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Teachers' Perceptions of the National Professional Development Policies and Mathematics Performance in Guyana

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Abstract

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Educational Policy, Leadership & Management

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Abstract

The Ministry of Education in Guyana has focused on improving primary students' performance in mathematics; however, low student performance persists. The problem addressed in this study was the limited understanding of how Guyanese primary teachers used the national professional development policies (NPDP) to address the low performance of students on the Math National Grade 6 Assessment (MNGSA). Grounded in Bandura's social cognitive theory and Senge's systems thinking theory, the purpose of this study was to explore Guyanese primary teachers' perceptions of their successes and challenges using the NPDP to address the low performance of students on the MNGSA. For this basic qualitative design, semistructured interviews were conducted with 12 teachers from 10 regional districts. Through deductive and inductive coding, the following themes emerged: teachers (a) integrated professional development into classroom practice; (b) collaborated through joint planning/coteaching to improve instruction; (c) faced limited and inconsistent implementation of strategies; (d) encountered resource shortage, time constraints, and difficulties differentiating instruction; and (e) struggled with students' attitude and engagement in mathematics learning. The findings revealed two key insights: teachers effectively applied professional development through confidence, engagement, and collaboration, while systemic and contextual barriers hindered consistent implementation. Implications for positive social change include promoting teacher-centered, context-responsive professional development that strengthens instruction, fosters collaboration, and enhances student achievement.

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Dedication

To my loving, patient, and ever-giving husband, Ivan Johnson, thank you for your unwavering support; I wouldn't have come this far without it. We have weathered the storm, and the sun is slowly coming out. To my beautiful kids, Devon, Christine, and Tamera, your understanding and patience through this process have been phenomenal. You all are my rock and my world. To Alix, my mom, thank you for shaping me into the person I am today. To Abi (my father), I thank God I am blessed to have you in my life to share this milestone. To my sister, Dionne, thank you for your words of encouragement. To my beautiful Grandchildren, Jael, Cassie, Rhyan, and Darius. This work is to ensure that you benefit from better quality teachers, who keep you engaged with an appreciation for mathematics and a love for school and learning.

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Table of Contents

List of Tables

Chapter 1: Introduction to the Study

Introduction

The low mathematics performance of Grade 6 students in the national Grade 6 assessment has been a perennial issue for the Ministry of Education in Guyana. There is limited understanding of how Guyanese teachers used national professional development policies to address the low mathematics performance of students in the national grade 6 mathematics assessments. This study provides important insights into teachers' instructional practices and their impact on low performance. In this chapter, I present the rationale for exploring Guyanese teachers' perceptions of their successes and challenges in teaching mathematics as they relate to the implementation of national professional development policies. The discussion outlines the problem and purpose statements, research questions, and the conceptual framework guiding the study. It also describes the nature of the study, addresses its limitations, and highlights the significance of the study. The chapter concludes with a summary of the key points that frame the exploration.

Background

Although researchers had investigated this issue, the topic had not been explored in this way. There was limited research interviewing primary teachers on their perceptions of their practices. Researchers documented teachers' perception of the cause of students' poor performance in mathematics (Mazana et al., 2020), how their training shaped their belief in mathematics learning, school-related factors (Ariza et al., 2023; Downton et al., 2022), and their perceptions of the effects of policy on their teaching of mathematics (Polman et al., 2021). However, these studies were all conducted within the

education systems and contexts that were more developed and different from Guyana's education system and context. The current study provided important insights into teachers' instructional practices and their impact on low performance.

Problem Statement

The problem addressed in this study was the limited understanding of how Guyanese primary teachers used the national professional development policies (NPDP) to address the low performance of students on the Math National Grade 6 Assessment (MNGSA). Teachers' perceptions of students' mathematics performance or capabilities were well-researched (Bittner & Bull, 2021; Mason, 2023; Tsanwani et al., 2014), but not in the context of Guyana. Teachers' perceptions of their environmental factors and social constructs (time and gender) were essential for considering and understanding students' mathematics learning and performance. Other considerations for further insight were the approach to teaching mathematics and the need to delve deeper into teachers' perceptions of what shaped their views about students' low performance.

For decades, the Ministry of Education in Guyana struggled to find ways to improve primary-level mathematics performance, but low student performance persisted. Just over a third (34%) of students passed the national Grade 6 math assessment (Ministry of Education, 2023). In the hinterland and riverine areas, the national Grade 6 assessment (NGSA) pass rates in mathematics were even lower, at fifteen percent and thirty percent, respectively, in the last NGSA conducted in 2022 (Ministry of Education, 2023). The Ministry of Education saw this phenomenon as a significant challenge in improving quality. This resulted in the articulation of strategies focused on "improving

the quality of teaching mathematics" in its sector plan, which sought to address the issues contributing to this phenomenon (Ministry of Education Sector Plan, 2021, p. 80). Recent literature has indicated that teachers' perceptions of students' performance are crucial in student-teacher interactions and for academic outcomes (Looney et al., 2022). Thus, this study contributed to the literature by researching teachers' perceptions in Guyana, thereby highlighting one aspect of potential factors that may be attributed to students' low mathematics performance.

Purpose of the Study

The purpose of the study was to explore Guyanese primary teachers' perceptions of their successes and challenges in using the NPDP to address the low performance of students on the MNGSA. I conducted semistructured interviews with 12 primary teachers. The findings of this study could enhance policymakers' understanding of how teachers translate policy related to their professional development into practice.

Research Questions

The following two questions guided this research:

RQ1: What are Guyanese primary teachers' perceptions of their successes using the NPDP to address the low mathematics performance of students on the math national Grade 6 assessment?

RQ2: What are Guyanese primary teachers' perceptions of their challenges using the NPDP to address the low mathematics performance of students on the math national Grade 6 assessment?

Conceptual Framework for the Study

The conceptual frameworks that supported this study included Bandura's (2023) theoretical work on social cognitive theory and Senge's (2006) systems thinking. Bandura's social cognitive theory helped investigate how teachers' beliefs and self-efficacy about student learning could impact their perception. Furthermore, social cognitive theory informs teachers' perceptions of external influences, such as policies, that shape their views on their practices and their alignment with policies related to professional development in mathematics.

Senge's (2006) systems thinking theory can be applied to examine teachers' perceptions from a systems perspective by exploring how their instructional practices and school policies interact, influence, and shape their perceptions. The social cognitive theory and the systems thinking theory conceptually informed this research. More specifically, social cognitive theory served as the foundation for answering the two research questions and facilitating the collection and analysis of the data. The systems thinking theory underpinned all thought processes in this study, in that teachers were part of this educational ecosystem. Their perceptions were one aspect of the system's view.

Social cognitive theory is relevant to the study of primary teachers' perceptions of their successes and challenges using professional development policies to address students' performance because this framework was about learning through observation and patterning the behavior of others; self-efficacy is about belief in oneself to get the job done effectively and reciprocal determinism, which was the interplay between personal, environmental, and behavioral influences (Bandura, 2023). Understanding these

interactions between individual, behavioral, and environmental factors helps in understanding how teachers' perceptions of their skills and self-efficacy, influenced by professional development policies and practices, affect their teaching practices and whether they perceive their professional development policies as adaptable to the diverse and changing factors of the environment. These factors include the school policies, along with teachers' beliefs, experiences, and behaviors. By applying Bandura's social cognitive theory, I explored how teachers' perceptions of their successes and challenges, as influenced by professional development policies, impacted students' performance. This offers valuable insights into educational policy and practices.

Senge et al. (2012) stated that the systems thinking framework focuses on seeing the whole picture and understanding the interrelationships within systems. Senge et al. (2012) posited that systems thinking involves understanding five disciplines: personal mastery, mental models, shared vision, team learning, and systems thinking. These disciplines were relevant to this study in the following ways. First, for personal mastery, I examined how teachers' continuous learning, informed by professional development policies and self-improvement, affected their perceptions and effectiveness. Investigating teachers' assumptions and beliefs about students' performance and how these impacted their teaching method was linked to what Senge et al (2012) referred to as understanding mental models. This discipline was important in shedding light on their perceptions informed by personal mastery and mental models. Systems thinking enabled the exploration and illustration of the complex web of interrelationships that affected

students' performance, as perceived by teachers, within the unique context of Guyana's education system.

Nature of the Study

Qualitative research involves understanding the interactions between the researcher and participants to examine and make sense of human experiences and perspectives (Ravitch & Carl, 2019). A qualitative method was appropriate for this study because it focused on teachers' perceptions, which were based on their own experiences of teaching mathematics in the classroom, thereby shedding light on the phenomenon of interest. This basic qualitative study explored teachers' perceptions of their successes and challenges in using the NPDP to address students' low mathematics performance in mathematics. In this context, the primary data collection strategies were semistructured interviews with 12 primary school teachers. Primary school teachers were included in this study because they taught all core subjects (mathematics, English, science, and social studies) daily.

Definitions

The following terms were used frequently in this study; as such, the definitions are provided below:

Observational Learning: By observing others act, individuals could pick up new behavioral patterns through observational learning (Bandura, 2023).

Personal Mastery: The ability to continually clarify and deepen one's vision, focus one's energy, develop patience, and see reality objectively (Senge, 2006).

Self-efficacy: People's views on their capacity to exercise control over the various obstacles in their lives (Bandura, 2023).

Assumptions

This qualitative study assumed that teachers' perceptions of their success and challenges in using national professional development policies are deeply influenced by their individual experiences, professional backgrounds, and the specific contexts in which they work. It was presumed that these perceptions were not just straightforward reflections of the efficacy of the policies but also encompassed the complex interplay between individual teacher characteristics (such as their beliefs, prior experiences, and professional aspirations), the unique environments of their respective schools (including school culture, student demographics, available resources, and administrative support), and the broader educational system (such as overall policy goals, implementation strategies, and support mechanisms). Each teacher's experience is unique and subjective. Therefore, their perceptions offer valuable insights into the real-world impact, relevance, and practical challenges of implementing national professional development policies. This assumption underscored the importance of capturing and understanding the nuanced, varied, and often deeply personal ways in which teachers engaged with and perceived the impact of these policies on their professional growth and classroom practice.

Scope and Delimitations

This qualitative study focused on exploring Guyanese primary teachers' perceptions of their successes and challenges in using national professional development policies to address the low mathematics performance of students on the national Grade 6

assessment in mathematics. The purpose of the study was to understand how these policies affected their professional growth, teaching practice, and effectiveness. The sample included teachers from diverse backgrounds and varying years of experience in public primary schools across all regional districts in Guyana, ensuring a broad range of perspectives. Data were collected primarily through in-depth interviews and desk reviews of the national professional development policies. This method was chosen to capture detailed, nuanced insights into teachers' experiences and perceptions. This study employed thematic analysis to identify and analyze patterns and themes in the qualitative data, with a focus on areas such as policy implementation and its impact on teaching and learning.

This study was confined to the administrative regions in Guyana; therefore, the findings cannot be generalized to other areas or countries with different educational systems and professional development policies. The study included teachers who were currently teaching and were using the national professional development policies. Retired teachers, administrators, and policymakers were not part of this study. As the study relied on teachers' perceptions and experiences, the data were inherently subjective. The study did not aim to objectively measure the effectiveness of the policies, but rather to understand individual experiences and perceptions. These scope and delimitation parameters defined the boundaries of this study.

Limitations

My role as a researcher and employee in a leadership position at the Ministry of Education could have posed a challenge to the data collection process, as teachers might

be reluctant to share their experiences and perspectives about policy and their practices with me. Although I hold a leadership position within the Ministry of Education, my work does not require me to interface with head teachers in a supervisory capacity. I also ensured that the teachers selected for this study were notthose I knew or had interacted with. As such, during the process, I found ways to exercise reflexivity. With reflexivity, the researcher was aware of, monitored, and addressed their role (Ravitch & Carl, 2019). Another challenge could have been getting teachers to participate in an hour-long interview. As such, I scheduled interviews before and after school time or during the school term break. Understanding and being appreciative of the appropriate time and space for the study participants is known to affect the information collected from the interviews (Ravitch & Carl, 2019), as it can significantly influence the comfort level and openness of participants, thereby impacting the depth and authenticity of their responses.

Significance

This study was an examination of the gap in research in Guyana related to teachers' perceptions of their instructional practices and policies that influence persistent low performance in mathematics. Furthermore, teachers' perceptions of students' mathematics performance or capabilities have been well-researched (Bittner & Bull, 2021; Mason, 2023), but not in the context of Guyana. Teachers' perceptions of their environmental factors and social constructs (time and gender) are essential to considering and understanding students' mathematics learning and performance. This study's results provide significant insight into teachers' instructional practices and their impact on low

performance to policymakers and teachers at the central level of the Ministry of Education.

Summary

The purpose of the study was to explore Guyanese primary teachers' perceptions of their successes and challenges in using the NPDP to address the low performance of students on the MNGSA. Previous studies have looked at teachers' perceptions in various systems and contexts, but not in the context of Guyana. This qualitative study employed Bandura's social cognitive theory and Senge's (2006) systems thinking theory to examine how teachers' beliefs and the broader educational system influenced their perception of student performance in mathematics. Data were collected through semistructured interviews with 12 primary school teachers. This study was significant as it addressed a gap in research concerning Guyana's educational context and aimed to provide policymakers and educators with insights to understand and improve students' mathematics learning and performance. As a researcher, I acknowledged potential challenges in data collection due to my position in the Ministry of Education. I mitigated these issues through careful selection of participants and the scheduling of interviews. In Chapter 2, the literature reviewed in this study critically examines existing research and seminal work relevant to teachers' perceptions, with a focus on the teaching of mathematics at the primary level to establish a comprehensive foundation for the study and to identify gaps in current knowledge that this research aimed to address.

Chapter 2: Literature Review

The research problem addressed in this study was the limited understanding of how Guyanese primary teachers used the national professional development policies (NPDP) to address the low performance of students on the Math National Grade 6 Assessment (MNGSA). The purpose of this study was to explore Guyanese primary teachers' perceptions of their successes and challenges using the NPDP to address the low performance of students on the MNGSA.

Teachers' perceptions of students' mathematics performance or capabilities were well-researched, but not in the context of Guyana. Teachers' perceptions of their environmental factors and social constructs (time, perceptions/beliefs, and gender) are essential for considering and understanding students' mathematics learning and performance. Other considerations for further insight are the approach to teaching mathematics and the need to understand teachers' perceptions of what shaped their views about students' low performance, along with what teachers know about their students' ability to learn mathematics (Dicke et al., 2021). As such, teachers' perspectives on how these factors affect their teaching in the classroom need to be explored in various contexts and, more specifically, in Guyana.

According to Perera and John (2020), teachers who believe they can successfully carry out their teaching jobs should expect greater classroom process quality and better student outcomes, as it is anticipated that improved classroom procedures, such as offering emotional support and instructional support, will likely enhance both teacher and student outcomes. Teachers' strong sense of effectiveness increased their propensity to

organize and support students to a suitable degree, which in turn enhanced the quality of student-teacher interaction and ultimately improved their overall outcomes (Perera & John, 2020). This view substantiated that teachers with a high perception of their effectiveness are likely to put more effort into finding new and innovative ways to improve their practices in support of students. Li et al. (2024) posited that students' engagement, specifically in mathematics, is influenced by creative, innovative teaching practices that help students in mathematics at the primary level.

Policymakers and leaders within similar education systems could use the results of this study to understand and change how professional development for teachers is thought about, developed, and implemented in schools, districts, or the education system. Researchers have indicated that professional development is critical to teacher quality and efficacy, and access to professional development does not necessarily lead to improved teaching practices (Eun, 2018; Nawab et al., 2020). This perspective may exit because professional development involves more than the content covered in professional development sessions. Teachers must be able to apply what they learn or teach in these sessions. Policymakers may need to create a space that allows teachers to reflect on how to translate their learning into practice. Eun (2018) elaborated that there are fundamental differences between acquiring and using new knowledge and skills. As such, in planning professional development, consideration should be given to the content of the professional development and its implementation in the classroom. This approach of focusing on content and creating the space to practice what is learned in professional development holds for other researchers who have found that, by addressing pedagogical

content knowledge, PD can be effective (Dickson et al., 2021). As such, teachers can effectively connect concepts with real-world issues.

McClusky et al. (2021) argued that improved classroom practices and student outcomes occur when professional development is effective. This view suggested that teachers who receive high-quality professional development feel more empowered to instruct. Others have posited that teachers' perceptions of their own capabilities, their students' capacities, and the teaching and learning process all influence the way they behave when instructing (Dicke et al., 2021). These teachers are known to have high self-efficacy about the subject they teach and their pedagogical content knowledge.

I review the relevant studies to justify the problem in this study's introduction. I also identify several studies on teachers' perceptions that used social cognitive theory as a framework for their research. The main topic of the literature review includes sections on the literature search strategy, theoretical framework, and topics related to teachers' perceptions of their successes and challenges with the national professional development policy. I conclude the chapter with a summary based on a review of the literature.

Literature Search Strategy

The study literature comprises a thorough review of the current information retrieved from multiple databases, including peer-reviewed articles related to this topic. I searched the databases through the Walden Library, which included Educational Resources, ProQuest Educational Journals, SAGE, ERIC, Emerald Insight, and Google Scholar. The areas of focus were teachers' perceptions, mathematics education, and effective continuous professional development policies. The keywords included

instructional, pedagogical, teaching, mathematics, social cognitive theory, primary education, teachers' perception, policies, observational learning, procedures, and *practices*. In cases where there was little research, I sought the assistance of the librarian and attended the library search workshop. I applied the knowledge I gained from searching the advanced database, and this approach aided the process of acquiring sufficient studies on the topic.

Conceptual Framework

The conceptual framework of this study was based on Bandura's (2023) social cognitive theory and Senge's (2006) systems theory. I utilized both approaches to explore teachers' perspectives on their successes and challenges in using national professional development policies to address the low mathematics performance of students on the mathematics national Grade 6 assessments. The primary proposition of social cognitive theory is that people's learning is influenced by personal, behavioral, and environmental factors that interact with their beliefs and behavior. Senge referred to the interaction of the personal, behavior, and environmental as triadic reciprocal determinism, which means that people's behavior is influenced by individual factors, which he posited as cognition, emotions, biological events, and environmental factors, that result in a change in one factor. For example, an individual personal factor can affect a change in behavior or other factors.

One of the most notable aspects of social cognitive theory is the emphasis on observational learning, in which individuals acquire new behaviors, skills, and attitudes by watching others, where "modeling is a key first step in conveying strategies and

building in others a sense of efficacy for performance" (Bandura, 2023, p. 75). Social cognitive theory posits that certain behaviors will lead to specific outcomes, known as outcome expectations, which suggests that people are more likely to engage in behaviors they believe will result in positive outcomes and avoid behaviors they expect will lead to negative outcomes (Bandura, 2023). Another important aspect of social cognitive theory is that individuals control their behavior through self-monitoring, goal setting, feedback, and self-reinforcement, all of which contribute to self-regulation. This allows individuals to guide their actions and behavior toward achieving long-term goals.

Social cognitive theory has been extensively used to understand teachers' perceptions; for example, it has been employed to investigate teachers' valuation of mathematics and their students' valuation of mathematics. Social cognitive theory suggests that teachers may transmit their values and beliefs to students through their instructional practices, as these interactions are reciprocal (Dicke et al., 2021). The theory was used to analyze the factors influencing individual elementary teachers' innovative behavior by explaining how individual behavior was affected by two primary factors: internal and environmental (Li et al., 2024). In a study aimed at understanding teachers' self-efficacy in teaching mathematics, social cognitive theory was employed to examine the interactions between teachers' self-efficacy and its relationship with work satisfaction, as well as the quality and level of classroom interaction and achievement (Perera & John, 2020). Understanding these associations could inform strategies to enhance teacher training and support initiatives aimed at improving self-efficacy, thereby improving overall educational outcomes.

Other studies, such as McClusky et al. (2021), employed social cognitive theory to investigate the relationship between teachers' perceptions of professional development quality and their sense of teaching efficacy. Additionally, Eun (2018) employed social cognitive theory to underpin professional development, acknowledging that most contemporary theories of human development recognize the mutually reinforcing, reciprocal, and bidirectional effects that exist between an individual and their dynamic, ever-changing environment. The application of social cognitive theory in these studies provided valuable insights into how professional development can be structured to enhance teacher efficacy. By recognizing the reciprocal and bidirectional influences between teachers and their environment, professional development programs could be designed to be more effective and impactful, ultimately leading to better educational outcomes.

This study focused on understanding teachers' perceptions of their successes and challenges in using national development policies to address the low mathematics performance of students on the national Grade 6 assessment in mathematics. This involved examining the interaction between individual behavior, environment, and personal factors that influenced each other in this study context, which related to key components in social cognitive theory. Individual behaviors and personal factors influence teachers' perceptions of the efficacy of professional development policies and how these translate into successful or challenging classroom practices. Additionally, teachers perceive national professional development policies, which serve as environmental factors that can influence successful or challenging classroom practices.

This study also applied Senge's (2006) systems thinking as a conceptual framework undergirding this study. The primary proposition of Senge's systems thinking is that a systems approach to education can help transform educational institutions into learning organizations, where schools function as a system within a larger educational and community system. As such, decisions on national professional development policies should consider the curriculum, the administration's capacity to monitor, and how they are connected and interact.

Senge (2006) posited that building a shared vision among stakeholders (teachers, students, parents, and administrators) was crucial because this shared vision helps motivate and engage everyone in the school community towards common long-term goals, enhancing commitment and coherence across institutions and, in this instance, within the education sector. Further, promoting team learning among faculty and staff through collaborative practices, professional development, and reflective dialogue encourages collective problem solving and innovation, which are likely to lead to more effective teaching strategies and better learning outcomes. According to this framework, systems thinking encourages personal mastery among educators and students. This involves fostering a commitment to lifelong learning and personal growth, ensuring that individuals continually expand their ability to achieve the results they seek and engage deeply with the educational process, which also aligns with social cognitive theory.

Systems thinking has its roots in numerous indigenous civilizations that acknowledged the interdependencies and connections between all things, dating back thousands of years (Martin, 2016). However, Senge's (2006) systems thinking approach

has not been extensively researched in education in recent years. The studies that focused on system leadership with a similar proposition as Senge's framework explored it from a leadership/system perspective to understand the underlying pattern in an organization (Norqvist & Arlestig, 2021), as well as through sharing knowledge on the system thinking by incorporating this framework into leadership, which offers an innovative way of addressing professional competence (Talley & Hull, 2023). Authors of these studies made the general assumption that system theory would be a useful tool for revealing how specificities and generalities are articulated and interconnected inside educational institutions, which was important in understanding how professional development policies, as an environmental element, were interconnected or overlapped with other school processes that resulted in successes and challenges in practices.

Literature Review Related to Key Variables and/or Concepts

In this section, I discuss several topics pertinent to teachers' perspectives on their successes and challenges in implementing national professional development policies to improve mathematics performance. These topics were embedded in research that presents peer-reviewed sources on how to address students' low mathematics performance through professional development policies and practices.

Teachers' Perspectives on Professional Development

Researchers associated students' poor performance in mathematics with the challenges teachers face in teaching mathematics. They attributed teachers' challenges in teaching mathematics to their experiences in preservice teacher training and professional development (Barak, 2024; Fitriatri et al., 2023). Professional development has long been

closely tied to human development and lifelong learning. As such, the professional development structure varies from country to country. In some countries, such as those in Europe, professional development is voluntary, whereas in the United States, teachers participate in professional development to fulfill certain standards, making it mandatory (Ronnerman & Olin, 2021). In the context of Guyana, professional development is generally voluntary, meaning teachers choose to participate in the professional development programs. However, there are some professional development programs, such as those in mathematics, where teachers from low-performing schools are identified to participate in training in one of the mathematical strands, particularly at the primary level.

Teachers' perception of their experiences with professional development has been extensively researched (Druken, 2022; Perrotta, 2021; Woodland et al., 2019, 2023), especially related to professional development in mathematics (Cooper, 2019; Druken, 2022; Mason, 2023; Penfold & Hoskins, 2024). Because teachers' practices are shaped by their beliefs, studies have shown that effective mathematics practices and teachers' beliefs should be addressed through professional development (Hunt et al., 2023). When teachers' beliefs and actions are considered, their classroom strategies are likely to have a lasting impact on students' learning.

Other studies had shown that professional development should be content-specific, purposeful, and timely (Jurs et al., 2022; Perrotta, 2021); when professional development met these criteria for teachers, it supported teacher preparation and contributed to teachers' satisfaction. Teachers explained that being engaged in teacher-

driven professional sessions created the opportunity, through team planning and debriefing with colleagues, for them to rethink ways to best represent mathematics to their students in a practical way (Druken, 2022). These opportunities lead to teachers' efficacy; teachers learned new pedagogy from their peers, and there was space for them to internalize what this meant for their teaching.

There was other evidence from teachers that collaboration led to students' achievement, especially in improving mathematics. While this was generally agreed upon, some teachers held the view that the roles of teachers and parents in supporting their students should be distinct. This view suggested that their performance was positively affected when teachers work together, share strategies, and support each other. It also implied that successful education strategies involved structured collaboration among teachers, alongside clear communication and defined roles for parents to ensure a balanced support system for students.

Teachers viewed professional learning communities as a valuable support system that used their time effectively (Woodland et al., 2023). They explained that for professional learning communities to be effective, protocols should be used as a tool to facilitate structured conversations about the teaching-learning process (Woodland et al., 2023). These statements highlighted a dynamic approach to professional learning, supported by both theory and practice. The process of revealing, evaluating, and reflecting on educational practices with colleagues could lead to significant professional growth, provided there was support and a collaborative environment within the educational community. The focus on appreciation and structured implementation of the

professional learning community pointed towards the need for a strategic approach to professional development in education that engaged teachers and considered their views of what worked best for their learning and development.

There were gaps in the literature that addressed teachers' perceptions of their challenges and successes in implementing professional development. Another gap was how teachers perceived the policies that directly influenced mathematics practice. (2019) posited that there were always disparities between teachers' views on official policies and the school atmosphere. As such, policymakers must pay attention to teachers' perceptions of policy implementation at all levels.

Teachers' Perceptions of Mathematics Teaching

There was existing research on teaching mathematics (Binns-Thompson et al., 2021; Karali, 2021; McCarthy-Curvin & Berry, 2023; Teixeira, 2022), specifically at the primary level. These studies demonstrated that effective pedagogical subject knowledge is necessary for teaching mathematics and that an interdisciplinary approach to teaching mathematics is essential for learning (Karali, 2021). One of the primary factors used in society and educational institutions to assess a student's achievement in school was their proficiency in mathematics. As such, classroom teachers must understand that an interdisciplinary approach to teaching mathematics can accomplish it.

In the same vein, Mellroth and van Bomme (2019) found that differentiated education and adaptive teaching methods were two ways to address all students' needs. Teachers must possess an in-depth understanding of both their students and effective pedagogies to address the diverse needs of their students successfully. This statement

underlined the necessity for teachers to thoroughly understand effective pedagogical strategies to address the diverse needs of the classroom. Teachers viewed the teaching of mathematics to diverse groups of students in a particular class as a challenge because they could not employ culturally responsive practices effectively (Meeran & Van Wyk, 2022). This research highlighted the need for targeted professional development that equipped teachers with the skills needed to implement culturally responsive teaching practices.

The effective teaching of mathematics required the employment of various strategies and techniques that were relatable to students, taking into account their diverse learning needs. Friesen and Kuntze (2020) underscored the critical role that content knowledge plays in enhancing teachers' competence and employing effective strategies that are relatable to the teaching of fractions. They posited that content knowledge was a strong predictor of teachers' competence. While pedagogical knowledge was essential, the findings suggested that it was not sufficient on its own to develop strong analytical skills without a solid foundation of content knowledge. McCarthy-Curvin and Berry (2023) highlighted the need for teacher education programs, specifically in mathematics, to be designed with sufficient rigor to address how teachers' pedagogical content knowledge and content knowledge were developed. This suggested that well-designed teacher preparation was crucial for equipping educators with the necessary skills to meet the diverse needs of students effectively. This approach led to quality teaching of mathematics in classrooms through tailored instructions presented in ways that were accessible and understandable to students.

Teachers employed various strategies in the teaching of mathematics and, as such, had varying views about the efficacy of these strategies in improving students' conceptual understanding of mathematics. Manoharan and Kaur (2022) asserted that teachers did value the use of diagrams when teaching mathematics and employed them in a variety of methods and contexts throughout their lessons, which underscored the importance of diverse instructional methods. Teachers believed that using manipulatives could help students understand mathematics better, but how well they worked depended on the type of manipulatives and how teachers helped their students use them (Johnson et al., 2020). However, teachers also mentioned that inadequate preparation and instructional time were obstacles to using manipulatives. This obstacle highlighted the need for better support and resources to enable teachers to use manipulatives more effectively in their instructional strategies (Johnson et al., 2020). In the context of Guyana, teachers were trained in the use of manipulatives to support students' learning. However, there had not been any recent data or reports indicating teachers' successes or challenges in using manipulatives for teaching mathematics.

Russo and Russo (2021) contended that teachers view using games to engage students in mathematics as the greatest approach to do so. They thought that games could spark in-depth conversations about mathematics between students and teachers. Similar to how games were used to translate abstract ideas into real-world comprehension, metaphors were employed by teachers as a creative teaching strategy that helped students learn, particularly when it came to the perception that mathematics is abstract and challenging (Ozcan, 2023). By translating abstract ideas into real-world contexts and

relatable terms, these strategies enhanced understanding, engagement, and overall learning outcomes.

Teachers viewed differentiated instruction as a potential pedagogical method to be used when teaching students, especially highly gifted students. By aligning instruction and assessment with students' abilities, teachers can enhance learning through differentiation. Teachers who mastered leading students through the problem rather than providing them with solutions understood the principles to differentiate and indicated that this process of guiding them was done through analysis, development, and discussions of demanding problems (Gyongyosi-Wiersum, 2022; Mellroth & van Bomme, 2019). The Ministry of Education in Guyana emphasizes differentiation as a core learning principle for teaching Guyanese students, and teachers who used the renewed curriculum have to be trained to employ differentiated strategies. However, monitoring reports found that teachers were not differentiating during instruction; instead, they were grouping students according to their abilities. Webel and Dwiggins (2019) asserted that some teachers questioned the effectiveness of ability grouping in schools, given that it had a negative impact on their own experience. Others characterized ability grouping as a useful tool in promoting learning for all children.

Other studies (Jukic Matic & Glasnovic Gracin, 2020; Sekao & Engelbrecht, 2022; Viro et al., 2020) showed that teachers perceived methods such as project-based learning, lesson study, and teachers' use of teaching guides to support mathematics teaching as strategies that led to improvement in students' knowledge and understanding in mathematics. Through teacher self-efficacy and quality teaching, as it relates to

project-based learning, teachers perceived this method as appropriate for learning new mathematics methods and revision. In terms of lesson study, this method provided teachers with a framework within which they could interpret their instructional actions through social interaction with their peers. Being able to collaborate was the primary benefit perceived by teachers, enabling them to significantly enhance students' comprehension of mathematical concepts by reading, debating, and practicing teaching and learning strategies with their peers (Sekao & Engelbrecht, 2022).

Skilled mathematics teachers possessed a deep knowledge of the subject, enabling them to explain complex concepts clearly and accurately. Moreover, well-prepared teachers can differentiate instruction to meet the diverse needs of students, thereby ensuring that all learners are supported. Md-Ali et al. (2021) highlighted the importance of teachers' having deep knowledge of the teaching of mathematics, which enabled them to reflect on their teaching, adapting, creating, and implementing alternative and novel approaches to the teaching of mathematics that took into consideration their social context and cultural practices, specifically for students in deep rural areas. Vodickova et al. (2023), in their study on teachers' perspective of supportive factors in teaching inclusive mathematics, found that teachers viewed implementing inclusive mathematics as requiring an all-encompassing approach that required the establishment of a team within the school to support students. They indicated that teachers needed to blend mathematical didactics with customized adaptation for each student, drawing on knowledge that fell outside their main responsibility and sense of self, which were prerequisites for inclusive education. These studies (Md-Ali et al., 2021; Sekao &

Engelbrecht, 2022; Vodickova et al., 2023) emphasized the importance of this deep knowledge, which allowed teachers to adapt their methods to various social and cultural contexts, especially in rural areas. The following section delves into teachers' perspectives on policies that impact their teaching practices.

Teachers' Perceptions of Policies

Teachers perceived policies as driven mainly by economic and technological development, as well as their pedagogical content knowledge, especially in mathematics (Berry, 2021; Probert, 2021). These drivers put pressure on governments to adopt policies that were perceived to have worked in various contexts. When the local context in which the adopted policies were not considered, these policies were likely to fail. Probert (2021), in a study on policy transfer and isomorphism, found that when neoliberal education policies were transferred and adopted without considering the context, the policies were more likely to become convoluted. Teachers in this study felt that the policy on mathematics teacher exchange would have more currency for them if the political interest focused more on building capacity at the school level rather than importing costly reforms. Teachers posited that for any transnational policy to take shape in education, its local context must be considered.

Numerous studies highlighted the importance of teachers' roles in policy development and implementation (Mughal & Asad, 2020; Tenorio, 2022;, 2019). These studies indicated that teachers were the main factor contributing to successful policy implementation. When teachers were not involved in policy implementation, that affected how they delivered content in the classroom; their efforts to deliver new content, for

which they had not internalized sufficiently, were superficial and not sustained. Xenofontos (2019), in a study on primary teachers' perspectives on mathematics curriculum reform, highlighted the need for teachers' views on professional development policies and programs that impacted curriculum delivery. Using semistructured interviews conducted with 22 teachers in Cyprus, the teachers shared their opinions on effective professional development. They believed that well-structured, practical programs and policies, supported by relevant resources, were more likely to effectively address the needs of teachers at the school and classroom levels. Such professional development fostered teachers' agency, where teachers saw themselves as agents of change within the classroom (Tenorio, 2022). Underscoring the importance of teacher agency and their perception of the professional development policy's utility for their needs was an important consideration for successful implementation.

When teachers were given the space to internalize policies, specifically professional development policies, they were more likely to integrate the new knowledge into their classrooms sustainably, leading to improved student performance (Ashraf, 2019; Tenorio, 2022). Teachers posited that, given the integral nature of their role in the classroom, consideration should be given to them to be actively involved in professional development policies. They were the ones in the classroom implementing the policies and could describe their efficacy (Ashraf, 2019). Without such consideration, policies are likely to fail, resulting in a cyclical pattern of ineffective reform. This study extended this knowledge by unpacking, within the context of Guyana, what teachers' perspectives were

of their success and challenges in implementing national professional development policies geared toward improving mathematics performance at the primary level.

There were gaps in the literature, particularly regarding teachers' perceptions of their professional development challenges in specific contexts, such as Guyana. Studies on teachers' perceptions of student performance, particularly in mathematics, have been extensively researched (Bittner & Bull, 2021; Looney et al., 2022; Mason, 2023; Tsanwani et al., 2014), but many of these studies relied on quantitative approaches or single case studies. Several studies (Jurs et al., 2022; Linares, 2022; Perrotta, 2021; Xenofontos, 2019) emphasized the disparity between teachers' views on official policies and the school atmosphere, reinforcing the need for policymakers to consider teachers' perspectives at all levels of policy implementation. This study contributed to the broader understanding of these issues and offered a foundation for future research on professional development policy.

Summary and Conclusion

In this chapter, I provided an exhaustive review of the literature on Guyanese primary teachers' perceptions of their successes and challenges in using the NPDP to address the low performance of students on the MNGSA. It highlighted the reciprocal relationship between individual and environmental factors that shaped teachers' perceptions and behaviors, forming the study's conceptual framework. The chapter also explored teachers' views of professional development and mathematics teaching, emphasizing that effective professional development, as suggested by various researchers (Nawab et al., 2020), requires more than just content knowledge; it must include

implementation and reflection. Additionally, I examined how teachers' perceptions of their effectiveness and ability to innovate impacted students' outcomes, particularly in mathematics.

These findings revealed that if professional development policies are to lead to meaningful and sustained changes in teaching practices, a school-based, bottom-up approach focusing on teachers' beliefs, interests, and motivations, is recommended (Dicke et al., 2021; Mughal & Asad, 2020; Penfold, 2023; Tenorio, 2022). Teachers' experiences with these policies were shaped by a combination of social, environmental, political, and individual factors. These approaches would better inform policymakers and educators on designing effective professional development programs that enhance long-term student outcomes. In the following chapter, I discuss the research method I used to explore teachers' perceptions of their successes and challenges in relation to national development policies.

Chapter 3: Research Method

This qualitative study explored Guyanese primary teachers' perceptions of their successes and challenges using the NPDP to address the low performance of students on the MNGSA. In this chapter, I discuss the study design, rationale, and my role as the researcher. I then address the methodology and trustworthiness . This study focused on teachers' perceptions, which are based on their experiences of teaching mathematics in the classroom, thereby shedding light on this phenomenon of interest. Teachers' perceptions of their environmental factors, constructs, and students' performance are essential for considering and understanding student-teacher interaction and students' mathematics learning and performance (Looney et al., 2022). These perceptions are critical in shaping how teachers interact with students, affecting how students learnt mathematics and perform academically.

Research Design and Rationale

I chose a basic qualitative study because it enabled me to build different criteria using a wider range of methodologies and various data sources. A qualitative approach allowed me to determine the significance of the phenomenon based on participants' perspectives, providing deeper insights into the context and experiences being studied (Creswell & Creswell, 2020). This basic qualitative study was intended to provide interpretive lenses on the area of investigation by focusing on understanding teachers' subjective experiences, meanings, and interpretations within their classrooms in Guyana. Interpretive lenses were most appropriate because I sought to explore a topic in greater

depth (Burkholder et al., 2019). Interpretivism emphasizes understanding how individuals make sense of their experiences within their unique social and cultural contexts.

The purpose of this study was to explore Guyanese primary teachers' perceptions of their successes and challenges using the NPDP to address the low performance of students on the MNGSA. This study was context-specific, focusing on Guyana's national development policy. Employing an interpretive lens allowed for a deep exploration of how Guyana's specific sociocultural and institutional context influenced teachers' views and experience with professional development policies.

Role of the Researcher

I am currently employed as an education specialist in a development organization. As such, I had no leadership role within the education system and, therefore, did not have any supervisory responsibilities for the teachers I engaged with for this study. In my role as a researcher, I was aware of the interpersonal dynamics at play, which may have impacted the responses; therefore, I engaged in critical reflexivity. By engaging in reflexivity, I was constantly aware of and transparent about my influences to ensure the credibility and integrity of the research (Ravitch & Carl, 2019). I engaged in ongoing self-awareness and critical reflection, rather than imposing my perspectives on the data. A potential ethical conflict was my role involved supporting countries in implementing professional development policies.

Methodology

In this section, I present the methodology employed in this study to explore Guyanese primary teachers' perceptions of their successes and challenges using the

NPDP to address the low performance of students on the MNGSA. I also present the process I undertook to select the participants, the data collection method, and how I addressed ethical considerations, rigor, and trustworthiness.

Participant Selection Logic

Primary school teachers were the main participants in this study. At this level, 6,208 primary school teachers teach all subjects, including mathematics. The theory underlying qualitative research was to choose places or subjects that would best enable the researcher to comprehend the issue and study question (Creswell & Creswell, 2020). Thus, purposive sampling was used. Purposive sampling, also known as judgmental sampling, is the primary sampling technique used by researchers when they deliberately choose individuals who are most likely to provide specific knowledge, experience, or insights about the study context (Ravitch & Carl, 2019). In addition to purposive sampling, I also leveraged my 30 years of experience working in the Ministry of Education and my strong professional networks in all the education districts I was once a part of. I conducted the data collection process by sharing my flyers with colleagues. I also searched for groups on social media platforms that were specifically for Guyanese teachers and posted my flyer in these groups. In Guyana, there are 11 educational districts, each with its own unique characteristics. Given the diverse nature of each educational setting, I chose one teacher from each of the 11 districts in the country, thereby selecting 12 teachers for this study. Teachers' views from each district highlighted different interpretations of national professional development policies from varying standpoints, given that each teacher's context within a specific education district

was unique. The inclusion criteria were that each teacher had at least 5 years of teaching experience and had been exposed to some form of mathematics professional development in the last 4 years. These criteria ensured that participants possessed sufficient expertise, enabling them to offer rich, informed insights into the phenomenon being explored. Their extensive experience also ensured familiarity with the evolving dynamics of teaching, making their contributions particularly valuable to the study's purpose.

Saturation was reached when no new themes, insights, or patterns emerged from the data, signaling that further data collection no longer contributed to a deeper understanding of the research question (Creswell & Creswell, 2020; Ravitch & Carl, 2019). In qualitative design, the sample size was flexible and evolved based on the complexity of the topic, the diversity of the participants, and the depth of inquiry required (Ravitch & Carl, 2019). The goal was not the specific number of participants, but rather the richness and comprehensiveness of the data, to ensure meaningful findings. In the context of this study, saturation was reached when no new themes, insights, or patterns emerged from the data.

Instrumentation

This study used a basic qualitative approach. The data collection instrument was an interview protocol that I developed to guide in-depth discussions with the participants. The interview questions were crafted based on a comprehensive review of the literature and the conceptual frameworks of Bandura's (2023) social cognitive theory and Senge's (2006) systems thinking. These frameworks provided a comprehensive lens for developing the interview protocol to explore teachers' perspectives on their successes and

challenges in implementing professional development policies. Bandura's theory emphasized the interplay of personal factors (e.g., self-efficacy, motivation), behavioral factors (skill application), and environmental factors, such as school culture (Bandura, 2023), which guided questions about how teachers perceived their capacity and the external support they received in implementing professional development policies.

Senge's theory highlighted systemic elements, including personal mastery, shared vision, team learning, and feedback loops, which shaped questions about collaborative practices, the alignment of professional development policies with classroom realities, and systemic barriers or enablers (Senge et al., 2012). Together, these frameworks enabled a holistic exploration of individual and systemic factors, ensuring the interview protocol captured the dynamic interaction between personal agency and institutional structures. By integrating both perspectives, the protocol elicited insights into how teachers navigated their roles within the broader educational system to effectively implement professional development policies. The data for this study were collected from the responses of primary public school teachers within each educational district in the country. These teachers participated in professional development programs or workshops that were part of their school or district policies. The study aimed to explore their perspectives on successes and challenges in implementing professional development policies.

The sufficiency of the data collection instrument was ensured by aligning the semistructured interview protocol directly with the research questions, guided by Bandura's (2023) social cognitive theory and Senge's (2006) systems thinking, to explore

personal experiences. The protocol was flexible, allowing for probing and follow-up questions to capture rich, nuanced data while accommodating diverse participant experiences. Content validity was established by ensuring that the interview protocol comprehensively and accurately reflected the descriptions provided by the participants being interviewed (Ravitch & Carl, 2019). I conducted two mock interviews to ensure that the questions used in the protocol were clear, relevant, and reliable. I also utilized the committee members as key experts to evaluate the protocol's alignment with the key constructs and relevance of the topic (Burkholder et al., 2019). Feedback from committee members informed revisions to enhance clarity, coherence, and the ability to elicit meaningful data, thereby fully addressing the research's purpose.

Procedures for Recruitment

A flyer was designed to recruit volunteers for this study, which was posted on my Facebook, Instagram, and LinkedIn social media pages. I also explored other social media platforms that cater specifically to Guyanese teachers. In addition to purposive sampling, I employed snowball sampling to encourage teachers participating in the study to recommend colleagues who met the inclusion criteria (Creswell & Creswell, 2020). These approaches helped to increase the pool of participants. Recruitment focused on primary teachers in public schools within each education district. This method was employed to inform the selection of teachers based on their years of experience and recent participation in a mathematics professional development program organized by the Ministry of Education.

Procedures for Participation

Participants were provided with an email with the informed consent form for the study. It was clearly stated that participation was entirely voluntary and that teachers could withdraw at any time without any repercussions. The informed consent form also provided a brief explanation of what the study entailed, including any expected time commitments and how the data would be used (Burkholder et al., 2019). Potential participants were asked to thoroughly review the form before returning it, indicating their informed consent to participate in the study. After sending the emailed consent, participants provided an appropriate time for their involvement in the study.

Procedure for Data Collection

During the research, I adhered to the established ethical procedures. Using the Institutional Review Board (approval number 03-27-25-1047752), the data collection consisted of a one-time, in-depth interview with each participant. Participating teachers were engaged in the semistructured interview for approximately 27-45 minutes, conducted via the Zoom platform. Semistructured interviews were used to plan and direct the interview, allowing the researcher to ask targeted follow-up questions both during and after the interview (Ravitch & Carl, 2019). The interviews were conducted using a secure online platform over a 4-week period, thereby ensuring ample time for scheduling and potential follow-up. I thanked the participants for their participation and assured them that their responses would be confidential and recorded, with identifying details omitted, using only audio. If necessary, brief follow-up interviews or clarifications would be conducted to ensure a comprehensive and accurate understanding of participants' views. I

asked participants if they would be available for a possible follow-up if needed. Follow-up interviews would have been scheduled as necessary to clarify or expand on initial responses. The interviews were recorded with the teachers' consent for accurate data capture and security using a password-protected device that ensured the accuracy of the data and allowed for detailed transcription.

Data Analysis Plan

The data collected during the interviews were directly aligned with the research questions, ensuring that the analysis addressed the central theme of teachers' perspectives on professional development policies. A thematic coding approach was used to analyze the data. Deductive and inductive coding methods were applied to capture the full range of insight. Codes were developed based on the research questions and conceptual framework. Emergent themes were identified through open coding to capture unique or unanticipated perspectives participants shared. In qualitative analysis, a code is a word or phrase that gives a piece of language a summative, salient, and essence-capturing attribute (Saldana, 2021). I then connected the coded themes that emerged to the research question, which explored successes and challenges. I then read the transcript thoroughly to familiarize myself with the data that explored teachers' challenges with the national professional development policy. I used Excel and NVivo software to support the analysis of the data. NVivo is qualitative data analysis software (Saldana, 2021). Discrepant cases or data that diverged from the dominant themes or patterns were carefully analyzed and incorporated into the findings to ensure a comprehensive understanding of the data.

Issues of Trustworthiness

Credibility

Burkholder et al. (2019) posited that the extent to which, as a researcher, one can trust their source and the procedure they utilize to collect data is trustworthiness. For trustworthiness issues, I addressed all the components: credibility, transferability, dependability, and confirmability. Credibility refers to the researcher's ability to identify patterns that are difficult to describe and to consider all the intricacies that arise during the study (Ravitch & Carl, 2019). To establish credibility, I triangulated the data from the interviews with the documented policies and practices outlined in Ministry of Education documents, which enabled validation and strengthened the credibility of the findings. Strengthening credibility ensures the quality and depth of the information to answer the research questions (Ravitch & Carl, 2019). I conducted member checking by sharing preliminary findings with members to solicit feedback on whether the analysis accurately represented their perspective. Detailed accounts of participants' narratives were also provided using direct quotes and context to give readers a vivid understanding of the findings.

Transferability

Transferability is the ability of qualitative research to be relevant or transferable to larger contexts while retaining its context-specific richness (Ravitch & Carl, 2019). Giving readers enough descriptive information to assess how the results might apply to different circumstances or people is what transferability is about. The research context, participants' characteristics, and interactions that occurred during the study must be

thoroughly described (Lim, 2024). Therefore, I explain my process and outcomes, providing detailed descriptions of the study setting, participants, and the context of professional development in Guyana. Participants were selected to represent a range of experiences, including teachers with varying years of experience, teaching levels, and school contexts. This diversity ensured that the findings captured multiple perspectives, increasing their relevance to broader audiences. This process may help other researchers determine the transferability of the study.

Dependability

A study's dependability depends on the researcher's ability to justify their data-collection method and data supporting their claims (Ravitch & Carl, 2019). Dependability refers to the requirement that, although qualitative research frequently investigates dynamic and changing phenomena, the procedures and methodologies employed should be applied with enough consistency to ensure reliable and trustworthy results. This component of reliability is especially crucial because it provides confidence that the results are the consequence of a carefully considered and regularly executed research procedure rather than being random or arbitrary (Lim, 2024). To maintain this, I kept an audit trail, documenting each step of the process, including recruitment, data collection, coding, theme development, and any notes and memos made throughout the analysis. This documentation will allow others to trace the steps taken during the study. I also undertook peer debriefing by incorporating feedback from research committee members.

Confirmability

Acknowledging and investigating how researchers' biases and preconceptions influence their understanding of the evidence and mitigating those to the greatest extent feasible through structured reflexivity processes is a crucial objective of confirmability (Ravitch & Carl, 2019). I documented my reflections, decisions, and rationale throughout the process by maintaining a reflexive journal and reflecting on my biases to determine how these might influence the study. I also used direct quotes from participants to illustrate key themes. I coded and recoded the transcript to ensure consistency.

Ethical Procedures

Qualitative research is often delicate and personal, so ethical considerations are crucial. Especially for maintaining the integrity of the research and covering a wide range of processes, from recruiting participants to managing data (Lim, 2024). Upon receiving IRB approval, the data collection and analysis were undertaken using the following steps. The recruitment of participants occurred through a flyer on the social media platforms for which I had an account. When participants contacted me, I emailed them the informed consent form, which detailed the study's purpose and procedures, as well as the methods to ensure the confidentiality of the information they provided. They were required to email "I consent" before the interview was scheduled. The participant had the right to withdraw from the study at any time. Once the participant submitted their email consent and the interview was scheduled, the interview took place via Zoom and was recorded with the participant's consent. Each interview was conducted separately. After each interview, I informed the participants that I may reach out to them to follow up if needed.

I stored the recording of each interview on my OneDrive, which is only accessible to me through a password. After 5 years, the data will be disposed of by way of deletion, and the trash bin on my MacBook will be emptied to ensure that these files are not recoverable.

Summary

In this chapter, I articulated what was required to conduct this study. I elaborated on the process, which began with the selection of participants for the study, highlighting the sampling method that was employed and the inclusion criteria. Next, I further divided the methodology into subsections that addressed instrumentation, recruitment procedures, participation procedures, data collection procedures, and the data analysis plan. I examined credibility, transferability, dependability, and confirmability, as well as the ethical procedures. Now that I have established how this study was undertaken, Chapter 4 focuses on the research and analysis. Chapter 4 presents the study's findings, organized into key sections that detailed the study setting, participant demographics, data collection, data analysis procedures, evidence of trustworthiness, and results.

Chapter 4: Results

The purpose of this study was to explore Guyanese primary teachers' perceptions of their successes and challenges using the NPDP to address the low performance of students on the MNGSA. I conducted semistructured interviews with 12 Grade 6 primary teachers. The findings of this study could increase education policymakers' understanding of how teachers translate policy related to their professional development into practice. Two research questions guided this research:

RQ1: What are Guyanese primary teachers' perceptions of their successes using the NPDP to address the low mathematics performance of students on the math national Grade 6 assessment?

RQ2: What are Guyanese primary teachers' perceptions of their challenges using the NPDP to address the low mathematics performance of students on the math national Grade 6 assessment?

In this chapter, I begin by describing the research setting, providing a context for the study's location, and identifying any relevant personal or institutional factors. It then outlined the demographic characteristics of the participants, offering insights into their professional backgrounds and teaching contexts. Next, the chapter outlines the data collection process, including the methods used for conducting, recording, and transcribing interviews. The data analysis procedures are then explained, demonstrating how emerging themes were identified and categorized using a thematic analysis approach. Following this, the chapter addresses evidence of trustworthiness, including steps taken to ensure credibility, dependability, confirmability, and transferability of the

findings. The final section presents the results, organized by theme corresponding to the research questions and supported by direct quotes from participants to highlight their lived experiences.

Setting

The target population for this study comprised primary school teachers across all 10 administrative regions (10 geographic divisions in which the country is divided) in Guyana. These teachers, who are responsible for teaching all subjects at the primary level, including mathematics, brought diverse personal conditions with them, such as varying years of classroom experience, different levels of confidence in mathematics content knowledge, and a range of pedagogical skills. These personal factors directly shaped how they engaged with and interpreted the national professional development policy (NPDP), influencing the strategies they employed in their classrooms. Equally important were the organizational conditions that framed participants' experiences. Two recent policies instituted by the Ministry of Education had particular significance for this study. First, during the 2023/2024 academic year, the Ministry introduced a school cash grant program that provided teachers with cash grants to procure classroom resources for every child. Teachers in coastal areas received approximately $20 per child, while those in rural areas received approximately $26 per child. This policy created opportunities for teachers to supplement instruction with additional resources but also highlighted disparities in access and challenges of resource management across different geographic regions.

Second, the Ministry has recently changed the leadership of the department responsible for monitoring and supporting the implementation of the NPDP. This shift influenced how teachers perceived the focus and effectiveness of professional development support at the system level. These personal and organizational conditions are essential for interpreting the study's findings and reflect not only individual teacher capacity but also the dynamic interplay between policy, institutional support, and classroom practice.

Demographics

The 12 teachers who participated represented a diverse range of demographics. The participants included teachers with fewer than 10 years of experience, those with more than 30 years of experience, and the majority fell within this range. The teachers lives and taught in most of the administrative regions. The gender distribution consisted of three men and nine women; the ethnic backgrounds of these individuals were also varied. The education of the teachers included six teachers with bachelor's degrees, one with an associate's degree, two with postgraduate diplomas, and three with master's degrees. The teachers taught all core subjects from grades three to six. I used pseudonymized codes for teachers' names to protect teachers' identities (e.g., Participant 1, Participant 2, Participant 3, etc.). Table 1 presents the demographics of the teachers who participated in the study, including their gender, years of experience, grade level, qualification, and administrative region.

Table 1

Demographics of Participants

Teachers	Gender	Years of Experience	Grade Level	Administrative Region	Teachers Qualification
Participant 1	Male	11	5	6	Bachelor Degree
Participant 2	Female	19	6	9	Associate Degree
Participant 3	Female	12	3	4	Masters Degree
Participant 4	Female	13	6	8	Masters Degree
Participant 5	Male	12	4	1	Bachelor Degree
Participant 6	Female	10	3	3	Post Graduate Diploma
Participant 7	Female	13	4	4	Bachelor Degree
Participant 8	Male	8	5	11	Bachelor Degree
Participant 9	Female	26	6	11	Post Graduate Diploma
Participant 10	Female	20	All Grades	2	Masters Degree
Participant 11	Female	33	2	9	Bachelor Degree
Participant 12	Female	28	6	2	Bachelor Degree

Data for this basic qualitative study were collected from 12 interviews, supplemented by reflective journaling, capturing tone, cultural nuances, communication styles, and teachers' perceptions.

Data Collection

Before collecting any data, I received approval from Walden University's IRB (approval number 03-27-25-1047752). Once approved, I posted the flyer on my social media platforms, including Facebook, Instagram, LinkedIn, and WhatsApp. When participants expressed their interest, a consent form was emailed to them with a message asking them to respond by stating "I consent," along with a convenient date and time for the interview. Fourteen participants agreed to participate in the study. Of the 14 participants, two were not suitable for this study. Each of the 12 participants was asked all 10 questions, and follow-up questions were used when it was determined that the main question had not been answered. The interviews were conducted via Zoom and took place over a period of 1 month. The interviews ranged from 27 minutes to 45 minutes. The

audio for each interview was recorded using Zoom, and a transcript was created following each interview to ensure accuracy.

I recorded the audio from the Zoom meetings for reference. As each interview was conducted, I transcribed the audio, and the first interviews were sent to my chair for review. I was given clearance to proceed with the process. I transcribed each interview word for word to ensure that all the communicative nuances are captured, thereby capturing the true essence of the participant's perspective. After the transcriptions were done, I used ATlast.ti to code the responses. After the coding was complete, I reviewed each code to ensure it accurately reflected the word or phrase. These codes were grouped into two categories in ATlast.ti based on the research questions. Finally, I created themes based on the categories.

Data Analysis

Data were collected from semistructured interview responses of 12 participants. The interviews were transcribed via Zoom. I reviewed the transcripts against the audio to ensure accuracy and clarity. Notes and initial observations were documented to record reflections and contextual insights. Each transcript was imported into the web version of ATlast.ti for coding. ATlast.ti, is a data analysis software that facilitates thematic analysis. An initial deductive coding approach was employed, based on the research questions, which informed the predefined categories of "success perception" and "challenge perception." These codes were applied to all segments of the text across all transcripts. I remained open to emerging ideas and meanings not covered by the deductive code list. New codes were created based on participants' words and recurring

patterns. After completing the coding of all transcripts, overlapping codes were merged. Codes were grouped into categories that reflect broader patterns of meaning, which emerged as themes, as illustrated in Table 2 below.

Table 2

Categories, Codes, and Themes from the Interviews

Categories	Codes	Themes
Success	Support; overall engagement; Effective Strategies; Practice Work; Problem Solving Strategies; Differentiated Instruction; Peer teaching; Active Learning; Hands on Experience; Motivation; Tailored Instruction; Relevance; Strategy Implementation; Classroom Strategy; Tailored Approach; Overall engagement; Understanding; Practical application; Active Participation; Improvement; Confidence; Enthusiasm; Improvement; Teaching Strategies; Knowledge Improvement; Observational Learning;	Transforming Professional Development into Practice.
	Peer Teaching; Collaboration; External support; Receptiveness; Collaboration; Feedback; Teaching Strategy; Team work; Teacher development; Positive Initiative; Subject Teaching; Teacher development;	Collaborative Planning/Co-teaching
Challenges	Implementation; Real life connection; teaching challenges; Teaching Methods; Training needs; Ineffective Training; Relevance; Inconsistent training; Resource constraints; Lack of knowledge; Assumption; Fundamental approach; Lack of structure; Irrelevant content; ineffectiveness; Instructional Gap; Differentiation Challenges; Instructional Challenges; Diverse Learning Styles; Peer Resistant; setbacks; Application issues;	Limited or inconsistent Implementation
	lack of professional development; Reversion; Sustainability; Teaching Methods; Resource Scarcity; Traditional method; Lack of Professional Development; Misalignment; Systemic issues; Lack of Professional Development.	Resource Constraints, Time, and Differentiation Challenges
	Financial Strain on teachers; Disconnect; Adaptation; Lack of Exposure; Distraction; Need for strategy; Student attitude and Engagement; Students Beliefs; Teaching Difficulty; Confidence Issues; Students resistance; Interest based teaching; Student attitude and Engagement; Motivation issues; Negative perception; Learning Challenges; Discouragement; Communication Challenges; Approachability; Fear.	Students Attitude and Engagement

During the coding and thematic analysis, discrepant cases were intentionally identified and retained to strengthen the credibility of the findings. These cases reflected perspectives that diverged from the majority. Rather than dismissing these accounts as outliers, I analyzed them alongside dominant patterns to refine and contextualize the

themes. Factoring these discrepant cases into the analysis ensured that the results captured the complexity of teachers' experiences and highlighted the conditions under which professional development policies could be more effective. Their inclusion added nuance, balance, and rigor to the interpretation of findings.

Evidence of Trustworthiness

Credibility

To maintain credibility, I ensured that each step undertaken was consistent and aligned with my IRB approval. I recorded each interview and reviewed it by replaying it several times to ensure the accuracy of the transcripts. Once each transcript was coded, I triangulated the interview data with the Ministry of Education policies and practices on professional development. This comparison validated participants' accounts and ensured that the findings were grounded in lived experiences and policy realities. Participants' voices were preserved through verbatim quotations, and discrepant cases were deliberately included to provide a balanced portrayal of experiences. Member checking was conducted by sharing preliminary findings with participants to confirm that interpretations accurately represented their perspectives. These strategies ensured that the data were of sufficient quality and depth to answer the questions (Ravitch & Carl, 2019). This provides a strong foundation of rigor, ensuring that the findings are both trustworthy and well-positioned to address the research questions with depth and credibility.

Transferability

Transferability was supported by detailed descriptions of the setting, participants, and the context of professional development in Guyana, as recommended by Lim (2024).

Participants were intentionally selected to represent a variety of experiences, including different years of teaching, grade levels, and school contexts. As such, all participants were primary school teachers with varying ranges of experience, teaching levels, and school contexts. I hoped to recruit participants from all 11 educational districts, but I received participants from only 8 of the 11 districts. By providing such thick description, other researchers and practitioners can determine whether the findings are transferable to similar contexts.

Dependability

To address dependability, I maintained a comprehensive audit trail documenting each stage of the study, from recruitment and data collection to coding, theme development, and analytic decision-making. Code notes and reflective journaling captured the rationale for merging or refining codes, ensuring that decisions could be traced and reviewed for accountability and transparency. Peer debriefing with my research chair further strengthened dependability by allowing for external review and constructive critique of the emerging analysis. These strategies ensured consistency and transparency (Ravitch & Carl, 2019).

Confirmability

Confirmability focuses on the extent to which findings are shaped by participants' experiences rather than researcher bias or assumptions (Ravitch & Carl, 2019). To support confirmability, I engaged in ongoing reflexivity by maintaining a journal in which I recorded reflections, potential biases, and the rationale for methodological and analytic choices. I also used direct participant quotations to substantiate findings and

ensure they are grounded in the data rather than researcher interpretation. To maintain intracoder reliability, I coded and recoded transcripts, checking for and resolving any inconsistencies that arose during the process.

Results

The results are organized by research question and theme. A total of 351 codes were identified and grouped into two categories and five overarching themes. Each theme is aligned with one of the two research questions and is followed by a summary. To provide a clear overview, Table 3 presents the categories and their corresponding overarching themes. An expansion of these themes is presented below, drawing on participants' narratives to illustrate their perspectives. Direct quotes are used to capture teachers' voices, while summaries highlight common patterns and divergent views. This thereby creates a link between the raw data, the theme developed, and the research questions guiding this study.

Table 3

Categories and Themes from the Interviews

Categories	Themes
Success Perspective: Overall students engagement; Teacher engagement; Confidence	Transforming Professional development into Practice
Success perspective: Collaboration	Collaborative planning and co-teaching as an implementation tool
Challenges Perspective: Overall Implementation Issues/ Barriers:	Limited or inconsistent Implementation
Challenges Perspective: Student attitude and Engagement; PD Communication challenges	Resource Constraints, Time, and Differentiation Challenge Students Attitude and Engagement

Research question 1 focused on Guyanese primary teachers' perceptions of their successes in using the national professional development policy (NPDP) to address the

low mathematics performance of students on the mathematics National Grade Six Assessment. Two overarching themes and three supporting sub-themes emerged, providing insight into answering this research question.

Theme 1: Transforming Professional Development to Practice

Confidence

This theme explores how teachers apply knowledge from professional development to their classroom practices. It highlights the importance of confidence, active engagement in professional development, and the ability to use engaging instructional strategies to support students' mathematics learning. The analysis indicated that teachers' success in implementing national professional development policies was grounded in three interconnected subthemes: confidence in their pedagogical and content knowledge, developed through professional development; active engagement in professional development sessions; and the ability to translate this learning into engaging instructional practices for students. In relation to confidence in pedagogical and content knowledge developed through professional development, teachers in this study consistently identified confidence as a central factor influencing their ability to implement professional development strategies effectively. Those who reported a higher level of confidence in their content knowledge and instructional skills described being more willing to adapt the curriculum and try innovative approaches. P11 explained, "I feel confident I can do it. I can now use what I was taught, or what I was told to do." A teacher shared that they struggled with teaching geometry. However, through professional development sessions, where teachers were exposed to different strategies

for teaching geometry, the participant's confidence was boosted. P7 highlighted, "It makes me more confident in being able to deliver the concept of geometry." Confidence in their competence was also shared by P12, who reported: "I used to ponder, but now I can read a problem. And, I can understand it in the same way they would normally say it, by looking for clues and keywords, just as we would tell children. And, you can solve it from there. So yes, it has built my confidence." Participants explained that professional development deepened their mathematical content knowledge, which in turn boosted their confidence in selecting appropriate strategies, breaking down complex ideas, and supporting students' conceptual understanding.

Knowledge into Practice

Regarding their ability to apply knowledge gained from professional development to enhance their instructional practices, most participants indicated that they incorporated a range of engaging strategies during mathematics lessons. These strategies, acquired through professional development, include the use of educational games, differentiated worksheets and activities, quizzes, manipulatives, videos, and the 5Es instructional model (engage, explore, explain, elaborate, and evaluate), as well as field trips. For instance, P2 noted the impact of the 5Es model in promoting student-centered learning: "So instead of me telling them all the information, they were able to learn on their own and get the concepts that they were expected to learn." This approach enabled P2 to translate knowledge from professional development into classroom practice effectively. Other participants also highlighted the importance of stimulating students' interest by posing questions related to the lesson topic. P9 explained, "You give children the significance of

the topic. And so, you find that a lot of children are more in tune, or they're more interested once you teach it like that, to me." Participants also described using videos to present problems and prompt critical analysis, alongside structured peer-to-peer learning activities. Together, these strategies were consistently seen as effective in sustaining student interest and promoting active engagement throughout lessons. This finding aligns with Gyongyosi-Wiersum (2022), who asserted that differentiated education and adaptive teaching methods are essential for effectively addressing the varied needs present in today's classrooms. Teachers highlighted the importance of using interactive strategies, real-life examples, and differentiated methods to make learning more meaningful, relatable, and engaging. Friesen and Kuntze (2020) also underscored the critical role of content knowledge in enhancing teacher competence and enabling the use of effective, relatable strategies for instruction. Teachers noted that confidence in content knowledge was a prerequisite for applying professional development strategies successfully. In addition, Li et al. (2024) highlighted how creative and innovative approaches, such as games and real-life applications, enhance student engagement in mathematics, directly reflecting the strategies employed by the teachers in this study. Thus, the teachers' practices provide concrete, context-specific evidence of how professional development can translate into classroom strategies that resonate with and engage students.

Active Engagement in PD

Participants consistently highlighted the importance of their active engagement during professional development sessions, noting that meaningful participation enhances both their professional growth and classroom practice. Teachers emphasized that they

learned best when professional development activities were practical, hands-on, and directly connected to the realities of their classrooms. P10 recalled:

> So we had a sir, who used to teach CSEC mathematics, and he would break the concepts down small, small, like for example, angles on a straight line is how much right angle. And then he would go from that to calculation, supplement, and complement. And that session was really, really good. The teachers really enjoyed it.

P10 went on to explain that what made the session effective was the facilitator's attitude: "He wouldn't talk down to the teachers and say, 'You know what, you're supposed to know this.' He came there to help, and he did everything he could to help them." Teachers also valued the opportunity to practice problem solving. P2 reflected, "We had a workshop with the facilitator, and he showed us how to teach fractions differently. He had us working through step by step, which made the process clearer and more engaging." These examples highlight how participants engaged most deeply when professional development fostered respect and practical skill building, which they could immediately apply in their classrooms. It also aligns with adult learning principles highlighted by Druken (2022) and Perrotta (2021), who argued that teachers learn best when professional development is designed to position them as active contributors and to emphasize relevance, practice, and problem solving, rather than passive reception.

Theme 2: Collaborative Planning and Coteaching as Implementation Tools

Teachers identified collaborative planning and co-teaching as key successes in implementing professional development in their classrooms. Participants shared that

working alongside colleagues to plan lessons, coteaching instruction, and creating a supportive environment improved lesson quality. Others described school-to-school collaboration, where Grade 6 teachers assisted colleagues at different schools in teaching a particular concept, which they viewed as an effective strategy contributing to improved Grade 6 student performance. Collaboration also extended to vertical planning, where teachers met with colleagues who taught the same students in the previous class to discuss areas of difficulty in mathematics, ensure curriculum coverage, and share strategies that worked with specific groups of learners. P9 emphasized the importance of this process, stating, "The consultation among staff members is very important, getting feedback from the feeders of the class that you're currently teaching is very important, helping to shape what you need to teach." Regular weekly planning meetings also emerged as a valued practice. Participants noted that these Thursday meetings were more than routine scheduling; they created a space for peer learning, sharing best practices, and reflecting on challenges. P6 described this dynamic:

> So, if there is anything you have encountered during the week that you want to reteach, or you can ask your colleague, 'How can I do this?' Or, what ideas do you have that we can teach this? So that is the collaborative effort we have in our grade. Coming together and finding ways to help or assist children in learning something, especially if it is difficult.

These experiences demonstrate how collaborative planning and co-teaching are practical tools for integrating professional development content with classroom applications, ultimately supporting the more consistent and effective implementation of

mathematics strategies. This finding aligns closely with Senge's (2006) systems thinking framework, which emphasizes building a shared vision among stakeholders, including teachers, principals, and parents, to help align efforts towards a common goal and enhance commitment across the education system. Senge's (2006) emphasis on team learning is evident in the participants' accounts, as they engaged in ongoing professional dialogue and collective problem solving. Teachers believe that these practices foster innovation and allow them to respond more effectively to students' needs. Taken together, the themes of collaborative planning, teachers' confidence, and active engagement in professional development suggest that successful implementation of the NPDP depends not only on individual teachers' skills but also on the existence of supportive professional networks and opportunities for collective learning that connect policy with classroom realities.

Research Question 2 focused on Guyanese primary teachers' perceptions of their challenges in using the national professional development policy (NPDP) to address the low mathematics performance of students on the national Grade 6 math assessment. Three main themes and 16 subthemes addressed this question.

Theme 3: Limited or Inconsistent Implementation

A recurring theme across all participant responses was the limited or inconsistent implementation of strategies from the national professional development policies. While most teachers acknowledged the relevance of professional development, many noted that what they learned was not consistently applied in practice. Teachers believed that planning for professional development would be more effective if it were done

collaboratively between the Ministry of Education and teachers themselves, ensuring that sessions were tailored to their specific professional needs. P10 reflected on this gap: "Firstly, for professional development to be implemented, it has to be something that the teachers actually want to share with the learners, or something that the teachers actually think is useful. So, it comes back to the planning of these professional developments." Participants attributed this challenge in part to the way in which professional development was communicated. Many felt excluded from decision-making processes and believed their contextual knowledge and classroom insight were often overlooked. P10 explained:

> So, they need to look into those, talk with the head teachers, and speak with the teachers to see what they want and what they need help with. They need to hear from teachers themselves, because sometimes, they assume things. There will still be challenges, so they need to listen to the teachers and hear from them if they are unable to visit. Maybe they can use Google Forms and let the teachers express how they feel and what they need help with. And just don't assume.

Teachers consistently reported that decisions related to the design, planning, and delivery of professional development were made without consultation or feedback loops, resulting in initiatives misaligned with classroom realities. P9 remarked, "Okay, I would first recommend they do a consultation with teachers a little bit more to find out their individual issues." Communication was described as largely directive rather than dialogic, with information delivered as mandates rather than opportunities for collaboration. P1 illustrated this dynamic:

> The relationship between teachers and the ministry officers should be more approachable on both sides. Not all teachers have the attitude or behaviour that encourages open exchange, but we too can improve in how we interact with officers. At the same time, it would help if the officer were more respectful and approachable when dealing with teachers. That way, it would be easier for us to share ideas and benefit from the new approaches and educational initiatives introduced.

This hierarchical or unapproachable style of communication not only diminished teachers' agency but also reinforced a sense of detachment from professional development goals. Participants agreed that the uneven level of preparation and communication among the facilitators shaped the quality of professional development and, in turn, the likelihood of implementation in classrooms.

Another challenge teachers identified was the ineffectiveness of both the modality and content of professional development delivery, which they believed negatively impacted implementation. P9 emphasized the limitation of the modality:

> My personal belief is you need to have a way of teaching teachers how to make connections when they're teaching between the topics they're teaching and real-life circumstances, how they could implement these things, and a lot of them did not do that. They don't explain it.

Similarly, P8 critiqued the content, stating:

> Just their selection of the content that is coming from them, or the layout of the content, because when you look at the things that are being covered, it's like they

> don't make sense. Yeah, it's like, there's just no proper structure to these sessions, and there's no proper information to be shared.

These views underscored a shared sentiment that professional development sessions often lack practical modelling and a clear structure to meet teachers' professional development needs. P10 added:

> In terms of the topics they would cover, or general sessions, sometimes we have sessions, and at the end of the session, you're more confused than when it started, to be honest. And then sometimes you go to one session with this person, and the person says, Okay, this is how you have to do it. So, the whole strategy will have changed by the time you go to another session. A third person arrives, and the strategy changes again, leaving the teachers more confused than they were when they attended the first strategy.

As a result, teachers reported that these shortcomings in the delivery of professional development led to uneven implementation, with clarity often dependent on individual initiative rather than consistent guidance. P3 captured the frustration of contradictory advice:

> It's like you have one set that will come. They would say, Okay, you need to do this. And then you have another set that will say, "Don't do this, do that," and then another comes back and says, "But you were doing the wrong thing." You need to do this. So, it's always contradictory. It's like these professional people. They are not working together. Who should I be listening to? So, it's always a contradictory issue regarding whether they give us the correct information.

Collectively, these accounts reveal how poor alignment in the modality and content of professional development weakened its effectiveness, leaving teachers without clear, consistent, and actionable strategies to implement in their classrooms.

While most participants cited systemic factors, such as unclear guidance and inadequate training, as challenges to implementing strategies from professional development, one discrepant case highlighted the timing of professional development as a critical factor influencing the translation of training. The teacher noted that professional development was sometimes scheduled after school, when most teachers felt mentally and physically exhausted from a full day of instruction. P3 stated, “So actually, to carry out a staff development session that can work. But then, when you want people to stay back after a long, dreary, tired day, it will not work.” Unlike other participants who emphasized content or delivery issues, this teacher attributed the lack of implementation not to the quality of the professional development itself, but to when it was delivered. This perspective sheds light on an overlooked logistical aspect of professional development, teacher readiness, and cognitive load during learning time.

Theme 4: Resource Constraints, Time, and Differentiation Challenges

In addition to inconsistent implementation, teachers identified resource constraints and time as major challenges to applying professional development strategies in their classrooms. Several participants explained that while a school grant policy had recently been introduced, resources were still inadequate to meet their instructional needs. P7 noted, “The biggest challenge for me right now is resources. Resources, even

though we have been given a grant now.”. Similarly, P5 emphasized the lack of adequate instructional tools, stating:

> Another systemic change is that they should bring in more resources, as we currently face a scarcity of resources in implementing mathematics. We need more interactive games to teach maths, such as smartboards and 3-dimensional shapes, which will promote more concrete operational thinking in primary school children, rather than relying solely on flat teaching aids. It is not sufficient.

Teachers also reported that the time allotted for mathematics instruction limited their ability to help students fully grasp concepts. P7 explained, “The time allotted for the subject is not enough, so sometimes the children are not grasping the concept, and you have to leave.” P1echoed this frustration: “It is hard to have to teach using the timetable mandated by the ministry, when the children are not able to work at the speed required. Sometimes, it takes a longer time for the children to process stuff.” These time pressures discouraged teachers from experimenting with new strategies or adapting lessons to meet the varying learning needs of their students. Compounding these systemic issues were concerns regarding teachers’ perceived ability to differentiate instruction. While teachers understood the importance of tailoring lessons to students’ varying needs, many felt underprepared to do so in practice. P9 explained:

> For example, we would have covered angles at a workshop, but we were not provided with different strategies to approach angles with children at various learning levels. When implementing these strategies, you still need to research to reach the children at various tiers within your class. Lower-level learners, those in

> the middle, and those who quickly grasp concepts. That's one challenge I have personally.

P5 reinforced this point, "Well, the biggest challenge I face is differentiating the instruction to cater to all children in my classroom. It has children of different learning styles, so tailoring the instruction to suit each child can be difficult." Similarly, P7 reflected:

> And to me. I may be wrong, but they cater to the high flyers. As the classroom teacher, you now have to internalize and analyze what was taught to you, and you must present it in a way that allows those who are slower to grasp the concept to do the same. The children tend to focus more on the playing or game aspects than on the message or content.

These gaps in practical modelling and support left teachers relying on traditional, one-size-fits-all methods rather than differentiated approaches. Together, these accounts highlight how systemic constraints, such as resources, time, and support, combined with practical difficulties in differentiation, hinder the consistent implementation of professional development strategies. They also suggest that contextual factors, such as the timing of professional development, must be carefully considered to ensure teacher engagement and effectiveness.

Theme 5: Student Attitudes and Engagement

The analysis revealed a strong connection between student attitudes toward mathematics and teachers' engagement with professional development policies and sessions. A significant sub-theme across participant responses was the negative student

attitude and low engagement in mathematics learning, which teachers described as a persistent challenge to improving performance despite their best instructional efforts. P3 explained:

> From the time a child hears mathematics, they think it's like you're telling them to commit suicide for whatever reason. They have this philosophy: maths is hard, maths is this, maths is that. They view it as a challenge. They tend not to give it full attention; they tend to sit there and not apply themselves. So, not applying themselves affects content delivery because, as they progress or move up the line, they will encounter challenges.

This sentiment reflected teachers' broader view that many students lacked motivation and interest in mathematics, often approaching the subject with reluctance. P8 elaborated:

> I would also always look for something they would be interested in. But in most cases, children already look at mathematics as if it's just something hard, and if they don't get it this time, it's like, Oh, I'm not going to get it at all. They don't see it as a challenge to be conquered. They see it as something challenging, like a wall.

Teachers also described passive participation and behavior resistance that hindered active learning. P2 shared:

> As I mentioned before, I was given the below-average learners. And so, mathematics has been a real challenge for them. Even though I would show them examples and guide them, they think that mathematics is really difficult, and they tell me that it is the only subject they keep failing, although they try. But

> still, it is really difficult. So they have that perception that mathematics is a difficult subject, which they find really hard to pass.

Teachers further noted that a misalignment between the curriculum and students' readiness contributed to disengagement and frustration. P12 explained:

> At professional development sessions, they would say, use a real-life situation. But when you look at these children, some are not exposed. Sometimes you have to go through different ways to get them to realize where you were coming from, even though. Yes, they said, do this through professional development. However, some of these children are not exposed. It wouldn't be relevant, so we have to find other ways. But still, you remember some of these children; they are withdrawn. So, when it comes to school. You've got to find ways and means to bring them out. This misalignment between prescribed strategies and students' lived realities created barriers to meaningful learning, often leading to anxiety, confusion, and further withdrawal from engagement. Collectively, participants' accounts demonstrate how entrenched negative perceptions of mathematics, coupled with curriculum misalignment, reinforced a cycle of low motivation and underperformance despite teachers' efforts to apply professional development strategies.

Summary

Teachers identified two overarching themes: transforming professional development into practice and collaborative planning and coteaching as implementation tools, with three key subthemes that explained their successes in using national

professional development policies. First, teachers' confidence in their pedagogical and content knowledge, strengthened through professional development, emerged as a central factor that empowered them to implement strategies effectively. Second, the knowledge-to-practice transition was evident as teachers applied professional development strategies, including games, manipulatives, differentiation, videos, the 5Es model, and peer learning, to foster student engagement and conceptual understanding. Third, active engagement in professional development itself was critical, as teachers reported learning best when professional development was practical, hands-on, and respectful of their contributions. These findings suggest that when professional development strategies are designed to build teachers' confidence, recognize their agency, and equip them with strategies, it can be successfully translated into classroom practice. Additionally, collaborative planning and coteaching were described as essential for bridging the gap in professional development practice. Teachers valued opportunities to plan and teach alongside colleagues, share strategies across schools, and participate in professional networks that enhanced lesson quality and responsiveness to student needs.

Teachers also described significant challenges in implementing the national professional development policy, organized under three overarching themes. First, limited or inconsistent implementation highlighted gaps between the design of professional development and classroom realities. Teachers noted that professional development content and delivery were often ineffective, inconsistent, or contradictory, and that sessions were planned without sufficient consultation with teachers, resulting in misalignment with their professional needs. A discrepant case further revealed that

professional development delivered after school, when teachers were fatigued, hindered implementation regardless of content quality. Second, resource constraints, time, and differentiation challenges limited teachers' ability to apply new strategies. Despite school grants, resources remained insufficient, instructional time was too short for deep learning, and teachers felt underprepared to differentiate lessons for diverse learners. Finally, students' attitudes and engagement posed an ongoing challenge; entrenched beliefs that mathematics is "too hard," coupled with low motivation, passive participation, and curriculum misalignment with readiness levels, reinforced cycles of disengagement and low performance. These findings highlight the interplay between systemic barriers, logistical constraints, and student dispositions that collectively undermined the consistent implementation of professional development strategies. Building on these insights, Chapter 5 will provide the interpretation of the findings in relation to the existing literature and conceptual frameworks, address the study's limitations, and present recommendations for policy and future research. Finally, the chapter will reflect on the broader social change at the individual, organizational, and societal levels.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to explore Guyanese primary teachers' perceptions of their successes and challenges using the NPDP to address the low performance of students on the MNGSA. Guided by two central questions, the study explored teachers' perceptions of their successes in implementing national professional development policies and their challenges in doing so. By centering teachers' voices, I sought to capture their lived experiences in applying national professional development policies within diverse classroom contexts. This focus is important because understanding teachers' perspectives offers critical insight into how professional development policies are translated into practice and how they influence mathematics teaching and learning outcomes in Guyana.

The findings captured both the successes and challenges Guyanese primary teachers experienced in using the national professional development policy to improve students' mathematics performance on the math national Grade 6 assessment. On the one hand, teachers reported gains in confidence, deeper engagement in professional development, and successful translation of strategies into practice. Particularly, when supported by collaboration and coteaching. On the other hand, challenges such as inconsistent implementation, inadequate resources, limited time, difficulties with differentiation, and entrenched negative student attitudes created barriers that weakened the effectiveness of professional development. These successes and challenges highlight the complex interplay between teachers' capacity, systemic support, and student readiness in shaping outcomes.

Interpretation of the Findings

Transforming Professional Development to Practice

The findings under the theme "transforming professional development into practice" revealed that teachers' ability to apply the national professional development policy in meaningful ways was shaped by three interconnected factors: their confidence in pedagogical and content knowledge, their active engagement in professional development sessions, and their capacity to translate knowledge into engaging instructional strategies. This theme highlights the dynamic process by which professional development is not only acquired but also transformed into classroom practice. The findings confirmed previous research that emphasized the centrality of teacher confidence and self-efficacy in effective teaching. Teachers in this study consistently identified confidence in content and pedagogical knowledge as the foundation for implementing professional development strategies. This aligns with Perera and John (2020), who argued that teachers with stronger self-efficacy are more likely to organize learning effectively, offer emotional and instructional support, and pursue innovative teaching practices.

Similarly, Friesen and Kuntze (2020) underscored the role of content knowledge in empowering teachers to employ strategies that make abstract mathematical concepts more relatable, an insight echoed by participants who explained that confidence allowed them to break down complex ideas for students. The study supports Gyongyosi-Wiersum. (2022), who emphasized the value of differentiated education strategies to address diverse student needs. Participants explained that professional development equipped

them with strategies, including games, manipulatives, differentiation, and the 5Es instructional model, which they successfully applied to sustain student engagement. These accounts reflect the literature that interactive and student-centered approaches improve motivation and conceptual understanding.

While much of the literature assumes that professional development leads directly to improved practice when content knowledge and strategies are provided, the findings complicate this assumption. Several participants noted that confidence and application of strategies only occurred when professional development facilitators themselves demonstrated deep content and pedagogical knowledge. When facilitators lacked this expertise, the transfer of knowledge was limited. This observation disconfirms the implicit claim that access to professional development alone is sufficient to improve teaching quality (Nawab et al., 2020). Instead, the findings highlight that the quality of facilitation and the modeling of strategies are critical mediators in whether professional development content translates into practice.

This study extends the literature by situating these dynamics within the Guyanese context, where systemic constraints and policy communication shaped the success of professional development implementation. Teachers' experiences showed that professional development was not uniformly impactful; its effectiveness depended on whether teachers left sessions with both the confidence to act and the practical strategies to apply. Moreover, their reflections highlight how professional development is experienced as a cycle of self-efficacy (Bandura, 2023) reinforced through modeling and peer learning, extending the literature by illustrating how reciprocal interactions between

personal factors, such as confidence, behaviors, in terms of instructional practices, and environmental supports, in the form of professional development structures, drive successful implementation.

Collaborative Planning and Coteaching as Implementation Tools

The findings under the theme “collaborative planning and coteaching“ revealed that teachers viewed collaboration with colleagues, both within and across schools, as a vital strategy for bridging the gap between professional development policy and classroom practice. Teachers described coplanning lessons, coteaching, and weekly collaborative meetings as avenues to share best practices, reflect on challenges, and develop tailored strategies to address students’ learning needs. These practices were not only seen as improving lesson quality but also as strengthening teacher confidence and building a supportive professional culture. It confirms Senge’s (2006) systems thinking framework, which emphasizes the importance of building a shared vision and engaging in team learning to align efforts toward common goals. Participants described how collaboration with colleagues allowed them to better anticipate students’ challenges and apply professional development strategies in ways that suited their classroom realities. For example, teachers cited consultation with “feeder” teachers (those who taught students in prior grades) as vital for identifying knowledge gaps, a practice that resonates with Senge’s (2006) emphasis on systems-level feedback loops to improve performance across the school.

The study also supports research on professional learning communities (PLCs). Scholars (Drunken, 2022; Woodland et al, 2023) argued that teacher collaboration

through structured professional learning communities fosters reflective dialogue, peer support, and innovative practice. Participants in this study echoed these views, noting that their weekly Thursday planning meetings functioned as informal PLCs where they exchanged strategies, debriefed lessons, and codeveloped approaches to teaching difficult concepts. These collaborative spaces provided the support needed to translate professional development content into practical classroom tools, reinforcing the literature that links peer collaboration with improved instructional outcomes. Tenorio (2022) and Mughal and Asda (2020) highlighted that teacher agency is strengthened when teachers are given opportunities to collaborate and contribute to the adaptation of professional development to local contexts. Participants in this study described collaboration as empowering, helping them feel less isolated and more confident in applying new approaches.

While the literature often presents collaboration as something that occurs naturally or can be easily fostered within schools, the findings from this study indicate that effective collaboration depends on intentional structural support and a school culture of openness. Some participants noted that collaboration was limited to specific grades or schools and was not consistently systematized across all contexts. This finding contradicts the more optimistic accounts in the literature; for example, Mason (2023) assumed that teacher collaboration universally leads to consistent improvement. Instead, the study shows that while collaboration is powerful, its reach and impact can be uneven without formal structures or broader systemic support.

This study extends the literature by highlighting school-to-school collaboration as a unique practice within the Guyanese context. Teachers described instances where Grade 6 teachers traveled to other schools to help colleagues teach specific mathematical concepts, a practice not widely documented in the international literature on professional development. This demonstrates how collaboration can extend beyond the confines of a single school, creating cross-institutional networks that support the implementation of professional development. Additionally, the study extends Bandura's (2023) social cognitive theory by showing how observational learning occurred through coteaching. Teachers reported that watching colleagues model strategies in real-time provided them with practical insights that they could adapt for their own classrooms. This reinforces the reciprocal nature of the social cognitive theory, as triadic determinism, personal confidence, observed behavior, and environmental supports (such as peer collaboration) all interact to shape teachers' practices.

Limited or Inconsistent Implementation

A recurring theme across participant responses was the limited or inconsistent implementation of strategies from the national professional development policy. While most teachers acknowledged that professional development was relevant, they reported that strategies learned were often not translated into classroom practice or were applied unevenly. This gap between training and practice reflects deeper systemic and contextual challenges, including unclear guidance, conflicting messages from facilitators, inadequate modeling, and a lack of collaborative planning. The findings strongly confirm the observations of Tenorio (2022), who highlighted that professional development is

effective only when teachers have opportunities to move beyond the acquisition of new knowledge and actively integrate it into classroom practice. Participants' accounts revealed that, although they were exposed to strategies such as differentiation and real-life applications, insufficient modeling and follow-up support resulted in inconsistent implementation. Similarly, Nawab et al. (2020) argued that access to professional development does not guarantee improved teaching outcomes, a point underscored by teachers in this study who described confusion and frustration due to contradictory or impractical training. It also aligns with Mughal and Asad (2020), who noted disparities between official policy and school-level implementation. Teachers in this study described how top-down communication often excluded their voices, leaving them with strategies that did not always match classroom realities. This confirms the broader literature emphasizing the importance of aligning policy intentions with teachers' contextual knowledge.

Some of the findings disconfirm overly optimistic accounts in the literature that indicate professional development inevitably leads to improved outcomes when provided. For example, McClusky et al. (2021) argued that effective professional development is strongly linked to improved classroom practices and student outcomes. While participants acknowledged potential benefits, they stressed that without clarity, consistency, and structured opportunities for application, the expected improvements did not materialize. This suggests that in the Guyanese context, the link between professional development and practice is far more tenuous than some literature proposes.

This study extends the literature by highlighting the role of contradictory communication and uneven facilitator preparation as unique barriers to implementation. Teachers explained that different officers provided conflicting instructions, leaving them uncertain about which approaches to adopt. While prior literature has discussed gaps in alignment, for example, Probert (2021) on policy transfer, this study contributes new insights into how conflicting guidance at the delivery stage undermines teacher confidence and consistency. Additionally, the findings extend Bandura's (2023) social cognitive theory by illustrating how inconsistent modeling reduces opportunities for observational learning, which is essential for building teachers' efficacy. When facilitators failed to demonstrate strategies in practice, teachers were left to interpret and adapt the content individually, thereby weakening the reciprocal learning cycle of social cognitive theory. Similarly, the results extend Senge's (2006) systems thinking by showing how the absence of collaborative structures between the Ministry and teachers breaks down feedback loops, preventing policies from being refined to suit classroom realities

Resource Constraints, Time, and Differentiation Challenges

Teachers in this study consistently identified resource limitations, restricted instructional time, and difficulties in differentiating instruction as significant barriers to implementing the national professional development policy. These challenges not only constrained the effective application of strategies learned in professional development sessions but also reinforced reliance on the traditional, one-size-fits-all method of instruction. The findings confirm earlier research that highlights systemic constraints

hindering the implementation of professional development. Fitriatri et al. (2023) and Barak (2024) both emphasized that teacher challenges in mathematics are frequently tied to insufficient preservice training and ongoing professional development opportunities, compounded by limited access to resources. The concerns expressed by participants about the lack of manipulatives, interactive materials, and adequate technology, such as smartboards and 3D teaching aids, echo Friesen and Kuntze's (2020) claim that robust content knowledge and sufficient resources are necessary for effective mathematics teaching. Similarly, the issue of insufficient instructional time was confirmed by Mellroth and van Bomme (2019), who argued that differentiated education requires teachers to invest time in adapting lessons to meet the varied needs of students. Participants' remarks about struggling to cover content within rigid timetables reflect this same tension, underscoring how systemic scheduling practices can undermine pedagogical flexibility.

However, these findings also disconfirm more optimistic accounts in the literature that assumed differentiation is increasingly practiced by teachers when encouraged through professional development. For example, Hunt et al. (2023) and Jurs et al. (2022) suggested that effective professional development helps teachers adopt differentiated strategies. In contrast, participants in this study revealed that, although they were encouraged to differentiate, they often lacked the necessary modeling, guidance, or resources during professional development to do so effectively. Thus, the promise of differentiation promoted in the literature was not fully realized in the Guyanese context.

The findings extend the literature by adding nuance to the understanding of differentiation challenges in under-resourced contexts. While Meera and Van Wyk

(2022) highlighted the importance of adapting instruction to diverse learners, this study shows how the absence of concrete examples during professional development sessions, combined with limited materials and time, leaves teachers struggling to apply these concepts in practice. From a social cognitive theory perspective (Bandura, 2023), the lack of practical modelling reduces opportunities for observational learning, weakening teachers' confidence and efficacy in attempting differentiated strategies. Teachers often reported having to "do their own research" to adapt strategies, which shifted the burden away from systemic support and towards individual effort. From a systems thinking perspective (Senge, 2006), these challenges highlight a breakdown in alignment between professional development policy and the realities of school-level implementation, particularly in rural and resource-scarce settings. Without coordinated structures to ensure adequate materials, flexible scheduling, and responsive professional development design, the system fails to support teachers in bridging training with practice.

Student Attitudes and Engagement

Teachers consistently identified negative student attitudes, low motivation, and limited engagement in mathematics as persistent challenges to improving performance, even when professional development strategies were applied. Teachers described students approaching mathematics with reluctance, perceiving it as inherently complex, and often withdrawing from participation. They also highlighted a misalignment between curriculum expectations and students' readiness, which further compounded disengagement. These findings confirm existing research on the decisive role of student attitudes in shaping mathematics achievement. Teixeira (2022) noted that students'

negative perceptions of mathematics often manifest as anxiety, avoidance, or passive participation, which limits the effectiveness of even well-designed instructional strategies. Similarly, McCarthy-Curvin and Berry (2023) observed that students who perceive mathematics as abstract or overly complex often disengage, reinforcing a cycle of underachievement. The teachers' descriptions in this study, that students "tend not to give it full attention" or how the learners repeatedly express that mathematics is "really difficult", mirror these established findings. The misalignment between curriculum expectations and students' lived experiences further confirms Meera and Van Wyk (2022), who argued that culturally relevant and context-sensitive teaching is critical in engaging learners. Teachers in this study echoed that professional development often emphasized real-life applications, but that these examples were sometimes irrelevant to students with limited exposure outside their immediate environment.

While previously published studies often highlighted professional development as a pathway to equipping teachers with strategies to foster engagement (Hunt et al., 2023), this study revealed that professional development alone was insufficient to overcome entrenched negative attitudes. Teachers described how, despite employing games, manipulatives, and interactive strategies, student disengagement persisted. This suggests that the literature may have overestimated the capacity of pedagogical strategies alone to shift students' attitudes without parallel systemic or socio-cultural interventions.

The findings extend the literature by illustrating how student disengagement interacts with professional development policy in the Guyanese context. Teachers highlighted that disengagement was not only a matter of student disposition but also

linked to systemic misalignments, such as rigid curriculum pacing, lack of exposure to contextual examples, and insufficient differentiation. This extends Friesen and Kuntze (2020), who emphasized differentiation and content knowledge, by showing how these strategies are undermined when students lack the foundational motivation or readiness to engage. From a social cognitive theory perspective, students' negative attitudes reflect low outcome expectations and limited self-efficacy, which in turn affect their willingness to persist in mathematics tasks (Bandura, 2023). From a systems thinking lens, student disengagement highlights systemic disconnects, while professional development policies promote engagement strategies. Broader system elements, such as curriculum design, family support, and socio-economic exposure, also shape students' readiness. Without addressing these interconnected factors, teachers' efforts remained constrained.

This study sought to explore Guyanese primary teachers' perceptions of their successes and challenges using the NPDP to address the low performance of students on the MNGSA. The findings revealed two broad areas of insight: first, how teachers successfully translated professional development into practice through confidence, active engagement, and collaboration; and second, the systemic and contextual challenges that hindered consistent implementation, including resource limitations, student attitudes, and top-down communication of professional development. Overall, the themes align closely with Bandura's (2023) social cognitive theory, particularly the principles of self-efficacy, observational learning, and reciprocal determinism. Teachers who developed greater confidence in their pedagogical and content knowledge reported stronger classroom performance and a willingness to employ innovative strategies. This reflects Bandura

(2023) assertion that self-efficacy enhances motivation and persistence, influencing both teachers' practices and student outcomes. Teachers also described learning best when professional development involved modeling strategies that they could observe and adapt, an example of observational learning, which reinforced their efficacy.

Equally, the findings resonate with Senge's (2006) systems thinking framework, which emphasizes shared vision, team learning, and organizational interconnectedness. The theme of collaborative planning and co-teaching illustrates how collective dialogue and shared responsibility among teachers can enhance the implementation of educational initiatives. Participants also emphasized that professional development was often communicated in a top-down manner, excluding teacher voice, which underscored the absence of a genuine shared vision between policymakers and practitioners. This disconnect highlights the systemic barriers that arise when feedback loops are weak and communication is hierarchical rather than collaborative.

Limitations of the Study

In Chapter 1, I outlined several anticipated limitations at the outset of this study. The first was my positionality and the potential for researcher bias, given my prior professional involvement in education policy and planning in Guyana. To mitigate this, I maintained a reflective journal throughout the process, documenting my thoughts, decisions, and reactions to ensure transparency and to monitor how my background might influence data collection and interpretation. By the time I began writing Chapter 3, I had transitioned from employment within the Ministry of Education to a development agency in another country, which further reduced the risk of institutional bias. A second

anticipated limitation was securing teachers' willingness to participate in an hour-long interview. However, once participants agreed on an appropriate time, engagement was seamless. All interviews were conducted during the Easter break, which allowed for flexible scheduling and facilitated follow-up through the use of a detailed interview protocol and reflective journaling.

Despite these measures, several limitations must be acknowledged. Firstly, the study was limited to a specific group of primary teachers who participated voluntarily, meaning the perspectives captured may reflect those teachers who are more professionally engaged or motivated, while excluding the voices of those less inclined to participate. Second, the study relied solely on teachers' perspectives and did not include other stakeholders such as school leaders, curriculum officers, and students, whose input might have provided a more holistic understanding of national professional development policy implementation. Thirdly, as with many qualitative studies, reliance on self-reported interview data introduces the possibility of recall bias, social desirability bias, or responses framed in ways deemed professionally acceptable. Fourthly, the findings are context-specific to the Guyanese education system and the Grade 6 mathematics curriculum, which limits their transferability to other contexts or subject areas. Finally, although trustworthiness was strengthened through member checking and the inclusion of a discrepant case, my professional background in education policy and planning may still have influenced the interpretation of findings despite deliberate reflexivity throughout the process.

Recommendations

This study provided meaningful insights into Guyanese primary teachers' perceptions of their successes and challenges using the NPDP to address the low performance of students on the MNGSA. As such, it contributes to the limited body of knowledge on how Guyanese teachers perceive their successes and challenges in using the national professional development policy to improve mathematics outcomes. While the study's strengths lie in capturing teachers' voices and situating their experiences within Bandura's (2023) social cognitive theory and Senge's (2006) systems thinking, several limitations, combined with the insights from the reviewed literature, suggest important directions for further inquiry. One such recommendation is to broaden the scope of participants beyond teachers. This study focused solely on the teachers' perspectives, which provided rich, context-specific insights, but excluded the voices of principals, curriculum officers, parents, and students. As highlighted in the literature, Tenorio (2022) emphasized the importance of including multiple stakeholders in understanding policy implementation. Future research could adopt a multistakeholder approach to explore how alignment or lack thereof among teachers, administrators, and policymakers influences the effectiveness of professional development and its classroom translation.

Second, this study is a basic qualitative exploration, providing a snapshot of teachers' perceptions at a single point in time. As noted by Perrotta (2021) and Ronnerman and Olin (2021), sustained professional development is most effective when tracked over time. Future longitudinal studies could follow teachers across several years

of exposure to the national professional development policy to determine whether increased confidence, collaborative planning, and new instructional practices are sustained, and whether these changes ultimately improve student outcomes.

Third, the reliance on self-reported data was both a strength and a limitation. While interviews provided a voice for teachers' experiences, they may have been influenced by recall bias or social desirability. To address this, future studies should triangulate teachers' accounts with classroom observations or student achievement data. This recommendation aligns with Friesen and Kuntze (2020), who argued that teachers' reported competence must be examined alongside observed practice to evaluate the real impact of professional development. Fourth, the study revealed persistent challenges with differentiation and student engagement. Meera and Van Wyk (2022) noted that differentiated and culturally responsive practices are essential for effective mathematics teaching, yet teachers in Guyana reported feeling underprepared to implement them. Future research could therefore examine how targeted professional development interventions in differentiation and inclusive pedagogy impact teaching practices, especially in low-resource or rural contexts.

Fifth, the study highlighted issues related to modality, timing, and communication in professional development. Nawab et al. (2020) emphasized that effective professional development requires more than content; it requires structures that support practice, reflection, and teacher agency. Future research could systematically investigate how different modalities (workshops, coaching, blended learning), timing (during versus after school), and communication approaches (top-down versus participatory) influence

teacher engagement and the translation of professional development strategies in the classroom. Finally, expanding research beyond Grade Six mathematics to earlier grades and other subject areas would be valuable. Teachers themselves suggested that interventions should not be restricted to grade six, as earlier, consistent exposure to quality instruction may help reduce the negative attitudes and disengagement identified in this study. Linking professional development to literacy, science, and lower-grade mathematics could test whether early, system-wide interventions build stronger foundations for learning.

Implications

This study has implications for positive social change at multiple levels: organizational, societal, and individual. By exploring Guyanese primary teachers' perceptions of their successes and challenges in relation to the national professional development policy, the findings highlight opportunities for strengthening professional development practices and creating environments that foster more equitable student outcomes. At the organizational level, the findings emphasize the importance of designing professional development policies that are contextually relevant and collaboratively constructed. Teachers consistently expressed that professional development sessions would be more effective if planned in consultation with educators themselves, ensuring alignment with classroom realities. By adopting more participatory approaches to policy design and implementation, the Ministry of Education and schools can foster greater teacher ownership and enhance the fidelity of implementation. Moreover, the study suggests that schools could benefit from institutionalizing

collaborative practices such as peer planning, co-teaching, and professional learning communities. These approaches build capacity not only for individual teachers but also for the wider system, aligning with Senge's (2006) call for schools to operate as learning organizations.

At the societal level, the findings highlight the broader role of professional development in addressing educational equity. Teachers highlighted persistent challenges with student engagement and negative attitudes towards mathematics, particularly among learners from disadvantaged contexts who lacked exposure to real-life applications. By creating professional development opportunities that equip teachers with strategies to connect mathematics to culturally relevant, real-world contexts, education systems can begin to close the achievement gaps that often mirror broad socio-economic inequalities. Societally, this can contribute to improved performance on high-stakes assessments, such as the national Grade 6 assessment, which plays a critical role in shaping students' academic pathways in Guyana.

At the individual level, the study underscores how professional development enhances teachers' confidence, competence, and agency. Teachers reported that their ability to adapt curriculum, employ creative strategies, and sustain student engagement was directly tied to the confidence gained from professional development. When teachers feel empowered, they are more likely to experiment with innovative strategies, persist through challenges, and create positive learning experiences for their students. This, in turn, can foster greater student self-efficacy in mathematics, aligning with Bandura (2023) assertion that confidence and modelling are key to learning. For individual

students, more effective and engaging mathematics instruction translates into improved readiness for secondary education and broader life opportunities.

Methodologically, this study demonstrates the value of using a qualitative approach, supported by reflexive practices, to capture teachers' nuanced perspectives. The inclusion of a discrepant case and member checking strengthened the trustworthiness of the findings, highlighting that even within relatively small samples, diverse voices can yield meaningful insights. Future methodological approaches may benefit from mixed-methods designs, which could triangulate qualitative teachers' perspectives with quantitative measures of students' performance, thereby offering a richer evidence base for evaluating the effectiveness of professional development.

Theoretically, the findings confirm and extend both Bandura's (2023) social cognitive theory and Senge's (2006) systems thinking. Consistent with Bandura, teachers' confidence and reliance on observational learning were central to their ability to translate professional development into classroom practice. At the same time, Senge's emphasis on collaborative planning and the development of a shared vision was evident in how teachers bridged national policy with classroom realities, highlighting the importance of collective engagement in sustaining effective implementation. The study also extends these frameworks by highlighting the constraints that arise when systemic structures, such as resource allocation, communication channels, and curriculum pacing, are not aligned with teacher needs, demonstrating the interconnectedness of individual, behavioral, and environmental factors.

From a practical standpoint, this study suggests that professional development must be teacher-centered, ongoing, and contextually responsive. Specifically, teachers should be engaged as collaborators in professional development planning to ensure training meets their classroom needs. It should not be one-off workshops, but instead embedded in everyday practice through coaching, modeling, and mentoring, with professional learning communities, coteaching, and interschool exchanges institutionalized as regular avenues for professional growth. Professional development strategies should not only target grade six but also extend to earlier grades to ensure a stronger foundation in mathematics learning. Policies must address disparities by ensuring that teachers in hinterland and riverine schools receive tailored resources and training aligned with their unique challenges.

Conclusion

This study aimed to explore Guyanese primary teachers' perceptions of their successes and challenges using the NPDP to address the low performance of students on the MNGSA. Using a qualitative approach, grounded in Bandura's (2023) social cognitive theory and Senge's (2006) systems thinking, the study illuminated how teachers experienced professional development both as a source of empowerment and as a site of systemic constraints. The findings revealed that professional development has the potential to build teachers' confidence, enrich instructional practices, and foster collaboration that directly benefits student learning. Teachers valued opportunities to engage actively in professional development sessions, and they highlighted collaborative planning and co-teaching as critical tools for translating policy into practice. At the same

time, teachers identified persistent barriers, including limited or inconsistent implementation, inadequate resources, time constraints, challenges with differentiation, and student disengagement, that continue to impede the full realization of the policy's goal. These tensions underscore that professional development should not be treated as a stand-alone activity but rather as part of a broader system designed to incorporate teacher voice, contextual realities, and sustainable support structures. Ultimately, this study confirms that when teachers are valued as co-creators of policy and practice, professional development becomes not only a tool for enhancing mathematics achievement but also a catalyst for transformative change across classrooms, schools, and the broader education system.

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Appendix A: Recruitment Flyer

Professional development policies.

I AM RECRUITING

For this study, you are invited to share your perception of your successes and challenges using national professional development policies to address the low mathematic performance of grade six students. Your participation could contribute to improving mathematics education in Guyana and to shape future policies.

ABOUT STUDY

- A 60-90 minutes Microsoft Teams interview that will be audio recorded.
- This study has 33 interview questions
- You will receive a $20 USD Amazon gift card as a thank you.
- To protect your privacy, the published analysis will not share any names or details that can identify you.

VOLUNTEER REQUIREMENTS

- Must be a trained teacher with a minimum of 5 years teaching experience.
- Attended professional development in mathematics in the last 4 years.

This interview is part of the doctoral study for Nicola Johnson, a PhD student at Walden University. Interviews will take place during March-April 2025.

PLEASE MESSAGE ME AT [redacted]

Appendix B: Interview Protocol

Opening:

1. Introduce myself as an education specialist and researcher and thank the participant for volunteering to be part of the study.
2. Iterate the fact that the interview will be recorded.
3. Ask the Participant for any questions

Time of Interview:

Date of Interview:

Method of Interview:

Interviewee:

Position of Interview:

1.What grade do you currently teach?
2. How many years of teaching experience do you have?
3. What is your highest level of education complete?
4. What does success in implementing the national professional development policies (NPDP) look like to you?
5. How did your confidence in your teaching methods contribute to this success?
6.What role did collaboration with colleagues or administrators play in achieving this outcome?
7.What are the biggest challenges you face when implementing the NPDP?
8. Are there specific aspects of the NPDP that you find difficult to use in the classroom?
9. How do time, resources, or administrative support impact your ability to implement the policy effectively?
10. How has the NPDP influenced your confidence in teaching mathematics?
11. Do you feel more prepared to teach challenging mathematical concepts? Why or why not?
12 How has professional development under the NPDP contributed to your confidence?
13. How relevant do you feel the NPDP is addressing the specific challenges in your classroom?
14. Does the policy align with your students' needs and learning styles? Why or why not?
15. Are there areas where the policy feels disconnected from the classroom reality?
16. How do you perceive the role of collaboration in implementing the NPDP?

17. Can you describe a situation where collaboration with colleagues or administrators impacted your implementation of the NPDP?
18. What opportunities for collaboration are available in your school?
19. What strategies have you learned from professional development sessions under the NPDP?
20. Can you describe a specific strategy or technique you've successfully implemented?
21. How have these strategies influenced your students' learning outcomes?
22. How has the school environment supported or hindered your implementation of the NPDP?
23. What specific support systems (e.g., resources, leadership) have been helpful?
24 Are there systemic issues that make implementing the NPDP more difficult?
25. How do your personal beliefs about teaching mathematics align with the NPDP?
26. Do you think the NPDP reflects your teaching philosophy and goals? Why or why not?
27. How do your beliefs influence the way you implement the policy?
28. How do you think students' perceptions and abilities influence your implementation of the NPDP?
29. How do your students' attitudes toward mathematics affect your teaching practices?
30. Are there specific challenges in addressing diverse students' abilities under the NPDP?
31. What systemic changes would you recommend to improve the implementation of the NPDP?
32. Are there specific changes at the school or district level that you think would make the policy more effective?
33. What role do you think policymakers should play in supporting teachers?

Post Interview

Statement to Participant: Thank you so much for taking the time to participate in this interview and for sharing your experiences. Your insights are incredibly valuable and will contribute significantly to understanding how teachers like yourself navigate professional development policies and address challenges in the classroom.Before we conclude, do you have any questions for me about the study and the process?

- I want to remind you that everything you've shared today will remain confidential.
- Your responses will only be used for this research, and your identity will not be disclosed in any reports or publications.

- I will transcribe and analyze the information you've provided, which would involve members checking. Members checking is when the researcher takes the findings back to the participants for their review and validation. Participants are asked to provide feedback within seven days of receiving the analysis. Please indicate whether you prefer to provide the feedback by email or phone.
- If I need any clarification or additional details, is it okay for me to contact you?
- If you have any questions after today or think of something you'd like to add, please feel free to reach out to me. You can contact me at Nicola.johnson@waldenu.edu or [redacted].
- Thank you again for your time. Have a wonderful day, and I look forward to staying in touch as this study progresses!