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Instructional Leadership Practices to Advance Secondary Student Mathematics Achievement in a British Commonwealth Country

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Abstract

Instructional Leadership Practices to Advance Secondary Student Mathematics

Achievement in a British Commonwealth Country

by

Dawn Agdomar Jean

MA, Walden University, 2011

BS, University of the West Indies, 2007

Project Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Educational Administration & Leadership

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August 2025

Abstract

The problem addressed in this study was that school leaders are challenged in providing instructional leadership to teachers to advance secondary students' mathematics achievement in a British Commonwealth Country (BCC). The purpose of this basic qualitative study was to investigate secondary school leaders’ perceptions of the challenges to providing instructional leadership practices found to be effective to support teachers to advance secondary students' mathematics achievement in a BCC. The conceptual framework for this study was Hallinger and Murphy's model of instructional leadership. A self-designed semistructured interview protocol with open-ended questions was used to interview participants. Purposive sampling was used to select 10 leaders from four secondary schools. Data were analyzed using thematic analysis with the following themes emerging: school leaders were challenged to effectively implement instructional leadership practices due to the scope of responsibilities in their roles, constraints within the school system, and setbacks when attempting to promote growth in mindsets to create positive school climates; school leaders used motivation, collaboration, assessments, feedback, and empowered teachers through professional development as a means to advance students’ mathematics achievement. Study findings were used to develop a professional development project for school leaders highlighting practices they can use to support teachers who teach mathematics, thereby contributing to better student mathematics learning that might help them gain acceptance to tertiary institutions.

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Dedication

I am grateful to the Almighty God, for providing me with the strength to complete this study. This doctoral study is dedicated to my supportive husband, Caron Jean, who constantly reminded me of how much money we were spending and that I needed to get this work done. Thank you for pushing me to complete this study. To my loving mother, who would often ask how the work is going and when would I complete this task. I know that you missed quality time with me, as I had to sacrifice this time to complete my doctoral study. To my caring son, Lawn Felix, and grandchildren, I hope that this can be a testament to you that all things are possible with the help of God.

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Section 1: The Problem

The Local Problem

Most school leaders have a challenge in dealing with the low mathematics achievement among secondary school pupils, island wide, as measured on the Caribbean Examination Council (CXC) examinations, according to a personal interview with the minister of education. When students are enrolled in a secondary school, they begin preparation to take the CXC examinations. The CXC is an examining board established to set examinations and maintain standards that ensure regional and international acceptance of its certification. Secondary schools consist of Form 1 (Grade 7) to Form 5 (Grade 11). Each secondary school consists of one principal and one vice principal and a teaching staff of more than 40 teachers, with at least five to six of those as mathematics teachers in each school. Stakeholders expect to see an improvement in mathematics achievement with at least a pass rate of 50%; however, most secondary schools have a pass rate below 45% as evidenced in CXC results, according to a personal interview with the minister of education. The problem addressed in this study was that school leaders are challenged in providing instructional leadership to teachers to advance secondary students' mathematics achievement in a BCC.

A study by Mabena et al. (2021) highlighted that poor discipline, language obstacles, and learner attitude were some learner-related factors that influenced mathematics performance. Other reasons for poor achievement in mathematics can be related to attitudes of teachers, as well as students’ attitudes towards mathematics (G. Lee & Simpkins, 2021). Altakhyneh (2020) found that student anxiety towards mathematics contributed to poor achievement.

The use of ineffective teaching practices by teachers can also hinder the academic success of students in mathematics (Enikanolaye, 2021). Researchers recommend that school leaders engage in professional development activities that will enhance their instructional leadership practices to support teachers and, by extension, student achievement (Chabalala & Naidoo, 2021). School leaders have a responsibility to create effective instructional programs for teachers to advance students' academic achievement (Mohair et al., 2021; Shariff, 2020), and Denessen et al. (2020) contended that the inadequate use of instructional leadership practices could result in a decrease in students' academic achievement.

The desirable practice is that school leaders be equipped with effective instructional leadership and practices that offer support to teachers to help advance mathematics achievement; however, Mathematics CXC results showed that the overall pass rate for the country is 43%. There is a need for knowledge on the instructional leadership practices that school leaders can use to advance students' mathematics achievement. The problem addressed in this study was that school leaders are challenged in providing instructional leadership to teachers to advance secondary students' mathematics achievement in a BCC.

> The areas tested for the Mathematics CXC exams include items and questions classified according to the cognitive demand for knowledge, comprehension, and reasoning. Knowledge items require the recall of rules, procedures, definitions and facts, that is, items characterized by rote memory as well as simple computations, computation in measurements, constructions, and drawings. Comprehension items require algorithmic thinking that involves translation from

> one mathematical mode to another and the use of algorithms and the application of these algorithms to familiar problem situations. Reasoning items require: (a) translation of non-routine problems into mathematical symbols and then choosing suitable algorithms to solve the problems; (b) combination of two or more algorithms to solve problems; (c) use of an algorithm or part of an algorithm, in a reverse order, to solve a problem; (d) the making of inferences and generalizations from given data. (CXC, 2008, p. 4)

Effective use of the mathematics curricula supports and develops student analytical thinking skills (Yurt, 2022). When students are successful in mathematics, it increases the likelihood of being accepted in tertiary institutions and to earn a good living for themselves and their families (Blom & Hobbs, 2008). Thus, closing the gap in mathematics achievement is a priority.

School leaders significantly contribute to decreasing the achievement gap in mathematics by putting instructional leadership strategies in place that will advance mathematics performance. School leaders should provide teachers with instructional support to monitor students' achievement, to engage with stakeholders, and to communicate school progress with district administration (Hallinger, 2005). Gordon and Hart (2022) found that principals who worked toward having positive learning climates created structures that facilitated learning. School leaders who engage in becoming change agents and ensure that there is an academic environment where teachers can teach effectively support student achievement.

Enikanolaye (2021) suggested that school leaders should advocate for effective mathematics teaching by assisting teachers in raising students' performance. The study investigated instructional leadership practices and practices that will advance mathematics achievement. The literature confirmed that the teaching and learning process is impacted by instructional leadership practices (Çoban et al., 2023; Cox & Mullen, 2023). Thus, it is necessary to comprehend and implement instructional leadership practices that have been established as effective to support mathematics teachers to advance secondary students' mathematics achievement in a BCC.

Rationale

The problem addressed in this study was that school leaders are challenged in providing instructional leadership to teachers to advance secondary students' mathematics achievement in a BCC. The issue of poor mathematics achievement is a challenge for educational leaders, teachers, and students, according to a personal interview with the minister of education. According to the BCC's Department of Education, the country recorded a 43% pass rate in 2023, and a 44% pass rate in 2024 in the CXC mathematics examinations. While there was a minor advancement in the results during the 2023–2024 school year, the Caribbean mathematics examination results remain a problem, according to a personal interview with the minister of education. Several factors may have led to the slight improvement in mathematics; these include improvements in students' attitudes towards learning and teachers' instruction of the subject, as well as improvements in school leaders' instructional leadership practices, according to a personal interview with the minister of education.

School district officers echoed the sentiment that some school leaders are struggling with instructional leadership and practices that can advance mathematics achievement, according to a personal interview with the minister of education. Parents, the Ministry of Education, and other stakeholders have been calling for improvements in mathematics achievement. It is necessary for school leaders to possess knowledge on instructional leadership practices to support teachers to advance students' mathematics achievement (see G. Lee & Simpkins, 2021; Osborne, 2021).

The results from the CXC mathematics examination provided information on secondary schools that have been successful. The CXC report informs stakeholders about secondary schools’ performance in comparison to each other. Few schools experienced improvements in their pass rate during 2023–2024, while many schools had a decline in mathematics performance, as measured on the Mathematics CXC examinations for the past 2 years. The 2023 and 2024 examination results for 25 secondary schools showed that only five schools improved results with a pass rate above 50%. While other schools improved, their pass rate was less than 50%, and the remaining schools’ pass rates declined. Cox and Mullen (2023) examined principals’ instructional practices in rural, low-economic-status schools. The results from Cox and Mullen supported the need for this study, as they showed that administrators who make use of instructional leadership practices to provide support to teachers' instructional practices result in improvements in students’ achievement. Osborne (2021) recommended further research pertaining to instructional practices that will improve mathematics achievement. Therefore, the purpose of this basic qualitative study was to investigate secondary school leaders’ perceptions of the challenges to providing instructional leadership practices found to be effective to support teachers to advance secondary students' mathematics achievement in a BCC.

Table 1

2022–2024 CXC Mathematics Pass Rates

School	2022 CXC pass rate	2023 CXC pass rate	2024 CXC pass rate	2023–2024 comparison
S2	97.64	96.18	98.20	Improved
S3	85	83.33	88.54	Improved
S4	44.83	44.44	74.19	Improved
V5	57.55	54.14	59.33	Improved
L9	73.44	78.63	77.54	Declined

Note. Data from the Office of the Registrar of Examinations (2024). Declined means a reduction in pass rate when comparing 2023 with 2024. Improved means an increase in pass rate when comparing 2023 with 2024.

Definition of Terms

The following are definitions of important terminology used in this study:

Caribbean Examination Council (CXC): An examination board that offers secondary schools exams that are regional and international while catering to the needs of the Caribbean region (Caribbean Examinations Council, 2008).

Professional development: Programs intended to improve educators' skills to advance the learning of students (Guskey, 1999).

School leaders: Persons who manage the affairs of educational institutions, typically school principals, vice principals, and heads of department (Wong & Ng, 2021).

Secondary school: Secondary education begins after primary school, usually including Grades 6 through 12 (Jacob & Lehner, 2011). This is consistent with the BCC.

Student achievement: Performance outcomes that indicate how successfully a student has accomplished the goals of the education system (James et al., 2022).

Significance of the Study

This study contributed to filling a gap in practice by exploring administrators' instructional leadership practices that advanced mathematics instruction and secondary students' mathematics achievement. The instructional leadership practice model developed by Hallinger and Murphy (1985) was utilized as the lens through which school leaders employed strategies to assist mathematics teachers to raise mathematics achievement. The results from this study are intended to support school leaders, teachers, and students, in that participants shared the instructional leadership practices they used to improve mathematics teaching and to help advance students' mathematics achievement on the CXC examinations (Cornelius & Gustafson, 2020).

Prior research recommended further investigation of students' academic achievement in mathematics, as measured on assessments that will enable students to further their advancement in mathematics, and become more employable (G. Lee & Simpkins, 2021). Participants in this study shared information on the successes and challenges they faced as administrators in implementing instructional leadership practices and how they were able to conquer the obstacles. The results of this research are intended to be used to assist other secondary schools in the BCC that experience a similar problem with mathematics achievement. A positive social change can take place if school leaders employ the practices identified in this study's results, to enhance the teaching of mathematics skills so students can progress to graduation and be better prepared for employment or postsecondary education.

Research Questions

Research questions that guided this basic qualitative study to explore the instructional leadership practices of secondary school leaders in a BCC to advanced mathematics achievement were as follows:

RQ1: What are the perceptions of secondary school leaders on the challenges to provide instructional leadership practices to support mathematics teachers to advance secondary students' mathematics achievement?

RQ2: What are the practices school leaders found to be effective to support mathematics teachers to advance secondary students' mathematics achievement?

Review of the Literature

The review of the literature includes an overview of the topics that are relevant to this study. Prior research explored the reasons for low mathematics achievement (G. Lee & Simpkins, 2021; Mabena et al., 2021), but there was a need for the exploration of instructional leadership practices that specifically supported teachers to advance secondary students' mathematics achievement through training and assistance. The problem addressed in this study was that school leaders are challenged in providing instructional leadership to teachers to advance secondary students' mathematics achievement in a BCC. The purpose of this basic qualitative study was to investigate secondary school leaders' perceptions of the challenges to providing instructional leadership practices found to be effective to support teachers to advance secondary students' mathematics achievement in a BCC. The study addressed how school leaders, to advance mathematics achievement of secondary school students in a BCC, used instructional leadership practices.

The review of the literature begins with an explanation of Hallinger and Murphy’s (1985) model of instructional leadership, which served as the conceptual framework for the study. This is followed by related research in the review of the broader problem that consists of current studies related to instructional leadership. This section also includes an overview of factors that affect mathematics achievement, instructional leadership practices, school leadership, and student achievement. The review of the literature concludes with an explanation of barriers to implementing instructional leadership practices.

Conceptual Framework

The conceptual framework for this study was Hallinger and Murphy's (1985) theory of instructional leadership, which concentrates on instructional leadership practices. Hallinger and Murphy's philosophical orientation is focused on using great leadership practices to influence the instruction and learning that take place in the classroom. Instructional leadership practices are critical to improve student achievement; therefore, Hallinger and Murphy’s instructional leadership model grounded this study to provide results that give guidance on the use of instructional leadership practices that enhance mathematics teaching and, thereby, student learning.

Hallinger and Murphy's (1985) instructional leadership model consists of three essential dimensions that are necessary for the implementation of instructional leadership practices: “defining the school's mission, managing the instructional program, and promoting a positive school-learning climate” (p. 221). The first dimension, defining the school's mission, refers to school leaders setting up goals for the institution. Instructionally effective school leaders set goals that consider student achievement (Hallinger & Murphy, 1985). Students and staff must understand the school vision and goals to contribute to student achievement (Wilson Heenan et al., 2023). School leaders must communicate those goals to stakeholders to help create buy-in to ensure the successful achievement of schools' mission (Leithwood, 2021).

The second dimension, managing the instructional program, involves school leaders working with teachers on the curriculum and instruction (Hallinger & Murphy, 1985). School leaders should offer guidance to teachers, observe classroom instruction, and provide feedback based on the instructional practices of teachers (Hallinger & Murphy, 1985). Sumapal and Haramain (2023) asserted that some common instructional leadership practices include monitoring and evaluating teaching and providing feedback and support to teachers based on their instruction.

The third dimension, promoting a positive school-learning climate, involves advocating for a positive school environment (Hallinger & Murphy, 1985). This can be achieved by school leaders communicating expectations to students and teachers, through the policies, practices, and activities that influence learning at the school. The school leaders' leadership behaviors can influence the social, emotional, and academic success of students (Baptiste, 2019). If the school climate is not hospitable, it will be difficult for school leaders to have an environment conducive to learning; therefore, it is crucial that school leaders create a positive school climate that will lead to improvement of student performance (Eval & Roth, 2011).

The logical connections between Hallinger and Murphy's (1985) theory of instructional leadership and this study provided a framework to explore how secondary school leaders support all aspects of teaching and learning related to mathematics. Hallinger and Murphy's instructional leadership theory includes coordinating the curriculum, overseeing and evaluating lessons, monitoring student growth, as well as motivating students and teachers to excel. Hallinger and Murphy's theoretical work has been used extensively to inform all aspects of teaching and learning as it provides the basis for exploring the perceptions of school leaders on instructional leadership practices that can support teachers. The framework related to the research questions in the study concerning the challenges and the successes school leaders had in terms of implementing instructional leadership practices that advanced mathematics achievement. Additionally, the interview protocol was based on Hallinger and Murphy's instructional leadership framework, as the interview questions were linked to the dimensions of the instructional leadership theory for content validity. This conceptual framework then served as the lens to identify the school leaders' perceptions of their instructional leadership practices to support teachers to advance students' mathematics achievement.

Review of the Broader Problem

This review of the literature included an overview of the topics that were relevant to this study. Knowledge of mathematics is essential for students to succeed in an increasingly technological world, and so it has been a cause of concern for all stakeholders at the study site. In reviewing instructional leadership practices and students' low mathematics achievement, consideration was given to the factors that affect mathematics achievement in the literature review. School leaders need to be knowledgeable about instructional leadership practices that can support mathematics teachers and by extension help advance mathematics achievement. A review of literature revealed topics related to the broader problem that included factors that affect mathematics achievement, instructional leadership practices, barriers to implementing instructional leadership practices, and professional development.

The Walden University Library was used to retrieve current articles for the literature review. The search engines used to identify peer-reviewed publications were SAGE Publications, ERIC, Google, and Google Scholar. Key search terms included *low mathematics achievement, secondary education students, instructional leadership practices*, *methods of improving mathematics achievement*, and *challenges to implementing instructional leadership practice*s. The peer-reviewed articles were published between 2019 and 2024 with the exception of seminal works and research relating to Hallinger and Murphy's (1985) instructional leadership theory.

Factors That Affect Mathematics Achievement

Researchers in the area of mathematics achievement have identified a number of factors that influence mathematics achievement, which include teachers' interactions with students, demographics, parental involvement, and socioeconomic backgrounds (G. Lee & Simpkins, 2021; Núñez-Peña & Bono, 2019). G. Lee and Simpkins (2021) found that a decline in support from teachers could lead to low student achievement. The researchers considered whether factors such as self-concept and parental support could resolve the possible negative effects between low teacher support and students' mathematics achievement. The finding of their study confirmed that low teacher support negatively affected students' mathematics achievement. In addition, Núñez-Peña and Bono (2019) posited that mathematics and test anxiety affect students' mathematics achievement. Núñez-Peña and Bono conducted a study on the relationships between anxiety and students' performance and found that mathematics anxiety was a primary factor contributing to students' mathematics performance. These findings showed that there are external factors that affect students' mathematics achievement.

In addition, executive functioning skills, motivation, school leaders' instructional leadership practices, and teaching methods also affect mathematics achievement (Iglesias-Sarmiento et al., 2023; Kaskens et al., 2022; Núñez-Peña & Bono, 2019). Iglesias-Sarmiento et al. (2023) posited that students who possess stronger executive functioning skills performed better in mathematics. To predict difficulties in mathematics achievement, Iglesias-Sarmiento et al. investigated the connection between inhibition, cognitive flexibility, and working memory combined with difficulty in mathematics achievement throughout primary and secondary school. Iglesias-Sarmiento et al. verified that various sets of executive predictors of mathematical achievement served as buffers against mathematical challenges.

Kaskens et al. (2022) asserted that continuous challenges occur in learning basic mathematics concepts and posited that the use of dynamic mathematics interviews of students could have positive results with students who exhibit low mathematics achievement. Kaskens et al. had 14 fourth grade teachers conduct semistructured interviews with students with low mathematics achievement to determine their mathematics needs. Kaskens et al. found that teachers’ use of individual dynamic mathematics interviews was appropriate to identify and understand the educational needs of students who perform poorly in mathematics. Students must also be highly motivated to work towards being successful in mathematics. A mixed method study investigated by Mazana et al. (2019) showed that students' attitudes have an impact on their mathematical performance. Mazana et al. found that students must be disciplined, be willing to put in the effort, and be motivated to be successful in mathematics.

A number of researchers have found a connection between parents' educational level, socioeconomic status, and parental involvement, and students' mathematics achievement that have persisted over time (Harju-Luukkainen et al., 2020; Mooney & Becker, 2021). Harju-Luukkainen et al. (2020) used data to research the connection between family-related socioeconomics and pupils' later academic achievement in Finland. The results indicated that family socioeconomic status had varying effects on a student's later achievement in mathematics.

Students from low-socioeconomic-status backgrounds often lack access to resources, and this affects their mathematics achievement, as found in a study by Mooney and Becker (2021). Mooney and Becker investigated the degree to which socioeconomic status and working memory in children were associated. It was discovered that socioeconomically disadvantaged students had lower working memory skills, and this relationship held true across different working memory tasks.

Increasing student achievement involves a learning environment and approaches that are conducive to learning. Denessen et al. (2020) observed the varying ways that teacher–student interactions were connected to students' mathematics performance in the Netherlands. The researchers found that while teachers provided more feedback to low-performing students. Feedback that was more frequent, task related, directive and less facilitative led to higher levels of learning. The results of the investigation showed that the learning environment and the type of student–teacher interactions could affect students' mathematics performance.

Additionally, the use of effective instructional approaches supports teachers in teaching mathematics and improves students' learning. Enikanolaye (2021) explained that teachers must find new ways to make mathematics more appealing to learners to help improve their performance by investigating the impact of multimedia teaching approach on high school students' mathematical retention. Enikanolaye found that multimedia instructional packages helped to improve the learning of mathematics. Likewise, Ling and Krishnasamy (2023) found similar results in a quantitative study to create a suitable information technology framework for advancing the learning experience and achievement in mathematics. It was found that having visual learning content provided a better learning experience; the use of animations, images, and audios enhanced the learning of mathematics. As a result, Ling and Krishnasamy recommended that school leaders and teachers be cognizant of effective instructional practices related to the use of multimedia to advance students' achievement.

Instructional Leadership Practices

School leaders have a central role in teachers' instruction as their instructional leadership practices (Çoban et al., 2023; Mohair et al., 2021). Çoban et al. (2023) examined the impact of school leadership on teachers' behaviors and emotions in Turkey. Their quantitative study confirmed teachers' level of faith in their school leaders greatly influenced their teaching. Mohair et al. (2021) focused on situational leadership with a sample of 445 teachers in Jordan to determine how situational positional leadership related to motivation of achievement from the perspectives of teachers. Situational positional leadership occurred when principals changed their leadership style based on the teachers' readiness to perform specific tasks (Mohair et al., 2021). The findings indicated a positive relationship between the degree of situational leadership and the level of teachers' motivation to achieve. This was described, by the researchers, as a direct result of the principals' desire to achieve excellence in their leadership that requires all involved to be active participants in accomplishing high levels of achievement.

Instructional leadership practices involve setting the direction for continuous improvement in quality teaching and learning (Leithwood, 2012). It is evidenced by core leadership practices and skills that support improvement in students' achievement (Hallinger & Murphy, 1985). School leaders have the responsibility to provide direction for schools, to help build relationships that ensure that the quality of teaching and learning is enhanced. As such, school principals' success can be influenced by their leadership skills and moral character (Webster & Litchka, 2020). Webster and Litchka (2020) conducted a quantitative study to investigate the connection between teachers' perceptions of administrators' ethical leadership behaviors related to their overall leadership skills. Webster and Litchka found a strong relationship between the administrators' overall leadership skills and teachers' perceptions of the administrators' ethical behaviors.

School Leadership and Student Achievement

Much research has been conducted that confirms instructional leadership practices have a positive effect on student learning. George and Jan's (2021) qualitative study explored the integration of instructional and transformational leadership paradigms in maintaining teaching and learning in schools. Six in-person, semistructured interviews with school administrators from selected schools in rural South Africa served as data sources. The results from George and Jan's study showed that combining instructional and transformational models of leadership created school environments that supported a culture of teaching and learning.

In a related mixed-methods study, Gordon and Hart (2022) found that principals who created strong learning climates also created structures that facilitated learning. The study's goal was to identify specific instances of leadership practices in high-poverty urban schools in Chicago that improved student outcomes. The findings provided valuable information to confirm that school leaders can create structures that facilitate learning. When administrators improved schools, they were able to establish learning environments where teachers were receptive to new ideas and were willing to work towards achieving school goals and improving student-learning outcomes. The findings from Gordon and Hart indicated that these principals were able to implement strategies that improved student performance on state assessments, student attendance, and student discipline.

Maponya (2020) also evaluated the role of the instructional leadership practices of 15 participants in South Africa including the principal, the deputy principal, and heads of departments from secondary schools related to student academic achievement using a phenomenological design. Maponya found that instructional leadership led to improvements in student academic achievement. Maponya also discovered the development of a strong teaching and learning culture required learner support, parental involvement, and the interchangeable use of learning styles as elements of the instructional leadership role. These findings confirmed that learner academic achievement could be improved with the use of instructional leadership practices.

Barriers to Implementing Instructional Leadership Practices

Leaders must engage in the specific activities to implement instructional leadership practices that include setting directions, establishing relationships and developing people, and refining the instructional program (Leithwood, 2012). Barriers to implementing instructional leadership practices could be any factor that would hinder school leaders from exercising proper dispensation of these practices. Cobbinah (2019), who drew from the work of Fullan (2003), explained that some of the hindrances to succeeding as a school leader were a lack of communication skills and a lack of expertise in and knowledge of curriculum and instruction. When these gaps are present, school leaders will be unable to reach their full potential (Cobbinah, 2019). Bush's (2020) work had similar findings. Bush explored the connection between educational management theories and their application to policy and practice in diverse educational contexts. Bush, like Cobbinah, found that school leaders' lack of knowledge and skills hampered their ability to transfer knowledge. As an example, school leaders who found themselves in positions to serve in a new capacity as instructional technology leaders, but lacked training in the use of technology, had limited ability to serve as instructional leaders in this area.

The findings of Bush (2020) and Cobbinah (2019) are significant in that teachers depend on school leaders for instructional support and resources. In a descriptive survey study, Cherutoi et al. (2024) identified the obstacles that hindered instructional leadership practices from being used effectively, in public secondary schools in Kenya. Cherutoi et al. found a significant barrier in implementing instructional leadership results when there was a lack of provisions and resources for teachers and suggested that school principals make sure that institutions have access to sufficient instruction and learning resources.

A strong collaborative interaction between teachers and school administrators is important in an environment to boost student achievement and success. Goal setting and the achievement of goals is an essential component of instructional leadership (Hallinger & Murphy, 1985). Campbell et al. (2019) using in-depth interviews, sought school principals' insights into successful instructional leadership practices. Campbell found that principals believed that instructional leadership improved student results through enhancing teacher practice, creating meaningful professional learning opportunities, and building strong connections across the school. In addition, Campbell found that building strong collaborative relationships was dependent on school leaders' open communication with staff, students, and parents and this enabled schools to achieve identified goals.

Zarmalis (2020) examined whether academic supervision could improve a teacher's capacity in classroom management. School leaders not having sufficient time to provide teachers with academic supervision was another barrier to implementing instructional leadership practices (Zarmalis, 2020). Zarmalis posited that while school leaders are sometimes preoccupied with interruptions from non-instructional activities, school leaders should remain focused on providing guidance to teachers in carrying out their professional duties, so teaching is done effectively. The findings showed that supervision activities helped teachers with classroom management, which in turn, improved instruction. The implication was that when school leaders improve their supervisory skills, teachers then improve teaching and the learning outcomes of students.

The literature that was reviewed found that school leaders who provided support to teachers improved students' academic achievement. As recommended, by Wong and Ng (2021), school leaders need to offer assistance to teachers to help create a safe and effective learning environment. Similarly, Gordon and Hart (2022) recommended that principals create structures to facilitate learning; teachers need the support of school leaders to create learning environments that can advance students' achievement.

Professional Development

Instructional leadership coupled with professional development enables school leaders to collaborate with teachers, by providing training that supports teachers in delivering effective instruction. Sibomana (2020) identified instructional leadership behaviors implemented by the principals of secondary school, and the degree to which these actions influenced the professional practices of teachers. The findings revealed that frequent instructional leadership behavior of the participants included: supervising instruction, providing feedback; defining and communicating shared goals, supplying teaching and learning resources, and encouraging professional development of teachers.

School leaders also need to engage in professional learning that supports their own leadership. A study by Gümüş and Bellibaş (2020) evaluated the degree to which learning-centered leadership practices were used by principals, and whether the professional development programs in which they engaged influenced their practices. I nstructional leaders empowered teachers to plan and execute lessons effectively through professional development activities (Gümüş & Bellibaş, 2020). Gümüş and Bellibaş also found that professional development activities also strengthened principals' beliefs in their abilities to resolve academic issues and enhance student learning. Promoting collaborative inquiry through professional development supports teacher and leader learning that can lead to increases in students' achievement.

Implications

Given the findings from previous studies, school leaders must provide support to teachers to help advance student achievement. Therefore, school leaders must familiarize themselves with effective instructional leadership practices to offer support to teachers and students. Based on the findings of the literature review, school leaders can and should implement instructional leadership practices to help advance student mathematics achievement. A project can be designed to help school leaders be informed about instructional leadership practices that can specifically advance mathematics achievement. Based on the results of the literature review and the findings of this study, a professional development plan was developed to be shared with the district education officer. The plan highlights practices that school leaders can use to support teachers who teach mathematics, to advance student mathematics achievement.

Summary

Section 1 includes an overview of the local problem, rationale, research questions, review of literature, and key definitions. The problem addressed in this study was that school leaders are challenged in providing instructional leadership to teachers to advance secondary students' mathematics achievement in a BCC. A basic qualitative design was used. The conceptual framework was Hallinger and Murphy's (1985) theory of instructional leadership focusing specifically on the concepts of instructional leadership practices.

The review of literature focused on two primary topics: instructional leadership practices and student achievement. Instructional leadership practices include the responsibility to provide directions for schools, and collaboration that would ensure the quality of teaching and learning is enhanced. Some of the hindrances to implementing instructional leadership practices were found to be a lack of communication skills, and a lack of expertise on the knowledge of curriculum and instruction. These can be overcome through professional development activities.

The instructional leadership framework provides the three areas that school leaders must concentrate on to improve student achievement: “defining the school's mission, managing the instructional program, and promoting a positive school learning climate” (Hallinger & Murphy, 1985, p. 221). This study intends to close the gap in practice, by providing the foundation for the school leaders to make necessary improvements to enhance their instructional leadership practices to advance mathematics instruction, and mathematics achievement. Section 2 includes the methodology, participants, data collection methods and analysis, to achieve the purpose of the study in addressing the gap in practice.

Section 2: The Methodology

Research Design and Approach

The purpose of this basic qualitative study was to investigate secondary school leaders’ perceptions of the challenges to providing instructional leadership practices found to be effective to support teachers to advance secondary students' mathematics achievement in a BCC. The problem addressed in this study was that school leaders are challenged in providing instructional leadership to teachers to advance secondary students' mathematics achievement in a BCC. Two research questions addressed the problem and purpose of the study. What are the perceptions of secondary school leaders on the challenges to provide instructional leadership practices to support mathematics teachers to advance secondary students' mathematics achievement? What are the practices school leaders found to be effective to support mathematics teachers to advance secondary students' mathematics achievement? Section 2 includes information about the research design and approach, participants, data collection and data analysis methods, and the results of the study. The section concludes with a summary.

Research Design and Approach

A basic qualitative research design was used for this study. The aim of qualitative research is to comprehend a particular phenomenon (Creswell, 2013). Student learning, teaching strategies, and teacher training are often main topics in qualitative educational research (Dağdeler et al., 2018). Qualitative research is aligned to research questions that ask how and why (Creswell, 2013) and allows researchers to obtain important details on participants' perspectives, practices, and experiences (Ezer & Aksüt, 2021). Studying the perceptions of participants requires data about specific experiences to be in-depth, and a clear understanding of the study’s phenomenon is needed; thus, qualitative research was found to be the best fit for this study (Korstjens & Moser, 2017).

A quantitative design did not fit this study because no numerical data are being collected nor are variables being examined (Benzing et al., 2020). Quantitative research involves quantifying data and asking questions such as "how many," and "the degree to which" by using data collection and data analysis based on a logical method with the focus being on testing theory (Benzing et al., 2020), which was not the premise of this study.

Some common qualitative research designs that were considered but were determined to not be the best fit were ethnography, grounded theory, and case study. Ethnographic studies involve the collection and analysis of data about cultural groups and does not fit this because in ethnographic research, the researcher usually lives with the people and integrates into their culture (Creswell & Poth, 2018). In this study, the data collection involved the interviews of school leaders and did not involve observations over a period, thereby not fitting with an ethnographic design.

Studies that focus on gathering and analyzing data to develop a theory is known as using a grounded theory design (Creswell & Poth, 2018; Tomaszewski et al., 2020). Grounded theory was not the best fit for this study as data for a grounded research design must be extensive with iterative analysis; this was not appropriate, as there was no plan to develop an emergent theory but rather a focus on addressing a gap in practice.

While a case study design was a possibility, case studies involve an in-depth investigation of people or groups of people using multiple data sources within a bounded system, typically with participants at a specific site who experience the phenomena over a set period of time (Tomaszewski et al., 2020). A case study did not align with this study because the data plan was to collect interview data from school leaders from at least five different secondary schools to describe their perceptions of a problem.

The research design best suited for this study was a basic qualitative design. The goal of basic qualitative research is to present a thorough account of events with direct descriptions of the phenomena (Sandelowski, 2000). Basic qualitative interviews involve inductive data exploration to find recurring themes, patterns, or concepts and findings that are described and interpreted (Lambert & Lambert, 2012). A basic qualitative design involves using an interview process that will allow participants to describe their perceptions of the phenomena (Sandelowski, 2000), in this instance, the challenges to support teachers to advance secondary students' mathematics achievement. The study design afforded an opportunity to obtain a rich understanding of secondary school leaders' perceptions of the challenges in implementing instructional leadership practices and practices that were found to be effective so other administrators may better support mathematics teachers. The results of this study provide an understanding of how instructional leadership practices advanced students' mathematics academic achievement.

Participants

Purposive sampling was employed to select participants based on predetermined criteria (Creswell, 2013) and was used when selecting participants for this study. According to Sargeant (2012), an important criterion to consider when selecting participants is whether they can inform the study’s research questions. Purposive sampling ensured that the participants had knowledge to address the research questions by meeting the inclusion criteria. The inclusion criteria for this study were participants who (a) were secondary mathematics department heads, principals, or assistant principals and (b) served in secondary schools that had a pass rate of above 50% as measured on the mathematics CXC examination. There were 25 secondary schools in the study region, and participants who met the inclusion criteria were recruited from four of the five secondary schools having a pass rate above 50% on CXC mathematics examination results. My school was excluded from the study.

Permission was obtained from the Walden University's Institutional Review Board (IRB) and the Ministry of Education prior to recruitment. I obtained participants' school email addresses from the Ministry of Education and sent out the recruitment email (see Appendix B). In the email, the purpose, inclusion criteria, and requirements of participation in the study, including time commitments, were outlined.

After the recruitment email was sent and participants contacted me, I emailed those who volunteered and who met the inclusion criteria. I emailed a consent form to the participants using my Walden email. I informed participants to reply to email to offer consent by responding with "Yes, I consent" if they agreed to participate and have their interview recorded. I followed up with an email to participants who had not responded and scheduled the interview with those participants who gave consent.

I built trust by explaining to participants how I planned to protect participants' rights and maintain their confidentiality and privacy. Each participant was assigned an alphanumeric identifier to mask the participant's name, school name, and any identifying information. I shared that I was the only one who would have knowledge of the participants' identities to maintain their anonymity.

The consent form that was emailed to those who volunteered contained the details of the research study to help participants make an informed decision about participating in study. The consent form contained an overview of the intent of the study, the method and the length of time required for participation, the member checking process, and how the participant's identity and data were kept confidential. I also clarified that participation was voluntary, as outlined in the informed consent, and the participant's right to withdraw from study at any point in time, without consequence.

Babbie (2017) outlined the need for researchers to allow participants to feel at ease when disclosing personal information; thus, researchers must develop a good rapport with participants. For this reason, interviews were conducted via Zoom where participants were in a comfortable and private setting so that confidentiality was maintained. Prior to beginning the interviews, I explained that participants could decline to answer any questions that made them uncomfortable.

Data Collection

Data collection began after the participants gave informed consent. The data gathering tool was a self-designed, semistructured interview protocol with open-ended questions (see Appendix C) used for individual interviews. Interviews in qualitative data can lead to discussions with the participants who can provide information about the problem being studied (Roberts, 2020). In semistructured interviews, the interviewer can probe or can explain or rephrase questions to obtain a deep understanding of the phenomenon (Ridder, 2017).

The semistructured interview protocol was aligned with the research questions and the conceptual framework to ensure sufficient data were gathered to address the purpose of the study. The dimensions of Hallinger and Murphy's (1985) model of instructional leadership were used to guide the development of the research questions. The main dimensions of Hallinger and Murphy's theory address the mission of the school, the instructional program, and the climate conducive for learning.

The interview protocol was field tested for content validity with a mathematics teacher and a school leader who were not study participants. The results confirmed that the interview protocol provided a sound structure to conduct an effective interview, and the interview questions were designed to provide answers to research questions. The mathematics teacher and school leader gave no recommendations to revise the questions in the interview protocol.

Virtual interviews were arranged to take place at a time convenient to participants. Creswell (2013) recommended that interviews take place in a location and at a time that provides a setting allowing respondents to feel comfortable when sharing personal information. Using Zoom as the interview platform, gave participants greater flexibility in selecting a setting of their choice for the interview.

Following each interview, the data were transcribed and reviewed. Each participant's responses were saved using a unique alphanumeric identifier; a number for the school (1-4) for each of the four schools and a code for participants at the school that included secondary mathematics department heads (DH), principals (P), or assistant principals (AP). All data were kept secured using a password-protected computer that only I accessed. A reflexive journal was maintained that tracked my thoughts and perceptions throughout the research process to mitigate any bias that emerged and to document my insights (Orange, 2016).

To gain access to participants, I asked for permission from the Walden University's Institutional Review Board (IRB). I then sent the copy of IRB approval to the Ministry of Education and completed the designated form required by the ministry to obtain consent to conduct the study. After receiving permission from the Ministry of Education, I obtained participants' school email addresses from the Ministry of Education and sent the recruitment email to potential participants using my Walden email. Participants who met the inclusion criteria were emailed the informed consent. I asked participants to reply to the email by responding with "Yes, I consent" if they agreed to participate and be audio recorded using the Zoom platform. I then scheduled individual interviews with each participant who gave consent.

My role at the study site was that of a teacher in one of the secondary schools that achieved a pass rate of 50%; therefore, I excluded my school from the study. I was not in charge of overseeing or evaluating the duties of any of the potential participants at the remaining four study sites so there was no conflict of interest.

I monitored and controlled any biases through reflexivity. This practice promotes self-awareness and assists in identifying areas of bias during data collection and analysis (Darawsheh, 2014). Bracketing was used, which involves setting aside one's perspective and adopting an open-minded stance during data collection and analysis (Chan et al., 2013). By practicing bracketing using my reflexive journal, I acknowledged any biases and perceptions and accepted new insights that arose during data collection.

Data Analysis

Thematic analysis, following Clarke and Braun's (2013) six-step process, was used to analyze the data. Thematic analysis steps include being familiar with data, generating codes, searching, reviewing, defining and naming themes and establishing the findings (Castleberry & Nolen, 2018; Clarke & Braun, 2013; Nowell et al., 2017). Data analysis is the process of sorting and sifting through raw data to format into meaningful and useful information (Lester et al., 2020). The purpose of data analysis is to provide a deeper analysis of phenomena to help to bring about solutions to problems.

Thematic analysis began with Phase 1, familiarization with the data (Clarke & Braun, 2013). To familiarize myself with the data, I obtained the transcriptions of the interviews and converted them into readable Microsoft Word documents. After the completion of transcripts, I asked participants to validate that the transcript of their responses was correct and later, to review the initial interpretation of the data. After the participants confirmed that their interview transcripts were accurate or required amendment, I accepted any needed updates.

Phase 2 entails generating initial codes (Clarke & Braun, 2013). After the data were compiled and I read the transcript several times, I began the coding process. This involved reading through the data to assign the first set of code. I used manual coding to analyze data. By manually coding data, I was closer to the data and was able to gain an understanding of the overall context and its meaning (Elliott, 2018). I used code words or phrases that described a specific phenomenon (Creswell, 2013). Codes were selected words that were relevant to the research question (Ravitch & Carl, 2016) and could be modified in this phrase, which ended when relevant data were fully coded (Clarke & Braun, 2013).

Inductive coding was used to manually code data, generating initial codes in the thematic analysis process. Inductive coding is a ground-up approach that enables a researcher to start with the data to develop codes (Azungah, 2018). There are three types of codes: open, axial, and selective. Open coding breaks data into discrete parts to create codes; axial coding occurs when codes are grouped into categories; while selective coding connects categories together to form core categories (Korstjens & Moser, 2017). In the second round of coding, I used open coding. At this stage, coding moved beyond summarizing and included a measure of interpreting (Williams & Moser, 2019). I applied open coding by using color-coding for participants' responses to each corresponding question to help visualize common codes that were used to generate categories (Saldaña, 2021).

Phase 3 involves searching for themes (Clarke & Braun, 2013). At this point, I used the categories to generate themes. I used axial coding to group codes into categories with descriptive labels that aid in organizing and grouping the data into relevant categories related to research questions (Creswell, 2013).

Phase 4 entails reviewing potential themes (Clarke & Braun, 2013). I used selective coding to form the core categories that resulted in the emergent themes. I reviewed and evaluated the emergent themes to ensure that sufficient data were connected to themes, and that themes had a significant link to research questions (Clarke & Braun, 2013; Nowell et al., 2017).

Phase 5 consisted of defining and naming themes (Clarke & Braun, 2013). Researchers must think about the data and have a clear theoretical understanding to create themes that substantiate the answers to the research questions (Carey, 2017). Thus, adjustments were made by organizing emergent themes into broader themes related to the research questions and the theoretical framework (Williams & Moser, 2019). In creating these broader themes, I was meticulous about grouping emergent themes to provide significant insight into the research questions.

In Phase 6, the findings are reported (Clarke & Braun, 2013). During this phase, it is possible to notice that some participants have perceptions that are quite different from the rest of the participants; this is referred to as discrepant cases. It was important to pay attention to the reasons for discrepant cases and to note these in the findings of the study. This increases the trustworthiness of the findings.

Trustworthiness

Creswell (2013) referred to trustworthiness as measures researchers use to check the quality of data to gain the readers' trust. To improve trustworthiness in a qualitative study, there is a need for evidence of accuracy and credibility of the findings. The execution of techniques like member checking, reflexive journaling, and audit trails helps to improve trustworthiness (Rose & Johnson, 2020). There are four trustworthiness criteria in qualitative research: credibility, transferability, dependability, and confirmability (Sinkovics & Alfoldi, 2012). Credibility addresses strategies to establish confidence in the research findings (Creswell, 2013). I used member checks to ensure credibility for this study. Burkholder et al. (2016) defined member checks as participants' validation of data. This was achieved by allowing participants to confirm their responses by verifying their transcripts and providing feedback on the initial interpretation of their data (Harper & Cole, 2015).

Transferability in qualitative research measures how applicable the findings of a study are to other contexts (Shenton, 2004). Transferability was established by providing the readers with thick descriptions that included excerpts from the participants that supported the themes of the study as well as details about the context for readers to assess whether the findings are applicable to their contexts (Ravitch & Carl, 2016).

Dependability seeks to determine how consistent the findings are and how likely that another researcher can repeat and obtain the same results (Creswell, 2013). To establish dependability, a researcher explains the purpose of the study, the research questions, and data collection process selected for the study, according to Ravitch and Carl (2016). Anney (2014) explained that dependability is established by the use of an audit trail, which was maintained in this study. In the audit trail, I documented and provided details of how the data were collected and analyzed.

Confirmability is the degree to which others can substantiate the findings of the research (Anney, 2014). I established confirmability by documenting all the steps in the research process, by an audit trail of the processes that were followed (Korstjens & Moser, 2017). I also took written notes in a separate journal to document my thoughts during the interviews and to journal any feelings that surfaced given my experience as a teacher to increase the trustworthiness of the findings (Ortlipp, 2008).

A final step to establish trustworthiness was to address any discrepancies in the data. Data discrepancy occurs when comparable sets of data contradict each other, as both could not be true, during the data analysis process (Puljak et al., 2020). A researcher must identify discrepant data. Data discrepancies can have a significant impact on data analysis as misleading insights can lead to wrong conclusions and misinformed decisions (Miller et al., 2022). I reported all discrepant cases in the data analysis and final report, and I explained the reason for the discrepancy.

Data Analysis Results

In this section, the process by which the data were generated and analyzed are presented. After receiving IRB approval from Walden University (02-17-25-0445878), I obtained permission to conduct the study from the Ministry of Education. Invitations were sent to school leaders who met the criteria. Ten school leaders from four schools accepted the invitation, and I then emailed each school leader with informed consent. As soon as the informed consent was received, the interview was scheduled. The individual interviews were conducted using Zoom and followed the interview protocol. Zoom provided the means to audio record and transcribe the data. A few participants rescheduled their interview dates, but all interviews were completed over a three-week period. All interviews were conducted within the confines of my home office to ensure confidentiality.

Transcripts were saved on my personal password protected laptop that only I could access. I reformatted all transcripts for greater readability within 24 hours of the interview and then emailed the transcript to each participant for member checks. Only one participant requested to modify their transcript to add clarity to a point.

Table 2

Participant Demographic Data

School	Participant	Principal	Assistant principal	Mathematics head of department
1	Participant 1	P1		
1	Participant 2		AP1	
1	Participant 3			DH1
2	Participant 4	P2		
2	Participant 5		AP2	
2	Participant 6			DH2
3	Participant 7	P3		
3	Participant 8		AP3	
3	Participant 9			DH3
4	Participant 10			DH4

To protect the privacy of participants' identities, I used an alphanumeric identification system for the participants, consisting of three principals, three vice-principals, and four mathematics heads of department (see Table 2). I followed Clarke and Braun's (2013) six phases of the thematic data analysis process to analyze data. In Phase 1, I familiarized myself with the data to gain a deep understanding of content. In Phase 2, I created initial codes, using inductive coding, to represent the meaning and patterns that I found in the data that later became the themes of the study. I considered participants' perceptions and patterns in their responses, added to, and revised initial codes. In Phase 3, as the data analysis progressed, I reread the data and coded data that had the same meaning. Codes with the same meaning or common relationships were grouped into categories. Categories were reviewed for potential connections to identify emerging themes. The codes, categories, and theme alignment appear in Appendix D. In

Phase 4, I reviewed the themes to ensure that it accurately captured the patterns in the data

Table 3

Themes of the Study

Research questions	Themes
RQ1: What are the perceptions of secondary school leaders on the challenges to provide instructional leadership practices to support mathematics teachers to advance secondary students' mathematics achievement?	1. School leaders struggled to effectively implement instructional leadership practices due to the scope of responsibilities in their roles and the constraints within the school system. 2. School leaders were faced with setbacks when attempting to promote growth mindsets to create positive school climates.
RQ2: What are the practices school leaders found to be effective to support mathematics teachers to advance secondary students' mathematics achievement?	3. School leaders aligned the school's mission with instructional leadership practices and mathematics goals to advance secondary students' mathematics achievement. 4. School leaders used motivation and collaboration as a means of improving students' mathematics achievement. 5. School leaders used assessment and feedback to improve the students' mathematics achievement. 6. School leaders empowered teachers through professional development as a means to advancing student achievement.

In Phase 5, I did a final refinement of the themes (see Table 3). The final step, Phase 6, was the report of the findings using excerpts from participants' responses to support the themes that addressed the research questions. While analyzing the data, no discrepant cases emerged. All transcripts were returned to participants and the participant returned to me to confirm the accuracy of the findings.

RQ1

RQ1 was what are the perceptions of secondary school leaders on the challenges to provide instructional leadership practices to support mathematics teachers to advance secondary students' mathematics achievement? Two themes emerged from the data. Theme 1: School leaders struggled to implement effectively instructional leadership practices due to the scope of responsibilities in their roles and the constraints within the school system. Theme 2: School leaders were faced with setbacks when attempting to promote growth mindsets to create positive school climates.

Theme 1. School leaders struggled to implement effectively instructional leadership practices due to the scope of responsibilities in their roles and the constraints within the school system. School leaders, specifically principals and vice principals, were responsible for managing all aspects of the schools' operation. All the principals and vice principals described site management functions as having priority as opposed to their role as instructional leaders. P1 described their thoughts on prioritizing responsibilities:

> As the principal, it is my responsibility to ensure that the school functions seamlessly, so all areas can interact and integrate seamlessly and work harmoniously to achieve the overall goal, the mission and vision for the school.

> As a result, there are conflicts with schedules, so getting that window where I can meet with teachers is sometimes difficult. Teachers have heavy workloads. I can offer professional assistance, but I am in and out of office trying to accomplish the many other responsibilities. It is therefore a challenge to ensure that instructional duties do not take precedence over operational activities.

This excerpt exemplified school leaders' struggles in balancing the operational duties with the instructional leadership practices. School leaders served as administrators of schools and had a wide variety of responsibilities that stemmed from administrative duties, meetings with stakeholders, and instructional leadership activities. It became evident that some school leaders' priorities were less on instructional leadership practices and more on their managerial duties.

AP1 echoed the same sentiments and stated, "As vice principals, we have so many administrative tasks to do, focusing on instructional leadership is really a challenge." P2 shared the same view concerning having to prioritize duties, "It is a challenge to balance duties on a daily basis. Much time is spent on dealing with discipline issues and, as a result, it reduces the time available for instructional leadership practices." AP2 agreed, school leaders at their school focused more on other managerial and operational matters like meeting with parents and less on instructional practices. Principals and vice-principals often delegated instructional leadership practices to mathematics heads of departments. P3 expanded on this:

> There is so much to do in ensuring that the school is being run smoothly, that I often delegate the task of class visits to the head of departments and trust that they

> provide the necessary support to the teachers. I do provide guidance to teachers but much more can be done in this area.

There was also a need to balance time spent on teaching and provide support to other teachers reported by mathematics heads of departments. Mathematics heads of department, due to their teaching workload, placed priority on teaching students over providing instructional leadership practices to other mathematics teachers. DH1 explained:

> There is so much to do as it relates to instructional leadership, but I am also a mathematics teacher, and I am caught up between finishing the syllabus with students and providing support to teachers in the department. I spend more time being a teacher, than in my role as an instructional leader.

Participants also reported time constraints, lack of resources, and the quality of data as impeding instructional leadership practices. Some participants saw time constraints and a lack of resources as significant barriers to effectively implement instructional leadership practices. AP1 articulated this issue:

> You can well understand time constraints being a challenge, because when you have so many responsibilities to deal with, and then, time is always a factor. While you may want to observe, you may want to monitor. You may want to give constructive feedback, because of the multiple number of responsibilities that you have, it limits the amount of time you can devote to that. We also have resource limitations as well. Therefore, sometimes in the teaching of mathematics, we know, and we read in the literature, there is so much that you can do with mathematics to get students motivated to do mathematics. Nevertheless, in this

> little country, we know the resources are limited. This confirmed that time constraint and lack of resources are challenges for school leaders.

The responses from the mathematics heads of department also conveyed the challenge of time. This perception was best conveyed by DH1:

> For my department, I cannot speak for others, our biggest challenge is time. There is a lot we want to do, but even with the approaches that we explore, we have to be very wary of the need to complete our syllabus. Yes, other approaches such as analysis of data and differentiated lessons would be helpful, but when you spend time doing that with the students, and then you take away from the possibility of teaching something else.

Given the data collected, it was noted that a lack of resources also hindered the implementation of instructional leadership practices. P3 explained:

> I see a lack of resources as a factor that impedes my ability to effectively implement instructional leadership practices. Resource persons are very few, and the lack of finance to provide teachers with the necessary resources are challenges. The school lacks resources like manipulative software.

There was a challenge to find funding to provide additional resources. DH3 pointed out, “There are times that I would like to help train the teachers on how to use technology in the classroom, but WIFI is a problem. The school lacks the funding to install internet that is readily available in the classroom.”

An additional challenge was human resources, finding and keeping teachers qualified in teaching mathematics. This was explained by DH2:

> A challenge that I am faced with is not having teachers. We have gone through a few incidents of 6 or 8 weeks where a teacher has left to go take another job. Simply, there are not people who want to teach. On top of that, not many teachers want to teach mathematics. The challenge is finding personnel and the lack of incentives for making the profession attractive. My challenge is to find people who want to teach and want to teach mathematics specifically.

It was noted that the quality of data was also a challenge that affected the implementation of instructional leadership practices. AP1 explained:

> Lately we have been focusing on the use of data driven instruction. We know there is difficulty in that, because if the data are not reliable, if the data are not consistent, with regard to the source of the data, that can affect how you actually use that data to drive your instruction. Then, we also have inconsistent data collection methods. So how do you determine, how do you compare this one versus this one when the collection methods were not the same.

The data from assessments were perceived as contributing to views that students lacked potential in mathematics that then resulted in interventions that might be ineffective. P2 explained:

> It is important to use data to guide the way in which we implement instructional leadership practices, but there are times that we do not receive the data in a timely manner, or that it is inaccurate. Then, the decision that we take to support the teachers may not be effective. It is important that we take time to analyze the data so that we can make decisions that are more informed.

Theme 2. School leaders were faced with setbacks when attempting to promote growth mindsets to create positive school climates. School leaders shared the view that it was difficult to change the mindset of both teachers and students as it related to fostering a positive school climate that would support an advance in mathematics achievement. Students were perceived as having a strong mindset against mathematics. Teachers found it challenging to embrace new ideas and technology in teaching mathematics. School leaders also faced resistance from teachers when they implemented instructional leadership practices. DH1 said, “It is a challenge to get teachers to be open-minded about this, quote unquote, new age. Once we talk about collaboration and going into the classroom, it's as if you're putting them under a microscope.” DH4 further explained, “Anytime I let the teachers in the department know that I will be visiting the class, their attitude changes. They resist this practice.”

P3’s response captured this theme, “Challenges include a lack of willingness on the part of a few teachers to truly collaborate, to implement new methods of teaching and be more deliberate about monitoring each other’s lessons.” P2 further expounded on this theme, “I have a challenge to get mathematics teachers to tweak lessons, if there is a new development. It will take time because the mathematics teachers have set ways of teaching.

AP1 explained the negative mindset from the students’ point of view. “Students are coming in with the mindset that they do not like mathematics, and they do not see the relevance of the content being taught to their daily living.” DH1 explained, “Teachers would rather stick to their way of teaching.” DH2 and DH4 felt that mathematics teachers were of the view that they were comfortable with their methods of teaching and felt there was no need to change. This led to those teachers resisting support from mathematics heads of department.

RQ2

RQ2 was what are the practices school leaders found to be effective to support mathematics teachers to advance secondary students' mathematics achievement? Four themes emerged from the data in response to this research question. Theme 3: School leaders aligned the school’s mission with instructional leadership practices to advance secondary students' mathematics achievement. Theme 4: School leaders used motivation and collaboration as a means of improving students' mathematics achievement. Theme 5: School leaders used assessment and feedback to improve the students' mathematics achievement. Theme 6: School leaders empowered teachers through professional development as a means to advancing students’ mathematics achievement.

Theme 3. School leaders aligned the school’s mission with instructional leadership practices and mathematics goals to advance secondary students' mathematics achievement. Participants perceived that by aligning the school’s mission and mathematics achievement goals with instructional leadership practices, they were able to advance mathematics CXC results. Participants shared their roles in ensuring that this was achieved. DH1 said, “Through collaboration and guiding that sort of professional exchange, I would ensure that those under my state are aware of trends in education, and that resources are available to achieve mathematics goals that are aligned with the schools mission.” P3 explained, “I ensured the standards of the school's mission are maintained and aligned mathematics goals by monitoring and evaluating student performance data, providing professional development, and fostering a collaborative culture where high expectations are upheld.

DH4 suggested that by offering guidance and resources, they would ensure that the school's mission remained at the heart of all mathematics activities, plans, and goals. AP1 highlighted how monitoring, supporting, and reinforcing the school's mission, and their alignment to mathematics goals, whether it be through leadership or collaboration, helped students and teachers to realize that improved mathematics results was a priority for the school. AP3 articulated the importance of effectively communicating the school mission "As principal, I use every opportunity to highlight the school's mission and show how it relates to the success of students. I encourage staff members to create an environment that is conducive to learning, by providing support to their colleagues as well as to students." This strategy involved school leaders aligning the school's mission to the instructional leadership practices whereby school leaders engaged in collaboration that entailed effective communication of school mission alignment to mathematics goals and positive school climates. Through these efforts, school leaders enhanced instructional leadership practices that led to advanced performance in mathematics.

Theme 4. School leaders used motivation and collaboration as a means of improving students' mathematics achievement. School leaders shared how they motivated teachers and students to achieve improvements in teaching and learning. All participants perceived that their practices motivated teachers and students to work towards improving mathematics performance. The responses articulated by school leaders revealed some of the motivation strategies that led to this theme. As P1 said:

> I provide recognition for teachers and students who excel, offer incentives such as awards, and ensure a supportive environment through professional development and availability of resources. I also encourage innovative teaching strategies and collaborative planning across form levels.

Responses like this illustrated the key components to improve mathematics performance were celebrations of teachers and students' achievements, and providing support for teachers to meet the diverse needs of students. P3 spoke of a strategy that no other school leaders mentioned but was worth noting; a main source of motivation for both students and staff was divine intervention, specifically the use of prayers and bible quotes motivated students

DH1 motivated teachers by encouraging team building through relaxation activities to reduce teachers' stress level so they were better able to focus on instruction that could improve mathematics performance. DH4 stated, "I motivated teachers by empowering them through encouragement, and I inspired students through games and rewards." Other school leaders shared similar ideas to motivate students and teachers by showing love and support and offering words of encouragement.

AP2 explained using technology motivated students, who were fascinated by it; therefore, using technology as a mathematics resource motivated students to participate in class and improved learning. Concerning technology, P3 felt that "school leaders need training that provides help on how teachers can use technology to improve mathematics performance." The use of technology, with the focus being on equipping teachers with new educational practices that enhanced student learning was a motivation strategy for teachers and students.

Some of the practices to motivate teachers to improve student mathematics achievement were collaboration through the sharing of data driven instruction. Collaboration was a strong motivation strategy for teachers, encouraging teachers to work as a team. Collaboration also fostered open communication among teachers to share ideas on how to improve mathematics performance. AP1 explained that they encouraged collaboration with other mathematics teachers, as well as curriculum officers, to share innovative ideas about teaching.

School leaders reported learning improved by providing an environment whereby school leaders, teachers, and other stakeholders felt comfortable to collaborate and use the analysis of data to guide instruction. P3 elaborated, “Improved mathematics performance was achieved through collaborative planning, and an encouraging environment that promoted data driven decision making.” It was perceived as important to provide an environment where teachers understood the reasons for collecting data and the implications of the results of data analysis. When teachers understood the reasons for data collection and analysis, this encouraged collaboration and open communication.

P1 encouraged an open-door approach where teachers could meet to discuss the results from their data analysis. P2 shared that time was given to departments to host professional learning communities (PLCs). Providing teachers with the time and avenues to discuss data encouraged collaboration that led to improved mathematics achievement. DH4 expounded on this theme, “We make data driven decisions based on students’ performance on assessments and teachers’ and students’ feedback. As a team, we set clear goals and objectives, and I provide classroom support and constructive feedback that advances students’ mathematics performance.” School leaders provided a culture for data driven instruction through collaboration that led to advancing student performance in mathematics.

Theme 5. School leaders used assessments and feedback to improve the students' mathematics achievement**.** School leaders perceived that the use of assessments and constructive feedback led to improved mathematics performance. AP1 explained that while schools have examinations, not everyone uses the data from these results to provide timely feedback that teachers could use to guide instruction. School leaders felt they must be knowledgeable about how to provide feedback that leads to reflection and a change in the way in which instruction is provided. AP2 shared:

> We conduct classroom observation and provide feedback. Teachers give assessments and they are encouraged to identify strengths and weaknesses and provide instructions in accordance with the results. Further, we had training sessions on how to analyze students' performance and how to guide instructions by results.

DH4 shared that they helped in creating the assessments, provided feedback, and additional support on how to use the feedback to guide instruction. DH1 saw the use of data from assessments as the most effective strategy in advancing mathematic achievement and explained:

> Using data from assessments to ensure that our remediation is more targeted is most effective. Instead of just knowing a child did not do well overall in the exam, teachers must be informed as to exactly where the child is faltering, then you can give extra lessons, or tailor the type of help students need.

To solidify this point P3 said, "Effective strategies to advance mathematics achievement included fostering the use of formative and diagnostic exams to guide instruction and provide targeted support." Assessments and constructive feedback from assessments were considered effective strategies to guide instructions that ultimately led to advanced mathematics achievement.

Theme 6. School leaders empowered teachers through professional development as a means to advancing students' mathematics achievement. All participants indicated that school leaders, as well as teachers, need professional opportunities and ongoing professional development activities to advance students' achievement. Participants expressed the view that by providing teachers with professional development opportunities to enhance teaching, students were able to advance their mathematics achievement. Participants also expressed that they were able to gain knowledge on how to use technology to teach mathematics and provided teachers with support to use data to drive instruction through professional development activities.

DH4 said, "I provided continuous training to the teachers on how to teach effectively. I did class observations, and I provided feedback to help improve both teaching and learning." P3 shared, "I worked with the mathematics head of the department to develop the scope, sequence, and outline for instruction, and these were transferred to the teachers." Similarly, P1 stated:

> We provided ongoing professional development, facilitated peer observations, encouraged mentorship, and ensured that teachers have access to quality instructional materials and technology to boost instruction and learning. Additionally, time was given to the department to host PLCs and professional

development sessions.

DH1 shared the same perceptions, “We provided professional development for teachers and got them exposed to different teaching practices to improve mathematics achievement.” School leaders clearly articulated that ongoing professional development activities for school leaders and teachers were vital in advancing mathematics achievement.

Summary

This section provided a summary of findings related to the problem, research questions, and conceptual framework. Findings for RQ1 led to the identification of two themes that described the perceptions of secondary school leaders on the challenges to provide instructional leadership practices to support mathematics teachers to advance secondary students' mathematics achievement. The themes for RQ1 focused on school leaders as they struggled to perform their expected responsibilities due to time constraints, lack of resources, unreliable data, resistance from teachers, and a lack of growth mindsets to create positive school climates. Similar to Cherutoi et al. (2024), it was found that a lack of teaching resources was a challenge to support teachers. The finding related to time constraints aligned with Zarmalis (2020) in that school leaders did not have sufficient time to provide teachers with the needed academic supervision. The findings of the study also reflected the core concepts of Hallinger and Murphy's (1985) theory of instructional leadership related to coordination of curriculum, supervision, and evaluation of instruction; monitoring of student progress; and incentives for teaching. School leaders used motivation and incentives to improve teaching and learning while they assessed instruction and provided feedback.

Findings for RQ2 described the practices school leaders considered as effective to support mathematics teachers to advance secondary students' mathematics achievement. The findings revealed that school leaders aligned the school’s mission with instructional leadership practices and mathematics goals and used motivation of students and teachers as a means of improving students' achievement; school leaders encouraged greater collaboration concerning the use of data to guide instruction and empowered teachers through professional development to advance student achievement. Findings for RQ2 reflected the instructional leadership framework of Hallinger and Murphy (1985) highlighting the school's mission, managing the instructional program, and promoting a positive school learning climate as areas that school leaders must concentrate on to improve students’ achievement.

The study’s findings led to the conclusion that the project deliverable, a professional development plan for school leaders, would help to address the gaps identified in their instructional leadership practices. The professional development plan will be shared with district education officers highlighting practices that school leaders can use to support teachers who teach mathematics to advance students' mathematics achievement. Section 3 includes an introduction, rationale, and review of literature concerning professional development for instructional leadership, project descriptions, project evaluation, and implications of the project.

Section 3: The Project

Based on the findings of this study, a professional development plan was developed to help address the challenges faced by school leaders to provide instructional leadership to mathematics teachers to advance secondary students' mathematics achievement. The purpose of the professional development (PD) project will be to enhance the school leaders' understanding of instructional leadership and practices found to be effective to support mathematics teachers to advance secondary students' mathematics achievement. The goal is to have a 3-day professional development program delivered to the target audience of district education officers and secondary school leaders that include principals, assistant principals, and heads of mathematics departments. The outcomes are intended to empower instructional leaders to support mathematics teachers to improve students' performance.

The content of the 3-day PD plan is based on the themes that emerged from interviews with school leaders. At the end of Day 1, participants will become knowledgeable about the challenges that are faced by school leaders to implement instructional leadership practices to support mathematics teachers and how to overcome them. During the Day 2 session, school leaders will be presented with strategies that have been found to be effective to implement instructional leadership practices to improve students’ mathematics performance. By the end of Day 3, school leaders will develop an action plan for improving the teaching and learning of mathematics at their secondary schools.

The activities for the PD project will include table discussions, presentations by experts, as well as group activities to create action plans that will be implemented at participants' schools to improve the teaching and learning of mathematics. The materials that will be needed for the project are the hardware for PowerPoint presentations and materials for activities and handouts. Funding for the PD project will be sourced through donations from the Ministry of Education and business partners. The project is scheduled to take place during the summer of 2026. There will be four activities scheduled for each day. Participants to determine the success of the PD, as it relates to the goals of the project, will complete an evaluation form.

Rationale

Based on the literature review and the findings of this study, professional development is crucial for improved teaching and learning. Gümüş and Bellibaş (2020) explained that instructional leaders could empower teachers to plan and execute lessons effectively through professional development activities. From the data analysis in Section 2, one of the themes highlighted that school leaders need professional opportunities as well as ongoing professional development activities to advance students' achievement. Through the content of the professional development activities, school leaders will become more knowledgeable about the challenges that other school leaders face in implementing instructional leadership practices and the strategies they have found to be effective in improving the teaching and learning of mathematics. At the end of the professional development project, school leaders will be better equipped to provide support to mathematics teachers by having the information and resources needed to begin to address the problem of mathematics achievement. Teachers will then have instructional leaders who support them in creating a learning environment that is conducive to advancing students’ mathematics achievement.

Review of the Literature

A review of scholarly literature revealed that a professional development project was appropriate in addressing the problem identified in this study. The problem addressed in this study was that school leaders are challenged in providing instructional leadership to teachers to advance secondary students' mathematics achievement in a BCC. The Walden University Library was used to retrieve current articles for this literature review. The search engines used to identify peer-reviewed publications were SAGE, ERIC, Google, and Google Scholar. Key search terms included *effective professional development for school leaders, importance of professional development to support teachers, use of assessment to improve student performance, motivating students and teachers,* and *aligning school's mission with mathematics goals.*

The review of literature revealed that the use of professional development is appropriate for school leaders to implement instructional leadership practices that will support teachers and lead to improved students' performance. Ghavifekr and Ramzy (2020) explained that the effective use of PD by school principals contributed toward teaching excellence and students' learning achievement. The researchers explored the factors influencing principles' practices by interviewing 10 participants that included principals, assistant principals, and heads of mathematics departments. The results of the study confirmed that the professional development of teachers and instructional supervision were effective practices used by principals to enhance school outcomes.

Additionally, Steinberg and Yang (2021) evaluated whether principals' professional development improved school outcomes. Steinberg and Yang discovered that by improving teacher effectiveness, principals' involvement in PD raised student mathematics achievement. Steinberg and Yang also found principals' professional development had the greatest impact on teacher effectiveness when newly hired principals were required to complete a professional development induction program during their first 2 years in the principalship. These findings confirmed that the PD of principals, particularly when newly hired, is important to improve student achievement in mathematics.

Jayaweera and Weligamage (2021) carried out an interpretative analysis of the literature on the professional development of educational administrators in a number of nations. The results indicated that educational leaders who had leadership competencies and skills resulted in superior outcomes in terms of students' achievement and school management. The study's findings included recommendations for improving and putting into practice professional development and training initiatives for educational leaders that use an outcomes-oriented approach. This study provided evidence that the use of PD is effective in providing school leaders with leadership skills that can improve student performance.

McGraw et al. (2025) examined the perspectives and experiences of 21 teachers in an intensive leadership development program who were also in leadership roles in their schools and districts. Thirteen of the 21 participants reported a sense of empowerment attributed to supporting and developing their capacities to lead through leadership development. These findings supported the idea that professional development programs aid in making those who serve in leadership capacities, such as department heads, knowledgeable about implementing instructional leadership practices that can support colleagues.

It is critical for school leaders to improve students' performance outcomes. Faizuddin et al. (2022) investigated the issue of administering PD for high school principals in Indonesia. The findings revealed some obstacles in managing PD programs at schools and suggestions to improve PD programs like developing personal and professional skills, recruitment systems, providing ongoing training programs, and building school organization capacity. The study by Faizuddin et al. supported the proposed project by providing suggestions for the PD activities that are valuable for improving leadership practices that contribute to educational benefits in teaching and learning.

A review of the literature revealed research that provided findings and recommendations to support the premise of the project and guide its development. The content of the project, based on the findings of the literature review, included topics such as the use of assessment and feedback to improve student achievement, the use of motivation and collaboration as a means of improving student achievement, and the alignment of the school mission with instructional leadership practices and mathematics goals to advance secondary students' mathematics achievement.

Principals can enhance their instructional practices on the use of assessment and feedback with PD. Based on the findings of this study, school leaders at the higher performing schools ensured that teachers used different types of assessment to determine whether learning was taking place. According to Zou et al. (2024), formative and summative assessments can be improved to better support teacher instruction and student learning. Kültür and Kutlu (2021) investigated how formative assessment practices can affect student performance and attitudes toward mathematics. The results of their study found that formative assessment practices were beneficial in facilitating the learning processes. Professional development programs that inform instructional leaders on how to use formative assessments can then be shared with teachers to improve the teaching and learning of mathematics.

C. Lee et al. (2025) recommended that professional development sessions for leaders and the cultivation of trusting organizational cultures are needed for instructional improvement and student success. The use of data-driven instruction is an important component of instructional leadership to understand better students' learning (C. Lee et al., 2025). Leaders who examine student data gain insights that inform instructional strategies that monitor student progress and address student-learning needs. Therefore, the use of professional development to guide leaders on how to use assessment data and feedback is needed to inform data-drive instruction.

Cunningham et al. (2023) found principals' knowledge of specific content areas influenced the ways they assisted teachers and conducted their instructional leadership responsibilities. Quebec Fuentes and Jimerson (2020) detailed that a leader who lacks a thorough comprehension of content in a subject area lack the ability to provide useful feedback to teachers to enhance their instruction. Similarly, Haglund and Glaés-Coutts (2023) found that some principals may not have a strong grasp of instructional methods and are at a disadvantage when it comes to their ability to develop pedagogical leadership in their schools. Therefore, school leaders need ongoing professional development in content areas and the pedagogical approaches in which they lack expertise. School leaders can then be equipped to provide teachers with feedback on how to implement changes in their instructional practice.

Based on the findings of the study, the higher performing school leaders used collaborative practices that facilitated their ability to support teachers and enhance student learning. Chen and Zhang (2024) examined the role of teacher leaders and their leadership facilitation in PLCs, found that teacher leaders were crucial in promoting teacher collaboration and professional learning in PLCs. Similarly, Park et al. (2019) studied how administrators supported PLCs, collaboration, and expectations to affect the mathematical achievement of 11th-grade students. The findings revealed that principal support positively influenced the collaboration and responsibilities shared within PLCs, which in turn, influenced student achievement. Park et al. recommended that school principals should engage in PD to offer support to teachers on best PLC practices.

Research noted that principals were the main force behind collaborative learning and played a central role in fostering an atmosphere that encouraged collaboration (Krasniqi, 2021; Patrick, 2022). Principals should not only collaborate with other school leaders but also create a positive work environment where they collaborate with teachers to help enhance students' learning (Patrick, 2022). For example, Prenger et al. (2021) contended that effective school leadership creates a culture of ongoing school improvement through PD. Teacher leadership also plays a significant role in facilitating discussions among teachers for ongoing collaborative efforts for professional growth, as found by Walker (2021). As school leaders and teachers collaborate through PD activities, they develop effective teaching strategies that support student learning (Prenger et al., 2021; Walker, 2021).

Technology also plays a central role in education systems (Gamrat & Zimmerman, 2021). Professional development provides the chance for school leaders and teachers to stay current with technological advances (Dahri et al., 2021). Olaniyan and Uzorka (2024) examined the role of leadership in assisting faculty PD in integrating technology. The results highlighted the importance of supportive and innovative leaders to create an environment where faculty enhance their proficiency to integrate technology into classroom instruction.

School leaders who engaged in collaboration to gain knowledge on technology integration in the classroom enhanced student learning. Wu et al. (2025) explained that collaborative PD fosters an environment where creativity and innovation can flourish. Students' learning improved when educators became more knowledgeable on the use of technology in the classroom (Wu et al., 2025). Wu et al. encouraged school leaders to share ideas and find new strategies to implement technology using instructional leadership practices. Al-Fayez (2024) also recommended that leaders share their knowledge and expertise to develop multiple solutions to the challenges of implementing technology to enhance instructional leadership skills.

A theme identified through this study was that school leaders used motivation to support teachers to improve their instructional leadership practices to assist teachers. Erhuvwu and Adeyemi (2019) shared the view that students' level of motivation can predict students’ academic achievement in mathematics. Teressa and Bekele (2021) explained that the elements of motivation are connected to achievement and need to be understood. By spending time, discussing what motivates teachers and students, school leaders can gain the knowledge and skills to address teachers’ needs and the needs of diverse learners.

Kulakow (2020) pointed out that a student-centered approach to teaching is beneficial to students with low levels of academic self-concept. According to Alzahrani (2022) if teachers are creative in their teaching methods to capture students' interests and stimulate their curiosity to learn, students can be kept motivated. School leaders must be aware of the different motivational factors linked to mathematical success. Therefore, school leaders should engage in PD where they can develop skills that motivate teachers to adapt and diversify their teaching methods to help their students develop and maintain enthusiasm for learning. The project will address the development of skills of school leaders to motivate their teachers and students to promote growth in mathematics achievement in their schools.

Another theme addressed in the project relates to school leaders creating a culture that aligns the school mission with mathematical goals. From the findings of this study, school leaders noted that a culture centered on a clear understanding of the school mission helped teachers and students to understand mathematics goals. This, then, contributed to student achievement that fostered a learning culture that positively influenced the school's overall mission. Plaku and Leka (2025) contended that schools with a positive school climate foster a culture among staff to collaborate in groups to develop curricular plans and programs. Professional development activities will focus on strategies that support school leaders in implementing instructional leadership practices to create a positive school environment needed to advance mathematics achievement.

The final theme identified in this study was related to professional development activities focused on the empowerment of school leaders to enhance instructional leadership practices. Liljenberg's (2021) study focused on the agreement that PD practices enhanced principals' instructional leadership. Productive professional development requires trustful relationships to ensure a collaborative setting is established (Liljenberg, 2021). Liljenberg found that PD requires a delicate balance to avoid giving the impression of hierarchical control.

An important component in this PD project is collaboration among principals to identify gaps in knowledge and skills and to brainstorm solutions. School leaders should engage with other school leaders in collaborative inquiries to address instructional leadership challenges concerning their multi-faceted roles and the support that will help them navigate their roles (Service & Thornton, 2021). Service and Thornton’s findings indicated that although principals gain implicit knowledge through on-the-job experience, they need opportunities to practice the reflection necessary for continual learning and professional growth.

Project Description

The purpose of the 3-day professional development project is to provide support to school leaders who are facing challenges when implementing effective instructional leadership practices to support mathematics teachers and advance mathematics achievement. The PD project will be offered to school leaders of schools that struggle to improve mathematics CXC results at their institution.

Day 1 is designed to help school leaders understand that their challenges are not unique and recognize that many school leaders are facing similar issues. The presenter will facilitate discussions and share some of the findings related to the challenges that have been identified through this study and in the literature. School leaders will have the opportunity to share their experiences with colleagues in applying instructional leadership practices to support teachers in mathematics and discuss whether these challenges are similar to what was presented and identify areas of need, unique to their schools and practice to brainstorm possible solutions to those issues.

Day 2 of the PD plan is designed to address the challenges faced by school leaders in applying instructional leadership practices. There will be three sessions for the day, each session concentrating on the themes identified in the results of this study. During each session, activities will be provided for the attendees to be knowledgeable on how to (a) align the school’s mission with instructional leadership practices and mathematics goals to advance secondary students' mathematics achievement, (b) motivate and collaborate as a means of improving students' mathematics achievement, (c) use assessments and feedback to improve students' mathematics achievement.

Day 3 of the PD plan is designed for school leaders to reflect and develop an action plan on how to effectively implement instructional leadership practices to improve teachers’ mathematics instruction and students’ mathematics performance at their schools. The action plan will be designed to empower school leaders to support mathematics teachers to improve mathematics achievement. The district education officers will have the opportunity to review the action plans and commit to assisting school leaders to achieve their plans, as they relate to implementing instructional leadership practices in their schools.

To ensure the success of the PD plan, there is a need to source resources and resource personnel; careful consideration has to be given to potential barriers and solutions to ensure the success of the PD. A potential barrier to having successful PD sessions is the lack of time. To overcome this barrier, the dates and approval for the sessions will be obtained from district education officers so that school leaders can have early notice and place these dates in their calendar. The project timetable (see Appendix A) includes the topics related to the challenges faced and strategies needed to implement instructional leadership practices to advance mathematics performance. The PD sessions will be scheduled on dates approved by the district education officer during the implementation year. It will also be important to give resource personnel sufficient notice to prepare presentations and give notice to other support persons who can serve as facilitators and back-up personnel should emergencies arise, or resource persons are not available. Therefore, school leaders and resource personnel will have to commit to three days of PD.

Materials needed for the presentations and activities during sessions are computers, a projector, a white board, PowerPoint presentations, markers, handouts, and an internet connection. Funding needed for the resources for the PD sessions will be sourced through donations from the Ministry of Education and business partners. After obtaining permission from the Ministry to implement the project, obtaining resources and setting a timeframe for the PD activities will be added to the proposed implementation plan for the project.

For the successful completion of this PD project, all parties must be aware of the goals of the PD and their roles and responsibilities in attaining those goals. The attendees of the PD will be the district education officer, principals, vice principals, heads of mathematics departments, and presenters. Presentations will be centered on the findings of this study and evidence-based research. Thus, I will ensure that all stakeholders are aware of the study’s results, the research concerning instructional leadership, and the objectives of the project deliverable.

As the researcher, I have the responsibility of meeting with the district education officer and the Ministry of Education and present them with the findings of the study and the research that supports the PD project. I also have the responsibility of seeking their approval to organize the PD activity. After receiving approval, I will email all the school leaders in the district to inform them of the purpose of the approved PD and the PD schedule. It is my responsibility to source the funding and resources to ensure the PD activity is supported. The roles and responsibilities of the school leaders are to be present and participate in the PD activities so, by the end of the PD, they are well equipped to implement instructional leadership practices to support mathematics teachers and improve student achievement in mathematics.

Project Evaluation Plan

The type of evaluation planned for the professional development activity is a summative assessment. The summative evaluation plan will be used as it affords the opportunity to measure the learning outcomes of the PD. In addition, it will highlight the strengths and opportunities for improvement. The overall goal of the project is, by the end of the PD activity, school leaders in attendance will have a clear concept of how they can effectively implement instructional leadership practices that will support teachers to improve student mathematics achievement. Several objectives will help achieve the overall goal. School leaders will develop the skills and knowledge to assist teachers in developing instructional practices specific to mathematics through collaboration, and know how to create formative assessments and use assessment data to guide instruction to improve students' mathematics achievement. School leaders will be able to align their school’s mission with instructional leadership practices and mathematics goals to help create a positive learning environment that can lead to improvements in mathematics performance. School leaders will be more knowledgeable on how to motivate teachers and develop collaborative relationships that will lead to a more supportive and positive learning environment, thereby fostering improved student learning and achievement.

School leaders will be asked to complete an evaluation at the end of the PD to measure if the learning objectives were sufficiently addressed and achieved. The participants will be the school principals, assistant principals, and mathematics heads of department. The evaluation will seek to address whether the PD activity improved knowledge of and skills on the implementation of instructional leadership practices. The evaluation will also seek to gather information on whether school leaders are more confident in being able to support mathematics teachers to improve mathematics performance. Feedback from the evaluation will be shared with school leaders and the district education officer. It will also be used to inform future PD sessions.

Project Implications

The project can have a significant effect on social change. The PD is intended to positively influence school leaders’ implementation of instructional leadership practices to support mathematics teachers and students’ mathematics achievement. Through this project, school leaders can enhance their skills and knowledge to support teachers in improving instructional practices specific to mathematics. As teachers become more effective in their teaching practice, they will be better able to create formative assessments and use assessment data to guide instruction that will address and improve students' mathematics achievement. In addition, school leaders will be in a more informed position to motivate teachers and develop collaborative relationships. When teachers are motivated, a more productive and positive school environment results, where learning can be maximized. Through the application of instructional leadership practices, a motivated staff, with improved teaching practices, will lead to student improvements in mathematics achievement.

The project is important to school leaders in a larger context as it is intended to have a direct impact on the quality of instruction, on students' mathematics achievement, improved CXC mathematics performance, and improvement in the quality of education in the school community at large. The long-term results can provide more students with access to tertiary education and improved opportunities for employment that will benefit families and the larger society.

Section 4: Reflections and Conclusions

This section is based on the reflections and conclusions drawn from this research. It addresses the project's strengths and limitations, recommendations for alternative approaches, implications, and directions for future research. The findings of this project study will be shared with education officers, through the 3-day PD activity.

Project Strengths and Limitations

The purpose of the PD project is to improve the school leaders' instructional leadership practices, that have been found to be effective to support mathematics teachers to advance secondary students' mathematics achievement. The content of the PD is designed to help school leaders gain a deeper understanding of the importance of supporting mathematics through effective leadership practices. The project will provide a valuable opportunity for professional growth in the way school leaders implement instructional leadership practices, increase support for mathematics teachers, improve their school climate, and advance students' mathematics achievement.

A strength of the professional development project is that school leaders will be equipped with strategies to implement instructional leadership practices. Through this project, school leaders will have opportunities to discuss and reflect on strategies such as pedagogy, assessment, data driven instruction, motivation, and the importance of collaboration. The insights gained through this project will lead to school leaders being in a more informed position to support mathematics teachers and engage in collaborative relationships with their peers and school personnel (Abrahamsen & Helstad, 2024). As school leaders become more effective in providing support to teachers, a positive culture that is mission focused will increase a sense of belonging that leads to a positive school environment that influences teachers and students. As teachers receive support, teaching and learning should improve.

The constraints of the project are the availability and willingness of the district education officer and school leaders to support PD activities as well as a limited budget to resource the project. The Ministry of Education and community business partners may have a set budget and their ability to commit resources for the professional development project may be minimal. In addition, school leaders and the district education officer may not be motivated to commit to the 3-day professional development activity without the approval and support of the Ministry of Education.

Recommendations for Alternative Approaches

The problem addressed in this study was that school leaders are challenged in providing instructional leadership to teachers to advance secondary students' mathematics achievement in a BCC. The purpose of this basic qualitative study was to investigate secondary school leaders' perceptions of the challenges to providing instructional leadership practices found to be effective to support teachers to advance secondary students' mathematics achievement in a BCC. Based on the study's findings and recommendations, it was determined that the best way to address this problem was through a PD plan for school leaders.

An alternate solution could have been to review the current curriculum and develop differentiated strategies that address the needs of diverse students. Teachers and school leaders could have then collaboratively reviewed and adapted current curricular approaches and instructional and assessment strategies to enhance students' learning (Park et al., 2019). This approach could improve the diversity of the curriculum to advance students' achievement in mathematics given their unique needs (Nooruddin & Bhamani, 2019). Mathematics teachers and school leaders could design a curriculum plan to include the learning outcomes and levels of students then prepare unit plans, learning activities, and assessments to measure the attainment of the learning outcomes. Assessment data would then be used to refine curriculum, as needed. Thus, instead of focusing on instructional leadership practices, the project could concentrate on a curriculum review and revision, but this was not supported by the findings of this study.

An alternative approach to the study could also have been to investigate the perceptions of mathematics teachers on the challenges to deliver mathematics instruction. An alternative definition of the problem would then be to explore the challenges faced by mathematics educators to provide instruction to advance secondary students' mathematics achievement. Solutions to the local problem would include mathematics teachers and school leaders fostering a culture of collaboration to discuss their instructional challenges and identify evidence-based practices that lead to improvement. This may serve as a follow-up to this study in the future.

Scholarship, Project Development and Evaluation, and Leadership and Change

The development of the project deliverable provided PD activities aligned to the findings of the study. It was designed to provide an avenue for school leaders to collaborate and develop their skills, as they relate to the implementation of instructional leadership practices and support for teachers. In the process of preparing a PD activity, it was important to have an overall goal and specific objectives for each event and identify the resources needed for the PD, the timeline for activities, and an evaluation plan to assess the outcomes of the project.

Throughout the process of conducting this study, I gained valuable insights. I developed my skills and knowledge in conducting qualitative research and had the opportunity to ask questions and receive valuable answers to build my critical thinking skills. I found the beginning of the research process challenging, but the result was very beneficial, as explained by Alphonse (2023), that the research process could be both challenging and rewarding. In the process of conducting research, one has to be very meticulous, and I came to understand the importance of alignment of the topic, purpose, research questions, and methods.

As I reflect on my learning, I realized that at the beginning of the research process, I started with a problem but as I came toward the end of the research, I recognized that a problem can have several solutions, and this can be obtained through good questioning techniques during the interview. As a scholar, I have developed a growth in mindset as it relates to the challenges that I faced during the research and project development. In the beginning, I saw the reviews of my proposal as failing to achieve my goals, but with a change in mindset, I saw that it was an opportunity to persevere to complete a task that would be beneficial to not only myself but also to fellow educators. As a practitioner, I experienced growth in time management and teaching and leadership practices. As I communicated with school leaders during the data collection process, I recognized the importance of data-driven instruction, and this has been beneficial in improving student learning. As I reflect on my growth as a project developer and future leader, I recognized that this would be an area needing additional mentorship. I look toward using this growth in my leadership skills to advance my career.

Reflection on Importance of the Work

Overall, this project study will benefit school leaders, teachers, and students as instructional leadership practices are used to improve the instructional process in mathematics. By conducting empirical research, I experienced professional growth as a scholarly practitioner, as I conducted the study I learned more about data collection and analysis as well as effective instructional leadership practices. Conducting this research addressed a challenge faced by many school leaders related to the improvement of students' mathematics performance. By improving students' acquisition of mathematics knowledge and skills, they will become eligible to attend tertiary education. Students will also become more confident in the practical applications of mathematics that will make them more productive as they enter the workforce.

This research study has been instrumental in developing my problem-solving skills and motivated me to become an effective instructional leader. I learned the process of conducting qualitative research by identifying a problem and focusing on how to conduct a study that identified the implementation of instructional leadership practices to support teachers in advancing students' mathematics achievement. Several practical solutions to the problem were identified that included: aligning the school's mission with instructional leadership practices and mathematics goals, using motivation and collaboration, using assessments and feedback, and empowering school leaders and teachers through professional development. I feel confident in applying what I have learned to effect positive social change through the use of instructional leadership.

Implications, Applications, and Directions for Future Research

This project study can lead to positive social change at the organizational and societal levels. The results of this study highlighted the importance of collaboration and the use of data-driven instruction. This has led to positive social change as I have been able to use this knowledge in my teaching, and I have seen improvement in my students' achievement. I feel confident that the project deliverable will have the same positive results. The 3-day PD plan for school leaders will provide information on approaches that they can use to overcome the challenges faced in the implementation of instructional leadership practices to support mathematics teachers. The resulting positive social change includes school leaders being better equipped to support mathematics teachers, and this will lead to students' improved mathematics performance. The implications for improvements in mathematics achievement in secondary schools are educational, social, and economic. When school leaders have a sound understanding of instructional leadership practices and apply these practices to support teachers, students are the ultimate recipients, as better instruction leads to better learning. Students will receive instruction that enhances their academic achievement and educational success, thereby, increasing their opportunities for success throughout school and later in life.

This study employed qualitative methods and used interviews to gain a deep understanding of school leaders' challenges and the strategies they used to overcome these challenges by implementing instructional leadership practices. The methodological approach yielded findings specific to the study site that led to the development of the PD plan. Theoretically, this research drew from Hallinger and Murphy's (1985) instructional leadership model to frame the research questions and to analyze the data. The theoretical application was appropriate as Hallinger (2005) asserted that while school leaders have to fulfill many roles and responsibilities, they need opportunities for collaboration with other school leaders and teachers to enhance students' learning. A key component of the 3-day PD plan was based on collaboration among school leaders, and the application of instructional leadership practice to improve instruction, using collaboration to support teachers to advance students' mathematics performance.

Recommendations for practice include providing PD opportunities for school leaders to examine their practices and use data effectively to support mathematics teachers through collaborative efforts. It is recommended that PD be ongoing so that school leaders can periodically meet to discuss their practices and work collaboratively to address issues that arise related to serving as the instructional leaders of their schools. It is also recommended that teachers receive professional development to gain knowledge and skill in evidence-based mathematics instructional practices, formative assessments, and the use of data to guide instruction. This can be done by implementing PLCs that are mathematics specific.

Recommendations for future research are to broaden the scope of the study to include the perceptions of teachers and the challenges faced in their instructional practice and in their ability to improve mathematics achievement, specifically on the CXC exams. A second recommendation is to replicate this study with school leaders from the lower-performing schools. Since secondary schools operate under different conditions and with students of different abilities, it can be important to determine whether the challenges faced by school leaders at these schools are similar. A follow-up study, after PD, can be important to determine if the action plans designed by participants were implemented and how effective the leaders were in the application of instructional leadership to implement their action plans. A similar study can also take place at the primary levels, where the foundation of mathematics learning takes place.

Conclusion

The essence of this research was founded on the challenges in providing instructional leadership practices to support mathematics teachers to advance secondary students' mathematics achievement. The key finding was that school leaders' challenges were a result of the scope of responsibilities in their roles and the constraints within the school system. School leaders were faced with setbacks when attempting to promote growth mindsets to create positive school climates. The practices school leaders found helpful in supporting mathematics teachers to advance secondary students' mathematics achievement were discovered in this study. School leaders aligned the school’s mission with instructional leadership practices and mathematics goals; school leaders used motivation and collaboration; school leaders used assessment and feedback; and school leaders empowered teachers through professional development. From the findings of this research, it was determined that professional development for school leaders can address the challenges they face to meet the needs of their teachers and students. By improving school leaders' knowledge and skills to provide support to mathematics teachers, it is expected that students' mathematics achievement on the CXC exams will improve.

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Appendix A: The Project

Professional Development Project for School Leaders

Module Title: Instructional Leadership Practices to Advance Secondary Student Mathematics Achievement

Target Audience: District Education Officer and Secondary School Mathematics Heads of Department, Principals, and Assistant Principals.

Purpose: The purpose of the professional development (PD) project will be to enhance the school leaders' understanding of instructional leadership practices found to be effective to support mathematics teachers to advance secondary students' mathematics achievement.

Goals: School leaders will develop the skills and knowledge to assist teachers by developing instructional practices specific to mathematics through collaboration, motivation, aligning school's mission with mathematics goals, creating formative assessments, and using assessment data to guide instruction that will improve students' mathematics achievement.

Learning Outcomes: By the end of the professional development, school leaders will be able to:

- create formative assessments and use assessment data to guide instruction that will improve students' mathematics achievement,
- align their school's mission with instructional leadership practices and mathematics goals to help create a positive learning environment that can lead to improvements in mathematics performance,

- Motivate teachers and develop collaborative relationships that will lead to a more supportive and positive learning environment.

Materials: Computers, a projector and white board, PowerPoint presentations, markers, handouts, and an internet connection

Day 1

8:30 AM - 9:00 AM Registration and Welcome

9:00 AM - 9:30 AM Introduction to objectives for the day

Objectives: Identify the challenges faced in implementing instructional leadership practices and strategies to address these challenges

9:30 AM - 10:30 AM **Component -** Results of the study

PowerPoint Presentation of the results of the study.

Activity 1: Participation in small group discussions on the challenges faced by leaders to implement instructional leadership practices

10:30 AM - 10:45 AM Morning Break

10:45 AM - 12:30 AM Group leaders present a report based on Activity 1.

12:30 PM - 1:30 PM Lunch

1:30 PM - 2:30 PM Component **-** Strategies to address the challenges to implement instructional leadership practices

Activity 2: Brainstorming to find strategies that can address the challenges identified

2:30 PM- 3:00 PM Group Report on Activity 2.

Closing Remarks: Trainers/speakers encourage active participation in group discussions and provide additional resources for participants to explore some more on the topic.

Day 2

8:30 AM - 9:00 AM Introduction to objectives for the day

Objectives: Analyze how to align the school's mission with mathematics goals

Describe how to motivate teachers

Develop a deep understanding of the importance of data-driven instructions

9:00 AM - 9:30 AM **Component -** Aligning school's mission with instructional leadership practices and mathematics goals

PowerPoint Presentation on research-based practices to align the school's mission with instructional leadership practices and mathematics goals by trainer

9:30 AM - 10:00 AM **Activity 1**: Work in groups to review and align the school's mission with instructional leadership practices and mathematics goals

10:00 AM - 10:15 AM Morning Break

10:15 AM - 11:30 AM   Group leaders present a report based on Activity 1

11:30 PM - 12:00 PM **Component:** Effective motivation practices to improve students' mathematics achievement

PowerPoint Presentation of evidence-based research on effective motivation, collaboration, and pedagogical practices to improve students' mathematics achievement by speakers

12:00 PM - 1:00 PM Lunch

1:00 PM - 1:15 PM **Activity 2:** Work in groups to review instructional leadership practices to increase motivation and collaboration and identify effective pedagogical practices in mathematics to guide teachers in improving students' mathematics achievement.

1:15 PM- 1:30 PM Group Report on Activity 2

Closing Remarks: Trainers/Speakers encourage active participation in group discussions and provide additional resources for participants to explore some more on the topic.

1:30 PM- 2:00 PM **Component:** Formative assessment data to guide instruction

Presentation on the types of assessments, the use of formative assessment data to guide instruction, and the use of feedback to improve students' mathematics achievement by speaker

2:00 PM- 2:30 PM **Activity 3:** Working groups to identify assessment and data analysis practices, and feedback to teachers to improve students' mathematics achievement.

2:30 PM- 2:45 PM Group Report on Activity 3.

2:24 PM- 3:00 PM Closing Remarks: Trainers/speakers encourage active participation in group discussions and provide additional resources for participants to explore some more on the topic.

Day 3

8:30 AM - 9:00 AM Introduction to objectives for the day

Objectives: Apply the knowledge gained by preparing an action plan to implement instructional leadership practices that will advance teachers' instruction of and student learning in mathematics.

9:00 AM - 10:30 AM **Component**: Plan to apply instructional leadership practices

Activity 1: Group work on action plans using the work from Day 2 to implement instructional leadership practices to advance teachers' instruction of and student learning in mathematics

10:30 AM - 11:00 AM Morning Break

11: 00 AM - 12:00 PM Continue working on the development of action plans

12:00 PM - 1:00 PM Lunch

1:00 PM - 2:00 PM School leaders present their action plan to colleagues, presenters, and district education officer

2:00 PM - 2:30 PD evaluation by participants.

2:30 PM - 3:00 Refreshment/collaboration/ dismiss

Appendix B: Recruitment Email

You are invited to share your views for a study titled: Instructional Leadership Practices to Advance Secondary Student Mathematics Achievement in a British Commonwealth Country.

One 45-60 minutes interview that will be audio recorded (no video recording)

To protect your privacy, the published study will not share any names or details that identify you

Interviews will take place during March 2025

Volunteers must meet these requirements:

Serve as secondary mathematics department heads, principals, or assistant principals

Serve in secondary schools that have a pass rate of above 50% as measured on the mathematics CXC exam.

Please email dawn.agdomar-jean@waldenu.edu to let the researcher know of your interest.

Appendix C: Interview Protocol

RQ1: What are the perceptions of secondary school leaders on the challenges to provide instructional leadership practices to support mathematics teachers to advance secondary students' mathematics achievement?

RQ2: What are the practices school leaders found to be effective to support mathematics teachers to advance secondary students' mathematics achievement?

Conceptual Framework: Hallinger's Instructional Leadership Model (a) defining the mission of the school, (b) leading the instructional program, and (c) establishing a climate conducive for school learning

Introduction: Good day, I am here today to conduct this interview to gain a better understanding of instructional leadership practices that school leaders can use to support teachers to advance students' mathematics achievement and to gain insight on the challenges faced in implementing the instructional leadership practices. In doing so, I gain partial fulfillment of the requirements of the degree of Doctor of Education in Educational Administration at Walden University. Thanks for agreeing to participate in this interview.

Please note that this interview is being done voluntarily and it should last approximately 45-60 minutes; however, you are free to stop me at any point if you do not feel comfortable with the line of questioning and can decline to answer any question. This interview will be audio recorded for transcription purposes, but strict confidentiality will be maintained, as only I will have access to the recording.

Are there any concerns? If not, we shall proceed to the interview questions.

Questions	R1	R2	CFD1	CFD2	CFD3
What is your view of instructional leadership?		X			
What is your role as it relates to informing others of the school's mission?			X		
What is your role in ensuring that the standards stipulated in the school's mission are maintained?			X		
What is your role in setting goals for mathematics achievement?			X		
How are mathematics goals communicated to staff and students?			X		
How do you assist in motivating teachers and students to work towards mathematics goal achievement?			X		
What instructional leadership practices do school leaders implement to advance students' mathematics achievement?		X		X	
What instructional leadership practices do school leaders implement to support mathematics teachers?		X		X	
What challenges have you experienced in implementing instructional leadership practices to advance mathematics achievement?	X			X	
What challenges have you experienced in implementing instructional leadership practices to support mathematics teachers?	X			X	
How are you involved in working with teachers on mathematics				X	

Questions	R1	R2	CFD1	CFD2	CFD3
curriculum and instruction?					
Are you faced with any challenges when working with teachers on the curriculum and instruction? If yes, what are they?	X			X	
What policies and practices are being implemented to create a positive school climate?		X			X
What is being done to promote mathematics achievement for students?		X			
Are there any incentives given to motivate students to achieve in mathematics?		X			
What challenges have you experienced in creating a climate conducive to mathematics achievement?	X				X
What instructional leadership strategies are most effective in advancing mathematics achievement?		X			
What strategies would you recommend to school leaders who struggle in advancing mathematics achievement?		X			
What professional opportunities are needed for teachers to gain a better understanding of how to support mathematics teachers?		X			X
What professional development activities are needed for school leaders to help advance mathematics achievement?		X			X

Questions	R1	R2	CFD1	CFD2	CFD3
Is there anything else you would like to share or add?					

Closure: Thank you for your availability and answers to interview questions. After the completion of transcripts, I will ask you to review an emailed transcript of your interview to verify accuracy. Do you have any questions? Once again, thank you.

Appendix D: Codes, Categories, and Themes Aligned to RQs

RQ1: What are the perceptions of secondary school leaders on the challenges to provide instructional leadership practices to support mathematics teachers to advance secondary students' mathematics achievement?

Codes	**Categories**	**Themes**
Instructional leadership expectations Teacher support Enhanced teaching Enhanced learning Provision of resources Divine intervention Intrinsically motivating Team building Relaxing activities Incentives Mathematics month Recognition Data driven instruction Differentiated Instruction Clearly communicated Instructions Open door approach Timely feedback Monitor and support Professional development Peer observation Mentorship Professional learning communities Classroom observation	School leaders' variety of instructional leadership expectations	Theme 1: School leaders struggled to effectively implement instructional leadership practices due to the scope of responsibilities in their roles and the constraints within the school system.
Time constraints Resource limitation Diverse learning need Differentiated instruction Lack of parental support Unreliable data Resistance to change	Obstacles	

Resist classroom supervision Lack of teamwork, Lesson planning, and help from curriculum officers		
Lack of tailored lesson, collaborative Planning Team teaching, diagnostic assessment, and mentoring Difficulty in overcoming Mathematics anxiety Negative mindset Lack of teacher readiness Lack of Wifi and technology	Need to create a positive school environment	Theme 2: School leaders were faced with setbacks when attempting to promote growth mindsets to create positive school climates.

RQ2: What are the practices school leaders found to be effective to support mathematics teachers to advance secondary students' mathematics achievement?

Codes	Categories	Themes
Missions Effective communication Modeling behavior Meetings	How to inform stakeholders of school's mission	Theme 3: School leaders aligned the school's mission with instructional leadership practices and mathematics goals to advance secondary students' mathematics achievement.
Observation Evaluating data	Enforcing school mission	
Encouragement Being available Celebrating success		

Show love and care towards students Promote respect Inclusivity Use of technology Ensuring safety Awards for good behavior Certificates Mathematics wall Awards ceremony Prizes Data driven Instructions Mentorship program Extra Classes Collaboration Tailored lesson Collaborative planning Team teaching Mentoring	Motivating students to achieve Data and collaboration to guide instruction and assessment	Theme 4: School leaders used motivation and collaboration as a means of improving students' mathematics achievement.
Assessment and feedback Culture of high expectation Constructive feedback Growth in mindset Teacher and student motivation Diagnostic test Build student confidence Differentiate lessons Parental involvement Student centered learning Use of online tools	Strategies to advance mathematics performance	Theme 5: School leaders used assessment and feedback to improve the students’ mathematics achievement.
Leadership development Instructional modeling Training on data driven instruction Content knowledge Use of technology	Professional development	Theme 6: School leaders empowered teachers through professional development as a means to advancing students’ mathematics achievement.