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School Leaders' Transformational Strategies for Successfully Preparing for Algebra I in Eighth Grade

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ACCEPTANCE

This dissertation, SCHOOL LEADERS' TRANSFORMATIONAL STRATEGIES FOR SUCCESSFULLY PREPARING FOR ALGEBRA I IN EIGHTH GRADE, by BROOKE HUMPHREY, was prepared under the direction of the candidate's Dissertation Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree, Doctor of Education, in the College of Education & Human Development, Georgia State University.

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SCHOOL LEADERS' TRANSFORMATIONAL STRATEGIES FOR SUCCESSFULLY PREPARING FOR ALGEBRA I IN EIGHTH GRADE

by

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Under the Direction of Dr. Nicholas Sauers

ABSTRACT

Algebra I is considered a gateway course that provides students with additional opportunities for accelerated mathematics at the secondary level. Algebra I in eighth grade is a strategy that has been previously implemented to provide these additional opportunities and yielded mixed results. Drawing from Burn's (1978) transformational leadership theory, this study explores the strategies of educational leaders that have led to success for a broad scale implementation of Algebra I for all eighth graders. Qualitative data was collected from schools that meet three criteria: increased enrollment of students in Math 6 Enhanced from the 2020-2021 school year to the 2021-2022 school year, successful completion of Math 6 Enhanced, and leaders in mathematics instruction that have been in the school for at least two years. Purposive sampling was used in this study and eight educational leaders were interviewed. The interviews were then transcribed then analyzed using In Vivo and focused coding. The key themes that emerged from the data are: (a) communicating for transparency, (b) additional supports for

students, and (c) strategically selecting teachers. These three themes highlight how educational leaders can be successful in preparing all middle school students for Algebra I in eighth grade.

INDEX WORDS: Algebra I in Eighth Grade, Acceleration, Mathematics, Transformational Leadership

SCHOOL LEADERS' TRANSFORMATIONAL STRATEGIES FOR SUCCESSFULLY PREPARING FOR ALGEBRA I IN EIGHTH GRADE

by

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DEDICATION

I dedicate this dissertation to my husband, family, and friends. They have provided unconditional support and encouragement through this doctoral journey, and I could not have done it without them. Thanks for the love and support.

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1 THE PROBLEM

Introduction

Algebra is considered a gateway course that provides students with additional opportunities for accelerated mathematics at the secondary level (Steen, 1999). The U.S. Department of Education (2018) acknowledges that "Algebra is the foundation for students' future success in science, technology engineering, and math". However, the national data tells a very different story. When students take Algebra I is significant but only 59% of schools offer Algebra I in eighth grade (*A Leak in the STEM Pipeline: Taking Algebra Early*, 2018). The access to Algebra I in eighth grade is uneven across the country with about 30% of school districts across the nation not offering Algebra I in eighth grade (*A Leak in the STEM Pipeline: Taking Algebra Early*, 2018). Finally, when eighth graders do have access to take Algebra I, many do not. Overall, only 24% of all eight graders in the nation are enrolled in Algebra I (*A Leak in the STEM Pipeline: Taking Algebra Early*, 2018). The literature claims that it is important for school districts to work toward providing access to Algebra I for all eighth graders.

Utilizing the standards-driven mathematics curriculum through the Common Core State Standards, there exists the potential to provide both rigor and opportunity through algebra in eighth grade to all students (Spielhagen, 2006). This study investigates a suburban, southeastern school district that is endeavoring down a path to prepare all eighth-grade students to take Algebra I. Research demonstrates that there are many challenges for broad, system-wide implementations of Algebra I for all eighth graders (Clotfelter et al., 2015; Domina et al., 2015; Rosin et al., 2009). The focus of this study is on the transformational strategies that educational leaders employ to successfully prepare middle school students for algebra.

Statement of the Problem

Knowing that algebra is a gateway course to advanced math opportunities (Steen, 1999), many educational leaders and school districts are looking for ways to give more eighth graders the opportunity to take Algebra I. As educational leaders, it is important to review lessons learned in the past when embarking on new endeavors. In reviewing previous research, Algebra I for all eighth graders has been implemented and studied, however, these studies focused on student outcomes (Domina et al., 2015; Dougherty et al., 2015; Remillard et al., 2017). The studies also show that there are mixed results of implementing Algebra I for all eighth graders regarding student achievement (Domina et al., 2015; Howard et al., 2015; Liang et al., 2012). In order to effectively implement Algebra I for all eighth graders, school leaders may need to investigate a different approach to ensure that more students meet with success.

Purpose

This case study focuses on middle school educational leaders who are effectively preparing middle school students for Algebra I in eighth grade as defined by the success criteria of increasing enrollments and student's successfully completing the content. By focusing on leaders who are transforming mathematics education for students and the lessons learned, the successes analyzed will ensure more students complete Algebra I in eighth grade. The focus of this study is on the dimensions of transformational leadership that middle school leaders use to affect student performance and increase enrollments. Centering on the strategies transformational leaders use to successfully implement Algebra I for eighth graders, districts can replicate best practices in other schools to promote effective, system-wide implementation.

For the purposes of this study, two different measures define successful implementation. The first measure is an increase in the number of students participating in the enhanced math

curriculum in sixth grade from the 2020-2021 to 2021-2022 school year. Through participation in the enhanced math track, students will complete middle school math in two years and be on track for Algebra I in eighth grade. The second measure is that at least 75 percent of the sixth-grade students completing the enhanced curriculum earn an A or B as the final grade. The desire is to focus on schools that are meeting with success and identify transformational strategies that the mathematics instructional leaders use to change mathematics education within their buildings.

Research Questions

To meet the purpose of this study, the research focuses on answering the following guiding questions:

1. What transformational strategies do middle school educational leaders employ to ensure sixth-grade students complete the enhanced curriculum successfully?
2. What transformational strategies do middle school educational leaders utilize to increase enrollments in the enhanced curriculum to provide more students the opportunity to reach Algebra I in eighth grade?

Significance of the Study

This study's significance is to provide educational leaders' successful strategies for implementing Algebra I for all eighth graders. Based on a review of current research, this study is one of the first to focus on educational leadership regarding Algebra I for all eighth graders rather than focusing on student outcomes. The study also highlights the themes and successful shifts educational leaders implement when preparing all middle school students for Algebra I in eighth grade. Since Algebra I for all eighth graders has had various student results in the past, it

is essential to focus on schools where implementation is going well to understand explicitly what leadership practices have had the most impact.

Definitions

The following terms are defined to give more context to this study:

Acceleration: Indicates that a student is moving through the curriculum at a quicker pace. Students may be skipping content or compressing content to accelerate their completion of the math curriculum. For example, an accelerated student may be a fourth-grade student who is taking fifth grade math. The student is at least one full-year ahead compared to normal math progression.

Enhanced Mathematics Curriculum: At the middle school level, this is a year and a half of math curriculum condensed into one school year. The sixth-grade enhanced math curriculum includes the state's sixth-grade standards as well as half of the seventh-grade standards. The seventh-grade enhanced math curriculum is inclusive of the remaining seventh grade standards and all eight-grade standards. Sixth and seventh grade enhanced curriculum condenses three years of standards into two years to allow all eighth-grade students the opportunity to participate in Algebra I in eighth grade.

Continuous Achievement: The continuous achievement framework for advancement allows each child to progress in language arts and math at his/her optimum pace and depth, expanding and compacting the curriculum as appropriate. The framework is implemented in all elementary and middle schools and includes a process for advancement in the current grade level and an acceleration process which allows a student to advance above grade level.

Overview of the Study

Qualitative research aligned with the purpose of this study because it allowed for the study of a research topic in context and occurs within the natural setting (Hays & Singh, 2012). Specifically, this qualitative research is a case study that investigates the phenomenon of educational leaders preparing middle school students for Algebra I in eighth grade within the school setting. Case studies seek to understand the "how" and "why" of a phenomenon or event that the researcher has little or no control over (Yin, 2018). This study seeks to understand the transformation leadership strategies that successful educational leaders employ to prepare middle school students for Algebra I in eighth grade.

Chapter two explores relevant literature that includes: transformational leadership; leading mathematics instruction; mathematics professional development; early algebra; preparing for Algebra I; Algebra I in eighth grade; and broad, system-wide implementation of Algebra I for all eighth graders. The literature provides context for the study as well explaining the need for the study to fill the gap in the literature. While there are many studies focused on student outcomes such as achievement and motivation (Domina et al., 2015; Dougherty et al., 2015; Remillard et al., 2017), there are limited studies around the leadership strategies needed to support an effective implementation of Algebra I for all eighth graders.

Chapter three furnishes details of how the study was conducted including sample selection, data collection process, and necessary steps to complete the data analysis. Three criteria were established to assist with sample selection for the study: increased enrollment of students in Math 6 Enhanced from the 2020-2021 school year to the 2021-2022 school year, successful completion of 75% or more students in Math 6 Enhanced, and math instructional leaders who have been in the school for at least two years. Data was collected through district

enrollment and academic data, interviews, and initiative documentation. The data was analyzed through In Vivo coding which uses a word or phrase from the actual language of the qualitative data (Saldaña, 2021). Following the In Vivo coding, focused coding was used to identify themes within the data.

Chapter four reviews the common themes identified through the data collection and analysis. The revealed themes are paths forward and strategies to be utilized by educational leaders in successfully preparing middle schoolers for Algebra I in eighth grade.

Finally, chapter five analyzes the results, draws connections to the previous research, and discusses the implications for educational leaders moving forward.

2 REVIEW OF THE LITERATURE

This chapter reviews the literature collected to support the different aspects of the study and begins by exploring transformational leadership, including the history, characteristics, and links to educational leadership. The purpose of this section is to provide additional information regarding the theoretical framework of the study. The literature review then focuses on leading math instruction and professional development which provides additional context around the background of the study. The review then segues into literature related to early Algebra and Algebra I in eighth grade. Examples of broad implementations, advantages and challenges of Algebra I for eighth graders are then examined.

Transformational Leadership

Transformational leadership has a rich history and is the lens used to provide a theoretical framework for the study. The introduction of transformational leadership and transactional leadership began with James MacGregor Burns' seminal work in 1978. Burns's work was focused on the business world and identified two types of leaders: transactional and transformational. Transactional leaders lead through an exchange of services or capital (Burns, 1978). For example, a transactional leader may offer financial incentives for productivity (Bass & Riggio, 2008). Conversely, Burns (1978) found that transformational leaders uplift their followers' morale, motivation, and morals. As similar research has occurred in education, the tenants of Burns's work have held.

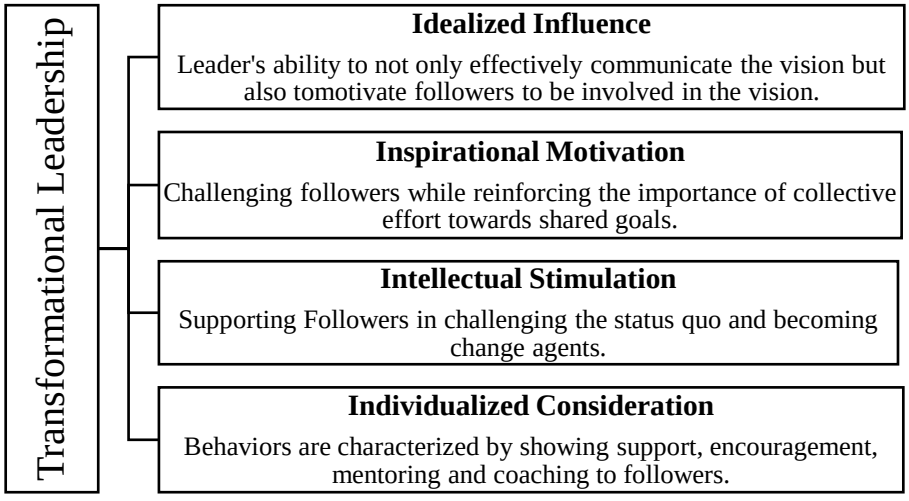
Followers appreciate leaders who are more transformational and less transactional (Bass, 1999). Transformational leaders motivate others to exceed expectations, leading to higher performance (Bass & Riggio, 2008). The motivation is that their colleagues and employees view transformational leaders as both satisfying and influential leaders (Bass, 1990). Transformational

leaders have better relationships with supervisors and make more significant contributions to the organization (Bass, 1990).

The transformational leader model focuses on the motivation and development of followers to improve overall performance through achieving established group goals. The work of Bass & Avolio (1990) state that transformational leadership involves four dimensions: inspirational motivation, intellectual stimulation, individualized consideration, and idealized influence (See Figure 1 below). Inspirational motivation is the leader's ability to inspire confidence, motivation, and a sense of purpose. Individualized consideration recognizes the needs of what motivates each individual. Intellectual stimulation values creativity and autonomy and idealized influence refers to the charismatic personality that is needed to influence others. These characteristics afford transformational leaders the ability to promote critical organizational issues while also increasing followers' confidence (Lochmiller, 2016).

Figure 1

Bass's (1985) Conceptualization of the Four Dimensions of Transformational Leadership



Leithwood studied the connection between the work of Burns and Bass as it relates to transformational educational leadership. Leithwood (1994) presents seven dimensions of

transformational leadership in education: building school vision and establishing school goals, providing intellectual stimulation, offering individualized support, modeling best practices and essential organizational values, demonstrating high-performance expectations, creating a productive school culture, and developing structures to foster participation in school decisions. In addition to the dimensions of transformational leadership in education, Leithwood (1994) also included four management dimensions: staffing, instructional support, monitoring school activities, and community focus. Additionally, Leithwood offers that transformational leadership has a significant positive effect on student engagement and organization conditions (Leithwood & Jantzi, 2008).

In reviewing the literature, it is evident there are different approaches to or models of transformational leadership. While the approaches or models may vary slightly, they share the same underlying goals and assumptions. Leithwood and Sun (2012) investigated the instruments used in transformational school leadership research in order to develop a common understanding of transformational leadership across various models. They found that all models and their measures included developing goals in conjunction with a widely shared vision and providing individualized support. Leithwood and Sun (2012) went on to describe the meanings ascribed to each of the leadership practices as shared in Figure 2.

Figure 2

Leithwood and Sun's (2012) Meanings of Transformational Leadership Practices

Setting Directions

1. ***Develop a shared vision and building goal consensus.*** Leaders enacting this practice identify, develop, and articulate a shared vision or broad purpose for their schools that is appealing and inspiring to staff. They also build consensus among staff about the importance of common purpose and more specific goals, motivate staff with these challenging, but achievable goals, and communicate optimism about achieving these goals. These leaders also monitor progress in achieving shared goals and keep these goals at the forefront of staff decision making.
2. ***Hold high performance expectations.*** Leaders expect a high standard of professionalism from staff, expect their teaching colleagues to hold high expectations for students, and expect staff to be effective innovators.

Developing People

3. ***Provide individualized support.*** Involved in the various definitions of providing individualized support are leaders listening and attending to individuals' opinions and needs, acting as mentors or coaches to staff members, treating staff as individuals with unique needs and capacities, and supporting their professional development.
4. ***Provide intellectual stimulation.*** Leaders enacting this set of practices challenge the staff's assumptions, stimulate and encourage their creativity, and provide information to staff members to help them evaluate their practices, refine them, and carry out their tasks more effectively.
5. ***Model valued behaviors, beliefs, and values.*** Modeling includes "walking the talk," providing a model of high ethical behavior, instilling pride, respecting and trusting in the staff, symbolizing success, and demonstrating a willingness to change one's own practices as a result of new understandings and circumstances.

Redesigning the Organization

6. ***Strengthening school culture.*** Leaders enacting this set of practices promote an atmosphere of caring and trust among staff, build a cohesive school culture around a common set of values, and promote beliefs that reflect the school vision.
7. ***Building structures to enable collaboration.*** Leaders ensure that staff participate in decisions about programs and instruction, establish working conditions that facilitate staff collaboration for planning and professional growth, and distribute leadership broadly among staff.
8. ***Engaging parents and the wider community.*** Leaders demonstrate sensitivity to parent and wider community aspirations and requests, reflect community characteristics and values in the school, and actively encourage parents and guardians to become involved in their children's education at home and in school.

Improving the Instructional Program

9. ***Focus on instructional development.*** The development and inclusion of this set of leadership practices represents the most substantial difference between models of transformational leadership developed for school and non-school contexts. These practices are typically associated with models of "instructional leadership" but are

included in the Nature of School Leadership Survey's (NSL) conception and measure of transformational school leadership as a result of work over many years to create and test a "purpose-built" model of transformational leadership appropriate for school contexts. More recent versions of NSL expand the number of practices in this dimension, but these additional practices (e.g., staffing the instructional program) were not measured by studies meeting the inclusion criteria for this review.

Since 1978, transformational leadership has been an effective approach to improving performance and climate in business organizations. Over the past thirty years, research has supported transformational leadership in schools (Anderson, 2017). Transformational leadership is a preferred style of leadership that is conducive to making positive changes in schools and professional development (Anderson, 2017). An educational leader with a transformational leadership style positively influences a teacher's work during periods of change because of the connections they have made and the willingness to exchange knowledge and information (Bass & Avolio, 1994). Transformational leadership in education is an integral part of this study as it lays the foundation for how leaders can successfully implement an initiative and make positive change in their schools.

Initiative success is important, but ultimately in education, it is crucial to understand the effects of transformational leadership on student outcomes. Li (2022) conducted a review of empirical research on transformational school leadership and found that transformational leadership effects student outcomes in both direct and indirect ways. When transformational leadership is coupled with instructional leadership, student outcomes and performance see significant improvement (Cruickshank, 2017). Along with the improvement of student outcomes and performance, students' and teachers' satisfaction and efficacy is also improved in schools that embody transformative leadership (Liebowitz & Porter, 2019). Transformational leadership

in a school does not stop with the school principal. When principals create an environment of transformational leadership, teachers also become instructional leaders within their classrooms.

Classroom teachers are transformational leaders as they create a vision and goals for students. A teacher's transformational leadership has a moderate to strong correlation to students' achievement (Bolkan & Goodboy, 2009) and can be a significant predictor of cognitive and affective learning (Harrison, 2011). Harrison (2011) also noted that teachers who exhibited elements of transformational leadership were more successful in the classroom then those who rely on more transactional leadership. There is a significant correlation between a teacher's transformational leadership and students' learning (Shen et al., 2020). When the teacher creates an environment that requires positive change from students, the students are inspired to achieve the goals that the teacher sets.

Leading Mathematics Instruction

Educational leadership literature has clearly defined that one role of school administrators is to serve as instructional leaders (Hallinger, 2005; Murphy, 1988). Effectively implementing Algebra I in eighth grade requires a school's administration to be at the forefront of curriculum and instruction. At the core of instructional leadership is classroom instruction supervision (Hallinger & Heck, 2010; Leithwood & Louis, 2011; Wahlstrom & Louis, 2008). Classroom supervision necessitates observations, feedback on instructional practices, and support through professional development as needed. Sergiovanni and Starratt (2002) recommend that feedback should assist teachers with content and pedagogical decisions. Providing feedback on math and science content can be a challenge for instructional leaders.

Lochmiller (2016) found that for math and science teachers, administrative feedback emphasized basic pedagogical strategies and was anchored in the leader's experience. Leaders

struggle to provide content-specific feedback in math and science unless it is a part of their experience. School administrators rely heavily on outside sources of professional development to improve content instruction within their buildings (Lochmiller & Acker-Hocevar, 2016). Rigby et al. (2017) noted similar findings as well. Most of the administrator feedback was content-neutral and often superficial. The focus is typically on compliance, and the required hours spent in classrooms are unlikely to contribute to teachers' development (Rigby et al., 2017).

When leading math instruction, it is essential to maintain teachers and reduce teacher turnover. Principal support is a critical component of lowering teacher turnover rates (Redding et al., 2019). Redding et al. (2019) described principal support to include expectations, encouragement, support, enforcement of school rules, time for collaboration, and external support. Principals who pair their beginning teachers with mentor teachers in the same grade or subject area and create time for collaboration in the school day see the effects in school climate (Redding et al., 2019). This positive approach to professional development can transform mathematics instruction.

As an educational leader, a principal might feel that it is necessary to participate in math professional development to improve mathematics content knowledge and better support math instruction within the school. Herrmann et al. (2019) conducted a study in which the assumption was made that principal professional development would lead to improved principal practice. This would ultimately lead to increased student achievement through enhanced school and teacher outcomes based on the improved principal practices. However, the program did not meet its goal of improving student achievement (Herrmann et al., 2019). On the contrary, the study found that principal professional development did not affect student achievement nor the amount of time that principals spent on instructional leadership.

Professional Development

The Algebra I for all eighth graders initiative requires appropriate professional development. The literature supports that high-quality professional development can positively impact classroom practices and, therefore, impact student outcomes (Desimone et al., 2002; Yoon et al., 2007). Desimore et al. (2002) found five critical features of professional learning that effectively improve teacher practice: reform type, duration, collective participation, active learning, and coherence. These findings align with the principal perception that effective professional development is sustained over time, involves collaboration, and includes follow-up (Brown & Militello, 2016). This perception is confirmed on account of the fact that the average knowledge gains from professional development will be lost 37 days after completing the training (Liu & Phelps, 2020). Moreover, summer institutes, programs with higher intensity, and fewer training sessions are associated with a higher decay rate (Liu & Phelps, 2020).

Due to the complex nature of determining the requirements for effective professional development, Guskey (1994) recommends six guidelines for effective professional development:

1. Recognize that change is both an individual AND organizational process
2. In planning and implementation, think BIG, but start SMALL
3. Work in teams to maintain support
4. Include procedures for feedback on results
5. Provide continued follow-up, support, and pressure
6. Integrate programs

The key to more effective professional development is not new knowledge but the capacity to use the knowledge deliberately and wisely (Guskey, 1994).

Sims et al. (2021) confirmed Guskey's findings through a systemic review and meta-analysis of professional development research from 2002 to 2020. The researchers coded the study using four purposes of professional development: helping teachers gain new insights, pursuing new goal-directed behaviors, acquiring new skills or techniques, and embedding these changes in practice. The meta-analysis defined 14 mechanisms in four categories that can produce effective professional development: build knowledge, motivate staff, develop teaching techniques, and embed practice.

Math Professional Development

Piasta et al. (2015) explored the effects of science and math professional development. The results indicated that extended amounts of math and science professional development might impact the learning opportunities that teachers provide students in science, but not math. They also found that professional development did not significantly benefit children's math and science learning. One key limitation of the study was that it did not speak to factors that may have facilitated or inhibited responses to the professional development.

In taking a broader look at the effectiveness of math professional development, Gersten et al. (2014) reviewed 643 studies related to K-12 math professional development. Of the 643 studies, researchers found 32 were primarily focused on math and used a research design for examining effectiveness. Of those 32 studies, only five were found to meet the What Works Clearinghouse evidence standards, and from those five, only two were found to have statistically positive effects on student math proficiency. The first study by Sample McMeeking et al. (2012) investigated two intense math summer content courses with follow-up workshops for middle school educators. The content courses focused 80% on math content and 20% on pedagogy. There were then four follow-up workshops on Saturdays in the fall focused on designing lessons

using the summer course content. This intensive effort led to significant improvement in student math achievement as measured by the state assessment (Sample McMeeking et al., 2012). The second study was a lesson study focused on the linear model of fractions conducted by Perry and Lewis (2011). This study took a very different approach. Groups of teachers met 12 to 14 times over five months during the school year. The groups were led by alternating teachers in the group and followed the lesson study cycle provided to them in the intervention materials. This study led to a significant increase in fraction knowledge in grades 2, 3, and 5 (Perry & Lewis, 2011).

Studies have also found that teachers who work with young children spend less time working on math instruction than they do in other content areas (Early et al., 2010; Hachey, 2013). During the math instructional time, there is a greater focus on rote learning as opposed to conceptual understanding and problem solving (Kinzie et al., 2015; McGuire et al., 2016). Professional development can serve to make teachers more comfortable with math content and pedagogy required to teach math. Beneficial professional development sessions assist with creating positive attitudes and beliefs about the math content that early childhood educators teach, include aspects of reflection and collaboration, and utilize coaches or mentors to provide individual feedback. (Brenneman et al., 2019). Understanding the benefits of professional development for our early childhood educators is important to improving early algebra instruction.

Early Algebra

The adoption of Common Core Standards allows for a foundation for algebra to be built in to kindergarten through grade five. The focus of early grades remains on arithmetic, but it is important for students to build an algebraic foundation along with instruction for algebraic

thinking (*Common Core State Standards for Mathematics*, 2010). As described in "Progressions for the Common Core State Standards", the standards are "designed to help [students] extend arithmetic beyond whole numbers…and understand and use expressions in alter grades" (2013). Early algebra must be included in early years through developmentally appropriate strategies and lessons. Studies show that students in early grades are able to develop algebraic thinking, but also remind us that early algebra (algebra in elementary school) is different from traditional middle school algebra (Blanton et al., 2015; Schliemann & Schwartz, 2017).

Project LEAP (Learning through and Early Algebra Progression) is a partnership between the University of Wisconsin and TERC. TERC works to develop a deeper understanding of learning and teaching. The project has been researching implementing algebraic thinking in elementary school for several years. Project LEAP defines algebraic thinking as making and expressing generalizations in formal and conventional systems and reasoning with symbolic forms across three main content strands:

1. Algebra as the study of structures and systems abstracted from computations and relations, including those arising in arithmetic (algebra as generalized arithmetic) and quantitative reasoning.
2. Algebra as the study of functions, relations, and joint variation.
3. Algebra "as the application of a cluster of modeling languages both inside and outside of mathematics" (Kaput et al., 2008, p. 5).

Researchers identified five big ideas for engaging in core algebraic thinking practices for early algebra including (1) equivalence, expressions, equations, and inequalities, (2) generalized arithmetic, (3) functional thinking, (4) variable, and (5) proportional reasoning. They have also

identified key expectations for what students should be able to do under each of the big ideas by grade band (Blanton et al., 2015).

Investigating the difference between arithmetic and algebra can assist in understanding problems that students have with early algebra. Arithmetic is focused on straightforward calculations with known numbers. Algebra requires reasoning with unknown variables and situations (Van Amerom, 2003). Van Amerom (2003) found that informal, pre-algebraic methods for reasoning and symbolizing can facilitate the transition from arithmetic to algebra. It is widely accepted that algebra should be treated as a kindergarten to the twelfth-grade content strand for students to have long-term, sustained algebra experiences in school mathematics. By beginning algebra instruction in the elementary grades, students build their conceptual understanding of patterns and relationships into formalized mathematical thinking (Common Core State Standards for Mathematics, 2010; Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics: A Quest for Coherence, 2006; Principles and Standards for School Mathematics, 2000).

When students are provided with the appropriate instruction, they can engage successfully with a broad and diverse set of algebraic ideas (Blanton et al., 2015). All students, including high-risk students, improve their algebraic understanding significantly faster and maintain their advantage when provided with algebraic intervention at an early age (Blanton et al., 2019). One challenge with early algebra instruction is that most teachers have not had many early algebra experiences in their elementary education. Therefore, they require additional professional development in early algebra to provide appropriate instruction (Hohensee, 2017).

In preparing students to take a higher-level math course, such as Algebra I, implementing curriculum changes over several years is essential to success (Howard et al., 2015).

Incrementally enhancing kindergarten to seventh-grade math instructional levels aids districts with large populations of minority or lower socio-economic students who have been relegated to lower academic expectations and denied their classmates' post-secondary opportunities (Howard et al., 2015). It is also essential to provide additional support to students struggling to maintain proficiency before Algebra I (Howard et al., 2015).

Research has determined critical skills to assist in algebra success: understanding rational numbers, quantitative relationships, and negative magnitudes (Liang et al., 2012; Powell et al., 2019; Young & Booth, 2019). Powell et al. (2019) found that rational numbers act as a dominating contributor to algebra performance. A rational number is a number that can be made by dividing two integers. Rational numbers can be addressed with elementary instruction through more exploration of fraction concepts and middle school instruction of proportions, ratios, decimals, percentages, and fractions (Powell et al., 2019). Liang et al. (2012) also found that rational numbers are a significant predictor of algebra performance. In addition, quantitative relationships appear to contribute to algebra achievement (Liang et al., 2012). Providing more opportunities with rational numbers and quantitative relationships during middle school assists in enhancing students' understanding of the rational number system. Young & Booth (2019) found that improving students' understanding of negative integer magnitudes is imperative to success in algebra and other advanced mathematics courses.

Algebra I in Eighth Grade

Algebra I in eighth grade is not a new idea. As early as 1963, studies have been conducted on the effects of Algebra I in eighth grade. Hegstron and Riffle (1963) completed a two-year study over the 1960-1961 and 1961-1962 school years. High achieving students were selected to participate in a course that consisted of six weeks of eighth grade standards followed

by Algebra I. The study concluded that at least 15% of the students had the potential to accelerate (Hegstrom & Riffle, 1963), demonstrating that Algebra I in eighth grade can be successful when students are identified through ability grouping.

Spielhagen (2006) found a correlation that students who take algebra early stay in mathematics courses longer and take more advanced courses than the students who did not have early access to algebra. However, when California implemented an effort to enroll all eighth graders in Algebra I, it correlated to adverse consequences on mathematics achievement (Domina et al., 2015). There was no corresponding increase in students taking additional higher-level math classes in high school (Liang et al., 2012). Based on the results, California has backed away from Algebra I for all eighth graders efforts.

Outside of California, the results have also been mixed. Researchers have found that students who had been enrolled in eighth-grade Algebra I did not perform higher than students who completed a lower-level math class by the time they reached eleventh grade (Howard et al., 2015). Students who failed Algebra I in eighth grade were significantly less likely to meet math requirements for a 4-year college than those who participated in a lower-level math course (Howard et al., 2015). Setting aside academic achievement, it is also essential to evaluate how course placement can affect student motivation in mathematics. Average and low-performing students show an overall decline in motivation after being placed in Algebra I in eighth grade (Simzar et al., 2016).

Domina (2014) helped explain the disconnect between studies that demonstrate a positive effect of advanced mathematics courses and studies showing that broad policy-driven curricula intensification may be ineffective. Domina (2014) found that positive outcomes from advanced course enrollment are contingent on student readiness, so studies focused on accelerating middle

school mathematics may see diminishing returns when students are enrolled in courses for which they are unprepared. Domina (2014) noted that enhanced opportunities and tailored instruction for low-achieving students might help prepare students for an accelerated math curriculum in middle school.

Clotfelter et al. (2015) uncovered substantial evidence that introducing algebra in middle school exacerbated inequality instead of equalizing student outcomes. Their interpretation of the findings led them to believe that algebra for all eighth graders is a worthy standard if districts also work to raise the performance of all students before Algebra I. However, when districts such as the two prominent North Carolina districts in the study try to implement algebra in eighth grade when the average student is in the sixtieth percentile in mathematics entering algebra, they do not met with success.

Rickles (2013) looked at a nationally representative sample to delve into the effects of algebra for eighth graders on a larger scale. Rickles found that on average, across students and schools, students can benefit from early access to algebra. There is also mounting evidence to support an educational system in which algebra in eighth grade is the default for most students (Rickles, 2013).

Examples of Broad Implementation of Algebra I for Eighth Graders

The state of California and Charlotte-Mecklenburg School District in North Carolina are two education systems that have attempted the implementation of Algebra I for all eighth graders. Both systems discontinued their initiatives before they were fully realized. The initiatives in Charlotte-Mecklenburg School District and the state of California both led to dramatic increases in enrollment of eighth graders in Algebra I and provide insights into the

advantages and challenges that are present when executing such a policy (Clotfelter et al., 2015; Domina et al., 2015; Rosin et al., 2009).

In the early 2000s, Charlotte-Mecklenburg began a broad initiative to accelerate more students into algebra. The initiative was created in response to an increase in the number of math courses required for admission into the University of North Carolina. The district leaders believed that algebra should be offered in middle school as opposed to waiting until high school (Clotfelter et al., 2015). While the program did not result in broad reform of the math curriculum, it did change enrollment patterns. This initiatvie resulted in an increase in the number of middle school students in Algebra I from 40% to over 60% of students (Clotfelter et al., 2015). Unfortunately, as enrollment of eighth graders in Algebra I increased, achievement in the course decreased.

Clotfelter et al. (2015) found that students who only had moderate achievement prior to entering Algebra I in eighth grade scored one-third of a standard deviation lower on the end-of-course exam. They were also 10% less likely to pass Geometry by eleventh grade when compared to similar students who were not accelerated. The main reason for this discrepancy appears to be the skipping of a year's worth of pre-algebra mathematics (Clotfelter et al., 2015). Charlotte-Mecklenburg discontinued their Algebra I for eighth graders beginning with the 2004-2005 school year. Follow-up research was conducted in ten North Carolina school districts with similar results. Students who enrolled in Algebra I in eighth grade but were in the bottom 60% of the prior year's achievement experienced negative impacts on taking and passing geometry by eleventh grade (Clotfelter et al., 2015).

California is another example of broad implementation of Algebra I in eighth grade. The state began purposefully increasing enrollment in Algebra I for eighth graders in the 1990s. Then

in 1999, the California State Senate passed the Public School Accountability Act (PSAA). This act penalized schools who enrolled eighth graders in a general math class or a pre-algebra class. Due to this change, the number of eighth graders enrolled in Algebra I increased to more than 50% of students (Rosin et al., 2009). The PSAA led to the California State Board of Education voting to require all students to enroll in Algebra I by eighth grade in 2008. Due to implementation delays and the adoption of the Common Core State Standards in 2010, the policy was not fully executed. However, the two combined initiatives did dramatically change eighth grade enrollment in Algebra I. From 1999 to 2008, the percent of eight graders enrolled in Algebra I in the state of California rose from 16% to 51%.

District leaders argued that having all eighth graders take Algebra I in eighth grade could combat historically inequitable practices and give students exposure to higher level math classes that they would need to be successful in high school, as well as open up a wide range of post-secondary options (Knudson, 2019). The increased enrollment had two very different effects on end of course exams. At the high end of achievement, 1.8 times as many eighth graders in California were scoring proficient or advanced on the Algebra I end of course exam in 2008 compared to 2003. However, 1.5 times as many eighth graders were scoring below or far below basic on the same exams (Rosin et al., 2009). When examining the data even further, researchers found that the increased enrollment of eighth graders in Algebra I led to negative effects on tenth grade math scores two years later (Domina et al., 2015).

The findings related to the negative effects of broad implementation in Charlotte-Mecklenburg School District and the state of California conflict with studies that investigated the effects of Algebra I in eighth grade. Heppen et al. (2012) found positive effects on student achievement when high-achieving students in rural New England middle schools were enrolled

in Algebra I in eighth grade. When responding to the conflicting results, researchers in the California study hypothesized that the difference probably occurred due to the fact that in California, 80% of eighth graders were enrolled in algebra while in New England, only 40% of eighth graders were enrolled (Domina et al., 2015). While enrolling high achieving students in Algebra I in eighth grade may be positive, the studies of broadscale implementation indicate that the positive effects do not necessarily hold true across all achievement levels.

Advantages and Challenges of Broad Implementation of Algebra I for Eighth Graders

The broad implementation of Algebra I for eighth graders in Charlotte-Mecklenburg and California yielded universal themes for developing these initiatives and highlight implementation challenges. There are two main reasons that Algebra I for all eighth graders policies are created. First, school districts desire to provide time and flexibility for students to engage in higher level math courses that provide more rigor in high school. The research has shown that more rigorous math courses in high school positively correlate to postsecondary outcomes (Long et al., 2012). Second, educational leaders are attempting to address equity gaps between student groups in higher-level math courses. The equity gaps are especially common for racial minorities and economically disadvantaged students. The gaps are common nationally (Fong et al., 2014) and can have long-term implications for math courses taken in high school and post-secondary institutes (Long et al., 2009). Therefore, inequitable access to more rigorous math coursework is a critical issue to address. It is similarly just as important to appropriately prepare students for algebra. Research studies have shown that increased enrollment in advanced math courses has not produced higher achievement. Loveless (2013) studied the relationship between states with increased eighth grade enrollment in Algebra I or Geometry and composite NAEP scores from 2005 to 2011. The study found no evidence of a relationship between increased enrollment in

advanced math courses for eighth graders and higher achievement. Instead, Loveless (2013) found that the achievement gains were smaller for states with increased enrollment in Algebra I in eighth grade while they were larger for states that increased the number of eighth graders in a general math course.

The research studies in Charlotte-Mecklenburg and California demonstrated that broad policies to increase eighth grade enrollment in Algebra I negatively impacted student achievement. The increased enrollment decreased the chances that students would successfully complete high school math coursework (Finkelstein et al., 2012; Fong et al., 2014). The additional research completed in North Carolina indicated that the students in the bottom 60% of prior achievement were most negatively impacted while the students in the top 20% generally benefitted from Algebra I in eighth grade (Clotfelter et al., 2015). Clotfelter's study implies that the adverse impact is due to students being unprepared for algebra. Since the research establishes that the negative effects of Algebra I for eighth graders are due to being unprepared for algebra, it may be productive to determine the types of supports needed to prepare students to be successful in Algebra I.

The cumulative nature of mathematics instruction increases the risk of insufficient preparation for algebra. The California implementation research found that students who achieved proficiency in student achievement in sixth grade only had a 40% chance of being proficient in Algebra I in eighth grade. Sixth grade students who scored almost a full standard deviation above proficiency had a 75% chance of achieving proficiency in Algebra I in eighth grade (Huang et al., 2014). This leads researchers to believe that students need to be significantly above the basic level of proficiency to be successful with Algebra I in eighth grade. The research also shows that students who show a B or higher in seventh grade math are significantly more

likely to later enroll courses beyond Algebra II by twelfth grade (Finkelstein et al., 2012). This demonstrates that performance in sixth and seventh grade can be indicators of future success for students enrolled in Algebra I in eighth grade.

The impacts of failing Algebra I in eighth grade can be severe and are important to understand when implementing broad policies. In California, of the students who were in seventh grade in 2004-2005, approximately 57% of them took Algebra I in eighth grade. Nearly 40% of those students had to retake Algebra I in ninth grade. Even more alarming is that only 27% of the students passed Algebra I, Geometry, and Algebra II by tenth grade (Finkelstein et al., 2012). In addition, 80% of students who failed to meet proficiency in Algebra I in eighth grade also failed to meet proficiency when they retook the course in ninth grade (Finkelstein et al., 2012). There are long-term impacts to a high percentage of students failing and retaking courses in middle school and early high school. High failure rates during these early years are strongly associated with a substantially reduced chance of high school graduation (Balfanz et al., 2007). Intentional and focused preparation for students entering Algebra I in eighth grade is needed to bolster the chances of passing the course on the first attempt.

There are increasing concerns around the detrimental impact of condensing math instruction in order to get students to Calculus by twelfth grade. The National Council of Teachers of Mathematics (NCTM) highlights concerns that when students move through preliminary math courses so quickly, they do not establish an adequate mathematical foundation. Students are unable to build on that mathematical knowledge to meet the needs of in-demand STEM careers even when they pass high school calculus. This trend is supported by the high percentage of students who successfully completed calculus in high school, but then reenroll in calculus or a remedial math course in college (Bressoud et al., 2013). The evidence led the

NCTM and the Mathematical Association of America to release a statement in 2013 arguing that "although calculus can play an important role in secondary school, the ultimate goal of the K-12 mathematics curriculum should not be to get students into and through a course in calculus by twelfth grade but to have established the mathematical foundation that will enable students to pursue whatever course of study interests them when they get to college" (2013). Overall, it is important for students to be prepared for Algebra I in eighth grade and there can exist a positive impact and trajectory for students who are prepared. The current research, however, indicates that the impact is negative and enduring for students who are not well-prepared for Algebra I in eighth grade.

The Gap in Literature/Need for the Study

Algebra I for all eighth graders has been implemented before at both the district and state levels. There is literature as to the effects of implementing algebra I for eighth graders on student achievement, student success in math, and how it affects students' math confidence. The body of literature published on Algebra I in eighth grade is focused on students and does not address how educational leaders affect the implementation, and what strategies ensure success. This study investigates middle schools that are successfully implementing Algebra I for all eighth graders and explores the transformational leadership strategies that school leaders utilize to ensure student success.

Summary

The literature shows that Algebra I is the gateway to success in advanced mathematics courses. Research articles indicate that students should be given the chance to explore advanced mathematics courses in secondary education. However, broad implementation of Algebra I has not met with success. Mathematics professional development, instructional leadership, and early

algebra can all provide a solid foundation for the implementation of Algebra I for eight graders. Revealed throughout the literature is the need for transformational leaders who are necessary to make positive changes in schools and professional development. Studies show that the broad implementation of Algebra I for all eighth graders has had its advantages and challenges. Understanding the advantages of broad implementation has mostly been focused on student outcomes. Unfortunately, little research exists on educational leadership strategies that lead to successful implementation of Algebra I for all eighth graders. Therefore, to begin addressing the gap in literature, this study aims to identify transformational leadership strategies that lead to successful implementation of Algebra I for all eighth graders. This study may reveal important information to determine how to provide all students with the opportunity to participate in Algebra I in eighth grade.

3 METHODOLOGY

The purpose of this case study is to investigate middle schools that are successfully preparing middle school students for Algebra I in eighth grade and identify the strategies leaders are utilizing to transform math instruction in their buildings. The study focuses on answering the following research questions:

1. What transformational strategies do middle school educational leaders employ to ensure sixth-grade students complete the enhanced curriculum successfully?
2. What transformational strategies do middle school educational leaders utilize to increase enrollments in the enhanced curriculum to provide more students the opportunity to reach Algebra I in eighth grade?

Chapter three describes the methodology used to conduct the study and address the research questions. Transformational leadership is the theoretical framework that provides context for the investigation. Case study research design is the method employed to conduct the research. This chapter details the sample, data collection, assumptions and limitations, as well as the data analysis methods employed in the study.

Theoretical Framework

Transformational leaders are defined by the seminal work of James MacGregor Burns (1978) as those who motivate and uplift the morale and morals of their followers. When pursuing an initiative that has had mixed results, it is essential to have transformational leaders because they motivate others to exceed expectations leading to higher performance (Bass & Riggio, 2008). In this study, higher performance is needed from teachers and instructional leaders to prepare middle school students for Algebra I in eighth grade since this is earlier than most states and districts teach Algebra I. From the broad implementation standpoint, it is also important for

transformational leaders to have better relationships with supervisors so that they can have open communication about the successes and challenges of the initiative with district leaders which may lead to more significant contributions to the organization throughout the implementation (Bass, 1990).

To frame the study in transformational leadership, the interview questions utilized focus on the seven dimensions of transformational educational leadership: building school vision and establishing school goals; providing intellectual stimulation; offering individualized support; modeling best practices and important organizational values; demonstrating high-performance expectations; creating a productive school culture, and developing structures to foster participation in school decisions (Leithwood, 1994). Acknowledging that transformational leadership positively affects student engagement and organizational conditions, this study is designed to examine which of the seven dimensions of transformational leadership are most productive for middle school principals as they prepare students for success in Algebra I for all eighth graders (Leithwood & Jantzi, 2008).

The research focuses on the mathematics instructional leaders in the building because they can positively influence a teacher's work during periods of change through transformational leadership (Bass & Avolio, 1994). This is a large initiative that requires significant change and transformational leaders make connections with their teachers that result in the open exchange of perspectives and information with their leaders (Bass & Avolio, 1994). Student outcomes and performance typically see significant improvement when transformational leadership is combined with instructional leadership (Cruickshank, 2017). To see success with broad implementation of Algebra I for all eighth graders, transformational leaders may contribute to improving student performance. Along with the improvement of student outcomes and

performance, students' and teachers' satisfaction and efficacy may be improved in schools that embody transformative leadership (Liebowitz & Porter, 2019). The increase in teachers' and students' satisfaction may bolster the success of a new initiative, thus the need to integrate transformational leadership in this study, laying the foundation for how leaders can successfully implement an initiative and make positive change in their schools.

Research Design

Qualitative research is used to study a phenomenon or research topic in context and occurs in a natural setting (Hays & Singh, 2012). In education, qualitative research is needed to understand phenomena in context and influence policy (Hays & Singh, 2012). There are several different qualitative approaches, including case studies, phenomenology, ethnography, and narratology (Hays & Singh, 2012). According to Yin (2018), a case study investigates a phenomenon in-depth within the real-world context. Case studies are best utilized when "a "how" or "why" question is being asked about a contemporary set of events or over which a researcher has little or no control" (Yin, 2018, p. 13). A case study approach is used in this study as it seeks to answer "how" questions over which the researcher has little or no control.

For this study's purposes, a single case study approach allows for examining one phenomenon representing a unique case, the successful preparation of middle school students for Algebra I in eighth grade (Hays & Singh, 2012). Single case studies are appropriate when the case is critical, unusual, common, revelatory, or longitudinal (Yin, 2018). This study focuses on a unique case in which one district is working to condense the math curriculum to have all eighth graders ready for algebra a year sooner than most districts across the state and region. Case studies rely on multiple sources of evidence so that the data collected can be triangulated and converge on one or more themes (Yin, 2018). To pinpoint specific transformational strategies

middle school educational leaders leverage to successfully implement Algebra I for eighth graders, interviews and document analysis were triangulated.

Sample

Site Selection

Purposive sampling was utilized to select a southeastern suburban school district for this study due to the current implementation of math curriculum that prepares all eighth graders for Algebra I. Purposive sampling is often used in qualitative research for the selection of information-rich cases related to the phenomenon of interest (Palinkas et al., 2015). It also allows for a small sample to be employed for the purpose of increasing the depth of understanding and using limited research resources effectively (Palinkas et al., 2015). The selected district initiated the path toward Algebra I for all eighth graders during the 2020-2021 school year. The district created two goals to ensure that all students are ready for Algebra I in eighth grade. The first long-term goal was to remap the mathematics curriculum that currently spans kindergarten to eighth grade, for completion by the end of seventh grade, allowing the enhanced curriculum to expand a year at a time. All kindergarten students who began school in 2020 participated in the newly mapped curriculum. In 2021, the enhanced curriculum expanded to first grade. The program will continue to expand each year until the enhanced curriculum has been fully implemented kindergarten to seventh grade. With the understanding that it will take several years for students to matriculate through the system, a second goal was created to focus on middle school students.

The second goal is short-term and focused on middle school students providing students with an opportunity to complete the entire middle school math curriculum (grades six, seven, and eight) during grades six and seven, so that they can take Algebra I in eighth grade. To achieve

this, the middle school curriculum is compacted. Students complete all of grade six and first semester of grade seven during their sixth-grade year. Then in seventh grade, they complete second semester of seventh grade and all of eighth grade. Kindergarten and sixth-grade teachers began implementing the new enhanced curriculum mapping during the 2020-2021 school year.

The studied district serves more than 94,000 students in over 100 schools. The district consists of a diverse student demographics: 41% Black or African American, 27% White, 16% Hispanic, 12% Asian, 3% Multi-racial, 0.1% Pacific Islander, 0.1% American Indian. The students also have a variety of needs: 15% Talented and Gifted, 15% English to Speakers of Other Languages (ESOL), 13% Special Education, and 41% Economically Disadvantaged. The study focuses on the 19 middle schools within the district that launched an enhanced math curriculum offering all sixth graders the opportunity to accelerate their learning in grades six and seven in preparation for Algebra I in eighth grade. The participant selection describes how the three specific sites were selected for the study. Table 1 describes the demographics of the three anonymized schools, and Table 2 describes the student needs.

Table 1

Demographics of Selected Sites

School	Black or African American	White	Hispanic	Asian	Multi-Racial	Pacific Islander	American Indian
Cedar Middle School	64%	1%	34%	0%	1%	0%	0%
Moss Middle School	14%	39%	12%	32%	4%	0%	0%
Sterling Middle School	11%	34%	12%	38%	4%	0%	0%

Note. 2020-2021 Enrollment by Subgroup Programs https://gosa.georgia.gov/dashboards-data-report-card/downloadable-data

Table 2

Student Needs of Selected Sites

School	Talented and Gifted	ESOL	Special Education	Economically Disadvantaged
Cedar Middle School	4%	10%	16%	100%
Moss Middle School	36%	2%	12%	9%
Sterling Middle School	37%	4%	8%	7%

Note. 2020-2021 Enrollment by Subgroup Programs https://gosa.georgia.gov/dashboards-data-report-card/downloadable-data

Participant Selection

Purposive sampling allows the researcher to select participants and sites associated with the research problem being studied (Creswell, 1998) and was utilized to select the participants for this study. Due to the subjectivity of purposeful sampling, it is most appropriate for small samples from a limited geographic area or a restricted population (Lavrakas, 2008) as is the case for the district to be studied. Participants for this study are the middle schools with instructional leaders who have undertaken the implementation of the enhanced mathematics curriculum. Three criteria were established to identify the participants who could best answer the questions in this study related to the research problem:

- The school increased enrollment of students in Math 6 Enhanced from the 2020-2021 school year to the 2021-2022 school year.
- Students successfully complete Math 6 Enhanced.
- Principals, assistant principals, and math instructional leaders have been in the school for at least two years.

The first requirement for participant selection was identifying the schools that have increased the number of enrollments of students participating in Math 6 Enhanced from the 2020-2021

school year to the 2021-2022 school year. Increased enrollment was used because it indicates that the school is working to increase access to the enhanced curriculum for all students. It is also an indication that there is a perception of success with the first year of implementation amongst the staff, students, and stakeholders. Six schools demonstrated increased enrollment as outlined in Table 3.

Table 3

Enrollment in Math 6 Enhanced

School	2020-2021 Enrollment	2021-2022 Enrollment	Change in Enrollment
1	144	115	-29
2	50	37	-13
3	44	40	-4
4	27	68	+41
5	43	69	+26
6	33	33	0
7	98	95	-3
8	0	98	+98
9	106	96	-10
10	5	37	+32
11	59	29	-230
12	78	76	-2
13	116	96	-20
14	62	53	-9
15	40	37	-3
16	113	121	+8
17	78	104	+26
18	38	29	-9

The second criterion is based on student achievement within the enhanced course. The district provided deidentified student grade data for all students who participated in the sixth-grade math enhanced course during the 2020-2021 school year. Schools with ≥ 75% of students completing the Math 6 Enhanced course with an A or B average were selected. This criterion was a second indicator for success because an A or B is indicative of student mastery of a year and a half of content in one year. Unfortunately, due to conditions created by the COVID-19

pandemic, state assessment data was not available to be used as a gauge of student success in the Math 6 Enhanced curriculum. Therefore, grades had to be used as an indicator of student achievement for this study. Table 4 outlines the schools' student achievement data that met the enrollment requirement.

Table 4

Student Achievement in Math 6 Enhanced

School	# of Students with A/B Average	Total # of Students	% of Students with A/B Average
1	112	144	78%
2	40	48	83%
3	35	44	80%
4	24	27	89%
5	36	43	84%
6	35	47	74%
7	75	93	81%
8	0	0	N/A
9	93	106	88%
10	5	5	100%
11	36	59	61%
12	61	77	79%
13	99	116	85%
14	24	51	47%
15	25	40	63%
16	87	110	79%
17	72	78	92%
18	31	38	82%

Based on the first two criteria, five schools were invited to participate in the study: schools 4, 5, 10, 16, and 17. The district research process requires that principals review the study proposal and agree to allow their schools to participate in the study. Of the five schools invited to participate, three principals agreed to participate in the study and completed the district's agreement form.

Finally, each school's participants were selected based on their educational leadership role within the building. Additional requirements for the leaders were direct involvement in leading math instruction and leading within the building for a minimum of two years in the current role. Two years' commitment indicates full engagement on the part of the leader for the entirety of the rollout and first year of implementation. The participants include principals, assistant principals who supervise mathematics teachers, mathematics coaches, and mathematics department chairs as they are most directly aligned with the implementation and able to share their perspectives. Table 5 provides anonymized information about each educational leader's background who participated in the study.

Table 5

Educational Leaders' Background

Educational Leader	Position	Background
Anne	Assistant Principal	16 years in educational leadership, MTSS/Intervention Coach, Graduation Coach, Assistant Principal
Ben	Principal	17 years in educational leadership, Assistant Principal, Principal
Christine	Assistant Principal	17 years in educational leadership, Administrative Assistant, Assistant Principal, Principal
Diane	Department Chair	2 years in educational leadership, Department Chair
Elijah	Department Chair & Instructional Coach	10 years in educational leadership, Department Chair, Instructional Coach
Franklin	Assistant Principal	7 years in educational leadership, Assistant Principal
Gina	Principal	9 years in educational leadership, Assistant Principal, Principal
Henry	Instructional Coach	4 years in educational leadership, Department Chair, Instructional Coach

Data Collection

Student performance and enrollment data, individual semi-structured interviews, and district initiative documentation were collected during the study. Collecting data in multiple ways allowed for data triangulation, a method that strengthens a case study's construct validity by providing multiple measures of the same phenomenon (Yin, 2018). All data were collected and maintained in a secure location by the researcher (Yin, 2018).

Data requested from the district was used to select sites to include in the study. The first data request was for the number of students enrolled in Math 6 Enhanced in 2020-2021 and 2021-2022. The second data request was for final grades for the students in Math 6 Enhanced at the end of the 2020-2021 school year. The final data set includes physical and demographic information for the sites selected to participate in the case study. All data that is not publicly available has had all identifying information removed.

After selecting five sites that met the criteria, semi-structured interviews were conducted with two to three middle school mathematics instructional leaders at each location. The questions posited consisted of predetermined background/demographic, behavior/experience, and opinion/value questions (Hays & Singh, 2012). At the same time, the semi-structured approach allowed for probing questions to be asked, affording interviewees the opportunity to expand on answers (Hays & Singh, 2012). During the interview, it was vital to establish rapport, make the interviewee comfortable, and give the him/her the final word (Hays & Singh, 2012).

The interview questions are based on the study's research questions, the seven dimensions of transformational leadership, and background information (Leithwood, 1994). Table 6 depicts the relationship between the interview questions, research questions, and transformational leadership.

Table 6

Interview Questions with Study Relationship

Interview Question	Research Question	Dimensions of Transformational Leadership
How long have you been an educational leader? During that time, what roles have you served in?		providing intellectual stimulation
How did you build a shared vision around Algebra I for all eighth graders within your building?	RQ2	building school vision and establishing school goals
What goals did you set around this initiative?	RQ1 RQ2	building school vision and establishing school goals
How did you message the opportunity to participate in the enhanced curriculum to your students and parents?	RQ2	creating a productive school culture
How do you model best practices within the enhanced math classroom?	RQ1	modeling best practices and important organizational values
What are you doing to support teachers with the implementation of Algebra I for all eighth graders?	RQ1	offering individualized support
What processes and procedures have you put in place to support strong performance within the enhanced math classrooms?	RQ1	demonstrating high-performance expectations
How did you foster participation in enhanced math?	RQ2	developing structures to foster participation in school decisions
Thank you for taking the time to meet with me today. Are there any additional ways in which you are helping to ensure the success of the enhanced mathematics curriculum that you would like to share with me?	RQ1 RQ2	

Due to district COVID restrictions, each participant was given the choice to engage in a 60-minute (maximum) virtual or face-to-face interview. Four participants chose an in-person session at a time and location that was convenient for them while the remaining three scheduled a virtual interview on a secure platform. The semi-structured interviews consisted of predetermined consistent questions and probing with additional questions as needed. The sessions were recorded and are stored in a password-protected hard drive. Following the interviews, each session was transcribed for analysis and placed in the case study hard drive.

The final form of data collection was documentation pertaining to the Algebra I in eighth-grade initiative. A variety of evidence was collected from the director of mathematics as well as from public and employee websites and includes implementation plans, curriculum maps, training resources, placement guidelines, and a continuous achievement framework. This documentation was used to provide supporting evidence as it relates to the semi-structured interviews.

Informed Consent

From the onset of the study, it was vital that participants had the autonomy to participate and provide informed consent. The researcher did not have any direct authority over the participants which removed any indirect threat around participation. It was also essential that the participants identities remained confidential to avoid unintended harm based on participation. Providing voluntary, confidential participation creates an environment that leads to trustworthy and credible information. Therefore, informed consent was also collected from all participants. Informed consent documentation is stored on a password protected hard drive.

Data Analysis

Analyzing a qualitative case study can be challenging because there is no fixed formula to use as a guide (Yin, 2018). This study utilized In Vivo coding as the data analysis strategy and NVivo software to organize the data gathered in the case study. In formulating and understanding how middle school educational leaders ensure eighth graders' success in Algebra I, In Vivo coding is applied to the transcriptions of the interviews. In Vivo coding uses a word or phrase from the actual language of the qualitative data and was used in this study because it is appropriate for beginning coders, and prioritizes and honors the participant's voice (Saldaña, 2021). For the first round of In Vivo coding, the researcher began by reading through the interview transcript and highlighting keywords or phrases. Following the first reading, transcripts were reread to review the initial codes and ensure nothing was accidentally missed the first time. After reading through the transcripts twice and highlighting keywords and phrases, a list of the In Vivo codes was made in the order that the highlighted items appeared on the transcripts, and then the In Vivo list was reviewed to make a note of anything striking. The list of 374 codes was then rearranged alphabetically to review the results from a different perspective and note any additional observations.

Upon completing the In Vivo coding of the data, a second round of coding was completed that was focused coding. Focused coding searches for the most frequent or significant codes to develop categories and make logical sense of the In Vivo coding (Saldaña, 2021). Through focused coding, categories and subcategories are developed and plotted on a tree diagram to visualize the phenomenon. Focused coding allows the researcher to compare newly created codes across other participants' data to assess comparability and transferability (Saldaña, 2021).

The focused coding process began by organizing the In Vivo codes into clusters and those initial clusters were then ordered from most important to least important as demonstrated by the volume of each type of code. Once ordered, the clusters were categorized into larger themes. The theme labels were placed into a diagram that illustrates their relationship or process (Saldaña, 2021). Visualizing the relationship is another way to explore the data and how the categories may be connected.

The data from the coding process is being maintained on an encrypted hard drive. The codes, categories, and subcategories identified targets strategies that educational leaders use to ensure success in implementing Algebra I for all eighth graders. In Vivo coding followed by focus coding allowed for grouping the strategies and answering the research questions.

It is essential to focus on the criteria and strategies for trustworthiness in qualitative research throughout the coding process. Guba (1981) is a naturalistic investigator who proposes four criteria for a trustworthy study: credibility, transferability, dependability, and confirmability. A naturalist approaches credibility by considering the array of factors and patterns in their entirety (Guba, 1981). In this study, credibility was achieved through triangulation and member checks. Triangulation occurs through various sources, including semi-structured interviews from participants at multiple schools and documentation analysis to support the findings from the interviews. Interview participants were also asked to review the transcripts of the interviews to confirm that the transcript represents their answers fairly and accurately.

In order to maintain transferability, the finding must be descriptive of the given context (Guba, 1981). Transferability was accomplished through purposeful sampling and descriptive data that compares this case study to other similar contexts. Dependability refers to the stability of the data from the study (Guba, 1981). Dependability was developed through a clearly outlined

process of data collection, data analysis, and interpretations. Finally, confirmability was established through data triangulation, as mentioned, with credibility and reflexivity. Reflexivity is the practice of discussing the shifts and changes in the researcher's thoughts and interpretations through the process (Guba, 1981).

Summary

In this research, a qualitative case study approach focused on answering three research questions. Purposive sampling was utilized to select the site and participants. The district provided enrollment and student achievement data to identify schools that would be information rich around preparing eighth graders for Algebra I. Data was gathered through semi-structured interviews focused on transformational leadership strategies utilized when preparing students for Algebra I in eighth grade. The interviews were transcribed and coded through In Vivo coding to determine common themes and strategies.

4 RESULTS

The focus of this study is to investigate the strategies that transformational educational leaders use to effectively prepare students for Algebra I in eighth grade by answering the study's two research questions:

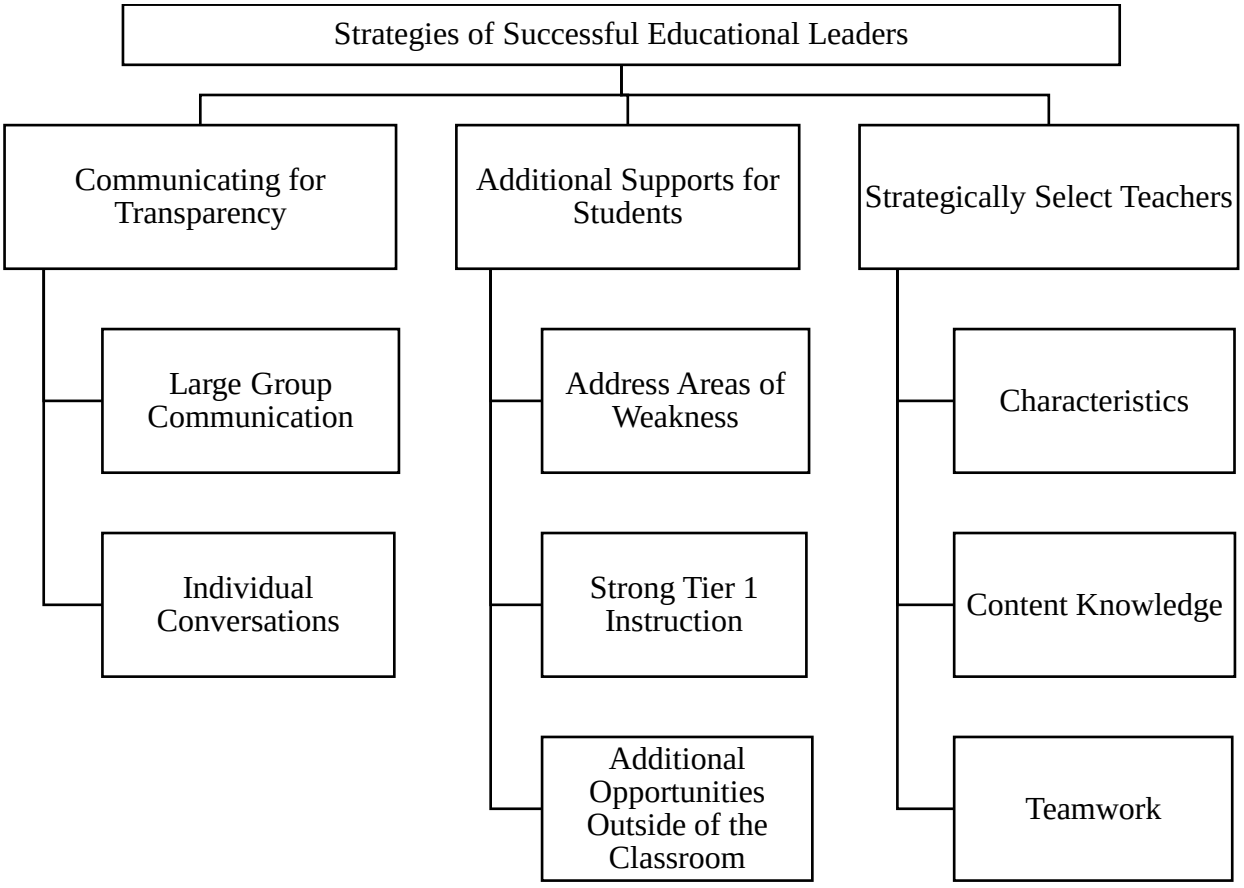
1. What transformational strategies do middle school educational leaders employ to ensure sixth-grade students complete the enhanced curriculum successfully?
2. What transformational strategies do middle school educational leaders utilize to increase enrollments in the enhanced curriculum to provide more students the opportunity to reach Algebra I in eighth grade?

Data were collected through eight interviews with educational leaders at three schools who met the site selection criteria. These schools had increased enrollment of students in Math 6 Enhanced from the 2020-2021 school year to the 2021-2022 school year, and at least 75% or more of the students received a grade of an A or B. The eight educational leaders at the sites have been in their schools for the least two years and were involved in the implementation of the enhanced math curriculum.

Following the interviews, each was transcribed and In Vivo coding was utilized to capture words or phrases from the actual language of the qualitative data (Saldaña, 2021). After the first round of In Vivo coding, focused coding was employed to determine common themes and subcategories. Through the focused coding process, the themes became readily apparent. Figure 3 represents the tree diagram created through focused coding that illustrated the common themes.

Figure 3

Tree Diagram from Focused Coding



Successful transformational leaders utilize three key strategies throughout a variety of settings and roles to ensure that middle school students are prepared for Algebra I in eighth grade. First, transformational leaders communicate in a variety of ways to ensure transparency with teachers, students, and staff. This communication includes large group communication as well as individual conversations. They also provide a range of additional supports for students who participate in the enhanced curriculum such as addressing areas of weakness, providing strong tier 1 instruction, and offering additional instructional opportunities outside of the math class period. Finally, successful transformational leaders strategically select teachers who meet the needs of the school and initiative.

Communicating for Transparency

In the eight interviews, communication was mentioned 55 times and became a consistent theme amongst the educational leaders in successfully preparing students for Algebra I in eighth grade. Educational leaders shared that communicating consistently in both large group settings and in individual conversations with parents and students was imperative to success. The initial large group meetings were an opportunity to provide an overview of the enhanced math pathway and created a platform to market the initiative with many constituents at one time. As a result of these gatherings, doors were opened for personalized conversations with parents and students.

Large Group Communication

Schools used multiple ways to communicate to large groups of stakeholders. These efforts included math nights, town halls, and events at community centers within the community. Through these large forums schools shared the vision of the initiative, provided an overview of the enhanced math curriculum, and answered broad questions that students and families had about the pathway. At each school, the large group communication looked different, but each school found it to be important and effective.

At Cedar Middle School, Anne stated that it is important to, “be transparent about some things we offer here. The communication starts with our parent town halls.” In the parent town halls, Cedar Middle School shared a variety information about different courses students could take and the impact the classes would have on their high school options. The enhanced math curriculum was discussed as being one of those options. The presentations for the town halls included implementation materials and placement guidelines provided by the district as well as information specific to the school. Furthermore, Anne stated that to reach more parents, “We have our town halls or going into the community centers when we go out there to talk about the

things that we offer in the school." Cedar Middle School goes beyond the town halls that are hosted at the school by providing parents with information at their community centers to eliminate transportation barriers that may keep parents from being able to come to school.

Moss Middle School did not host a large group communication for their students. They have multiple feeder elementary schools and rely on them for the large group communication. The principal shared that "We tried to be really deliberate with the elementary schools because we have 5 elementary feeders." Moss Middle School shared that they have been providing multiple math pathways prior to the enhanced curriculum so, "It was really just part of what we were doing anyways." The principal shared that, "We have had so many kids when they are entering sixth grade you know run the gambit and so we said here's another option." The enhanced pathway was another option that was communicated to students, but not in a separate way. The variety of pathways available to the students was shared using the district provided placement guidelines.

Sterling Middle School takes a more targeted approach when it comes to sharing information about enhanced math with parents and students. Christine shared that, "We did have a math night to discuss it with those students. We did have a Teams meeting during the pandemic." The math night focused solely on the math offerings at Sterling Middle School. The enhanced math curriculum is just one pathway they employ to accelerate math instruction within the school. Elijah provided additional details around the math night, "First and foremost, we have a math night. It's not a curriculum night, it's literally a math night, so you're coming here only about math." The focus at Sterling Middle School is to host large group meetings that feature the various math options available to students and how middle school decisions can affect the student's math trajectory through high school and beyond.

Individual Conversations

Following large group communication, schools had individual conversations with families related to the specific needs of their student. At Cedar Middle School they started by, "having those personal pairing meetings," Anne stated. The personal pairing meetings allowed educational leaders and teachers to meet with students and families to discuss the different math pathways available and which one might be best for their student. In essence, they paired the student with the math pathway that was best suited for them. Placement guidelines from the district were used to assist in placing students in the appropriate math pathway. This allowed students the opportunity to, "observe some of those upper classes, let them go into kind of see what it's like prior to going in." The observations provided the students with real-time input to understand the expectations more fully before committing to a certain pathway.

Sterling Middle School stressed the importance of individual conversations. Christine noted that they have, "a lot of one-on-one conversations also to help the parents have a better understanding and make sure," that they are making the most informed decision for their student. Sterling Middle School has created an individual student profile to assists the leaders in identifying which students are ready to accelerate their learning in math. This student profile included information from the district placement guidelines but takes it a step further by including the school's criteria for success based on previous student performance. When meeting with parents, teachers and educational leaders discuss how the student meets or does not meet the profile. Elijah recounted the positive results of the "really, really deep conversations we were having with families" and "more intimate conversations with families." The in-depth conversations enabled Sterling Middle School to assist students with finding the best math path for them based on the data.

Though Moss Middle School did not provide opportunities for large group communication, they did focus on individual conversations. Ben, the principal, emphasized that they engaged in, “a lot of communication with the parents and a lot of communication with the kids.” Moss Middle School also shared with parents their willingness to be flexible and make placement changes when necessary. Franklin, the assistant principal, noted it was impactful to share the “pros and cons of moving into enhanced math class and making sure they are aware of the pace.” These individual conversations were an integral part of assisting parents in making the best decision for their student.

Educational leaders referenced most frequently in the interviews that communication was primary to the success of the enhanced math curriculum within their buildings. Communication began with a variety of large group formats and then progressed to more individual conversations with students and parents. Transparent, consistent messaging led to students and parents having a solid understanding of the expectations of the program and thus making informed decisions. Ben at Moss Middle School emphasized that “for every kid that has the potential, we should honor that potential.” Starting with a strong placement decision based on open communication aided student success in the enhanced math curriculum. The district provided placement guidelines assistance to start the placement decision with individual students and families.

Additional Supports for Students

Successful educational leaders discussed the need to provide a variety of additional supports for students in the enhanced math curriculum. They recognized that completing a year and a half of content in one year would require more than could be effectively accomplished in the regular instructional period. The specific supports varied by school, but included ways to

address areas of weakness, providing strong, evidence-based tier one instruction, and allowing for additional instructional opportunities outside of the classroom to support students.

Address Areas of Weakness

Cedar Middle School leaders stressed the importance of addressing areas of weakness with individual students and small groups. At Cedar Middle School, teachers took time to "look at the data and where we need to position the kids and what supports they need". As a PLC, teachers asked questions about the data such as, "What standards do we need to concentrate a little bit more on? What do we need to spiral back on?" Anne noted that students were told at the beginning of the school, "these are the standards that you have to master. These are the areas you need to work on." The schools then worked with the students to help build their capacity in terms of the weaker standards. Addressing areas of weakness happens not only individually, but also in small groups. Anne shared that the staff, "teach certain standards that we (they) saw on the data that was weak." The teachers worked in their PLCs to analyze formative assessment data and build small instructional groups to focus on targeted gaps in content. The district provided curriculum maps with prerequisite skills assisted in supporting the teachers' PLC discussions.

Considering a student's instructional needs, Diane at Moss Middle School commented that, "gaps were filled when they needed to be filled." She discussed how it was important for PLCs to identify areas of weakness through diagnostic assessment and provide additional instruction in those areas to help students quickly fill any knowledge gaps around content that may be skipped or moved through quickly to ensure student success. Additionally, Diane shared that, "knowing your students when there's a more difficult topic, we might need an extra day or two on this." Based on student needs, teachers also adjusted the pacing of the curriculum and

reviewed the prerequisite skills on the curriculum maps. Identifying the gaps for students and designing instruction to address them gives students the foundational underpinnings needed to meet the rigor of the enhanced curriculum.

Strong Tier One Instruction

Educational leaders shared that an essential component of success is ensuring that the enhanced math classrooms have strong tier one instruction. Strong tier one instruction utilizes research based instructional strategies so that all students meet the expectations of the rigorous standards. Leaders described the need for instruction to meet the rigor of the standard and to be appropriately paced to allow for the time necessary to master the content. When discussing instructional design at Cedar Middle School, Anne referenced, “using the Standards Mastery Framework” to support rigorous instruction. The Standards Mastery Framework is a district-created tool that prioritizes the standards, describes the learning targets and progressions, and provides evidentiary guidance to track mastery of the standards. The prioritized standards are deemed by the district as essential to student success and may require additional time or remediation. The district curriculum maps directly support the Standards Mastery Framework and instructional pacing of the districts.

Ben at Moss Middle School emphasized the need for teachers to “constantly reference the standards” when delivering standards-based, tier one instructional strategies. This intentional approach gives the students the scaffolds needed to master content commensurate with a pace that assures success on the accelerated schedule for enhanced math. Diane discussed the need to be, “looking at the standards and really deciding when we can pair things up.” As a specific example, she shared that “teaching unit rate in seventh grade, we can go ahead and tie that to

eighth grade with slope, putting those together." A strong knowledge of the curriculum allows the teachers to make strong tier one instructional decisions to support the students.

Additional Opportunities Outside of the Classroom

The most prevalently documented strategy to support students was providing additional instructional opportunities and support for enhanced math students outside of the classroom. While schools provided various additional instructional opportunities for students in enhanced math, they all found it necessary to provide these options outside of the classroom. These additional instructional opportunities occurred before school, after school, during interventions and connections times during the school day.

At Moss Middle School, they have "a support math class." Ben shared that, "kids that were struggling could find (the support math teacher) during the day or during connections" for additional instruction. "They can also meet with (the support math teacher) before or after school." In addition, Franklin mentioned that "teachers do morning tutoring sessions, and that's pretty much every day," and "(They) also have after school that students can go to which is the extended learning program." Franklin shared that, alternatively, students, "can go to another math teacher in the morning to work with the other teacher which is huge that they are allowed to work with other teachers in regard to tutoring."

Cedar Middle School also provides additional opportunities outside of the classroom. Anne shared a few strategies that they employ: parent strategies for the summer, teachers supporting during planning, and tutor support. Parent strategies for the summer were ideas shared with parents so they could support their student and help prepare them for the enhanced curriculum at home over the summer. Prior to the students even starting middle school and the enhanced math curriculum, Cedar Middle School talked to parents about, "what can you do at

home in the summer?" They, "give them small things to do not only in the building but at home." Teachers also provided support to students during their planning periods. Teachers were also "taking time off their planning" to "go back over some things" with their students to support them outside of regular class time. In addition, Cedar Middle School provides tutor support which they do by "adding in acceleration into our tutor (program) with the district." The outside tutoring vendor is also, "helping them with the gaps." This means that students can receive instruction on material that they may not be confident in outside the classroom in order to support them with the enhanced curriculum being provided within the classroom.

Finally, Sterling Middle School created another set of opportunities for students outside of the enhanced math class. Elijah describes that, "we have math help sessions on Wednesday morning." The morning sessions are an opportunity for the enhanced math students to get additional support from their math teacher if they are struggling with the content. Elijah cited an additional supplement sharing that they "are doing evening virtual sessions during quiz and test weeks so that kids get extra support." The sessions are specifically used to review material that students need to be confident with on the assessment.

Through their interviews, educational leaders shared the different ways in which they provide additional support for students. The supports to students encompass three key components: addressing areas of weakness, strong tier one instruction, and additional opportunities outside of the classroom. The supports varied by school, but all appear to be meeting the needs of supporting students to be successful in the enhanced math curriculum.

Strategically Select Teachers

The final theme this study identified is the importance of strategically selecting educators to teach the enhanced math curriculum. The educational leaders described the characteristics

they valued in their math teachers such as talent and leadership, as well as the need for the teachers to have the necessary pedagogical and foundational knowledge to plan for and instruct on over a year's worth of content in one year. Noted to be of equal importance was teamwork amongst the math department teachers.

Valued Characteristics: Talent and Leadership

At Moss Middle School, Ben discussed how the talent and leadership of his math teachers contributed to the success of the enhanced math curriculum and pathway in his building. Ben began by sharing that his department chair, "is a fantastic teacher and a really, really good leader." Having a department chair who is a strong leader has allowed the teachers on the team to feel well-supported. Ben went on to reiterate that, "I have got a fantastic lead." To make the initial year of implementation a success, Ben strategically selected the first teacher to work with the enhanced math students in sixth grade. Based on the success, he had the teacher loop with those students to seventh grade. He noted that, "the first teacher that has taught both enhanced sixth and enhanced seventh is a talented, talented teacher too and really knows how to break it down for the kids. So, we have had a lot of success there." The aforementioned teacher can now directly support the teacher who is teaching Math 6 Enhanced for the first time during the second year of implementation. Ben also noted that the teachers working with the enhanced math students "don't give up" and explained that they are committed to ensuring that all students succeed.

Christine shared similar sentiments about the math teachers at Sterling Middle School. She described her math team as "some of our top educators in the building." Christine shared that the teachers are top educators because they "keep up with best practices" and "are willing to try new things." The teachers are "always looking for new strategies to keep the kids interested."

While most of the math teachers at Sterling Middle School are already high school certified, Christine recounted that one teacher "wanted to push herself to be able to teach algebra so she studied and took the GACE to become certified." At both Moss and Sterling Middle Schools, the educational leaders expressed great confidence in their math teachers and their tenacity.

Content Knowledge

Another factor that affected teacher selection for the initiative was content knowledge. The educational leaders desired to have teachers who were well prepared to teach the fast paced, enhanced math curriculum. The principal at Moss Middle School noted that he has "to have teachers that are certified in algebra." He felt that it was essential for teachers to have the Algebra I content knowledge for them to know that they were appropriately preparing students for the content necessary level of rigor. When first implementing the initiative, he knew that he wanted, "someone who is strong with sixth graders and that can handle the rigor." Diane reiterated the point by saying that "we really chose teachers that we felt like knew all of the middle school curriculum well." Vertical curricular knowledge gives teachers a broad view of the initiative as well as the knowledge and skills that students would need to be successful in Algebra I in eighth grade. Along with individual teacher strengths, Ben wanted a team that was, "rock solid in terms of planning and setting (curriculum) out, and planning for the benchmarks."

At Sterling Middle School, Christine was fortunate to have math teachers who were "already high school certified." There is also a desire to teach math amongst other teachers, so Sterling Middle School has a strong pool of teachers to select from for the enhanced math class. Gina furthered Christine's comment by sharing that being high school certified "allowed our teachers to be rigorous." The teachers have "all of the foundational pieces and depth of knowledge" to assist students to be ready for the high school level courses. As a former high

school educational leader, Gina recognizes the level of content knowledge needed for the middle school teachers to appropriately prepare students for Algebra I.

Teamwork

The last aspect expressed as essential to strategically selecting teachers was the importance of teamwork. The composition of the team was essential to the educational leaders because they wanted teachers that were willing to work as a team collaboratively. Diane shared that at Moss Middle School her math team, "really encourages each other and communicates with one another." While Franklin noted that it was essential that his math team have, "camaraderie, and you know just working together." Franklin discussed that he "can go into a PLC and they are talking about data, what's next, and what we need to do. They pair off and work together as teams in these meetings." Not only was working together important, but Franklin also emphasized the importance of his Algebra I teacher reaching out to the high school to build collaborative practices. He shared that "she works directly with (the high school) so that she's able to work directly with their math teacher." This vertical articulation and consistent communication results in the teacher setting and maintaining the same level of rigor in her middle school course as is expected in high school.

At Sterling Middle School, both Elijah and Gina discussed the need for teamwork within their building. Elijah share that the math team "developed such a good rapport with one another and (are) very well connected with each other." This led to open communication and a willingness to support each other. Gina also recognized that for the math team, "sharing amongst themselves is helpful." Strong Professional Learning Communities (PLCs) were offered as evidence of collaboration within their math teams. The principal expressed that it was essential that she reorganize the building so that "now in the hallways, they are right by their PLC so

they've got that organic collaboration in between class." Since making some structural changes, she recognizes that "they've moved into a more collaborative unit." Elijah echoed Gina's sentiment by saying that his "PLCs are incredibly strong." The educational leaders created structures and processes around PLCs at Sterling Middle School that have had a positive impact on the math team being able to work well together.

Overall, educational leaders shared that strategically selecting teachers was an important part of having a successful implementation when preparing all middle school students for Algebra I in eighth grade. They valued having their teachers demonstrate talent and leadership characteristics, and therefore selected those teachers for the enhanced classes. Another strategic part of selecting teachers was to choose teachers who had deep content knowledge that spanned multiple grade levels. The leaders recognized that it would be very important for the teachers to work together and collaborate in order to ensure that all students were successful.

Summary

Following interviews with eight educational leaders, the results were transcribed and coded using In Vivo coding and focused coding. Through the focused coding process, the three themes became apparent for successful educational leaders: communicating for transparency, additional supports for students, and strategically selecting teachers. Educational leaders communicated with teachers, parents, and students through both large group methods as well as individual conversations to ensure transparency in preparing all students for Algebra I in eighth grade. Additional supports were provided to students in the enhanced math curriculum and focused on addressing areas of weakness, providing strong tier one instruction, and offering additional opportunities outside of the classroom. Successful educational leaders strategically

selected teachers to provide enhanced math instruction. The teachers display valued characteristics, content knowledge, and teamwork.

5 DISCUSSION

The objective of this case study is to identify successful transformational strategies that middle school principals in a large suburban district in the Southeastern United States utilize to effectively prepare middle school students for Algebra I in eighth grade. Two research questions guided the study to identify the successful strategies:

1. What transformational strategies do middle school educational leaders employ to ensure sixth-grade students complete the enhanced curriculum successfully?
2. What transformational strategies do middle school educational leaders utilize to increase enrollments in the enhanced curriculum to provide more students the opportunity to reach Algebra I in eighth grade?

Through data analysis, the findings of the case study show that successful, transformational leaders employ three key strategies through a variety of settings and roles to ensure that middle school students are prepared for Algebra I in eighth grade: communicating for transparency, additional supports for students, and strategically selecting teachers.

Chapter five begins by summarizing the data from the research, making connections between the outcomes of this study to previous research and transformational leadership, and drawing conclusions around communicating for transparency, additional supports for students, and strategically selecting teachers. This research summary is followed by a discussion about the unique implications of each of the three themes for both district leaders and school principals. Next, the chapter examines the study limitations and the need for future studies in transformational leadership in preparing all middle school students for Algebra I in eighth grade. Finally, conclusions will be made regarding the entirety of the study.

Communicating for Transparency

The first theme that became evident through the interviews with educational leaders was the importance of clearly communicating with teachers, students, and parents. Clear communication with all stakeholders laid the foundation for the new direction of the math curriculum and redesigning the instructional pathway. Three transformational leadership practices, as defined by Leithwood & Sun (2012), were employed within communicating for transparency: developing a shared vision and build goal consensus, strengthening school culture, and engaging parents and the broader community. Based on the results of this study, successful transformational leaders were able to develop a shared vision of Algebra I for all eighth graders amongst their staff and school community. Effectively communicating a clear vision and motivating followers demonstrates the idealized influence that educational leaders possess (Bass & Avolio, 1990). Teachers, parents, and staff were given a clear view of the enhanced math curriculum, expected outcomes for students, and data to support students participating in the program. Now we will take a more in-depth look at how communicating with transparency was demonstrated through transformational practices.

Setting Directions: Developing a Shared Vision and Building Goal Consensus

Leithwood and Sun (2012) describe the practice of educational leaders developing a shared vision and building goal consensus as identifying, developing, and articulating a shared vision or broad purpose for their schools. Setting the direction aligns to Bass and Avilo's (1990) idealized influence that not only requires communicating the vision, but also motivating others to be involved in the vision. In this case study, the goal of preparing all students for Algebra I in eighth grade was set by the district. However, the educational leaders who were successful internalized the goal and made it their own. Sterling Middle School's principal shared her vision,

"our top two things is to get to know them and grow them. Period the end. I think that if growth is always at the center, then we are doing the right work. So obviously the foundational piece of growing that relationship first but then getting to know them and grow them academically." The principals used clear communication to share the vision and goals with both staff and other stakeholders. This was echoed by the assistant principal who stated, "we have teachers who believe in the vision." They began by sharing their vision with stakeholders through large group communication such as town halls and math nights.

The large events allowed schools to share information about their vision and goals with a wide range of stakeholders including the multitude of opportunities that were available to students through participation in the enhanced math curriculum. Highlighted often was participating in Algebra I in eighth grade, students would be on a path the complete calculus in high school. Finishing calculus in high school allows students access to higher level mathematics courses in post-secondary institutions (Long et al., 2012; Steen, 1999). Consistently in the large group meetings, educational leaders outlined the supports provided to assist students in successfully engaging in the enhanced math curriculum.

Redesigning the Organization: Strengthening School Culture

Transformational leaders build a cohesive school culture around a common set of values (Leithwood & Sun, 2012). The educational leaders who participated in this case study used communication to strengthen school culture through a shared vision of the impact and importance of preparing students for Algebra I in eighth grade. This effective communication led to large-scale buy-in of the vision and, therefore, a strong school culture. Teachers were laser-focused on instruction and supporting students in a variety of ways. At Sterling Middle School, this led to "good conversations…vertical teams…teachers sharing amongst themselves and

becoming a more collaborative unit." Principals who were interviewed, described their teachers as never giving up and refusing to allow students to fail. The transformational leadership practices of the principal were also being employed by the teachers to ensure that students met with academic success (Bolkan & Goodboy, 2009). Moss Middle School's principal shared that "(teachers) don't give up. We've got excitement…the opportunity for kids to shine." These examples paint a picture of how the school culture is being strengthened by the common set of values around math instruction in buildings with successful transformational leaders.

Redesigning the Organization: Engaging Parents and the Wider Community

Engaging parents and the community-at-large is another vital transformational leadership practice lifted throughout the schools in the study. Leaders who effectively implement this practice demonstrate sensitivity to parents and actively encourage parents and guardians to become involved in their child's education (Leithwood & Sun, 2012). The schools shared their visions for all students to be able to access Algebra I in eighth grade through large group communication such as town halls, math nights, and Microsoft Teams meetings. These large events created the platform to share the path forward and the "why" behind decisions with families and other stakeholders. Following the large group meetings, leaders took it a step further and communicated directly with individual students and families. During these smaller meetings, teachers and educational leaders were able to discuss criteria for success as well as areas to address to be successful within the enhanced curriculum. The transparent communication allowed families to participate in school decisions and become empowered to make the best decisions for the student.

Communicating transparently was one of the key themes identified in this case study as leading to successful completion of the enhanced curriculum for students as well as an increasing

in participation. Adhering to the practice of clear communication consistently allowed school leaders to develop a shared vision, strengthen school culture, and engage families. These transformational leadership practices played a role in the success of the enhanced math curriculum within these schools. Next, we will look at how the second theme, additional supports for students, was instrumental in successfully preparing students for Algebra I in eighth grade.

Additional Supports for Students

The need to provide additional supports to students who are participating in the enhanced curriculum was the directly aligns to the transformational leadership practice of providing individualized supports (Leithwood & Sun, 2012). Providing additional supports to students in the enhanced math curriculum helped to ensure that ≥ 75% of students successfully completed the course with an A or B average. This goal is also supported by the research which shows that students who achieve a B or higher in seventh grade math are significantly more likely to later enroll courses beyond Algebra II by twelfth grade (Finkelstein et al., 2012).

Developing People: Provide Individualized Support

Leithwood & Sun (2012) include listening and attending to individual opinions and needs as a component of providing individualized supports. Instructional leaders in the buildings provided individualized supports to teachers, and teachers provided individual supports to students. While the individualized support looked different at each school, all schools felt it was vital to offer and included any combination of one-on-one meetings to address weak standards, before and after school help sessions, as well as virtual evening opportunities. The educational leaders saw it was essential to provide these options as students are expected to complete an accelerated course of learning in one year.

Additional supports for students provided school leaders with the opportunity to provide differentiated instruction tailored to learning gaps. The transformational leadership practice of individualized supports was effective in ensuring the success of the students in the enhanced math curriculum within these schools. The varying opportunities at the schools helped students to complete a year and a half of curriculum with an A or B average. We will investigate next the impactful practice of strategically selecting the teachers who would ensure that students were successful with the curriculum and, ultimately, increase the number of students engaged in the enhanced curriculum increased.

Strategically Selecting Teachers

Leaders wanted teachers who held themselves, peers, and students to high performance expectations. Selecting teachers with strong content knowledge and the ability to work collaboratively on a team were essential characteristics for instructing with the enhanced math curriculum. The previously mentioned characteristics directly align to three transformational leadership practices: holding high performance expectations, focusing on instructional development, and building structure to enable collaboration (Leithwood & Sun, 2012).

Setting Directions: Hold High Performance Expectations

The transformational leadership practice of holding high performance expectations is described by Leithwood and Sun (2012) as expecting professionalism, holding high expectations for students, and being effective innovators. Educational leaders described the teachers that they selected to implement the enhanced math curriculum as hardworking leaders who never give up on students. The elevated expectations that educational leaders have in place for the enhanced classroom contributes to building high-quality instructors, and the type of teachers that parents

want to have for their students. High caliber educators help students succeed in mastery of the curriculum and increase the participation in the program as a result.

Improving the Instructional Program: Focus on Instructional Development

The focus on instructional development is a transformational leadership practice that is specific to education (Leithwood & Sun, 2012). According to the educational leaders interviewed, the teachers were selected due to their content knowledge as well as their rigorous expectations. At Moss Middle School, the principal shared that he needed "somebody who is strong with sixth graders and that could handle the rigor." In addition, the educators possessed solid mathematical content knowledge across multiple grade levels, allowing them to effectively pace a year and a half of content into a yearlong curriculum.

Redesigning the Organization: Building Structures to Enable Collaboration

The educational leaders held high performance expectations for the mathematics Professional Learning Communities (PLCs) within their buildings. The PLCs established the working conditions needed to facilitate staff collaboration for planning and professional growth as defined by transformational leadership practices (Leithwood & Sun, 2012). The educational leaders expressed the need for teamwork, and teachers who are willing to take time outside of the classroom to provide additional support to students. Through the interviews, it became clear that school leaders worked diligently to provide for collaborative planning time as well as situating the math PLCs in proximity to each other.

Teachers play a vital role in ensuring success when implementing the enhanced math curriculum to prepare middle school students for Algebra I in eighth grade. Strategically selecting teachers relies upon three transformational leadership practices: holding high performance expectations, focusing on instructional development, and building structures to

enable collaboration. These crucial practices assisted educational leaders in successfully implementing Algebra I for all eighth graders.

Implications

A review of the literature found that previous studies have shown there are many challenges associated with broad implementation of Algebra I for all eighth graders (Clotfelter et al., 2015; Domina et al., 2015; Rosin et al., 2009). The purpose of this study was to identify successful transformational strategies for successfully preparing middle school students for algebra. The research results help to fill the gap in the literature regarding the educational leader's perspective on the implementation of Algebra I for all eighth graders. Previously, the research focused on student outcomes of the initiative with little attention paid to the educational leaders who were implementing the program. The findings of this study provide qualitative data to district leaders and principals to make informed decisions when implementing the enhanced math curriculum for all eighth graders participating in Algebra I.

District Leaders

Based on the previous research shared in the literature review, district leaders should begin by considering if a broad implementation of Algebra I for all eighth graders is the right approach for the district. If the district feels that Algebra I for all eighth graders should be implemented, the results of this study show that it is possible for the implementation to be successful. Based on the literature and results of this study, it may be in the best interest of a district to consider an approach that incrementally increases the number of students who participate in Algebra I in eighth grade without making it a broad implementation (Clotfelter et al., 2015; Domina et al., 2015; Rosin et al., 2009). This approach would allow students increased

opportunities to participate in more rigorous math courses in high school and post-secondary institutes without requiring students who are not ready for the opportunity to participate.

When a district decides to pursue a broad implementation, it is important for the district leaders to support the school leaders as they are communicating for transparency. To begin, district leaders would benefit from creating and vetting a shared vision with school leaders to help with the buy-in of broad implementation. The shared vision needs to be openly communicated with the schools to provide an example of how schools can then create a shared vision with their stakeholders (Bass, 1985; Leithwood & Sun, 2012). Due to the importance of large group communication at the beginning of implementation, district leaders could assist with creating presentation materials around the initiative and shared vision as well as marketing the initiative to all district stakeholders. To assist in preparing schools for the smaller, more intimate conversations with students and parents, district leaders can assist in preparing appropriate student achievement data in an easy-to-understand format. This allows schools to have deep knowledge of the data prior to meeting with parents and makes the data accessible to parents.

District leadership can assist schools with creating additional opportunities to support students who are participating in the enhanced curriculum outside of the class time. Individualized consideration and support for teachers and students can lead to success (Bass, 1985; Leithwood & Sun, 2012). One example of assistance may include providing funding for a summer prep course focused on previewing the course standards and content for all students entering the enhanced curriculum. An additional path would be funding extended learning opportunities before or after school for students who need support while enrolled in the enhanced curriculum. Finally, there could be an opportunity to provide virtual support to students in the evening and on the weekends through school staff or tutoring vendors. All these options require

additional funding, but it helps to support the shared vision of the district and the work the teachers and schools are doing.

District leaders can help schools with ensuring they have certified, high quality teachers available to teach high school courses in middle school. Strong teachers with transformational leadership skills can positively effect student achievement, so it is essential to recruit strong teachers for these positions (Bolkan & Goodboy, 2009; Shen et al., 2020). First, the district talent department can assist in the recruitment of middle school math teachers who are dually certified in algebra. Next, the district can provide support for middle school teachers desiring to pursue Algebra I certification. This could consist of a preparatory course to prepare for the certification assessment and/or paying for the certification assessment. Finally, the district can partner with local secondary institutions to identify teaching candidates who are interested in teaching higher level courses at the middle school level. The principals in this study noted the importance of finding high quality candidates who are prepared to teach upper-level mathematics courses at the middle school level.

As district leaders work to support schools with implementing Algebra I for all eighth graders, it is important to recognize that each school will have different needs based on their staff, students, and community. It is important to acknowledge equity issues that may arise within broad implementation and be prepared to support schools at the level that they need in order to implement the initiative equitably across the district. This may include differentiated professional development for educational leaders, varied funding for additional support programs for students, or additional district support at schools.

Principals

The findings of this study suggest that effective transformational educational leaders can successfully prepare students for Algebra I in eighth grade. A principal wanting to implement this initiative should start with a strong understanding of the previous literature as well undergirded by lessons learned within this study. The participants in this study achieved success by communicating with transparency, providing additional supports to students, and strategically selecting teachers. There are benefits and challenges of implementing Algebra I for all eighth graders, and by having a strong understanding of both, educational leaders can create a plan that will lead to success.

When developing an implementation plan, a principal should start by creating a communication plan. Leaders at all three middle schools had multifaceted communication plans to involve all stakeholders in the initiative. The plans included strategic ways to reach all stakeholders including teachers, parents, and students. The first key piece of communication is creating a shared vision with members of the school leadership team as well as key stakeholders in the community. Once a shared vision is created and shared, it vital to continue working toward the vision and including it in all communication. Based on the experiences of educational leaders in this study, starting with a large group event assists in sharing the vision and initiative with all stakeholders. This could include a separate math night for families, including information about math in a curriculum meeting or town hall format, and depending on the needs of the community, potentially taking the message out of the school building and into community centers or events.

Following a large-scale stakeholder event, a plan for the follow-up communication must be implemented. A building leader needs to ask what types of information might be shared in

school newsletters, by teachers at conferences, or directly with students. Having answers to these questions planned out as part of a communication plan supports continuing to move the needle on the initiative. Principals will want to be sure their teachers have internalized and are comfortable with the shared vision and communication plan so that they can assist by having conferences with parents and students as needed.

It then becomes imperative to start planning for implementation by strategically selecting teachers to work with students on the enhanced or advanced math curriculum. Successful educational leaders noted that they intentionally selected talented teachers who also displayed strong leadership characteristics. These two characteristics helped to ensure student success while also creating an inviting environment that other students and families could see the benefits of participating in. Teachers who displayed strong leadership characteristics were able to help lead the growth of the initiative by providing support to other teachers as the number of students participating in the enhanced curriculum increased.

Strong content knowledge was prioritized when selecting math teachers to provide the enhanced math instruction. Often, this meant that the teacher had also previously taught higher middle school grade levels and possibly high school courses. The educational leaders felt the prior experiences aided the teachers in understanding and educational path for the students and ensured the rigor of the curriculum remained the same even though the students were starting the work younger. Strong content knowledge yielded the opportunity for teachers to make critical decisions about pacing and assessment.

The final factor for principals to consider when selecting their enhanced math teachers is teamwork. Educational leaders noted that it is essential for the teachers to work well together. Collaborating and supporting each other through strong PLCs afforded teachers the opportunity

to share effective strategies and share the additional support opportunities that they provided students (Dufour & Eaker, 1998; Van Clay et al., 2011). Effective PLCs are able to create common formative assessments and have rich data discussions due to productive dialogue and collaboration.

Once principals have communicated with transparency and strategically selected the math teachers, a plan must be developed to provide additional supports to students in the enhanced math curriculum. As students begin the new enhanced course, it is of paramount importance to continue to support them throughout the journey. There will exist variations in the schools for additional supports to be provided, and it is important to consider a variety of options that will work within the school as part the implementation plan. A key success factor that has already been considered when strategically selecting teachers is providing strong tier one instruction during the school day. Teachers must have an awareness of the demands of the pacing and effectively plan to provide research-based instructional strategies throughout the math class.

The second option to consider is what additional supports could be provided during the school day. Schools in this study provide some examples: teachers providing support during planning, connections courses focused on mathematics, and support teachers being able to help students on an as-needed basis during the school day. Is it possible to create a math support class as an elective within the day so that students have additional math instructional minutes? Are there teachers who could potentially provide extra support during a planning period? These are just a couple of questions to think about when planning how to provide support during the school day. Part of this puzzle will necessarily be ensuring that instructional minutes are maximized within the school day.

Schools may also consider avenues to support students outside of the school day. These opportunities could include tutoring or working math sessions prior to the start of the school day, or extended learning in the afternoons or on weekends. These pathways of support could be provided by teachers or tutoring services depending on the capacity of the staff to take on duties outside of the school day. Additional supports outside the school day can be challenging because they often require additional funding and resources.

Implementing Algebra I for all eighth graders is achievable. In order to make it successful, both district leaders and principals need to create implementation plans that include lessons learned from both the previous research and this study. While improvement functions on a continuum, the three themes identified in this study provide a strong foundation to build on when creating a plan to prepare middle school students for Algebra I in eighth grade.

Assumptions and Limitations

Case study research cannot be generalized from a single case to other populations (Yin, 2018). Though this case study is not generalizable to all environments it does provide transformational strategies that are effective within the context. The assumption is being made that the successful strategies that work for these educational leaders can guide other educational leaders to successfully implement Algebra I for all eighth graders.

There are limiting factors associated with this study. First, the sample was limited in several ways. The case study included only a single suburban district in the Southeastern United States that is implementing enhanced math for all eighth graders to take Algebra I. Within the district, the sample was further limited by the selection criteria. Schools were only invited to participate if ≥ 75% of the students had an A or B average at the end of sixth grade enhanced math and student enrollment in sixth grade enhanced math increased from the 2020-2021 school

year to the 2021-2022 school year. Based on the criteria, five schools were identified with three choosing to participate in the study. Once the schools were identified, the educational leaders who were invited to participate in an interview had to have been a mathematics educational leader within the building for at least two years.

In addition to the limited sample, the data for student success in the enhanced math curriculum was restricted due to extenuating circumstances. The COVID-19 pandemic has affected the ability to obtain standardized end-of-grade math state assessment data which resulted in student success being measured by grades as opposed to a standardized measure. While there is at least one study supporting grades as an indicator of success in Algebra I in eighth grade, it would have been beneficial to have additional student success data points (Finkelstein et al., 2012).

The third limitation is a common concern around case study research; the ability to generalize from a single case to other populations (Yin, 2018). This case study is not generalizable to all environments but provides transformational strategies that are effective within the context. While the study has its limitations, the assumption is that it can provide helpful information to educational leaders who are interested in providing more students with the opportunity to participate in Algebra I in eighth grade.

Finally, in case study research, biases may occur more frequently, and greater attention must be paid to limiting and eliminating biases (Yin, 2018). It was essential to define the procedures clearly, appropriately document the study, and design unbiased interview questions (Yin, 2018). The first source of potential bias was site selection. It was imperative that the site be selected based on the criteria and not on the ease of access and willingness of participants. There was also the potential for self-selection bias if educational leaders choose not to participate based

on their perceived knowledge of the subject. Finally, it was necessary for the researcher to monitor for bias around preconceived ideas when analyzing the data collected during the study.

Suggestions for Further Research

There is a need for additional research regarding the success of the students in this study as they complete the seventh-grade enhanced curriculum as well as the Algebra I curriculum utilizing data points outside of grades. Further examination will help to determine the long-lasting impacts of the Algebra I for all eighth graders initiative on student achievement. Continued investigation should also be conducted to establish if the same transformational leadership strategies can be effective in other schools implementing Algebra I for all eighth graders.

Conclusions

Algebra I for all eighth graders has been implemented and studied previously. However, prior studies focused on student outcomes such as achievement and motivation (Domina et al., 2015; Dougherty et al., 2015; Remillard et al., 2017). Previous research in this area revealed that there are mixed results for implementing Algebra I for all eighth graders regarding student achievement (Domina et al., 2015; Howard et al., 2015; Liang et al., 2012). This study was designed to bridge the gap within current literature by focusing on the educational leaders who are successfully preparing middle school students for Algebra I in eighth grade. To that end, the study's focus was what transformational leadership practices middle school leaders are employing to effectively prepare students for Algebra I in eighth grade. The hope is to be able to learn from successful educational leaders to promote effective, system-wide implementation.

This qualitative case study included data collected through interviews and was supported by relevant artifacts and documents. Participants in the study were math educational leaders who

had been involved in the implementation of the enhanced math curriculum for the past two years. Their schools were chosen because they demonstrated successful implementation citing ≥ 75% of their students earned an A or B in the course, and enrollments in enhanced math increased from the 2020-21 school year to the 2021-22 school year. Interviews were conducted with eight educational leaders from three successful schools.

The findings of this study contributed to the identification of three themes that were aligned to the transformational leadership practices defined by Leithwood & Sun (2012). The three themes included communicating for transparency, additional supports for students, and strategically selecting teachers. Each theme had multiple facets directly aligned to transformational leadership practices. These themes can be utilized by educational leaders who wish to be successful in implementing Algebra I for all eighth graders.

It was essential for educational leaders to communicate with transparency which occurred through both large group events as well as individual conversations with families. The large group events, such as town halls and math nights, provided an opportunity for educational leaders to share the vision, strengthen school culture, and engage parents. These functions resulted in additional individual, intimate conversations with families where educational leaders were able to provide further details and answer questions specific to the students.

In conjunction with the conversations, educational leaders and teachers provided additional support to students who were participating in the enhanced math curriculum. The increased assistance was provided by addressing areas of weakness, utilizing strong tier one instructional practices, and supplementary opportunities outside of the classroom. The variety of ways that school leaders implemented increased support for their students directly aligned to the transformational leadership practice of providing individualized supports.

Finally, strategically selecting high-quality educators to teach the enhanced math curriculum was a valued practice of the educational leaders. The teachers were selected because they demonstrated characteristics that the educational leaders regarded highly such as hard-working, exhibiting leadership skills, imbuing a "never give-up" attitude, and valuing peer collaboration. Strong mathematical content knowledge that included multiple grade levels of content was another imperative quality due to the need for comprehensive understanding of the vertical alignment of standards and curriculum.

The intent of this research was to bridge the gap in literature between student achievement and educational leadership when implementing Algebra I for all eighth graders. Resulting conclusions clearly identified three key themes that are prevalent among educational leaders who are successfully preparing middle school students for Algebra I by implementing the enhanced math curriculum: communicating with transparency, additional supports for students, and strategically selecting teachers. The previous research clearly shows that broad, system-wide implementation is challenging and often ineffective. The hope is that the lessons learned in this study will help inform educational leaders to strategies that are essential to overcoming these challenges and successfully preparing students for Algebra I in eighth grade.

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Appendix A: Interview Questions

Background Information and Role within the Building

1. How long have you been an educational leader? During that time, what roles have you served in?
2. What is your role with mathematics instructional leadership within your school?

Transformational Leadership

3. How did you build a shared vision around Algebra I for all eighth graders within your building?
4. What goals did you set around this initiative?
5. How did you message the opportunity to participate in the enhanced curriculum to your students and parents?
6. How do you model best practices within the enhanced math classroom?
7. What are you doing to support teachers with the implementation of Algebra I for all eighth graders?
8. What processes and procedures have you put in place to support strong performance within the enhanced math classrooms?
9. How did you foster participation in enhanced math?

Closing

10. Thank you for taking the time to meet with me today. Are there any additional ways in which you are helping to ensure the success of the enhanced mathematics curriculum that you would like to share with me?