Merriam & Tisdell, 2016, p. 199). Saldaña (2021) added that codes are "actively constructed, formulated, created and revised by the researcher," with the background, discernment, and ingenuity of the researcher serving as the source of this process (p. 7). Table 3.11 details a sample of the codes the researcher used to analyze the data.

Table 3.11

Coding Sample

Code	Meaning	Data Sample
L	Lonely	"This job can be very isolating." – Dr. Carter's response to what she wished she had known before becoming responsible for scheduling.
S	Support	"I had a great mentor who was organized and structured and provided a whole outline." - Ms. Stokes described the support she received when learning to schedule as a teacher leader.
T	Time	"Not adhering to a timeline caused issues." – Mr. Fulton when explaining current master scheduling priorities.

The data analysis process used in the action research study was ongoing; therefore, the data labeling practices required constant reviewing and refining as ideas emerged, diverged, and combined (Bloomberg, 2023). The researcher created a coding organization system to reduce data as the first step in data analysis (Merriam & Tisdell, 2016; Mertler, 2020). The coding system included an open coding approach, allowing the researcher to be as expansive as possible when applying coding schemes to data that had potential relevance for answering research questions (Merriam & Tisdell, 2016). The researcher then reviewed the initial coding through multiple iterations to sort and classify the codes into thematic groupings and clusters of meanings while eliminating repetitive and irrelevant data (Bloomberg, 2023; Merriam & Tisdell, 2016).

Thematic Analysis

Themes in qualitative research develop as an outcome of coding and characterize the meaning and description of a data point (Saldaña, 2021). The thematic analysis required condensing data, which took place once the researcher created a tentative scheme of themes (Bloomberg, 2023; Merriam & Tisdell, 2016). The researcher interpreted thematic

representations of the findings to sort the schemes into categories and subcategories (Bloomberg, 2023; Merriam & Tisdell, 2016). The researcher then interpreted the simplified and organized data by finding the attributes that answered the research questions (Mertler, 2020).

The thematic analysis should establish trustworthiness in the study by promoting transferability due to a "thick, rich description," which results from the intensive observations made by the researcher during the study (Bloomberg, 2023, p. 85; Glanz, 2014). Transferability permits anyone to identify with the setting, thus promoting relevance and application to broader contexts (Bloomberg, 2023; Mertler, 2020). The researcher used concrete coding and thematic analysis examples to prevent biases and establish trustworthiness while supporting the findings the study generated.

Reliability, Validity, and Generalizability

A significant concern of confidence in study findings often plagues qualitative research (Bloomberg, 2023; Mertler, 2020). Therefore, the researcher implemented strategies encouraging rigor, transparency, and quality in data collection, analysis, and interpretation. In addition, the study findings reflected what the research intended to measure (Bloomberg, 2023; Glanz, 2014; Merriam & Tisdell, 2016; Mertler, 2020; Tracy, 2010). Though quantitative research designates these qualities as reliability and validity, they manifest in qualitative research through dependability and credibility, which require different strategies (Merriam & Tisdell, 2016).

In quantitative research, reliability implies the extent to which others, if they followed the same procedures and methods, can replicate findings and results expressed in a study (Glanz, 2014). However, Merriam and Tisdell (2016) find reliability in qualitative research, specifically action research, to be challenging, considering the nature of qualitative research involves understanding the lived experiences of participants and that no two experiences will yield the

same results. Therefore, placing control methods to produce repetition removes the variation in lived experiences (Bloomberg, 2023). As a strategy for establishing trustworthiness, demonstrating dependability is a better criterion for reliability in qualitative research (Bloomberg, 2023; Mertler, 2020).

Dependability requires consistent and stable study findings derived from collected data (Bloomberg, 2023; Merriam & Tisdell, 2016; Mertler, 2020). In this study, the researcher established dependability by creating an audit trail of the reflections from the researcher, questions, and decision-making processes during the data collection (Merriam & Tisdell, 2016). In addition, the researcher documented the research process and used triangulation to link collected data back to the research questions (Bloomberg, 2023). In addition to using the triangulation method to relay dependability, the researcher also used the technique to prove creditability, another criterion for establishing trustworthiness (Mertler, 2020).

Traditionally, research validity provides readers the confidence that study findings are believable and accurately reflect what the data measured (Merriam & Tisdell, 2016). Researchers demonstrate validity in qualitative research by accurately reflecting perceptions and aligning findings and reality (Bloomberg, 2023). To strengthen credibility, the researcher used the following strategies in this study.

1. Member checking – The researcher engaged participants in reviewing all data sources, including interview transcripts, coding, and observation notes (Mertler, 2020).
2. Peer Debriefing and External Audits – The researcher practiced consensual validity when creating questionnaires and interview questions by relying on the ARDT, a critical friend, and the major professor to review for alignment with the purpose of the study and research questions. (Glanz, 2014; Mertler, 2020).

3. Persistent and prolonged engagement with the study - The researcher intentionally spent considerable time with the ARIT at the research site throughout the study. The researcher was able to build and establish trust with the ARIT by fully immersing in the culture of the school (Bloomberg, 2023).
4. Triangulation - The researcher used multiple data sources, including interviews, questionnaires, consultation groups, participant observations with notes, documents, and researcher journaling, to ensure that the data findings from each source told a similar story (Glanz, 2014).

Table 3.12 provides a triangulation matrix of the data sources and participant engagement.

Table 3.12

Data Triangulation Matrix

Research Questions	Participants	Data Sources	Data Analysis Method
RQ1: What factors impacted how school leaders use the master schedule structure to meet the needs of each student equitably in a college and career academy setting?	College and Career Academy Principals and Assistant Principals, including ARIT	Initial Questionnaire	Coding/Thematic Analysis
	ARIT	Initial Individual Interview	Coding/Thematic Analysis
	ARIT	Scheduling Team Observation Notes	Coding/Thematic Analysis
	Researcher	Journaling	Reflection Summary
RQ2: How did college and career academy leaders describe the impact of district-designed interventions	ARIT	Intervention Consultation Group	Coding/Thematic Analysis
	Documents	Document Analysis	Coding/Thematic Analysis

Research Questions	Participants	Data Sources	Data Analysis Method
on their approach to master scheduling for student equity?	ARIT	Scheduling Team Observation Notes	Coding/Thematic Analysis
	ARIT	Follow-up conversations	Coding/Thematic Analysis
	Researcher	Researcher Journal	Reflection Summary
RQ3: What did an action research design team learn from creating and facilitating master schedule interventions for college and career academy leaders?	ARDT	Consultation Group	Coding/Thematic Analysis
	ARDT	Meetings Observation Notes	Coding/Thematic Analysis
	Researcher	Researcher Journal	Reflection Summary

Along with proving trustworthiness through dependability and credibility, it was important for the researcher to provide enough information that the study resonated with future readers. Unlike quantitative research, qualitative research does not generalize results across settings but establishes transferability, which may help a reader visualize applying the findings from the study to their environment (Bloomberg, 2023). The researcher demonstrated transferability by providing a rich, detailed explanation regarding the context and participants (Tracy, 2010).

Confirmability is the fourth criterion for establishing trustworthiness. Lincoln and Guba (1985) described confirmability as ensuring the findings are indeed the extent of the perceptions participants expressed and not based on the biases, motivations, and influences the researcher projected. The researcher practiced self-reflexivity to explore how personal and professional

prejudices, motivations, and interests changed data interpretations (Bloomberg, 2023; Tracy, 2010). The subjectivity statement in the next section clarifies the positionality of the researcher.

Subjectivity Statement

The researcher spent 19 years in public school education in the state where this study occurred, 17 years in the school district where the research ensued, and two years in two different rural school districts. During the study, the researcher served as a district leader who oversaw the master scheduling processes within the school district. The oversight responsibilities included ensuring the local schools finished master schedules before the beginning of each school year and that the district offered technical training to support that goal. The researcher was interested in whether district-designed interventions targeting master scheduling processes could move district support beyond compliance and technical training. The researcher did not serve in a supervisory capacity for participants in the study.

Aware of potential biases due to job experiences, the researcher practiced an active self-examination to remain mindful of personal and professional assumptions and preconceptions that could affect the study. The reflexivity practices integrated journaling throughout the study to document the action research process, conversations, and thoughts with colleagues and study participants. In addition, the researcher relied on the major professor to provide guidance, feedback, and supervision throughout the study. The roles and experiences of the researcher also contributed to some study limitations.

Limitations

This study had limitations or external conditions that potentially restricted the scope or impacted the outcome (Bloomberg, 2023). First and foremost, the nature of qualitative research is voluntary, which impacted the sample size for the ARIT. The sample size reduction led to the

researcher considering fewer perspectives during the study. However, the lived experiences of the assistant principals and principals that contributed to the study provided valuable insight into the factors that impact master scheduling for equity and their support needs from their district.

The second study limitation occurred due to the primary researcher serving as a district leader, participant, and researcher. Coghlan (2019) recognized this constraint as "role duality" (p. 81). The researcher had to make conscious efforts to stay on the outrebounds of the school district to effectively assess and critique study findings. The researcher actively observed the process by focusing on reflective practices, including journaling and collaborative inquiry with the ARDT and ARIT.

Chapter Summary

This study focused on improvement through action, reflection, and collaboration. Therefore, the researcher chose action research as the qualitative method. The researcher worked with an ARDT to collaboratively analyze data that informed interventions an ARIT implemented into their environment. The perspectives of district and local school leaders, which the researcher collected through various sources, including a questionnaire, interviews, consultation groups, observations, research journals, and documents, were critical to improvement. The researcher coded and analyzed each data source to reduce the data volume and find emerging themes. These themes contributed to the researcher generating a detailed, thick description that promoted establishing trustworthiness in the study.

Chapter 4 presents the findings from the action research case. The chapter provides a detailed account of the cycles, interventions, and participant perspectives.

CHAPTER 4

FINDINGS FROM THE ACTION RESEARCH CASE

Hibbeln (2020) insisted that creating more equitable student opportunities and improving school experiences starts with the school schedule. However, master scheduling at the secondary level, specifically college and career academies, instigates a complex system of components schools must consider and manipulate. Those components include but are not limited to academy cohorts, graduation requirements, departmentalization, student choice, an array of course offerings, and multiplicity in academic programming (Clay et al., 2021; Hernandez-Gantz et al., 2019). School leaders need opportunities to plan and develop skills and knowledge to operationalize data-informed and equity-focused master scheduling processes within the intricate system (Pisoni & Conti, 2019).

The purpose of this study was to examine how district-designed master scheduling interventions impacted the scheduling approach of college and career academy high school leaders. The researcher considered perspectives from principals and assistant principals responsible for supporting a component of the local school master schedule. The researcher worked with an Action Research Design (ARDT) and Implementation Team (ARIT).

To address the purpose of this action research study, the following research questions guided this inquiry:

1. What factors impacted how school leaders use the master schedule structure to meet the needs of each student equitably in a college and career academy setting?

2. How did college and career academy leaders describe the impact of district-designed interventions on their approach to master scheduling for student equity?
3. What did an action research design team learn from creating and facilitating master schedule interventions for college and career academy leaders?

Chapter 4 presents the context of the study and findings from the case. The context provides a situational perspective about Beaver High School, the action research site, and the problem framing in the context. The findings from the case explain how the ARDT and ARIT used reflection to spiral each action research cycle.

Context of the Study

At the time of this study, BHS had been a college and career academy for nine years. The school educated 2,900 students with demographics representing a majority Hispanic population, the second largest in NCPS. The population included many high-risk student needs, including multilingual learners, those receiving exceptional education services, and those economically disadvantaged. The school employed approximately 200 staff members, encompassing administrators and teachers, who supported teaching, learning, and a supportive community.

The school leadership structure at BHS consisted of a principal and a team of eleven assistant principals, each with specific responsibilities such as assessment, athletics, attendance, curriculum, discipline, Title I, Title IX, and special education. This study specifically concentrated on the principal and the assistant principal responsible for curriculum, as this role primarily oversaw and generated scheduling processes in the local school.

In the Fall of 2019, Mr. Ford assumed the role of principal at BHS, following a six-year tenure as the principal of an alternative education school in the district. Before becoming a principal, Mr. Ford served seven years at BHS as a counselor for three years and later as an

assistant principal overseeing curriculum and instruction for four years. When Mr. Ford returned to BHS, the school had transitioned to a college and career academy model, and the district had adopted a new student information system. Although Mr. Ford had previous experience with the master scheduling process as a counselor, assistant principal, and principal, he faced new challenges. He had not previously managed a master schedule for a college and career academy model nor used the new student information system. Furthermore, his appointment as the BHS principal coincided with the COVID-19 pandemic.

COVID-19 impeded the time Mr. Ford had to learn the academy model and structures that supported the model. The pandemic created complications that led to constant pivots, which included concurrently scheduling in-person and virtual learning. The persistent changes, coupled with a new principal learning a new model and the burnout experienced by Dr. Carter, the seven-year veteran assistant principal for curriculum and instruction, resulted in lost processes, increased scheduling errors, and angst among school staff and students.

It is worth noting that after Mr. Ford left BHS, the school experienced a scheduling crisis on the first day of school when several students did not have schedules due to lax processes. Not wanting to repeat history, Mr. Ford recognized he would have to change the curriculum and instruction position to sustain Dr. Carter. Mr. Ford began transitioning a new assistant principal, Ms. Stokes, into the curriculum and instruction role at the beginning of this study. The novelty of leaders was broader than just BHS. Four other college and career academies had undergone similar leadership transitions within two years of the study. These leadership changes, plus scheduling and state reporting data processes changes, made it imperative to examine how district-designed master scheduling interventions could support school leaders in meeting student needs proficiently. The researcher collaborated with an action research team that included an

Action Research Implementation Team (ARIT) and an Action Research Design Team (ARDT) to investigate these challenges and potential interventions.

Action Research Implementation Team

The ARIT consisted of the primary researcher, the BHS principal, Mr. Ford, and two BHS assistant principals responsible for scheduling: Dr. Carter and Ms. Stokes. Dr. Carter was on staff when the school transitioned to a college and career academy. She had served the school for a decade, spending three years as a counselor and seven as an assistant principal. Ms. Stokes was a previous teacher in the school for four years before assuming the assistant principal role in November 2022.

The researcher invited these participants because they either generated the master schedule or supervised the master scheduling process at the research site. The team collaborated and shared information, participated in intervention treatment, and engaged with the researcher and one another on their experiences throughout the study. The researcher frequently met with the team to observe and collect data on their collective interactions with each other and the interventions. Additionally, the researcher collected initial feedback from additional participants from other NCPS college and career academies, Central Northeast High School (CNEHS), Exploratory High School (EHS), Brookmeadow High School (BMHS), Civil High School (CHS), and South Northeast High School (SNHS). This feedback allowed the researcher to identify common and unique factors that impacted the master scheduling process across all schools.

The primary researcher invited 13 college and career academy leaders to complete the initial questionnaire. Eleven participants responded, including three principals and eight assistant principals responsible for scheduling at their local school. Two of the eight assistant principals

included ARIT members. All participants held Master's level degrees or higher, and their educational experience ranged from eight to more than 16. Seven participants had over 16 years of experience in education.

The participants had backgrounds as teachers except one who previously served as a school counselor. One assistant principal had a non-education career before becoming a teacher. All participants served in teacher or counselor leader roles, including department chair, curriculum content leader, head counselor, academy lead teacher, academy coach, instructional coach, and teacher on special assignment before becoming a principal or assistant principal.

Action Research Design Team

The ARDT included the primary researcher and district leaders with roles and responsibilities impacting the local school scheduling process. The team comprised one principal supervisor, two executive directors, and three directors, each with responsibilities related to data governance, data reporting, multilingual learners, school improvement, and school operations and support. The team partnered to review data, determine interventions, and monitor progress. The primary researcher and ARDT used action research to engage with one another in addressing long-term and immediate needs. This interactive approach created flexibility for changes, such as adapting cycles based on real-time participant needs, thus enriching the findings from the case.

Findings From the Case

This qualitative action research study examined the effects of district-designed master scheduling interventions on college and career academy scheduling practices. The study included three action research cycles of interventions: assembling a scheduling team, intentional weekly scheduling team meetings, data audits, ongoing district scheduling coaching, and monitoring for

fidelity. The action research teams used data to develop, implement, and modify the interventions throughout the cycles.

The subsequent sections detail the findings of the case by cycle. The study revealed several key findings, including the absence of formal training for those responsible for master scheduling, complex challenges constrained by stakeholder influences, and impactful factors, such as human resources, varied academic programming, and resource allotment. The findings also emphasized the value of collaboration and communication between the local school and district support teams and the advantages of advanced preparation in meeting student needs. The researcher expounded on these findings throughout the ensuing sections.

Action Research Cycle I

The action research process began in mid-February 2023, overlapping with the NCPS scheduling timeline, which ran from January to May, with FTE and State Reporting adjustments in August and September. Cycle I began with a pre-step that established the context and purpose of the study. The context and objective included defining the why and success, setting boundaries, and cultivating collaborative relationships among participants (Coghlan, 2019). Constructing a working theme, initial data collection and analysis, and intervention implementation followed the pre-step.

Pre-Step – Establishing Context and Purpose

A subset of the ARDT held its first meeting in mid-February 2023 with the primary researcher and Mr. Andrew Fulton, Executive Director of School Operations and Support, who served as the business owners for school scheduling processes in the district. The pair established the context and purpose of the study before engaging the remaining ARDT members. Mr. Fulton acknowledged that the school district was experiencing a crisis in processes and procedures due

to high leadership turnover. The researcher concluded that based on district reports, the district was experiencing an unusual surge in data reporting errors that aligned directly with local school scheduling processes. The researcher informed Mr. Fulton that the mistakes were not isolated to schools with new leadership but were widespread throughout the district.

The pair feared that if they were not proactive in seeking a solution, the scheduling data errors would begin to impact district and local school funding due to the relationship between the two elements. The team decided that the current processes and procedures crisis necessitated the study. The outcome could potentially support mitigating the data reporting errors related to local school master scheduling and resourcefully supporting student needs. After establishing the context and purpose of the study, the team progressed to the constructing step.

Constructing Step

The primary researcher and Mr. Fulton reconvened to discuss ways their department could enhance leader knowledge of scheduling processes. The team recognized that fewer administrators proactively participated in technical scheduling training when the district shifted from in-person to virtual training during the pandemic. Additionally, there was an absence of consistent master scheduling interventions that reinforced the leadership skills essential to establishing solid scheduling processes at the local schools.

Mr. Fulton believed that although local schools needed consistent district master scheduling interventions to foster their capacity, the ARDT needed to better understand the master scheduling experience at the local schools, including factors that impacted how the leaders approached school scheduling. The team decided that an initial questionnaire and interviews were the best ways to discover and understand those factors. The primary researcher recommended extending the questionnaire to include all college and career academies that shared

demographic commonalities with the primary research site. She contended that this would help understand if the schools shared common factors that impacted their scheduling processes, which would help create more universal interventions.

The primary researcher designed the initial draft questionnaire and interview questions, and the team collaborated on all revisions. The revisions certified that the questions supported informed decision-making and would answer the first research question. The initial data collection occurred in the next phase of the action research process, the planning stage.

Stage 1 – Plan: Initial Questionnaire

The ARDT employed an initial questionnaire to identify common factors influencing scheduling practices across the college and career academy high schools. Between the last week of February and the first week of March 2023, the primary researcher used Qualtrics to administer the questionnaire to thirteen administrators at college and career academies, including members of the ARIT. The participants comprised seven assistant principals responsible for curriculum and six principals, providing one week to complete the questionnaire. Twelve administrators responded to the questionnaire.

The questionnaire comprised open and closed questions that established a reference point for the master scheduling perceptions, experiences, and reflections of college and career academy leaders. The open-ended feedback provided significant perceptions interconnected with the closed-end responses. The closed answers allowed participants to provide background information about their schools, professional experiences with master scheduling, and factors and influences that impact master scheduling processes at their sites. The open-ended questions enabled participants to reflect and communicate unfiltered perspectives and beliefs on their experience with the master scheduling processes at their college and career academy.

The questionnaire revealed that participants viewed the master scheduling process as a structured, student-centered endeavor with complex challenges constrained by stakeholder influences and impactful factors, such as human resources, varied academic programming, and resource allotment. The primary researcher used these findings to engage the ARIT in interviews that sought a deeper understanding of the questionnaire results.

Stage 1 – Plan: Initial Interviews

The personal reflections shared by the ARIT during the initial interviews enriched the questionnaire feedback. In March 2023, the primary researcher conducted hour-long, recorded interviews via Zoom with the ARIT. The researcher used a standardized interview protocol (see Appendix C) consisting of thirteen questions and provided each participant with a copy of their transcript to review and revise if necessary. Table 4.1 details a comprehensive summary of the collective feedback and perceptions from the ARIT participants.

Table 4.1

ARIT Initial Interview Key Summary Themes

Question Grouping	Key Summary Categories
Scheduling Experience and Training	All three ARIT members gained awareness of high school master scheduling processes through previous supportive roles (counselor or instructional coach) before assuming primary responsibility for overseeing and generating the master schedule. Lack of formalized Master Scheduling training outside of technical training (student information system). Master schedule leadership support received through on-the-job, hands-on, mentorship, and peer collaboration.
Master Schedule Purpose and Effectiveness	The purpose of a master schedule is to execute the instructional priorities and programs set for the school while ensuring

Question Grouping	Key Summary Categories
	students are placed in the correct class on day one and receive what they need. The ARIT recognized an effective master schedule as an organized, timely, and effectively communicated structure that accounts for student needs. However, Mr. Ford acknowledged that the school had not generated an effective master schedule due to a lack of staff buy-in and prevailing communication and time management issues.
Scheduling Priorities and Student Needs	Dr. Carter found difficulty in balancing the various student needs in an academy structure. In opposition, Mr. Ford did not believe the team was doing enough to support students not actively engaged in the academy model, so he launched a new academy right before the 2022-2023 school year for students off-track for graduation. Priorities shifted based on new ideas and desires of staff members and sometimes disrupted student needs.
Master Scheduling Concerns	The school experienced a difficult start to the 2022-2023 school year due to master schedule issues. Sticking to a timeline and adhering to deadlines and instructional priorities caused internal conflicts that impacted communication, establishing processes, and meeting student needs. Dr. Carter was transitioning out of the school at the end of the 2022-2023 school year and handing the total responsibility of master scheduling to Ms. Stokes, a novice assistant principal.
District needs	Mr. Ford acknowledged his gap in funding knowledge and how that gap could impact their local teamwork. The ARIT recognized a need for collaboration time with district leaders to partner and better understand the “puzzle” of the master schedule.

Question Grouping	Key Summary Categories
Additional Information	A difficult start to the school caused morale issues amongst teachers and staff – feelings of not being a priority. Communication and collaboration were a reoccurring theme amongst the ARIT.

The questionnaire and interview data, coupled with the ARIT having never worked together before regarding scheduling, prompted the ARDT to recommend the first intervention, intentional weekly scheduling meetings. The ARDT believed the purposeful scheduling meetings would help the implementation team build trust amongst the team, develop coherent scheduling processes, work on establishing effective communication protocols, agree upon instructional priorities, and solidify a school scheduling timeline. They wondered if consistent scheduling meetings focused on addressing challenges, concerns, and student needs would result in a decrease in student scheduling errors and more equitable opportunities for students.

Stage 2 and 3 - Do and Study: Intervention

The ARIT met every other Monday beginning in March 2023, maintaining this frequency throughout each action research cycle. The meetings explicitly focused on scheduling, including processes, timelines, instructional priorities, updates, communication protocols, and fielding unanswered questions. The meetings also served as designated times for the ARIT during the study. During the first scheduling meeting cycle, the ARIT focused on understanding the school context and current master scheduling processes and determining the instructional priorities for the 2023-2024 school year. The primary researcher provided coaching support as needed.

The meetings promoted productive struggles within the ARIT. For instance, during one specific meeting, the team mulled six potential instructional priorities for the 2023-2024 school year. The ARIT understood that the administration team had not solidified these priorities;

however, they immediately recognized the competing priorities. The recognitions led to a robust conversation about one of the priorities, changing the common planning times for the Professional Learning Communities (PLCs).

Dr. Carter wanted to first focus on determining the PLCs planning times because they had always been the core of their scheduling practices. She stated,

> *PLC has, you know, historically driven what we do here, and so, all PLCs meet on B days, so every PLC in the school and what the content Assistant Principals (APs) have asked for, and would like, is they've said it's very hard for them on B days to do that stretch of meetings, right? Especially because they might have two PLCs in one block and try to make it from one to the other. So, now they would like to have PLC split between A and B Day.*

She was happy to make the necessary adjustments for the administration team but wanted them to work with her to determine the new meeting day for each content area. Hearing Dr. Carter express her desires, Ms. Stokes reminded the scheduling team that they needed to consider the film academy planning time when determining content planning, which was also a priority. Conversations like these happened often during the scheduling meetings.

The ARIT clarified several issues throughout the first cycle. At the end of each meeting, the team compiled an action item list with tasks they needed to accomplish before the next scheduling meeting. The tasks included finalizing the PLC planning times with Mr. Ford because the team knew the planning periods would determine not only the layout of the master schedule but also the amount of time teachers would have to engage with one another, verifying the students invited to participate in the Whatever It Takes (W.I.T) Academy were indeed off-track, and updating staffing lists, to name a few. The primary researcher observed that the weekly

scheduling meetings offered uninterrupted time for the team to connect and address old business, handle new business, or both, and reconcile individual conversations with leaders and teachers outside the team.

Stage 4 – Act

After multiple scheduling meetings, the full ARDT reunited in April 2023 to analyze the scheduling meeting observation data and determine the second cycle of interventions. The primary researcher reviewed the context, data collected at that point, the current scheduling status, and the instructional priorities for BHS. The ARDT expressed concern regarding the scheduling practices at BHS, prompting in-depth discussions about issues that aligned with findings from the questionnaire, initial interviews, and observations.

During the meeting, Dr. Ransom appreciated the *"heart and desire"* of BHS pursuing the implementation of the W.I.T. academy during the 2022-2023 school year. However, as admitted by Mr. Ford during the interview, implementing the W.I.T. academy had caused a rough start to the school year for both teachers and students. Dr. Ransom hoped that we could find a way to *"operationalize"* their goals with *"very clear structures and directions"* for the new school year. Dr. Ransom contemplated whether the school understood how to schedule *"holistically."*

The assumption led her to suggest inviting additional members to join the ARDT, specifically district leaders with direct oversight of the special education instructional program, given the historical challenges with accurately scheduling students receiving special education services. Ms. Alexander also proposed inviting someone from the district office to represent the gifted department. Dr. Peek agreed and spoke about seeing every program area *"impacted by student scheduling errors."* Mr. Fulton acknowledged the numerous scheduling challenges but reminded the group of the scope of the study and asked that the ARDT narrow down a focus that

they could broaden after the study. He stated, *"When you focus on everything, you can't focus on anything,"* which he recognized as a challenge the BHS team faced.

Dr. Ransom wondered, *"Do we do an audit? Do they know wholistically the impact of their scheduling decisions and practices?"* Ms. Alexander emphasized the importance of *"getting everyone to understand their role on the scheduling team."* These discussions, emerging data findings, knowledge of multiple state reporting errors, and decreased funding for BHS prompted the ARDT to invite Mr. Ford, the BHS principal, to join their next meeting. They wanted to hear his perspectives directly.

At the next ARDT meeting, Mr. Ford shared two crucial focus areas for the 2023-2024 school year: *"having students in the appropriate courses for core and electives and being intentional about providing students with multitiered systems of support."* However, the principal supervisor, Dr. Peek, queried how the school planned to address the *"state reporting errors and issues surrounding those errors."* Dr. Ransom explained that the school *"lost $400,000 in funding"* due to scheduling errors that included qualified students not receiving special education services through proper course placement, a decrease in eligible, gifted students, missing certified staff, and too many changes, specifically, implementing the Whatever It Takes academy at the beginning of the 2022-2023 school year instead of waiting until next school year.

Mr. Ford acknowledged the *"hastiness"* of the decisions the BHS leaders made at the beginning of the school year. Dr. Ransom stated that due to the hastiness, *"the state reporting team did a lot of fixing"* on behalf of the school. Mr. Ford reiterated, as he did during his interview that this was *"the worst start of a school year."* He stated that he was more attentive to the scheduling practices and decisions made in the school. Dr. Peek recognized the transition of

Dr. Carter becoming a principal, and Ms. Stokes, succeeding her as the assistant principal for scheduling, presented an opportunity to make significant practice changes.

The ARDT and Mr. Ford concluded that the school would continue the intentional scheduling meeting intervention during the second cycle and expand the team to include staff with specific program knowledge, such as gifted, special education, and multilingual learners. They also chose additional interventions for the second cycle: state reporting and FTE audits and an office relocation that would place the student data management clerk (SDMC) and assistant principal responsible for scheduling closer to one another. These decisions concluded Cycle I and progressed the study into Cycle II.

Action Research Cycle II

The second cycle began mid-April and spanned seven weeks, culminating in June. The ARIT continued to meet as a scheduling team with additional members while participating in two other interventions: the state reporting and FTE audits. The cycle commenced with the planning stage.

Stage 1 – Plan

The ARDT and Mr. Ford mutually decided the ARIT needed to continue the weekly scheduling team meeting interventions, plus expand the scheduling team with additional members. They believed the expanded team expertise would reduce student scheduling errors in all instructional programs. The design team gave Mr. Ford autonomy to determine the additional members he would add to the scheduling team.

Additionally, the design team advised state reporting and FTE audits as separate interventions. The team believed the audits could add value to the ARIT by helping them better understand their scheduling and data reporting status and build their capacity to find and use the

right tools, including reports and applications, to access and understand their data. They envisioned that if the school expanded its scheduling team based on job roles that impacted state and FTE reporting, those team members could participate in audit interventions that expanded their capacity. As a result, student scheduling errors would decrease, leading to more equitable student opportunities.

The primary researcher met with Ms. Alexander, an ARDT member and Director of Data Reporting, and another district leader who would facilitate the state reporting audit for leaders to coordinate calendars and plan both audit interventions. Ms. Alexander believed the audits should occur in person instead of virtually because *"face-to-face works best"* for engagement and checking for understanding. The researcher recommended that the state reporting and FTE audits occur within two weeks, with the state reporting happening at the end of April and the FTE audit in mid-May. Ms. Alexander believed this would give the team time between audits to transfer knowledge from the first audit and prepare follow-up questions for the second audit. Ms. Alexander stated that *"she would attend both audits"* to help the ARIT connect state reporting to FTE.

Based on feedback from Mr. Ford, they also recommended an office move to relocate the AP responsible for scheduling and the SDMC physically closer to eliminate communication barriers and opportunities for the AP to be uninformed of requests made upon the SDMC by the school community. However, the ARDT and Mr. Ford recognized that the time of year was not conducive for an immediate move and that the intervention would become a part of the third cycle.

Stage 2 and 3 - Do and Study: Intervention

The implementation team continued its weekly scheduling meetings throughout the second cycle. The scheduling team expanded to include the Title I PIC, the student data management clerk, the registrar, and the records clerk. Although the researcher continued observations of the ARIT, she did not include the newest members of the scheduling team in this study and, therefore, collected no data on these members. However, at the end of the study, the researcher did seek the perspectives of the ARIT on adding new members to the scheduling team. The whole team met for the first time before the audit interventions, at which point the ARIT updated the latest members on what had previously occurred.

A week before the audits, the ARIT held a scheduling meeting to discuss various scheduling topics, such as updating their multilingual learners (ML) scheduling models to provide students with the services needed while providing equitable learning opportunities, specifically in heterogeneous environments. The team acknowledged not utilizing a scheduling model that maximized learning for students receiving ML services. Dr. Carter noted, *"We have a lot of multilingual learners apply for service waivers because they no longer desired sequestering from their peers not receiving ML services."* Their discussions aligned with the upcoming audit interventions.

The ARIT and the extended scheduling team participated in the state reporting audit in late April. A team of eight district leaders and support staff, including Mrs. Alexander, conducted the audit, and the primary researcher observed the ARIT during the audit. The state reporting team began the audit by presenting an agenda overview, a timeline and communication plan for end-of-year state reporting activities, and a support model. The state reporting team then

guided the ARIT through an immersive exploration of school reports essential for program scheduling, such as ML, gifted education, and special education.

The ARIT accessed 14 reports that focused on scheduling summaries, discrepancies, verifications, non-gifted students with gifted classes, non-grade ESOL classes, new students receiving ML services, IEP data checks, and IEP and schedule alignments. With assistance from the state reporting team, the ARIT dissected each report, learning how to read the errors and discussing multiple scenarios related to each report and error. The team learned which members received the reports and distribution frequency.

Interestingly, the team realized a gap in their team at this point. Several people receiving the reports were not a part of the team but played a critical role in addressing scheduling errors, specifically the special education and gifted program contact leads. This realization prompted Mr. Ford to contact the special education assistant principal to join the session. The discussions around the reports, errors, and scenarios also emphasized the absence of a formalized process for handling schedule changes within the school.

The ARIT discovered an accessibility gap in the reports, finding that the SDMC could not access the ML reports, and the scheduling AP lacked access to the special education reports. This discrepancy made the ARIT realize that even if essential scheduling contributors were not directly involved in specific instructional programs, they still required these reports to collaborate effectively with program contacts for efficient student scheduling. Recognizing this, Mr. Ford committed to *"making sure everyone on the scheduling team had access to all school reports."* In response, Ms. Alexander offered to contact his assistant to add the necessary names to the school report lists. The revelation also made Ms. Alexander contemplate whether access restrictions were consistent district-wide.

The last part of the audit focused on acquainting the ARIT with the state reporting application used by the district to monitor the Student Information System (SIS) data and student records errors. The ARIT learned that the application listed errors the school needed to accurately resolve to report data to the state Department of Education. The ARIT engaged with the SIS handbook, which contained instructions on fixing errors. They then participated in a thorough explanation of how scheduling concepts influenced all that they had learned thus far. Those concepts included creating sections, marking the appropriate student services, using instructional program delivery models and placeholder teachers, excluding additional staff from state reporting, duplicating classes, and resolving 4th- and 5th-year senior errors. Guided by the district team, the ARIT actively participated in a working session that enabled them to immediately transfer their learning into resolving mistakes.

The audit integrated several knowledge checks throughout the session, posing questions such as “How could this information be used,” “What are the next steps to correct these issues,” “How would these steps resolve this issue,” and “What is the review process for the school?” The district team used these questions to foster problem-solving strategies within the ARIT, guiding them toward self-sufficiency in finding solutions. After the district team left at the end of the session, the primary researcher conducted a debriefing session with the ARIT, functioning as a consultation group. The researcher used three guiding questions: how was the session, what were the key insights gained, and what does the team now need? The team looked forward to the FTE audit session.

A two-week gap between the state reporting and FTE audit allowed the ARIT to transfer lessons learned and compile follow-up questions. Ms. Alexander, an ARDT member, facilitated the FTE Scheduling Audit, and Ms. Dunn provided support for the multilingual learner (ML)

questions the team raised. The audit included defining FTE, thoroughly explaining FTE programs, categories, and weights, building capacity for course numbers and how they impact funding, and exploring the district FTE application that focused exclusively on data for BHS. This session was critical for the school because the ARDT had already expressed a $400,000 loss in funding for the current school year.

The ARIT asked questions regarding their data. Ms. Stokes asked, *"When a teacher is enrolled in the gifted program, can the school schedule the teacher with a gifted course number?"* She also wondered if gifted-qualified students enrolled in dual enrollment received services at the college. Ms. Alexander explained the fundamental allotment formula and how the district generates *"teacher points."* Dr. Carter began to reconcile this information with how the team approached resource alignment by saying, *"For every teacher that teaches general education, we should have 150 students on their rosters, and for every teacher teaching multilingual learners, their rosters we should have at least 90 students."* Dr. Carter immediately realized they had never generated enough staffing points because they always had a goal of 120 students per general education roster.

Throughout the session, the ARIT gained immediate insights about changes they could make as they scheduled for the 2023-2024 school year and recognized changes that needed more follow-up discussions. With support from Ms. Dunn, they deliberated ideas for creatively scheduling ML to support their growing population. The team also cycled back to their previous learning to provide a status update and ask follow-up questions that focused on fixing errors related to special education scheduling. These questions showed that the team needed additional support to clear errors and that they had progressed in other areas. At the end of the session, the primary researcher conducted a debriefing session with the ARIT, functioning as a consultation

group. The researcher used the same three guiding questions from the first session: how was the session, what were the key insights gained, and what does the team need?

The ARIT recognized they needed more time to transform their ML scheduling to support their growing population. They believed they would need to prepare for that during the upcoming school year. The ARIT also wanted to work on their remedial education scheduling because they made a connection between how the remedial education course numbers could generate additional funding and provide the necessary resources that would support their W.I.T. Academy.

Stage 4 – Act

The ARDT analyzed the observation notes, reflections, and feedback from the state reporting and FTE audits to determine the final cycle. The team believed both audits provided the ARIT with much information to ponder and implement. Mr. Fulton wondered, *"Since school ends in a few weeks, should we add an intervention that monitors the progress of the ARIT?"* The primary researcher thought the progress monitoring would align adequately with the FTE count and state reporting error checks the school team would do when they returned for the new school year.

The FTE count would occur on the first Tuesday in October, and the district had a goal for schools to maintain their state reporting errors daily. The ARDT looked forward to seeing if the interventions made a difference in the funding the school generated and the ability of the ARIT to manage the state reporting errors efficiently. The primary researcher conferred with the dissertation chair, who recommended that progress monitoring become an additional cycle due to the extensive break between the end of the school year and the beginning of the following year. The ARIT continued to work through their scheduling processes and apply their intervention

learning throughout the summer months. Also, during the summer, Mr. Ford finalized the office moves for Ms. Stokes and the SDMC to place them next door for easier collaboration.

Action Research Cycle III

The third action research cycle began in August and ended in October. The ARIT continued to meet with their scheduling team while participating in the monitoring for fidelity intervention. The primary researcher and ARIT relied upon the district reports to determine outstanding state reporting errors for the new school year scheduling and monitor FTE. The third cycle started with the planning stage.

Stage 1 – Plan

The cycle started with the planning stage, where the ARDT used data and reflections from Cycles I and II to recommend monitoring for fidelity as the final intervention. They wanted to understand if the interventions positively impacted scheduling outcomes, such as decreasing state reporting errors and funding implications. The team believed that if the ARIT reduced state reporting errors, they would enroll students with accurate information, schedule students in their correct classes with appropriate services, and assign teachers to classes aligned with their certification. If all these things happened, the result would positively impact funding, allowing the school to earn more resources to support student needs. The team settled on using district reports to monitor fidelity and contact the ARIT for support as needed.

While the ARDT planned the intervention, unprompted by the team, Mr. Ford invited Dr. Ransom to perform a *"data health check"* for the ARIT and scheduling team in early August. His request showed that the ARIT recognized a continued need for support in monitoring their progress, which validated the ARDT recommendation. Dr. Ransom advised that Mr. Ford take some time to recalibrate his team as they had lost Dr. Carter to her principal

appointment, and two other scheduling team members left for promotions at other schools before the health check. She also reminded him who should be on the scheduling team to support each data area. She performed the health check with the scheduling team once he recalibrated.

Stages 2 and 3 - Do and Study: Intervention

The ARIT met weekly on Fridays to monitor the scheduling, state reporting, and FTE district reports and applications shared during the spring audits. Mr. Ford led those meetings by guiding the team through conversations regarding each outstanding error. The guiding question at the forefront of the discussions was, *"How does the error impact other areas, and how will scheduling changes to resolve the error impact other areas."* Ms. Stokes identified that the goal of the meetings was always to help everyone on the team *"see the bigger picture."* The team assigned the errors to members based on expertise and set goals to clear all outstanding misconceptions by the next meeting. The team also identified routine errors they could resolve automatically through streamlined processes that they worked collaboratively to create.

Dr. Ransom attended one of the weekly meetings to perform a data health check. The data health check consisted of a mini audit in which Dr. Ransom reviewed various reports, state reporting, and FTE application tools specific to the beginning of the year and the upcoming FTE count. Dr. Ransom found that, for the most part, the team was in a good place. However, some data issues needed resolving, such as many students with the wrong 9th-grade entry date, which impacted graduation rate and athletic eligibility. She questioned who on the team was assigned to each area of need and how to equip that person to lead the team through resolving those errors.

The primary researcher also monitored the scheduling, state reporting, and FTE district reports and applications to determine differences between the 2022 and 2023 school years. The school earned $1,145,155 more QBE earnings than the October 2022 FTE count, doubling its

earnings in gifted education, more than tripling its earnings in remedial education, and saw a significant increase in ML that was shy of $1,000,000. The primary researcher conducted final conversations with the ARIT to determine the impact of the action research study, current status, and continuing needs.

Stage 4 – Act

The design team analyzed the ARIT reflections and feedback to establish a support plan for the school outside the study. The team acknowledged that Ms. Stokes still needed direct coaching from the primary researcher to support her learning now that she assumed the immediate management of the BHS scheduling process. The primary researcher agreed to contact Ms. Stokes to schedule coaching sessions at her desired frequency. The team also recommended that the implementation team consider scheduling a follow-up meeting with the ML department to develop a plan for supporting the ML population growth the school experienced. The team had new members who needed adequate training in the SIS to proficiently perform their duties as scheduling team members. Finally, the design team recommended that the implementation team continue their weekly scheduling meetings to *"stay on top"* of their scheduling, data, and funding.

Chapter Summary

This chapter detailed the action research process by explaining the context of the study and exploring the findings from the case, including each action research cycle and the interventions that accompanied those cycles. The ARDT relied on data collection such as a questionnaire, interviews, observation notes, documents, and consultation groups to design and facilitate interventions. The interventions, which include intentional scheduling team meetings, state reporting and FTE audits, and progress monitoring for fidelity, aligned with Systems

Thinking, a skill within the Systems theory that allows for practice through analyses, creation, and inquiry into systems. Systems thinking shifted from a linear cause-and-effect thought process to a comprehensive approach that created awareness of connections within the master schedule, the role of master schedule structures, and the hidden consequences of decisions the local school team made. Chapter 5 offers an analysis of findings from the action research case.

CHAPTER 5

ANALYSIS OF FINDINGS FROM THE ACTION RESEARCH CASE

Chapter 4 detailed a thorough account of data collected and interventions employed during each action research cycle. The initial data collection and analysis for the action research process began in late February. The researcher paused the study to accommodate the summer months, continued data collection and analysis in August, and finalized collection in October 2023. Chapter 5 analyzes the data findings and explains how the findings informed the purpose of the study and answered the research questions that guided the study.

The purpose of this study was to examine how district-designed master scheduling interventions impacted the scheduling approach of college and career academy high school leaders. The researcher considered perspectives from principals and assistant principals responsible for supporting a component of the local school master schedule. The researcher worked with an Action Research Design (ARDT) and Implementation Team (ARIT).

To address the purpose of this action research study, the following research questions guided this inquiry:

1. What factors impacted how school leaders use the master schedule structure to meet the needs of each student equitably in a college and career academy setting?
2. How did college and career academy leaders describe the impact of district-designed interventions on their approach to master scheduling for student equity?
3. What did an action research design team learn from creating and facilitating master schedule interventions for college and career academy leaders?

The researcher collected and analyzed data simultaneously as the analysis informed the interventions the ARDT designed and executed. The researcher used a phased analysis approach to organize and reduce the collected data. These phases overlapped depending on when the data collection occurred. The first phase began with transcribing and reading the open-ended questionnaire, interviews, observation notes, and consultation group feedback to identify the main points made by the participants. The researcher employed the Qualtrics analysis feature for all closed-end questionnaire questions during the first phase.

Once the researcher transcribed and read each data method, the next phase consisted of writing data summaries in the researcher journal, along with thoughts, questions, and reflections considered by the researcher, and coding participant responses using an alpha coding system onto a spreadsheet tab for each research question. The alpha coding represented the first letter or a combination of letters from words and phrases that stood out to the researcher. During Phase III, the researcher identified the code frequency and participants associated with the code and then color-coded the codes by similarity.

The researcher then proceeded to the fourth phase by combining and collapsing similar codes into categories for each research question and eliminating codes no longer needed. During the final data analysis phase, the researcher used the categories and codes to elaborate on the findings and identify themes associated with those findings. Table 5.1 aligns the research questions and the themes.

Table 5.1

Research Questions and Themes Alignment

Research Questions	Findings
1. What factors impacted how school leaders use the master schedule structure to meet the needs of each student equitably in a college and career academy setting?	Theme 1: Internal factors Theme 2: External factors
2. How did college and career academy leaders describe the impact of district-designed interventions on their approach to master scheduling for student equity?	Theme 3: Master scheduling does not belong on an island Theme 4: Data richness should not replace expert district voices
3. What did an action research design team learn from creating and facilitating master schedule interventions for college and career academy leaders?	Theme 5: Customized interventions move learning from compliance to practical and applicable

This chapter details the themes from the findings and their alignment with each research question.

Research Question 1

The researcher used a questionnaire, interviews, and observations to identify factors that impacted how school leaders used the master schedule structure to meet student needs. The participants identified several aspects that significantly and moderately affected their ability to create a master schedule at their college and career academy. The factors, grouped by two central themes, emerged from the collected data as internal and external factors. The following subsection details each of the factors.

Internal Factors

The internal factors consisted of interconnected elements within the local school organization. Those factors included operations, communication, and leadership and culture, all of which created complexities that promoted a variety of outcomes in the school environment.

The questionnaire disclosed personal beliefs participants held regarding site-based master scheduling processes, an operational factor. Participants believed that their local school scheduling processes represented a systematized structure that, though challenging, centered around their students. The feedback emphasized the difficult aspects of the process, including confusion, time-consuming, and complexity. Table 5.2 categorizes words expressed by each participant into common ideas.

Table 5.2

Words Used to Describe the Master Schedule Process at a College and Career Academy Site

Purposeful	Systematized	Challenging	Student-Focused	Collaborative
Thoughtful	Structured (2)	Confusing spots	Equity	Collaborative (2)
Intentional	Organized	Complex	Opportunity	
Essential	Detailed (2)	Challenging (2)	Student-driven	
	Layered	Hard		
	Flexible	Tedious	Student-focused (2)	
	Fluid	Time-consuming	Student-centered	
	Evolving	Reactive (not proactive)		

Note. Numbers in parentheses represent the number of times the word appeared in responses.

The interviews further expounded on these beliefs, with Mr. Ford expressing that *"master scheduling is one of the most complex, but it is one of the most rewarding and fun jobs in this profession."* Dr. Carter emphasized the master scheduling complexities by stating,

> *Much more far-reaching than I think people initially realize, the totality of all that curriculum touches. And I think that took a while for me to wrap my brain around. That so much of what happens in the school comes out of my office but also so influential in how the school works. You're implementing the instructional priorities for the school and the importance of staying true to those instructional priorities. It's such a massive task, and so that has a lot of different layers that can dictate where teachers are in the building.*

Questionnaire findings showed that the elements that created a student-concentrated schedule, such as scheduling students in various course and program offerings (AP, IB, Gifted, Special Education, English Learners), accommodating numerous students off track, and placing students in pure academy cohorts all significantly impacted their approaches to scheduling while programming college and career pathways moderately influenced their practice.

However, despite the intricacies of creating, generating, and managing the master schedule, the ARIT collectively recognized the value of the structure and that its purpose should be student-centered, another notion explicitly communicated in the questionnaire and interview findings. Ms. Stokes commented, *"Students should be placed in the right classes based on their sequences and needs. If they are not in the right classes, then we cannot serve them, and equitable access to resources is not guaranteed for them."* Nevertheless, even with understanding the influence the master schedule can have on student success and response to their needs, the ARIT expressed an underlying concern that ineffective communication amongst

stakeholders coupled with leadership and culture hindered constructing a schedule that fully addressed student needs.

Mr. Ford expressed:

> *If it [the master schedule] doesn't happen the way it's supposed to, it truly is the core of what we do in our building. Like it really is the core. I've always known that, but I felt it this year when the Master wasn't and what it did to the spirits of everybody in this building. Because kids come back to school ready to learn, whether they admit it or not, they do, and teachers do as well. And the master schedule not being right this year; it really just ripped the core, and it took months for us to start feeling and I know we still feel it now, but not as bad. But it took months for us to recover. Lack of communication. And that communication, or lack thereof, led to teachers not knowing what they were teaching. Kids not knowing where, and who, and or knowing their scheduled was wrong, and how long it was going to take to be fixed. We were missing so many key vital pieces.*

Communication, specifically a need for effective communication amongst stakeholders, reverberated throughout the study as a significant internal factor for the master scheduling process.

Ms. Stokes listed it as one of her top three concerns regarding the master schedule and identified *"effective communication"* as the most significant component of an effective master schedule. Mr. Ford stated that *"communication first"* is the primary decision for providing students with high-quality instruction for the 2023-2024 school year. He believed,

> *Ensuring that all our teachers have a good understanding to the best of our ability before they leave [for the summer] what they will be teaching so they could plan appropriately.*

Making sure that collaboration, we get feedback from teachers regarding areas of which they wish to teach.

Dr. Carter concurred by expressing her need for other team members in the school to *"communicate"* changes in instructional priorities *"to her."* A questionnaire participant also identified *"effective communication between all stakeholders"* to improve scheduling processes.

Questionnaire data also identified multiple stakeholders they found significantly or somewhat influenced master schedule decisions through their desires, non-negotiables, and opinions. Table 5.3 identifies the stakeholders in order of their perceived influence.

Table 5.3

Stakeholders Who Influence Master Schedule Decisions

Extremely Influential	Somewhat Influential
Students receiving special education services	Veteran Teachers
Students receiving English Learning services	Students on college prep academic pathways
Other Site Administrators	Department Chairs
	New Teachers
	Teacher Leaders (non-department chairs)
	Students on advanced academic pathways
	Families of students receiving special education services
	Feeder Middle School Administrators
	Families of students receiving gifted services
	Students receiving gifted services
	Families of students receiving English Learning services
	Counselors
	District Administrators

Each of these stakeholders influenced a desire for the master schedule. Mr. Ford recognized, *"We've done some things to appease the adults that has hurt the master schedule…it just creates this mess, and it's not necessary, so it's stop thinking about the adults as much and making sure the master's schedule is, is student-friendly."* Dr. Carter discussed how the scheduling process historically minimized student voice and choice over their schedules by teachers recommending students for courses they did not desire. However, she also recognized that an effective master schedule is *"about the kids getting what they need in the area that they like. But it's also designing a schedule that takes care of the teachers and what they need."* Ms. Stokes believed caring for teachers happened through *"step procedure, follow the procedure, and communicate effectively."*

Dr. Carter perceived the purpose of the master schedule was to *"execute the instructional priorities set for the school"* and that *"It's really a juggling act, and I've found really trying to force my principal and my administration to say okay, "for next year's schedule…"* when describing how difficult it was to get the team to commit to instructional priorities. Mr. Ford acknowledged that he *"still had some incredible ideas in June, right, that we wanted implemented when we see it, right?"* which waivered from the priorities that the leadership team initially set for the 2022-2023 master schedule. As a result, he concurred, *"And so, at the end of the day, there were so many components that just weren't right, that told a story to staff and kids that you really weren't a priority, and that's what ripped the heart and soul out of people."*

Establishing effective procedures and processes that included communication, setting instructional priorities centered on student needs, and balancing stakeholder influence required leadership commitment to cultural shifts that minimized adult impact. Although school leader participants viewed their scheduling process as student-centered, many still identified it as

challenging. Operations, communication, and leadership and culture emerged as internal catalysts for the complex disposition. However, there were also external factors that local school leadership did not exclusively control.

External Factors

The external factors represented elements within the school district organization that the local schools had minimum oversight over. Those factors included experience level, professional support, resource allocations, and instructional programs. School leaders described the impact of each of these external factors.

Findings from the questionnaire divulged a high level of inexperience as it related to actively designing and generating a master schedule. For instance, two veteran principals had never actively designed and developed a master schedule, yet they oversaw the process as principals. In addition, half of the assistant principals who completed the questionnaire had less than two years of experience actively designing and generating the master schedule, including Ms. Stokes, the ARIT member who became an assistant principal in November 2022 and became responsible for the master schedule by the end of the 2022-2023 school year. Mr. Ford conveyed that having a young scheduling team was one of his top three concerns regarding the master scheduling practices at BHS. He recognized the professional support they would need to generate the master schedule successfully.

The questionnaire and interview data gave the ARDT situational context regarding how leaders learned master scheduling processes. Data showed that professional support for generating a master schedule at college and career academies varied greatly. Table 5.4, extracted from questionnaire data, ranked the top three modes participants learned to create the master

schedule. Although district-level training held a number three ranking, only one participant recognized it as a leading learning method, while most participants saw it as a top three method.

Table 5.4

Top Three Master Scheduling Learning Methods

Rank	Learning Method
1	Collaboration with an on-site assistant principal
2	Collaboration with a student data management clerk
3	District-level training

The researcher found a potential link between the perception of the master scheduling process being challenging and the fact that the first level of master scheduling guidance most of the leaders had did not come from the district level but instead came from another assistant principal colleague on-site or the student data management clerk, whose primary responsibility was inputting data into the student information system and not making leadership decisions regarding meeting student and teacher needs. A questionnaire participant also expressed, *"Peer collaboration has been a great help in creating the master schedule. Academy school curriculum APs meet regularly to collaborate and share ideas and best practices."*

The interview findings revealed results similar to those of the questionnaire. All three ARIT members expressed during their interviews that before assuming primary responsibility for overseeing and generating the master schedule, they gained awareness of master scheduling processes by supporting and collaborating with a leader in that role. However, none received formal training beyond technical district learning that focused on inputting data into the student information system. Dr. Carter indicated,

Before I was officially named the curriculum AP, I was support to the curriculum AP since I started at Beaver, and during that time, I specifically helped with…I did all the electives as well as the special education master.

And before that, when I was at Duke Middle School, I was curriculum there, so I did all the scheduling and the master scheduling at Duke as well as I did some work with it when I was at Brookmeadow as a counselor in designing their ninth-grade academy. So, I scheduled the ninth grade at Brookmeadow High School.

We got training as far as how to support our work through the old student information system, but beyond that, there was really nothing beyond that. When we moved to the new student information system, we got a lot of training in that.

Ms. Stokes agreed,

Before coming to NCPS, I was an instructional coach...when I was in high school, along with supporting the instruction, my role was to work with credit recovery and mass, you know, scheduling, too. So, I worked with an AP side-by-side during summer to schedule. I had a great mentor who was really organized and structured; she basically gave me a whole outline.

Collaboration with peers was a common idea expressed by the participants.

Reflecting on his experience as a counselor in a different state where counselors were responsible for scheduling, Mr. Ford stated, *"Most of it was hands-on. Most of it was through a mentor. I was basically just thrown in the seat, and again with guidance, but there was no real formalized training."* Considering his training as a Curriculum AP, Mr. Ford added,

You're looking at the technical side, but at the same time, you're being exposed because not only is the trainer sharing their experiences, but those that are in the room with you

that are also doing the work, the other APs, over curriculum at other schools. They're sharing different ways in which they go about doing things.

These reflections affirmed the questionnaire feedback that college and career academy leaders had learned to generate the master schedule through collaboration with an on-site leader and not formalized training aside from technical.

These leaders collaborated with their local school peers and fellow leaders. However, who trained those leaders? This wonder and the findings emphasized that knowledge transferred without formalized training created potential participant learning gaps. These learning gaps possibly impacted the approach to master scheduling. As was the case for Mr. Ford. Mr. Ford, having served as an assistant principal responsible for scheduling, shared what he wished he had known when he began generating the master schedule. Mr. Ford stressed,

FTE. What I didn't really understand is the funding piece, you know. When we set this up for the study, I need to still be involved in that, because there are so many nuances about it that I still don't really understand, which could potentially be hurting us with regards to funding. So, that would be the big piece.

FTE is how NCPS schools generate funding to support resources, including human resources. The FTE becomes "points" that the local schools can use to hire staff.

Questionnaire participants identified human resources as one of the factors that significantly and moderately impacted their ability to create a master schedule at their college and career academy. Human resource factors included teacher turnover and mid-year hires as significant factors and hiring quality, certified Career and Technical Education teachers as moderate factors. In addition, they recognized scheduling to reduce class sizes, which required staffing, as a significant factor. A questionnaire participant stated*, "I would say the lack of*

points," as an additional factor that impacts their approach to master scheduling. All these factors require schools to generate enough FTE to meet student needs. However, a deficit in knowledge because of a lack of formalized training in understanding how the district produces points and how to use the points in master scheduling efficiently can run a risk of meeting student needs through high-performing instructional programs.

Although school leadership oversees scheduling students into instructional programs and incorrect scheduling can have significant funding implications, they do not manage how students qualify to receive instructional program support services, which include multilanguage learners (ML), gifted students, and special education students. For instance, during this study, BHS experienced a significant ML population increase twice, once in the spring and another during the summer. This increase created a scheduling challenge for the school because they lacked sufficient ML-certified staff to support student needs. When discussing the instructional programs, Mrs. Stokes surmised that,

> *The current master schedule embraces all these concepts. But that I think, this could have been we could have been a little bit more proactive to get this from day one. I think all these pieces have to connect together in the same way, or else the master schedule cannot come, become the perfect thing that we are talking about.*

A partnership between the local school and district leaders emerged as essential to attending to student needs.

Internal and External factors emerged as the central themes for the first research question and influenced one another. Managing internal factors requires effective school leadership oversight that encourages effective communication, consistent operational processes, and student-driven instructional priorities. External factors represented factors that school leaders had

minimal control over and required partnership with district leaders. Those factors comprised professional support focused on technical training, leadership training, and collaboration on resources management and instructional programs. The following section addresses the impact district interventions had on these factors and improving the problem of practice.

Research Question 2

The second research question probed how college and career academy leaders describe the impact district-designed interventions had on their approach to master scheduling for student equity. After each audit intervention session, the primary researcher conducted a debriefing session with the ARIT, using three guiding questions: How was the session, what were the key insights gained, and what does the team now need? In addition, the researcher observed the ARIT and engaged the team in final individual follow-up conversations to determine the impact of the action research study, current status, and continuing needs. The themes from the collected data included the importance of team collaboration and communication and the inclusion of district experts in a data-rich environment.

Master Scheduling Does Not Belong on an Island

Throughout the state reporting and FTE audit interventions, the ARIT made connections that one person could not effectively own the entire master scheduling process and that collaboration and communication within their teams were crucial. Ms. Alexander, an ARDT member, emphasized the *"team effort"* required for scheduling to work efficiently. Ms. Stokes believed that the *"entire team coming together was great."* She liked that everyone on their team heard the same message and thought the session allowed them to connect with district support, which would lessen their hesitance to *"email people when you don't know them."*

Ms. Stokes revealed that the time together helped her understand that *"we have to talk face-to-face with our SDMC."* This revelation led her to express the need for their offices to be near. Dr. Carter agreed that they *"established relationships"* during the session. Mr. Ford voiced appreciation for the district team taking the time to work with his team to not only fix current issues but also to help the team position themselves for the upcoming school.

During the study follow-up, Dr. Carter also noted the importance of ensuring the assistant principal responsible for scheduling is *"not on an island"* and *"making sure other people are involved."* As a result of the study, she created an intervention team at her new school. She established a consistent weekly meeting time, an action she described as *"pivotal,"* to review schedules, complete credit checks, and make decisions for each student. In addition, she hired another student data management clerk to assist with data mining to create individualized educational plans for each student.

Ms. Stokes disclosed, *"Starting off not knowing a lot, the team, I feel okay to say, was fragmented, but now people are okay knowing they are playing a part."* Ms. Stokes expressed that participating in the study interventions significantly improved *"teamwork, effective communication, and follow-up."* She added that the school now has streamlined *"processes and procedures in place with strict guidelines that must be followed through."* Mr. Ford expressed pride that the team continued their weekly meetings, even while experiencing turnover in team positions. He credited having the team in place to being able to quickly onboard new members.

Data Richness Should Not Replace Expert District Voices

Dr. Carter thought the state reporting audit session was *"great"* and shared that the interventions eliminated a *"gotcha"* belief and appreciated the customization that the district team delivered. She also asked, *"Can we do this for every school because everyone can benefit*

from this." Shortly before the FTE audit session, the school board approved Dr. Carter to serve as the new principal at one of the alternative education programs in the school district. Although her start date would be June 1st, Dr. Carter requested that her new team receive the same customized audit as BHS. She stated, *"I would love for you (primary researcher), Ms. Alexander and the state reporting team to come over and support my new team."*

Ms. Stokes stated that the FTE session *"helped a lot. I had no clue about funding."* She further commented, *"Support was at the top because hearing from experts makes a big difference. Hearing it from someone else creates potential to learn bad behavior."* Dr. Carter followed up with,

> *We are data rich, and sometimes you forget what you have reports for – the report interventions helped to know what we have access to – getting updates on synergy is helpful, and being able to learn more about how we can use synergy to make our work more efficient.*

Hearing district voices also prompted reflection.

At the end of one of the sessions, Ms. Stokes asked, *"Can we go somewhere to reflect and work to apply what we have learned because this isn't working by being in the building and being frequently called away from the work."* Dr. Carter asserted in her follow-up that the interventions made her *"more reflective."* Although the questionnaire participants did not participate in the interventions, completing the questionnaire prompted reflection and impelled a participant to send the researcher the following note after completing the questionnaire,

> *Completing the survey was a great reflection exercise. It gave me the opportunity to really think about how the processes we have in place support hearing the voices we*

believe to be most important. Thanks for the opportunity to participate. Great reflection for me and a chance to consider where I need to make some changes.

Overall, the participants found that the interventions helped improve their team approach to scheduling by developing effective communication and implementing follow-up procedures.

Research Question 3

The third research question focused on the perceptions of the Action Research Design Team (ARDT). It was essential to collect perspectives regarding their learning from creating and facilitating master schedule interventions for college and career academy leaders. The ARDT learned that customized interventions helped leaders apply the knowledge to their school needs.

Customized Interventions Move Learning From Compliance to the Practical and Applicable

At multiple meetings, the ARDT discussed scheduling, data, and team knowledge specifics for BHS. Ms. Dunn, Director of ML, discussed her interaction with the BHS team two weeks before one of the ARDT meetings. During this contact, she realized the team did not understand which teachers held ML certification or the number of students qualified for services. She recognized that the team needed support knowing how to *"go back and pull data"* before using it to improve programming. Dr. Ransom agreed, stating, *"We need to teach them how to get the right tools to access their data."* The realization that the team demonstrated limited capacity led to an agreement that BHS needed school-specific interventions.

After the final ARIT data analysis, the primary researcher debriefed the ARDT as a consultation group to determine their beliefs about the action research study. Ms. Alexander stated, *"The interventions were not a sit-and-get. Silos came down. I was amazed at watching the learning unfold as Mr. Ford kept bringing in different players based on errors."* Dr. Ransom

stated, *"The school was so far down the road when we started these interventions that they couldn't change enough, fast enough, yet they have more than recovered lost earnings from last year."* She added, *"Sitting with them for the health check struck an idea that maybe we should start bringing students to the meetings instead of making decisions and adjusting their schedules in isolation."* Students needing ML services increased waiver requests to forgo support because they did not want to enroll in classes that isolated them from their peers, which surfaced earlier in the study. The team made a connection to the fluidity in the scheduling team structure and how multiple vital players, including students, should be a part of the discussion.

The team determined that the interventions could benefit other district schools, including non-college and career academies. Mr. Fulton was amazed at how much change the school had made in such a short time and wondered, *"What could this look like for other schools if we have additional time to support or start at a different point in the school year."* Dr. Ransom added,

> *We have hesitated to start giving best practices. In this work, there is value in giving them a model and telling them that scheduling and data integrity work when there is a consistent agenda and everyone knows their responsibilities and how they impact one another.*

The team agreed to continue collaborating independently of the study to determine an intervention plan for other district schools.

Chapter Summary

This action research study used three research questions to examine the impact of district-designed master scheduling interventions on the scheduling approach of college and career academy high school leaders. Five themes emerged from the collected data—two from the first research question, two from the second, and one from the third.

The first research question identified factors that impacted how school leaders used the master schedule structure to meet student needs equitably in a college and career academy setting. Although participants identified multiple aspects, the factors thematically emerged as internal and external factors. Internal factors included operations, communication, and leadership and culture. External factors encompassed professional support, resources, and instructional programs.

The second research question described how the ARIT perceived the impact district-designed interventions had on their approach to master scheduling for student equity. Two themes emerged during data analysis. The first theme implied that master scheduling requires a team effort. There are too many components of the master schedule for one person to effectively manage. The second theme acknowledged that data richness is only as good as the district expert voices supporting schools in using the information.

The third research question explored what the ARDT learned when creating and facilitating master schedule interventions for college and career academy leaders. The overall theme explicitly acknowledged that customized interventions make learning applicable. When district leaders move from generalization to school leaders learning how to access their data, the purpose of the data, how different reports work in tandem and individually, and how to use it to identify school-specific issues, problems, and successes, they can make necessary adjustments to their processes and procedures.

CHAPTER 6

CONCLUSIONS, IMPLICATIONS, AND CONNECTIONS TO LEADERSHIP PRACTICES

The purpose of this study was to examine how district-designed master scheduling interventions impacted the scheduling approach of college and career academy high school leaders. The researcher considered perspectives from principals and assistant principals responsible for supporting a component of the local school master schedule. The researcher worked with an Action Research Design (ARDT) and Implementation Team (ARIT).

To address the purpose of this action research study, the following research questions guided this inquiry:

1. What factors impacted how school leaders use the master schedule structure to meet the needs of each student equitably in a college and career academy setting?
2. How did college and career academy leaders describe the impact of district-designed interventions on their approach to master scheduling for student equity?
3. What did an action research design team learn from creating and facilitating master schedule interventions for college and career academy leaders?

Chapter 6 finalizes this dissertation with a summary of the study, discussions of the findings correlated to each research question, implications for school and district leaders and policy, and concluding thoughts from the researcher.

Summary of the Study

This action research study examined the impact of district-designed master scheduling interventions on how school leaders use the master schedule to meet the needs of each student. The study occurred in the spring of 2023 at Beaver High School (BHS), a college and career academy in Northeast County Public Schools (NCPS). The researcher relied on the knowledge and experience of an Action Research Design Team (ARDT) to create and facilitate interventions for an Action Research Implementation Team (ARIT). The inquiry began when the ARDT noticed increased scheduling errors connected to an uptick in leadership transitions and changes in state reporting processes. The ARDT pondered if district-designed master scheduling interventions could support the efforts of school leaders in meeting student needs proficiently by decreasing the number of errors manifesting.

The researcher investigated the perceptions of both teams through multiple data collection methods, including a questionnaire, an interview, observations, documents, consultation groups, and follow-up conversations. The data collected determined the interventions employed and informed the three research questions that guided the study.

Action Research Study

The action research study employed a shared reflective process that consisted of three spiraling, iterative cycles that began in February 2023 and finished in October 2023. Each cycle progressed through a logical model of planning, acting, observing, reflecting, revising, and repeating. The primary researcher and the ARDT observed, noted, and discussed the master scheduling interventions as part of the data collection process. The collaborative nature of this study consisted of work between Action Research Design and Implementation Teams.

The ARDT consisted of the primary researcher, principal supervisor, executive directors, and directors from specific departments, contributing areas of expertise. The primary researcher served the district as the school operations and support director, a role that oversaw the scheduling processes in the school district. The ARDT met monthly to discuss the research, review current and proposed structures, and plan for district-designed master scheduling interventions for the ARIT. A principal and two assistant principals responsible for the scheduling process at BHS made up the ARIT. The team participated in data collection and interventions designed and facilitated by the ARDT. The ARIT met bi-weekly to collectively review current and proposed structures that impacted the system within their local school.

Theoretical Framework and Theory of Change

The school master schedule involves interactions between tangible and intangible elements to create student experience outcomes. Systems theory substantiated this study by encouraging participants to consider the complexity of the master schedule through organizational structures, people, policies, processes, and tools, as well as the revelation of unintentional actions due to fragmentation in the system. Participants used a systems perspective to gain a deeper understanding of how those elements interacted with one another and impacted organizational goals to improve student outcomes and meet the needs of each student. Systems thinking bolstered a practical approach to analyzing, designing, creating, applying, and testing interventions to transform the master scheduling system into a desired state. Systems theory and systems thinking informed the logic model theory of change for this study.

The study applied a continuous cycle of inquiry that included planning, implementing, assessing, and reflecting, thus utilizing the Plan-Do-Study-Act as the logic model for this study. The PDSA Cycle embedded a theory of change that allowed the action research team to identify

a lack of district-designed master scheduling interventions to support local school leaders with equitable scheduling practices, collect perception data, use the data to design and facilitate interventions, monitor the interventions, and make necessary adjustments to the next cycle of interventions that informed the desired outcome of more impactful master scheduling interventions. The theory of change projected that if district leaders designed and facilitated master scheduling interventions for college and career academy leaders responsible for scheduling, those interventions would impact the way those leaders used the master schedule to meet the needs of each student. The following section discusses the findings from each research question.

Discussions of the Findings

Data analysis produced multiple themes aligned with each research question and supported the findings. The three research questions required participant feedback that identified factors that impacted master scheduling, the impact of district-designed interventions, and district knowledge gained from designing the interventions. A discussion of the findings and connection with the literature follows.

Discussions of Findings From Research Question 1

The master schedule serves as a fundamental primary organizational framework within a school, functioning as a complex system that combines numerous school program elements (Parker, 1974). This study highlighted internal and external factors influencing how a leader approached master scheduling.

Internal factors identified in the study included operations, communication, and leadership and culture. Operational factors emphasized a need for well-established master scheduling processes considering timelines, logistical components, changes, and ownership.

However, implementing these practices requires school leaders to discern the choices influencing their actions. Clay et al. (2021) acknowledged the ease with which leaders get lost in master scheduling minutiae and stressed the importance of concentrating on decisions that drive the scheduling processes and the consequences. As emphasized by participants, quality communication is vital among school staff, students, parents, and district leaders in establishing solid processes.

Participants recognized that leadership and culture were pivotal in setting school philosophy to inform instructional priorities that led to a student-driven schedule. Lohr and McGrevin (1990) determined that the distinctive context of a school should guide leaders in prioritizing school objectives, aligning with student needs, and considering staff strengths, weaknesses, and collective agreements. Stakeholder influence was another significant finding, with Buehler et al. (2020) suggesting that by prioritizing adult wants over student wants, fewer opportunities exist for interventions, learning flexibility, and best teacher exposure for students with significant needs.

Participants identified external factors that comprised experience level, professional support, resource allocations, and instructional programs. Novice leadership was prevalent among college and career academy leaders, impacting their master scheduling knowledge. Professional support varied, with mentorships, peer collaboration, technical training, and, in one instance, self-teaching as opportunities for assistance. The study also highlighted the potential isolation and overwhelming responsibilities some leaders face, emphasizing the importance of social support among job-alikes (Zepeda, 2012).

Resource allocations and instructional programs were the final external factors. Resource allocation focused on generating funding and staffing challenges for hiring qualified, certified

staff. Interestingly, despite national staffing challenges intensified by the COVID-19 pandemic (Schmitt & deCourcy, 2022), the school offered a rich collection of course opportunities, including Advanced Placement courses, multiple CTE pathways, dual enrollment, and services for gifted, ML, and special education. Hanover Research (2020) underscored the need for an effective school schedule that aligned student needs with organizational capacity, thus providing equitable access to academic opportunities. This conclusion raised whether an excess of opportunities may be detrimental to meeting student needs.

Discussions of Findings From Research Question 2

In this study, the Assistant Principal who oversaw curriculum also designed and generated the school schedule. Parker (1974) recognized this person as the "chief architect of the master schedule" (p. 80). However, as organizational complexity increased, the study findings indicated a shift away from relying solely upon one person to design and implement the master schedule. Lohr and McGrevin (1990) asserted that for the school schedule to serve its purpose as an effective instructional tool, leaders needed to develop a shared working relationship among several staff members. The collaborative approach involves forming a scheduling team engaged in the scheduling process.

Scheduling support data in the district for which this study took place was plentiful. However, participants discovered that, despite the available data, they still needed the expertise of district leaders to utilize the reports and applications effectively. District leaders are essential in providing context from their respective positions and addressing barriers that local schools identify. For instance, a California district adjusted its course catalog approval policy upon learning that schools scheduled marginalized students into impractical classes (Clay et al., 2021).

District leaders can conduct comprehensive district audits and make substantial changes impacting the entire district, creating consistency in practice (Clay et al., 2021).

Discussions of Findings From Research Question 3

Parker (1974) suggested collaboration between colleges and public schools that focused on developing practical training programs that improved school scheduling. He emphasized the need to continuously investigate new scheduling techniques incorporated into administrative training programs. While ample research exists on scheduling techniques such as traditional models, bell schedule models, and departmentalization (Arnold, 2002; Canady & Rettig, 1995; Zepeda, 2006), there is limited research as to the effects of scheduling training and incorporating scheduling techniques into administrative preparation programs (Pittman, 2022).

The ARDT created customized, job-embedded interventions exclusively targeting scheduling practices at BHS. They followed research recommendations, providing the implementation team the time and space to learn and foster a learning community within their scheduling team (Croft et al., 2010). The ARDT designed each scenario and knowledge check as just-in-time opportunities that addressed the immediate needs of the research site. The team also integrated reports and applications that only consisted of BHS data. The tailored interventions provided study participants with practical and hands-on experience. The findings from this study underscored the value of customized school scheduling intervention programs.

Implications for School and District Leaders

The findings from the study inform suggestions that school and district leaders can implement to improve their master scheduling processes. The results confirmed the importance of incorporating reflective practices that support gaining a better understanding of current status,

leveraging district support through customized interventions, and establishing robust teams that practice shared ownership,

Reflective Assessment of Current Scheduling Practices

The researcher used a questionnaire and interviews to identify internal and external factors influencing how school leaders approach student scheduling. Recognizing the practical challenges associated with implementing questionnaires and interviews routinely, district leaders should consider developing a master scheduling equity appraisal tool.

The tool should incorporate a reflective assessment of academic and behavioral performance data, instructional program performance including multilingual learning, special education, gifted, Advanced Placement (AP), and International Baccalaureate (IB), and leader decisions across various elements such as behavior patterns, structures, beliefs, and assumptions about equity. School leaders would annually utilize this tool to conduct a comprehensive review and analysis to discover strengths and areas for improvement. The reflective practice can serve as a foundation for identifying improvement opportunities. District leaders could also leverage these insights to design targeted interventions tailored to the specific needs of individual schools.

Leverage District Support for Customized Interventions

The findings from the study indicated that participants appreciated that district leaders designed interventions tailored to incorporate school-specific data that addressed their needs. They also valued the integrated knowledge checks throughout the sessions and allocating sufficient time for the team to work through discoveries. District leaders should consider leveraging the results of an equity appraisal assessment tool and district-identified areas of needs and timelines to customize interventions to align with specific school needs.

Though scheduling planning begins in the Fall, the researcher decided to conduct the study in the Spring to align with the scheduling activities during that period. The researcher recommends that district leaders consider implementing quarterly interventions throughout the year and utilizing a tiered support model based on the unique needs of each school. Initiating interventions earlier rather than later fosters early capacity building, provides support during mid-year leadership transitions, and addresses potential issues promptly.

Assemble an Intentional Scheduling and Data Team

Participants acknowledged that historically, master scheduling fell upon two people to shoulder the workload of designing the schedule and placing students per their needs and wants. The study findings showed that this type of arrangement created isolation and increased scheduling errors because practices did not include individuals with expertise in specific scheduling components, such as instructional programs. Therefore, the researcher recommends that school and district leaders move to create purposeful scheduling and data teams that meet consistently and frequently.

Scheduling and data teams at the school level raise every voice impacting student equity. Though team structure will depend on the school organization, at the very least, the teams should consist of the principal, the assistant principal responsible for scheduling, the student data management clerk, instructional program leads, a counselor, and the person responsible for registration. The teams should also have consistent meetings to plan, evaluate, improve, and offer progress updates, error resolution, and action items. In addition, it is equally essential for districts to establish a scheduling and data team that collaborates to develop timelines, district processes, and interventions. The district team can model effective partnerships for the local school teams. The following section offers propositions for policy.

Implications for Policy

Student schedules served as the significant data source for determining funding through FTE in the state where this study happened. Each semester, school districts participated in an FTE count day that recorded the classes schools scheduled for students. Each student needed six segments to receive maximum FTE, equating to six class periods. State lawmakers have recognized a need for more stable funding, especially concerning poverty. Therefore, the researcher recommends that lawmakers act on adding a poverty weight to the funding structure. A poverty weight will afford high-poverty schools additional opportunities to support students through the master schedule.

Another effect for state policymakers to consider is the impact a school master schedule has on the Multi-Tiered System of Supports (MTSS). Infrastructure is one of the essential components identified for implementing the system with fidelity. An effectively designed master schedule is the foundation for implementing MTSS well. The schedule supports processes needed to fully operationalize all MTSS components: screening, progress monitoring, data-driven decisions, and effective leadership, including high-quality instruction. The succeeding section recommends further research on master scheduling for student equity.

Implications for Further Research

Although this study attempted to examine the impact of district-designed interventions on how school leaders approach master scheduling for equity, the study took place for a limited time in the specific context of Beaver High School, a college and career academy high school. While the study contributes to the research, there are gaps in qualitative or quantitative research examining the master schedule structure, including the effectiveness of a scheduling team, scheduling processes efficacy, and master scheduling implications on student equity goals.

Broadening the scope of the study to include non-college and career academy high schools would boost transferability, which supports a reader recognizing they can apply the findings from the study to any school setting. More research is needed to determine how school leader decisions impact the master schedule structure, such as reflecting school vision, instructional priorities, scheduling goals aligned to instructional priorities, and equity supports and barriers. Finally, further research could focus on determining the effectiveness of a scheduling team and the processes they undertake throughout the school year to evaluate, plan, and implement data-driven strategic scheduling practices. Research such as these recommendations may offer practitioners the best methods to transfer to practice.

Concluding Thoughts

The master schedule has promoted improvement efforts since as early as the 1940s. Nevertheless, school leaders continue to overlook the structure. The pretermitting may stem from leaders not understanding how the school master schedule is adequate, nor the processes and structures that systematically create inequality and prevent students from having access to opportunities, thus hindering student achievement and school improvement. Omitting the value reflects when school leaders exercise the same scheduling processes or even the same master schedule annually without much deviation. School improvement efforts will benefit from customized scheduling interventions incorporating building capacity associated with resource alignment and curriculum to student needs.

Customized scheduling interventions include engaging in a reflective yet intentional assessment of factors that impact scheduling. Leaders must determine if the philosophy and vision they set for their schools reflect how they place students and efficiently allocate core resources that serve and benefit each student. Equally important is the formation and strong

collaboration between a local school scheduling and data team and a district leader team that can support designing and implementing interventions that enhance strengths and improve challenges. Intentional teams encourage voice expertise and equity in determining approaches to addressing student needs. Local school and district teams partnering to implement those interventions could move the master scheduling process from a technical method to one that drives student access to opportunities and promotes overall school effectiveness.

When school leaders create the master schedule methodically, intentionally, and effectively, they can realize positive school improvement. These efforts include high-quality instruction and reduce variability in all classrooms by scheduling common planning times for teachers to engage, manage the school and its resources by hiring the right teachers and then placing teachers according to their strengths and students according to their needs, schedule interventions and enrichment opportunities, and offer robust instructional programs that provide students with access to opportunities. Students deserve to have their needs met regardless of how vast. The school schedule design lays the foundation to make that possible.

References

Al-Samarrai, S., Gangwar, M., & Gala, P. (2020, May 1). *The impact of the COVID-19 pandemic on education financing.* Open Knowledge Repository. Retrieved July 18, 2022, from https://openknowledge.worldbank.org/handle/10986/33739

Alverson, R., DiCicco, M., Faulkner, S. A., & Cook, C. (2021). America's middle schools: Examining context, organizational structures, and instructional practices. *Middle Grades Review, 7*(3), 1-22. https://scholarworks.uvm.edu/mgreview/vol7/iss3/5

Archibald, S. (2006). Narrowing in on educational resources that do affect student achievement. *Peabody Journal of Education, 81*(4), 23-42. https://doi.org/10.1207/s15327930pje8104_2

Arnold, D. E. (2002). Block schedule and traditional schedule achievement: A comparison. *NASSP Bulletin, 86*(630), 42–53. https://doi.org/10.1177/019263650208663006

Bates, C.C., & Morgan, D.N. (2018). Addressing the barriers of time. *The Reading Teacher, 72*(1), 131–134. https://doi.org/10.1002/trtr.1716

Betts, F. (1992). How systems thinking applies to education. *Educational Leadership*, *50*(3), 38-41. http://www.ascd.org/publications/educational-leadership/nov92/vol50/num03/How-Systems-Thinking-Applies-to-Education.aspx

Bloomberg, L.D. (2023). *Completing your qualitative dissertation: A road map from the beginning to end* (5th ed.). SAGE.

Boardman, J., Sauser, B., John, L., & Edson, R. (2009, October 11-14). *The Conceptagon a framework for systems thinking and systems practice*, 2009 IEEE International Conference on Systems, Man and Cybernetics, San Antonio, TX, United States, 3299-3304. https://www.doi.org/10.1109/ICSMC.2009.5346211

Bottoms, G. (2022). *Tomorrow's high school: Creating student pathways for both college and career*. Association for Supervision and Curriculum Development and Southern Regional Education Board.

Bowen, G.A. (2009). Document analysis as a qualitative research method, *Qualitative Research Journal*, *9*(2), 27-40. https://www.doi.org/10.3316/QRJ0902027.

Brown, C. L. (1978). The adequate program for education in Georgia. *Journal of Education Finance, 3*(4), 402–411. http://www.jstor.org/stable/40703154

Bryk, A.S., Gomez, L.M., Grunow, G., & LeMahieu, P.G. (2015). *Learning to improve: How America's schools can get better at getting better.* Harvard Education Press.

Buehler, K., Sánchez, B., Vaclavik, D., Rodriguez, E., & Gray, T. (2020). Rules of disengagement: Negative relationships and interactions between adults and youth. *Youth & Society*, *52*(6), 1033-1056. https://doi.org/10.1177/0044118X18793157

Canady, R.L., & Rettig, M.D. (1995). The power of innovative scheduling. *Educational Leadership, 53*(3), 4-10. https://www.ascd.org/el/articles/the-power-of-innovative-scheduling

Cartagena, E., & Slater, C.L. (2021). A district's journey of transformative leadership: Moving beyond open access to the improvement, inclusion, and success of students of color in advanced placement. *Journal of School Leadership*, *32*(2), 126-147. https://doi.org/10.1177/1052684621994474

Chenoweth, K. (2016). ESSA offers changes that can continue learning gains. *Phi Delta Kappan, 97*(8), 38–42. https://doi.org/10.1177/0031721716647017

Clay, A., Chu, E., Altieri, A., Deane, Y., Lis-Perlis, Y., Lizarraga, A., Monz, L., Muhammad, J., Recinos, D., Tache, J.A., & Wolters, M. (2021). *About time: Master scheduling and*

equity. Center for Public Research and Leadership. Retrieved July 28, 2022, from https://cprl.law.columbia.edu/content/about-time-master-scheduling-and-equity

Coghlan, D. (2019). *Doing action research in your own organization* (5th ed.). SAGE.

Coleman, J. S. (1968). Equality of educational opportunity. *Integrated Education, 6*(5), 19-28. https://doi.org/10.1080/0020486680060504

College & Career Alliance and Support Network (CCASN). (n.d.). Master schedule guide. Retrieved from https://casn.berkeley.edu/master-schedule-guide/

Cook-Harvey, C. M., Darling-Hammond, L., Lam, L., Mercer, C., & Roc, M. (2016). *Equity and ESSA: Leveraging educational opportunity through the Every Student Succeeds Act.* Learning Policy Institute. https://learningpolicyinstitute.org/product/equity-essa-report

Corey, S. M. (1954). Action research in education. *The Journal of Educational Research, 47*(5), 375-380. http://www.jstor.org/stable/27529611

Croft, A., Coggshall, J. G., Dolan, M., & Powers, E. (2010). *Job-embedded professional development: What it is, who is responsible, and how to get it done well*. National Comprehensive Center for Teacher Quality. https://files.eric.ed.gov/fulltext/ED520830.pdf

Daniel, L. (2007). Research summary: Flexible scheduling. *National Middle School Association.* Retrieved September 14, 2022, from http://www.nmsa.org/Research/ResearchSummaries/FlexibleScheduling/tabid/1140/Default.aspx

Davis, E., & Ruthotto, I. (2019). Financing Georgia's schools. *The Center for State and Local Finance (CSLF) Working Papers. 4*.

Day, C., Gu, Q., & Sammons, P. (2016). The impact of leadership on student outcomes: How successful school leaders use transformational and instructional strategies to make a difference. *Educational Administration Quarterly*, *52*(2), 221-258. https://doi.org/10.1177/0013161X15616863

deGregory, A. and Sommer, C. (2021). *Improving equity through master scheduling*. [Doctoral Dissertation, Lynn University]. Spiral. https://spiral.lynn.edu/etds/364

Devilbiss, W. (1947). Criteria of a good master schedule. *National Association of Secondary Principals, 31*(149), 31-38. https://doi.org/10.1177/019263654703114904

Donahoe, T. (1993). Finding the way: Structure, time, and culture in school improvement. *The Phi Delta Kappan, 75*(4), 298-305. https://kappanonline.org/structure-time-culture-school-improvement-donahoe/

Education Commission of the States (2021, October). 50-State comparison: K-12 funding. Retrieved September 9, 2022, from https://www.ecs.org/50-state-comparison-k-12-funding/

Education Commission of the States. (2016). Master schedule. Retrieved from https://www.ecs.org/issue-spotlight/master-schedule/

Ferrance, E. (2000). Action research. *The Education Alliance at Brown University.* Brown Digital Repository. Brown University Library. https://doi.org/10.26300/a3k2-4v50

Fletcher, E.C., & Tan, T.X. (2022). Implementation matters: A comparison study of career academy and comprehensive high school student's engage in college and career readiness activities. *Educational Studies,* 1-17. https://doi.org/10.1080/03055698.2022.2079374

Flyvbjerg, B. (2011). Case study. In N.K. Denzin and Y.S. Lincoln (Eds.), *The Sage handbook of qualitative research* (4th ed., pp. 301-316). Sage.

Ga. Const. art. VIII, § 1, para. 1

Georgia Department of Education (2024). *Quick facts on Georgia education 2021-2022.* https://www.gadoe.org/External-Affairs-and-Policy/communications/Pages/Quick-Facts-on-Georgia-Education.aspx

Georgia Department of Education (2024). *Enrollment by ethnicity/race and gender.* https://oraapp.doe.k12.ga.us/ows-bin/owa/fte_pack_ethnicsex_pub.entry_form

Georgia Insights. (2022, August 18). *ESSER funding*. Retrieved September 9, 2022, from https://www.georgiainsights.com/cares-act.html

Glanz, J. (2014). *Action research: An educational leader's guide to school improvement* (3rd ed.). Rowman & Littlefield.

Goldring, E., Rubin, M., & Herrmann, M. (2021). The role of assistant principals: Evidence and insights for advancing school leadership. The Wallace Foundation. Available at: https://www.wallacefoundation.org/knowledge-center/pages/the-role-of-assistantprincipals-evidence-insights-for-advancing-school-leadership.aspx.

Goodman, M. (n.d.). Systems thinking: What, why, when, where, and how?. Retrieved October 28, 2022, from https://thesystemsthinker.com/how-to-see-structure/

The Governor's Office of Student Achievement (2024). *K-12 public schools report cards.* https://gosa.georgia.gov/dashboards-data-report-card/report-card

Greene, G.K., Huerta, L.A., & Richards, C. (2007). Getting real: A different perspective on the relationship between school resources and student outcomes. *Journal of Education Finance*, *33*(1), 49-68. https://www.jstor.org/stable/40704314

Grissom, J.A., Egalite, A.J., & Lindsay, C.A. (2021). *How principals affect students and schools: A systematic synthesis of two decades of research.* The Wallace Foundation. http://www.wallacefoundation.org/principalsynthesis

Grubb, W. N. (2009). Moving beyond money: The variety of educational resources. In *The money myth: School resources, outcomes, and equity* (pp. 25–52). Russell Sage Foundation. http://www.jstor.org/stable/10.7758/9781610446372.6

Hackmann, D.G., Malin, J.R., & Gilley, D. (2018). Career academies: Effective structures to promote college and career readiness. *The Clearing House: A Journal of Educational Strategies, Issues, and Ideas, 91*(4-5), 180-185. https://doi.org/10.1080/00098655.2018.1480196

Hanover Research. (2020). *Master scheduling practices for principals*. https://content.govdelivery.com/attachments/VADOE/2021/01/14/file_attachments/1652439/January%20Bulletin%20%20VDOE%20%20%20Master%20Scheduling%20Practices%20for%20School%20Principals.pdf

Hanushek, E.A. (1997). Assessing the effects of school resources on student performance: An update. *Educational Evaluation and Policy Analysis, 19*(2), 141-164. https://doi.org/10.2307/1164207

Hanushek, E. A. (1998). The evidence on class size. *Occasional Paper, 98*(1), 1-40. https://hanushek.stanford.edu/sites/default/files/publications/Hanushek%201998%20HouseTestimony%20Class%20Size.pdf

Hanushek, E.A. (2006). School resources. *Handbook of the economics of education*, *2*, 865-908. Stanford University, National Bureau of Economic Research. https://doi.org/10.1016/S1574-0692(06)02014-9

Harris, J.F. (1986). In Georgia…Quality basic education. *NASSP Bulletin, 70*(491), 36-40. https://doi.org/10.1177/01926365860704910

Hemelt, S. W., Lenard, M. A., & Paeplow, C. G. (2019). Building bridges to life after high school: Contemporary career academies and student outcomes. *Economics of Education Review, 68*, 161-178. https://doi.org/10.1016/j.econedurev.2018.08.005

Herlihy, C. M., & Quint, J. (2006). *Emerging evidence on improving high school student achievement and graduation rates: The effects of four popular improvement programs.* National High School Center. https://eric.ed.gov/?id=ED501076

Hernandez-Gantes, V.M., Fletcher, Jr., E.C., & Keighobadi, S. (2019). A case study of the development of a career academy: Good intentions not enough?. *Journal of Research in Technical Careers, 3*(2), 114-135. https://doi.org/10.9741/2578-2118.1059

Hibbeln, C. (2020). Mastering the master schedule. *ASCD, 77*(9). https://www.ascd.org/el/articles/mastering-the-master-schedule

Jackson, C.K., Wigger, C., & Xiong, H. (2021). Do school spending cuts matter? Evidence from the great recession. *American Economic Journal: Economic Policy*, *13*(2), 304-35. https://doi.org/10.1257/pol.20180674

Karash, R. (n.d.). How to see "structure." Retrieved October 28, 2022, from https://thesystemsthinker.com/how-to-see-structure/

Kast, F. E., & Rosenzweig, J. E. (1972). General systems theory: Applications for organization and management. Academy of management journal, 15(4), 447-465. https://doi.org/10.5465/255141

Kemmis, S., McTaggart, R., & Nixon, R. (2014). *The action research planner: Doing critical participatory action research*. Springer.

Kemple, J.J., & Snipes, J.C. (2000). Career academies. Impacts on student's engagement and performance in high school. MDRC. Retrieved September 14, 2022, from https://www.mdrc.org/publication/career-academies-impacts-student-engagement-and-performance-high-school

Kemple, J. J., & Willner, C.J. (2008). Career academies: Long-term impacts on labor market outcomes, educational attainment, and transitions to adulthood. MDRC. Retrieved September 8, 2022, from: https://eric.ed.gov/?id=ED484616

Knight, D. S. (2019). Are school districts allocating resources equitably? The every student succeeds act, teacher experience gaps, and equitable resource allocation. *Educational Policy*, *33*(4), 615-649. https://doi.org/10.1177/0895904817719523

Kostyo, S., Cardichon, J., & Darling-Hammond, L. (2018). Making ESSA's equity promise to close the opportunity gap. Learning Policy Institute. https://learningpolicyinstitute.org/product/essa-equity-promise-report

Kruse, C.A., & Kruse, G.D. (1995). The master schedule and learning: Improving the quality of education. *NASSP Bulletin, 79*(571), 1-8. https://doi.org/10.1177/019263659507957102

Lafortune, J., Jesse R., & Schanzenbach, D.W. (2018). School finance reform and the distribution of student achievement. *American Economic Journal: Applied Economics, 10*(2), 1-26. https://doi.org/10.1257/app.20160567

Lanford, M., & Maruco, T. (2019). Six conditions for successful career academies. *Phi Delta Kappan, 100*(5), 50-52. https://doi.org/10.1177%2F0031721719827547

Lee, J., Fuller, B., & Rabe-Hesketh, S. (2021). How finance reform may alter teacher and school quality: California's $23 billion initiative. *American Educational Research Journal*, *58*(6), 1225–1269. https://doi.org/10.3102/00028312211047854

Leithwood, K., Seashore Louis, K., Anderson, S., & Wahlstrom, K. (2004). How leadership influences student learning. The Wallace Foundation. https://www.wallacefoundation.org/knowledge-center/Documents/How-Leadership-Influences-Student-Learning-Executive-Summary.pdf

Lewin, K. (1946). Action research and minority problems. *Journal of Social Issues, 2*(4), 34-46.

Lincoln, Y.S., & Guba, E.G. (1985). *Naturalistic inquiry*. Sage Publications.

Lohr, C. & McGrevin, C. (1990). Scheduling: The blueprint for educational success. *NASSP Bulletin, 74*(529) 83-89. https://doi.org/10.1177/019263659007452914

Lynch, M. (2016, April 27). *Allocating resources to improve student learning*. The Edvocate. https://www.theedadvocate.org/allocating-resources-to-improve-student-learning/

Malin, J.R., & Hackmann, D.G. (2019). Integrative leadership and cross-sector reforms: High school career academy implementation in an urban district. *Educational Administration Quarterly, 55*(2), 189-224. https://doi.org/10.1177/0013161X1878587

Masters, J. (1995). The history of action research. *Action Research Electronic Reader*. http://www.behs.cchs.usyd.edu.au/arow/Reader/rmasters.html

McKillip, M., & Farrie, D. (2019). Funding opportunity: Replacing Georgia's early intervention and remedial programs with funding for low-income students. *Education Law Center.* 1-11. https://edlawcenter.org/assets/Georgia/Report%201/Funding%20Opportunity%20.pdf

Mele, C., Pels, J., Polese, F. (2010). A brief review of systems theories and their managerial applications. Service Science, 2(1-2), 126 – 135. https://doi.org/10.1287/serv.2.1_2.126

Merriam, S.B., & Tisdell, E.J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). Jossey-Bass.

Mertler, C.A. (2020). *Action research: Improving schools and empowering educators* (6th ed.). SAGE.

Mokher, C. G., & Jacobson, L. (2021): Beyond academic preparation for college: The role of high schools in shaping postsecondary plans for underprepared students, leadership and policy in schools. *Leadership and Policy in Schools,* 1-21. https://doi.org/10.1080/15700763.2021.1885719

Murray, S.E., Evans, W.N., & Schwab, R.M. (1998). Education finance reform and the distribution of education resources. *The American Economic Review*, *88*(4), 789-812. https://www.jstor.org/stable/117006

National Center for Education Statistics (NCES). (2008). The condition of education 2008. Retrieved, August 31, 2022. https://nces.ed.gov/pubs2008/2008031.pdf

National Education Commission on Time and Learning. (1994). Prisoners of time. Retrieved from www.ecs.org

National Career Academy Coalition (NCAC) (2022). National standards of practice (NSOP) for career academies. Retrieved August 31, 2022 from https://www.ncacinc.com/nsop/about

Ndaruhutse, S., Jones, C., & Riggall, A. (2019). Why systems thinking is important for the education sector. Education Development Trust. https://www.educationdevelopmenttrust.com/our-research-and-insights/research/systems-thinking-education-sector

Northeast County Public Schools (2021, August 24). *NCPS by the numbers*. https://www.ncpsk12.org/cms/lib/GA02204486/Centricity/domain/11644/2021%20area%20board%20meetings/2021-22_NCPS_By_the_Numbers_Aug24.eq.pdf

O.C.G.A. § 20-2-164

OECD (2013), PISA 2012 results: What makes schools successful? Resources, policies, and practices (Volume IV). Pisa, OECD Publishing. http://dx.doi.org/10.1787/9789264201156-en

OECD (2017). The funding of school education: Connecting resources and learning. OECD Publishing. http://dx.doi.org/10.1787/9789264276147-en

Owens, S. (2022). The state of education funding. *Georgia Budget and Policy Institute*. Retrieved on August 29,2022 from https://gbpi.org/wp-content/uploads/2022/01/State-of-Education-Funding-2022.pdf

Parker, J. (1974). Intangibles in the master schedule. *NASSP Bulletin, 58*(384), 79-83. https://doi.org/10.1177/019263657405838412

Perkins Collaborative Resource Network. (n.d.) *Perkins IV*. Retrieved September 8, 2022, from https://cte.ed.gov/legislation/about-perkins-iv

Pisoni, A., & Conti, D. (2019). What does your school schedule say about equity? More than you think. *Ed Surge*. Retrieved July 14, 2022 from https://www.edsurge.com/news/2019-04-20-what-does-your-school-schedule-say-about-equity-more-than-you-think

Pittman, R. (2022). Implications for educational equity due to master scheduling decisions made by site administrators. [Doctoral Dissertation, Claremont Graduate University]. https://scholarship.claremont.edu/cgu_etd/384

Reimers, F.M. (2022). *Primary and secondary education during Covid-19*. Springer. https://doi.org/10.1007/978-3-030-81500-4

Romlah, O.Y., & Latief, S. (2021). Empowering the quality of school resources in improving a quality education. *Bulletin of Science Education, 1*(1), 37-41. https://attractivejournal.com/index.php/bse/article/view/109

Rothstein, J., & Schanzenbach, D. W. (2022). Does money still matter: Attainment and earnings effects of post-1990 school finance reforms. *Journal of Labor Economics*, *40*(S1), S141-S178. https://doi.org/10.1086/717934

Rubenstein, R., Doering, D., & Gess, L. (2000). The equity of public education funding in Georgia, 1988-1996. *Journal of Education Finance, 26*(2), 187-208.

S. Res. 650 (2022). https://www.legis.ga.gov/api/legislation/document/20212022/212337

Saldaña, J. (2021). *The coding manual for qualitative researchers* (4th ed.). SAGE.

Schmitt, J. & deCourcy, K. (2022). The pandemic has exacerbated a long-standing national shortage of teachers. *Economic Policy Institute.* Retrieved from https://www.epi.org/publication/shortage-of-teachers/

Schroth, G. (2016). Scheduling historical background of scheduling, selecting a schedule, scheduling models, staff development. Retrieved from http://education.stateuniversity.com/pages/2385/Scheduling.html

Seidman, I. (2019). *Interviewing as qualitative research: A guide for researchers in education and the social sciences* (5th ed.). Teachers College Press.

Senate Study Committee to Review Education Funding Mechanisms (n.d.). Retrieved September 8, 2022, from https://www.senateeducationfundingstudycommittee.com/

Silva, E., White, T., & Toch, T. (2015). The carnegie unit: A century-old standard in a changing education landscape. Carnegie Foundation for the Advancement of Teaching. Retrieved from https://www.carnegiefoundation.org/resources/publications/carnegie-unit/

Spillane J.P., Diamond J.B., Walker L.J., Halverson, R., & Jita, L. (2001). Urban school leadership for elementary science instruction: Identifying and activating resources in an undervalued school subject. *Journal of Research in Science Teaching*, *38*(8), 918-940. https://doi.org/10.1002/tea.1039

Stern, D., Dayton, C., & Raby, M. (2010). Career academies: A proven strategy to prepare high school students for college and careers. *Career Academy Support Network (CASN).* Retrieved from: https://casn.berkeley.edu/resource_files/Proven_Strategy_2-25-1010-03-12-04-27-01.pdf

Strengthening Career and Technical Education for the 21st Century Act, 20 U.S.C. § 2301. (2018). https://www.congress.gov/bill/115th-congress/house-bill/2353/text

Talib, F. (2013). An overview of total quality management: understanding the fundamentals in service organization. *International Journal of Advanced Quality Management, 1*(1), 1-20. https://ssrn.com/abstract=2725107

Thomas, C. (2001). What is wrong with block scheduling?. *NASSP Bulletin, 85*(628), 74-77.

Thornton, B., Peltier, G., and Perreault, G. (2010). Systems thinking: A skill to improve student achievement. *The Clearing House: A Journal of Educational Strategies Issues and Ideas, 77*(5), 222-230. https://doi.org/10.3200/TCHS.77.5.222-230

TNTP. (2018). The opportunity myth. Retrieved September 5, 2022, from https://tntp.org/publications/view/student-experiences/the-opportunity-myth

Tracy, S. (2010). Qualitative quality: Eight "big-tent" criteria for excellent qualitative research. *Qualitative inquiry*, *16*(10), 837-851. https://doi.org/10.1177/1077800410383121

U.S. Department of Education. (n.d.) *Improving basic programs operated by local education agencies (Title 1, Part A)*. Retrieved September 8, 2022, from https://www2.ed.gov/programs/titleiparta/index.html

U.S. Department of Education. Every Student Succeeds Act (ESSA). Retrieved from September 7, 2022 https://www.ed.gov/essa?src=rn

Usman, Y.D. (2016). Educational resources: An integral component for effective school administration in Nigeria. *Research on humanities and social sciences, 6*, 27-37. https://eric.ed.gov/?id=ED578024

Walton, M. (1986). The Deming management method. The Berkley Publishing Group.

Watt, D. (2007). On becoming a qualitative researcher: The value of reflexivity. The Qualitative Report, *12*(1), 82-101. https://doi.org/10.46743/2160-3715/2007.1645

Wolf, R. (2018). A within-school equity analysis of teacher resource expenditures. *Journal of Education Finance, 44(1),* 45-69. https://www.jstor.org/stable/45093709

Zepeda, S. (2006). An analysis of research on block scheduling. *Review of the Educational Research, 76*(1), 137-170. https://doi.org/10.3102/00346543076001137

Zepeda, S. (2012). *Professional development: What works* (3rd ed.). Routledge.

Appendix A

Empirical Findings Table

Author and Year	Title	Purpose	Method(s)	Sample	Result(s)	Conclusions	Implication (s)
Betts, F. (1992).	How systems thinking applies to education. Educational Leadership	To demonstrate why it is essential for educational leaders to seek improvement through Total Quality Management	Literature review analysis	The research analyzed multiple studies that focused on systems including opened-and-closed.	"The improvement of quality involves the design of an educational system that not only optimizes the relationship among the elements but also between the educational systems and its environment" (p. 40). "Total Quality Management in education means a total systems approach."	The education system as it was in 1992 needed overhauling to make way for a system that encouraged improvement.	Systematic change required educational leaders to consider education as a system

Author and Year	Title	Purpose	Method(s)	Sample	Result(s)	Conclusions	Implication (s)
Cartagena, E., & Slater, C.L. (2021).	A district's journey of transformative leadership: Moving beyond open access to the improvement, inclusion, and success of students of color in advanced placement.	The main point of this study was to highlight the essential role secondary leaders play in creating a sustainable, reformed AP culture that advocates inclusion and success for students of color.	Case Study Design	Mix of educational leaders from a mid-sized school district in Los Angeles County	Leader principles for promoting the inclusion and success of the reformed AP culture that improved AP scores: ● A shift in mindset ● Driven to create change due to lived experience of inequity ● Shared ownership through validation of the work of others, and ground in the community	Transformative leadership practices promote student inclusion and success	• Build synergy through inspiration, recruiting alumni, and staffing • Leader authenticity and commitment through actions • Commitment to improvement by taking risks
Clay, A., Chu, E., Altieri, A., Deane, Y., Lis-Perlis, Y., Lizarraga,	*About time: Master scheduling and equity.*	To advise leveraging the master schedule to generate equity in schools and districts.	Literature review, legal and policy framework analysis, and interviews and surveys	Participants with schedule-specific roles	• Master schedule undermines equity when treated as a constrained, technical, process	The COVID-19 pandemic exposed a need for more strategic master scheduling to	• If school leaders utilize a framework to organize, plan, and execute their master schedules,

Author and Year	Title	Purpose	Method(s)	Sample	Result(s)	Conclusions	Implication (s)
A., Monz, L., Muhammad, J., Recinos, D., Tache, J.A., & Wolters, M. (2021).					• Three enabling conditions to shift to strategic scheduling for equity ○ Commitment to equity ○ Data and Tools ○ Data Reporting	address inequities in learning, emotional needs, enrichment and innovation.	students may encounter expanded opportunities and access.
Fletcher, E.C., & Tan, T.X. (2022).	Implementation matters: A comparison study of career academy and comprehensive high school students' engagement in college and career readiness activities.	To examine the difference in students' engagement in college and career readiness at college and career academies and comprehensive high schools.	Survey Research Design	Purposive sampling to select three high school career academies and one comprehensive high school 1,283 Respondents	• Well-implemented college and career academies had a significantly higher level of engagement than traditional, comprehensive high schools. • College and career academies with low fidelity implementation did not	Career academies fulfil the intentions and provisions of Perkins V legislation	• A need to examine underperforming career academies to uncover barriers that have impacted implementing evidence-based career academy models using critical theories.

Author and Year	Title	Purpose	Method(s)	Sample	Result(s)	Conclusions	Implication (s)
					significantly differ from traditional, comprehensive high schools.		
Hackmann, D.G., Malin, J.R., & Gilley, D. (2018).	Career academies: Effective structures to promote college and career readiness.	To identify key characteristics that support developing and implementing academies.	Observational	Twelve Metro Nashville Public Schools Academies	Four key research-based aspects identified: • Cross-sector collaboration • Robust and career-focused interdisciplinary curriculum • Fully committed principals • Regularly collected and analyze data to monitor student access, participation, and progress	Successful college and career academies successfully connect educators, community, businesses, and students to meaningful skills and opportunities not always found in traditional school environments	• Academy models may economically benefit communities and student earning trajectory.
Knight, D. S. (2019).	Are school districts allocating resources equitably? The every student succeeds act,	To assess the equitably distribution of teacher salary spending, teacher	Analytic Approach measurement or within-district	Office of Civil Rights School-level expenditure data collected	• Nationally higher poverty, higher minority, and Title 1 schools had less	Targeted funded for high-needs districts may reduce resource gaps	Federal and state policymakers need more profound understanding

Author and Year	Title	Purpose	Method(s)	Sample	Result(s)	Conclusions	Implication (s)
	teacher experience gaps, and equitable resource allocation.	experience, and teacher–student ratios within school districts nationally.	teacher resource gaps	from 86,802 schools	funding for per student for teacher salaries, lower proportions of experienced teachers, and fewer teachers per student compared with lower poverty schools • Within districts, high poverty and high minority schools spend more money per student for teacher salaries and more teachers per students, however, they have more novice teachers compared to more economically advantaged schools	within-district which will required less strict requirements placed on districts by federal policy-makers to equalize funding across districts and schools.	of the teacher experience gaps in different districts.

Author and Year	Title	Purpose	Method(s)	Sample	Result(s)	Conclusions	Implication (s)
Lee, J., Fuller, B., & Rabe-Hesketh, S. (2021).	How finance reform may alter teacher and school quality: California's $23 billion initiative.	To examine how leaders hinder quality resources from reaching disadvantaged students	School-by-year-level panel data set	6,867 elementary and high schools in all 941 California school districts	● High poverty schools tended to rely more on novice teachers, compared with low-poverty schools ● School leaders assign resources to differing student groups and curricular structures ● Allocation sorting within-schools sort experienced teachers away from the students who could benefit most, even when between-school teacher sorting may be mitigated.	Schools with more significant demographics of disadvantaged students benefited in teacher hiring, instructional resource increases, and curriculum structures due to California's budget reform	Future research should examine resource distribution within-school and student subgroups

Appendix B

Initial Questionnaire

You are asked to complete a questionnaire for a qualitative action research study examining how district-designed master scheduling interventions impact college and career academy school leaders' usage of the master schedule to meet each student's needs equitably.

The questionnaire aims to identify factors that impact how college and career academy leaders utilize the master schedule to equitably meet students' needs in a college and career academy setting.

The factors you identify will help the researcher and action research design team create and facilitate master scheduling interventions for one college and career academy research site. In addition, your feedback will provide the school district with additional information regarding the factors school leaders encounter when meeting the needs of each student.

All responses to this questionnaire will remain confidential as your answers will remain anonymous, and your name will not be written on the questionnaire.
The questionnaire should take less than 15 minutes to complete.

Thank you for your time.

Q1. I am a/an:
- o Principal
- o Assistant Principal

Q2. What is your highest education level?
- o Bachelor's
- o Master's
- o Specialist
- o Doctorate
- o Other:_____

Q3. Please enter your total number of years in education.
- o <1
- o 1-3
- o 4-7
- o 8-11
- o 12-15
- o >16

Q4. Please indicate your background before becoming an administrator. (Please select all that apply)

- o Teacher
- o Counselor
- o Other:_____

Q5. Please indicate teacher/counselor leadership positions held before becoming an administrator. (Please select all that apply)

- o Academy Coach
- o Academy Lead Teacher
- o Curriculum Content Leader
- o Department Chair
- o Head Counselor
- o Instructional Coach
- o Other: _____

Q6. How do you support the master scheduling process? (Please select all that apply)

- o Establish the master schedule processes for your schools (timelines, course request collection methods, communication methods)
- o Collaborate with other site administrators and faculty to design the master schedule, including determining course offerings
- o Generate draft and finalized copies of the master schedule, including student schedules, teacher assignments, and balancing courses
- o Provide leadership guidance in resource allotment, including staffing, and financial/FTE
- o Provide leadership in the areas of program offerings and bell schedules
- o Provide active support to staff who performs the master schedule data entry in the student information system

Q7. Please enter the total number of years you have completed the following.

- o Actively designed and generated the Master Schedule throughout your career
- o Overseen the Master Schedule process throughout your career

Q8. How did you learn how to generate the master schedule for a college and career academy? Please rank, by dragging and dropping, the following responses in order of significance, where 1 represents the "most significant" and 10 represents the "least significant."

_____ Collaboration with an on-site Assistant Principal
_____ Collaboration with an off-site Assistant Principal (s)
_____ Collaboration with a school counselor
_____ Collaboration with a Student Data Management Clerk (SDMC)
_____ Collaboration with a teacher leader
_____ District-Level Training
_____ Principal Guidance
_____ Professional Organization Training
_____ Self-taught
_____ Others (please specify):

Q9. How many teachers are currently staffed at your school site?

- o 0-50
- o 51-100
- o 101-150
- o 151-200
- o 201-250
- o 251-300
- o >301

Q10. What is your current total student enrollment?

- o 0-1000
- o 1001-1500
- o 1501-2000
- o 2001-2500
- o 2501-3000
- o 3001-3500
- o 3501-4000

Q11. What percentage of your students currently receive English Learner services?

- o 0-10%
- o 11-20%
- o 21-30%
- o 31-40%
- o 41-50%
- o 51-60%
- o >61%

Q12. What percentage of your students currently receive Special Education services?

- o 0-10%
- o 11-20%
- o 21-30%
- o 31-40%
- o 41-50%
- o 51-60%
- o >61%

Q13. What percentage of your students currently qualify for Gifted services?

- o 0-10%
- o 11-20%
- o 21-30%
- o 31-40%
- o 41-50%
- o 51-60%
- o >61%

Q14. What percentage of your students currently qualify for free or reduced lunch?

- o 0-10%
- o 11-20%
- o 21-30%
- o 31-40%
- o 41-50%
- o 51-60%
- o >61%

Q15. Which Advanced Placement (AP) courses are currently offered at your site? (Please select all that apply)

- o AP Research
- o AP Seminar
- o AP Art and Design Program
- o AP Art History
- o AP Music Theory
- o AP English Language and Composition
- o AP English Literature and Composition
- o AP Comparative Government and Politics
- o AP European History
- o AP Human Geography
- o AP Macroeconomics
- o AP Microeconomics
- o AP Psychology
- o AP United States Government and Politics
- o AP United States History
- o AP World History: Modern
- o AP Calculus AB
- o AP Calculus BC
- o AP Computer Science A
- o AP Computer Science Principles
- o AP Precalculus
- o AP Statistics
- o AP Biology
- o AP Chemistry
- o AP Environmental Science
- o AP Physics 1: Algebra-Based
- o AP Physics 2: Algebra-Based
- o AP Physics C: Electricity and Magnetism
- o AP Physics C: Mechanics
- o AP Chinese Language and Culture
- o AP French Language and Culture
- o AP German Language and Culture
- o AP Italian Language and Culture
- o AP Japanese Language and Culture
- o AP Latin
- o AP Spanish Language and Culture
- o AP Spanish Literature and Culture

Q16. How many college and career academies (not including a 9th-grade academy) did you offer in 2022-2023?

- o 1
- o 2
- o 3
- o 4
- o 5

Q17. Do you offer a 9th-grade academy?

- o Yes
- o No

Q18. Please describe your bell schedule
- o Modified Block (4-1)
- o Modified Block (3-2)
- o Modified Block: (8 A/B)
- o Other: (3) _____

Q19. How did you create your 2022-2023 Master Schedule?
- o Rolled over last year's schedule and modified
- o From Scratch

Q20. Please list three words to describe the Master Schedule process at your college and career academy site.

Q21. At this time, do any of the following factors negatively impact your ability to create a master schedule at a college and career academy.

	Insignificant Impact	Minor Impact	Moderate Impact	Significant Impact
Class sizes for advanced courses are smaller at my site	o	o	o	o
Class sizes for college prep courses are smaller at my site	o	o	o	o
Changes to the master schedule generate too much conflict with teachers	o	o	o	o
Changes to the master schedule generate too much conflict with the counselors	o	o	o	o
Changes to the master schedule generate too much conflict with parents	o	o	o	o
Changes to the master schedule generate too much conflict with students.	o	o	o	o
Teacher turnover	o	o	o	o
Mid-year hires	o	o	o	o
Teacher hiring process, including the transfer process	o	o	o	o
Hiring quality teachers in core areas	o	o	o	o

Hiring quality, certified teachers in CTE areas	o	o	o	o
Limited number of gifted certified teachers at my site	o	o	o	o
Limited number of English Learner certified teachers at my site	o	o	o	o
Limited number of teachers willing to teach diverse course offerings at my site	o	o	o	o
Scheduling on a block schedule	o	o	o	o
Scheduling more than one teacher planning period	o	o	o	o
Scheduling daily interventions	o	o	o	o
Scheduling college and career pathways	o	o	o	o
Scheduling students in academy cohorts for purity	o	o	o	o
Scheduling to reduce class size	o	o	o	o
Scheduling a variety of course and program offerings (AP, IB, Gifted, Special Education, English Learners)	o	o	o	o
Student Transiency	o	o	o	o
There are too many course offerings at my site	o	o	o	o
Too many students are off track at my site	o	o	o	o
I have no idea how I would alter the Master Schedule to anything other than what is currently offered	o	o	o	o
I lack the technical skills to create the master schedule	o	o	o	o
I do not know how to schedule English Learning services properly	o	o	o	o
I do not know how to schedule Special Education services properly	o	o	o	o
I do not want to have difficult conversations about changes that need to be made to the	o	o	o	o

Master Schedule				
I have limited knowledge of how FTE/point allocations work	o	o	o	o
I do not know how to utilize Title I allotments to best support scheduling effectively	o	o	o	o
Other duties and responsibilities impact the time needed to focus on creating the master schedule	o	o	o	o
Other factor(s) not listed:	o	o	o	o

Q22. Stakeholders often influence master schedule decisions by recommending master schedule updates or non-negotiables. Please rate the influence level the following stakeholders have on master schedule decisions at your site.

	Not at all influential	Somewhat Influential	Extremely Influential
Coaches	o	o	o
Counselors	o	o	o
District Administrators	o	o	o
Department Chairs	o	o	o
Teacher Leaders (non-department chairs)	o	o	o
New Teachers	o	o	o
Veteran Teachers	o	o	o
Students on advanced academic pathways	o	o	o
Students on college prep academic pathways	o	o	o
Families of students on advanced academic pathways	o	o	o
Families of students on college prep academic pathways	o	o	o
Families of students receiving gifted services	o	o	o

Students receiving gifted services	o	o	o
Families of students receiving special education services	o	o	o
Students receiving special education services	o	o	o
Families of students receiving English Learning services	o	o	o
Students receiving English Learning services	o	o	o
Other Site Administrators	o	o	o
Feeder Middle School Administrators	o	o	o
Other Stakeholders not listed:	o	o	o

Q23. In order of importance, please drag and drop, the top three factors that administrators consider when matching specific teachers to specific courses (i.e. advanced placement, college prep, honors, remedial, elective, etc.) in the Master Schedule (1 = most important).
_____ Teacher Certification
_____ Administrator's perception of a teacher's ability level with challenging academic subjects
_____ Administrator's perception of a teacher's ability level with challenging academic subjects
_____ Administrator's level of comfort manipulating course offerings
_____ Common Planning alignment
_____ Courses offerings determined by graduation requirements
_____ Limit the number of master schedule changes
_____ Tradition
_____ Confrontation potential from specific stakeholder(s) (list them here):
_____ Other important factors not listed here (please specify):

Q24. In order of significance, please rank the top three characteristics that best represent teacher quality. (1 = most important).
_____ Bilingual
_____ Certified in a high-need area (English Learning, Special Education, Math, CTE, STEM)
_____ Excellent classroom management skills
_____ High academic abilities
_____ Instructional flexibility to meet student needs and increase engagement
_____ Positive relationships with other faculty and staff
_____ Positive relationships with students
_____ Proven ability to improve standardized test scores
_____ Responsiveness to student needs through adapting instruction
_____ Same Gender students
_____ Same race and/or ethnicity as students

_____ Shared traits and values
_____ Significant classroom experience
_____ Other characteristics you believe contribute to teacher quality:

Q26. In this study, high-need students are defined as being in any of the following circumstances:

a. Receiving special education services
b. Receiving English Learner services
c. Socioeconomically disadvantaged students
d. Failing most of their classes
e. Scoring in the lowest quartile on district and state assessments.

Q27. What percentage of the teachers you identified as having all three teacher quality characteristics are assigned to the classes that contain most of the students with high-needs?

- o 0-20%
- o 21-40%
- o 41-60%
- o 61-80%
- o 81-100%

Q28. Are additional factors impacting your ability to use the master schedule for equity?

Q29. Briefly state what you believe would help you to have more success generating and finalizing the Master Schedule for the 2023-2024 academic year.

Appendix C

Action Research Implementation Team Initial Interview

RQ1: What factors impacted how school leaders utilize the master schedule structure to equitably meet students' needs in a college and career academy setting?

Introduction

My name is Markita Spikes, and I look forward to interviewing you for my action research study. This interview is a part of the various data points I will collect in partial fulfillment of the Doctor of Education degree from the University of Georgia. The data collected will be used for that purpose only.

This interview will be recorded to capture all the information you share during the interview. You may notice me bow my head periodically throughout the interview. This is an indication of my note-taking.

The interview time is approximately 60 minutes. As a reminder, participation in the study is voluntary, and you may withdraw your consent at any time without consequence. Data collected will be confidential, and a pseudonym will be used to protect your identity. After the interview, a recording transcript will be shared for your review to make corrections or clarify information. The data from the interview will be destroyed upon completion of this study.

Through the perceptions of district and local school leaders, this study examines how district-designed master scheduling interventions impact local school leaders' scheduling practices. The data collected from this interview may be shared with the district to support improvement changes. However, all identifiable information will remain confidential and private. I appreciate the time you are providing for this study.

Before this interview, you completed a questionnaire. This interview is designed to develop a deeper understanding of those questions.

1. Before beginning, my record indicates that you signed the consent form. Is this correct?
2. Please state the following:
    a. Your current position
    b. Number of years in education
    c. Number of years at this school
    d. Number of years in your current role
3. Before your current position, describe any experience creating or supporting the master schedule.
4. What type of master schedule training have you participated in that supported your previous or current role?
5. Thinking back to being a new curriculum AP, what do you wish you had known, and what district-level support do you wish you had?

6. How do you describe the impact student instructional needs have on opportunities and access to these college and career academies and other instructional programs such as dual enrollment, advanced placement, work-based learning, etc.?
7. What do you believe is the purpose of a master schedule? How do the school model, i.e. traditional vs. college and career academy model, influence your belief in the purpose of the master schedule?
8. Based on your experience, please describe an effective master schedule in a college and career high school.
9. When considering your current master schedule, where do you think your priority lies – Advanced academics (including honors, gifted, accelerated, and AP), general education, remedial education, ELL, or special education?
10. What are your top 3 concerns regarding the master schedule practices at your local school?
11. What support do you need from the district level to support leveraging your scheduling for equity?
12. To ensure all students at your school receive high-quality instruction, what decisions would you need to make on next year's master schedule?
13. Do you have additional information you would like to share with me today?