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Mathematics Anxiety: Experiences of Intermediate Phase Teachers in the Chris Hani East Education District, South Africa

Nomxolisi Mtsi[1*]
Shakespear Chiphambo[2]
Lungiswa Nqoma[3]
Avela Ngqunguza[4]
Thami Isaac Makhoba[5]
Nana Y. B. Agyeman[6]

AFFILIATIONS
[1,2,3,4,5&6]Faculty Of Education, Walter Sisulu University, Queenstown, South Africa.

CORRESPONDENCE
Email: nmtsi@wsu.ac.za*

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Abstract: This study examines teachers' experiences in teaching intermediate-phase mathematics, aiming to uncover the factors influencing their instructional practices and overall effectiveness. In South Africa, the legacy of apartheid continues to impact how mathematics is taught, leading to significant gaps in educational quality and resources. Despite reforms since 1994, challenges such as a lack of qualified teachers and unequal access to resources persist. Many students struggle with mathematics, which is often taught in languages that are not their first language, resulting in underperformance in international tests and negative attitudes towards the subject. The main objective of the study is to provide insights into the challenges teachers face at this critical educational stage. Vygotsky's Sociocultural Theory informs the study, emphasising the significance of social interactions and cultural contexts in learning. The research involved a sample of ten intermediate-phase mathematics teachers. A qualitative approach was adopted, employing a case study design grounded in the interpretive paradigm. Findings reveal the following challenges: resource constraints were identified as a primary issue, the curriculum is too packed, language acts as a significant barrier, teachers are assigned mathematics subjects without adequate knowledge or support, and there is limited support from management. The study recommends tailored professional development programmes that blend technology training with teaching strategies crucial for helping teachers meet today's educational challenges. Additionally, establishing structured mentoring systems in schools can encourage collaboration and growth, fostering a supportive environment for sharing effective practices.

Keywords: Intermediate-phase mathematics, mathematics instruction, professional development, mathematics anxiety.

1. Introduction

Ensuring that students find enjoyment in maths is crucial. The intermediate phase of education focuses on imparting numerical skills and basic mathematics while helping students appreciate maths and develop problem-solving abilities and clearer thinking. Mathematics education is vital to worldwide educational systems as it fosters cognitive growth and enhances problem-solving capabilities in learners (Boaler et al., 2022). Research indicates a growing acknowledgment of the significance of effective maths teaching, especially during the intermediate phase, which acts as a foundational period for students' future educational experiences (NCTM, 2020). The global perspective of maths education reveals various instructional strategies and curriculum designs influenced by different cultural, economic, and political settings. For instance, countries involved in international assessments like PISA have demonstrated varying levels of success in maths, prompting a re-evaluation of their teaching strategies and teacher training initiatives (OECD, 2019).

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In the African context, the obstacles associated with teaching mathematics are intensified by insufficient resources, overcrowded classrooms, and a shortage of qualified teachers (Ndlovu & Tait, 2019). Numerous African nations encounter notable educational inequalities, with disparities between urban and rural areas affecting the availability of quality mathematics education. This scenario necessitates a deeper understanding of teachers' experiences and strategies to address these challenges, especially considering the African Union's Agenda 2063, which highlights the importance of enhancing educational systems (African Union, 2015).

In South Africa, the educational environment presents distinct challenges and opportunities. The South African curriculum has undergone several reforms to improve mathematics education; however, research reveals ongoing problems such as low student achievement in mathematics and insufficient teacher training (Mabena et al., 2021). Educators frequently express feelings of unpreparedness to teach mathematics effectively, leading to a dependence on conventional teaching methods that may fail to engage students or promote critical thinking abilities (Mahlaba, 2020). Moreover, the author highlights that gaining insight into these teachers' lived experiences is essential for uncovering obstacles to effective instruction and creating focused professional development programmes that cater to their needs. Current literature, as noted by Boateng (2024), indicates that feeling anxious about maths and science can create significant fear, stress, and discomfort when facing these subjects. This kind of anxiety can hold individuals back, making it challenging to excel in school and their careers. It's important to recognise and tackle this anxiety because it can greatly impact how learners learn. Furthermore, understanding the causes of these fears among teachers can create a more supportive and positive learning atmosphere.

How students engage in discussions during maths class is crucial to their understanding, regardless of their grade level (Vygotsky, 1978). Literature confirms that when students take the time to explain their ideas to teachers and discuss problems with their classmates, they not only solidify their grasp of mathematical concepts (Luong, 2022) but also improve their communication skills. Moreover, this idea is rooted in Vygotsky's Sociocultural Theory, which emphasises the importance of learning in a community and the advantages of social interactions. Therefore, the aforementioned author also notes that when students share their thoughts in maths class, they are working together in a supportive environment that helps everyone make sense of maths better. Thus, language is very important in maths classes, and teachers need training to empower them to teach effectively and mitigate maths anxiety in learners.

2. Problem statement

There is an increasing concern regarding the anxiety levels that teachers face while instructing mathematics, which can negatively impact their teaching methods and, as a result, student learning outcomes. Studies reveal that many pre-service teachers experience anxiety related to mathematics, often stemming from their own unfavourable experiences with the subject during their education (Novak & Tassell, 2017). This anxiety not only diminishes teachers' confidence but also affects their teaching strategies, potentially creating a cycle of anxiety that can influence student performance as well (Molin et al., 2021). Additionally, the expertise and readiness of teachers regarding the subject significantly influence their teaching effectiveness. Research indicates that a teacher's mathematical knowledge (both content and pedagogical knowledge) is essential for successful instruction; however, numerous educators feel unprepared to teach mathematics effectively at the intermediate level (Begue et al., 2023). This lack of self-assurance and understanding can arise from inadequate training and professional development opportunities that often fail to address the specific needs of mathematics educators (Acharya, 2019). Consequently, teachers may default to conventional, teacher-centred teaching strategies that do not actively engage students, exacerbating student disengagement and underperformance in mathematics (Atoyebi & Atoyebi, 2022). Therefore, against this background, the researchers explore the experiences of Intermediate Phase teachers in one of the

education districts in South Africa. The study answered the question of what *factors affect teachers' experiences in teaching mathematics during the intermediate phase.*

3. Literature Review

3.1 Factors that shape teachers' experiences and the challenges they encounter

Content knowledge is among the key aspects that shape a teacher's experiences; for instance, the depth of a teacher's content knowledge is crucial in influencing their teaching approaches. Studies suggest that a solid foundation in mathematical concepts is associated with more effective teaching and increased student involvement (Wong & Liem, 2022). Teachers who are confident in their understanding of mathematics are more inclined to adopt various instructional techniques that enhance students' critical thinking and problem-solving skills (Sitopu et al., 2024). Hence, Harefa and Hulu (2024) assert that the classroom setting is crucial in influencing teachers' experiences. Moreover, an encouraging and cooperative environment promotes positive student interactions and enhances teachers' ability to apply effective teaching strategies (Tong et al., 2021). Studies show that educators who develop a positive classroom culture, marked by mutual respect, open dialogue, and support, often report more gratifying teaching experiences.

Furthermore, classroom management techniques significantly affect teachers' perceptions of their effectiveness and enjoyment of teaching mathematics. Nepal and Rogerson (2020) also note that educators' beliefs and attitudes towards mathematics and teaching significantly impact their classroom experiences. While Attard and Holmes (2020) indicate that teachers who maintain a positive outlook on the importance of mathematics and their ability to instruct it effectively are more likely to adopt innovative and student-centred teaching methods, negative attitudes, frequently stemming from their own experiences with mathematics anxiety, can restrict their teaching effectiveness and result in a less engaging learning atmosphere for students (Attard & Holmes, 2020). External factors, such as curricular requirements, policy modifications, and societal pressures, significantly influence teachers' experiences in intermediate-phase mathematics. Educators frequently encounter pressures from standardised assessments and accountability standards that restrict their teaching flexibility (Tong et al., 2021). These external demands can lead to stress and diminish teachers' autonomy, which, in turn, impacts their instructional choices and overall job satisfaction.

3.2 Resource constraints in schools

After apartheid ended, there was a hopeful vision for all schools, including those in townships, to become desegregated and receive equal funding like other schools. However, many scholars, including Amsterdam (2007), as well as current authors such as Siyongwana and Chanza (2020), and Gruijters et al. (2024), highlight a troubling reality: township schools have continued to face segregation from 2017 to 2025. Research reveals that resource limitations, when combined with overcrowded classrooms, create compounded challenges that significantly affect teaching effectiveness (Ndlovu, 2025). Moreover, the literature notes that a teacher's role is to spark a love for learning (Mtsi, 2016) by using engaging materials and meaningful tasks that draw students in. Therefore, it is vital to consider the factors that shape a supportive and inspiring environment for every learner. These experts argue that the persistent lack of resources in township areas makes it incredibly difficult for these schools to reach funding levels that would allow them to provide the same quality of education as suburban or predominantly White schools. This ongoing inequality underscores the challenges still faced by communities striving for educational equity.

3.3 Curriculum implementation barriers

When teachers experience anxiety, it can significantly impact their pedagogical methods. This, in turn, creates obstacles in the effective execution of the curriculum, ultimately affecting the learning

experiences of their students. It is crucial to recognise that a teacher's emotional well-being plays a vital role in shaping a positive and productive classroom environment. While progress has been made in improving educational outcomes in mathematics, significant challenges persist. The literature by Talib, Nasri, & Mahmud (2025) emphasises that one major concern is the preparedness of mathematics teachers to effectively teach the subject. Additionally, the authors underscore the importance of ensuring that teachers feel confident and well-equipped to deliver mathematics lessons, which is essential for fostering a positive learning environment and facilitating student success. One of the most substantial hurdles in making mathematics effective for teaching and learning is the anxiety that many individuals experience around these subjects (Boateng, 2024). This anxiety impacts not only students but also educators, creating a challenging atmosphere for all involved (Griggs et al., 2013; Megreya et al., 2021). Research demonstrates that teaching mathematics inclusively and diversely is closely aligned with the foundational principles of differentiated instruction, as emphasised by Bobis, Russo, Downton, Feng, Livy, McCormick, and Sullivan (2021). This approach recognises that every student has unique learning needs, and by embracing these differences, educators can foster a more supportive environment that caters to various learning styles. Consequently, in recent literature, Maphumulo and Biccard (2025) highlight significant progress in updating curriculum policies to prioritise and celebrate diversity in education. This evolution is essential, as it not only validates the experiences of a diverse student body but also enriches the overall educational landscape. Similarly, creating a more interactive and engaging classroom, as suggested by Herner-Patnode and Lee (2021), can profoundly enhance the learning experience in mathematics. When students are encouraged to collaborate, share their ideas, and explore different perspectives, they are more likely to develop a deeper understanding of mathematical concepts. Additionally, incorporating diverse cultural contexts into the curriculum can make mathematics more relatable and relevant to all students, fostering a sense of belonging and motivation (Herner-Patnode & Lee, 2021). Ultimately, the above authors echo the sentiment that prioritising inclusivity and interactivity in maths education can help foster a generation of learners who are not only proficient in mathematical skills but also appreciate the richness of diverse viewpoints and experiences. This holistic approach to teaching mathematics is crucial for preparing students to navigate an increasingly interconnected world.

3.4 Advancing educators' professional growth and development

Professional development for teachers is vital because it equips them with the skills and knowledge necessary to teach mathematics effectively. This ongoing training enhances their teaching methods and creates an environment that promotes deep learning and critical thinking among students. Ball, Thames, and Phelps (2008) emphasise that effective teaching goes beyond just knowing the subject; it also involves understanding how to teach that subject effectively. They introduce the concept of mathematical knowledge for teaching (MKT), which blends deep subject knowledge with teaching skills. Their findings show that having this strong foundation in both areas greatly enhances a teacher’s effectiveness in the classroom. Ní Ríordáin, Paolucci, and Lyons (2019) delve into an important point that emphasises that teachers' knowledge profoundly affects what takes place in the classroom. Moreover, the above authors also note that this impact goes beyond just the information students learn; it also shapes how they feel about that learning experience. Their insights highlight how crucial a teacher's expertise is in making education effective and meaningful for students. Therefore, investing in teachers’ growth fosters more engaging and supportive maths classrooms that empower students to excel.

3.5 Role of school environment and support in education

Teachers' assistance from their peers and school leaders is essential for reducing mathematics anxiety. Studies indicate that insufficient professional development and collaborative support may make teachers feel isolated and apprehensive about their teaching methods (Au, 2020). A

collaborative work environment that promotes the exchange of resources and strategies can help alleviate some of this anxiety (Gölogluet al., 2021). However, Agir (2019) suggests that, from the teacher's perspective, the relationship between teachers and students can be influenced by various factors, including school culture and climate, the educational programme, and available equipment and resources. Furthermore, adopting a student-centred approach is key when creating a maths curriculum. This strategy helps to build a supportive school environment where all learners can thrive and feel valued (Jamil et al., 2024). Hence, Tirol (2022) highlights the importance of using a spiral method in the curriculum. This approach reinforces essential concepts and encourages students to develop their critical thinking skills over time. Research indicates that it is vital for all stakeholders—such as teachers, students, and parents—to play a significant role in creating a supportive and thriving academic environment. Moreover, this approach can help cultivate a space where learning flourishes and all individuals feel valued (Busari et al., 2023).

3.6 Learner diversity and challenges in mathematics

Learner diversity in mathematics involves recognising and appreciating the unique differences and learning needs among students in a maths classroom. This diversity may include various learning styles, cultural backgrounds, abilities, and experiences. Creating an interactive classroom environment has the potential to significantly enhance students' learning experiences in mathematics (Herner-Patnode & Lee, 2021). The authors note that this approach encourages active participation, collaboration, and hands-on problem-solving, which can lead to a deeper understanding of mathematical concepts. Furthermore, they highlight the crucial role of promoting diversity and inclusivity within mathematics education. By fostering an environment where students from varied backgrounds and learning styles feel valued and supported, educators can help ensure that all students have equal opportunities to succeed in mathematics (Herner-Patnode & Lee, 2021). However, Maphumulo and Biccard (2025) emphasise that, despite efforts to promote diversity through curriculum development, many mathematics classrooms still rely on traditional, teacher-centred approaches that enhance surface-level learning.

Studies indicate that inclusive maths instruction significantly benefits students and also note that by adapting teaching methods and materials to fit the diverse learning styles and backgrounds of learners, educators create an environment where everyone has the chance to succeed (Bobis, Russo, Downton, Feng, Livy, McCormick & Sullivan, 2021). This approach highlights the importance of personalised learning in achieving student success.

3.7 Understanding mathematics anxiety

Mathematics anxiety is an increasingly recognised concern that affects both teachers and students, significantly impacting teaching methods and student achievement. This anxiety is defined as a feeling of tension or apprehension that hinders the ability to engage with numbers and solve mathematical problems (Tong et al., 2021). The origins of this anxiety can vary widely, encompassing negative past experiences with mathematics, societal stereotypes, and a lack of self-assurance in one's mathematical abilities. Such emotions can be particularly detrimental for educators, as they may influence their pedagogical approaches and interactions with their students (Nepal & Rogerson, 2020).

3.8 Mathematics anxiety among teachers

According to Cipora et al. (2022), multiple elements contribute to mathematics anxiety in teachers. A key factor is the level of knowledge in mathematical content. Educators who feel inadequately equipped in their mathematical skills are more prone to feelings of anxiety. The pressure to comply with curriculum standards and perform effectively on tests can further intensify feelings of inadequacy and anxiety (Yarkwah et al., 2024). Additionally, a lack of professional development focused on mathematics teaching can leave educators feeling unsupported and anxious regarding

their teaching abilities (Cipora et al., 2022). These are some of the factors that lead to mathematics anxiety among teachers.

The literature emphasises that cultural perceptions of mathematics and societal stereotypes can heighten anxiety levels among teachers. Studies indicate that societal views characterising mathematics as primarily a male domain can discourage female educators and create feelings of inadequacy (Chwialkowska et al., 2020). This cultural bias may create an environment in which teachers feel pressured to conform to expectations, ultimately intensifying their anxiety. Bright et al. (2020) argued that the incorporation of technology into maths teaching has grown in significance; nevertheless, educators might experience apprehension regarding their capability to use digital tools and resources proficiently. Studies show that low confidence in utilising technology can heighten anxiety, especially when teachers lack familiarity with the tools essential for effective maths instruction (Heissel, Adam, Doleac, Figlio, & Meer, 2021).

3.9 Strategies for mitigating mathematics anxiety

Addressing the anxiety that teachers face in mathematics is essential for enhancing their teaching methods and, in turn, positively affecting student achievements. Professional development initiatives aimed at improving teachers' understanding of mathematical concepts and their teaching methods have been shown to lessen anxiety levels (Au, 2020). Furthermore, creating a supportive network among educators can provide a space for sharing experiences and strategies to manage anxiety (Chwialkowska et al., 2020). Promoting reflective practices can also assist teachers in recognising and confronting their anxieties, leading to greater confidence and effectiveness in their teaching (Au, 2020).

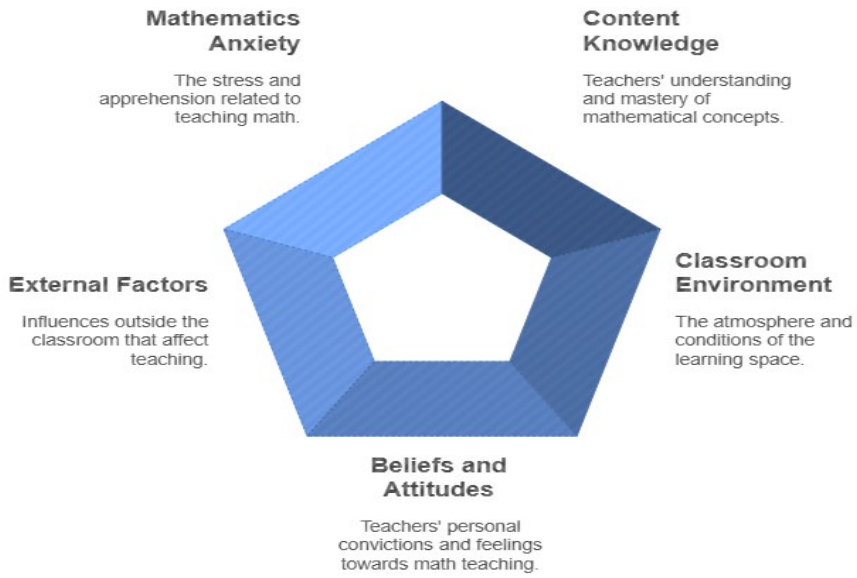

***Figure 1**: Teachers' experiences in mathematics teaching*

Figure 1 effectively visualises how these various factors interconnect and influence teachers' experiences in mathematics teaching, making it easier to understand the complex relationships discussed in the literature review.

4. Theoretical Framework

The theoretical framework for this research on teachers' experiences in teaching mathematics during the intermediate phase draws from Vygotsky's Sociocultural Theory. This theory emphasises the significance of social interactions and cultural environments in the learning process (Vygotsky, 1978).

It is particularly relevant for examining educators' experiences, as it highlights how collaborative practices, peer relationships, and cultural backgrounds shape teaching methods and student engagement in mathematics. By delving into teachers' experiences within their specific sociocultural contexts, the research can uncover how these factors influence their instructional decisions and the overall effectiveness of their teaching approaches.

Furthermore, Vygotsky asserts that cognitive development is intrinsically a social endeavour, shaped by cultural exchanges and the guidance of more knowledgeable individuals. A central tenet of this theory is the Zone of Proximal Development (ZPD), which describes the difference between what learners can achieve independently and what they might accomplish with assistance. Effective teaching occurs within this zone, where scaffolding—temporary support aiding students to master skills just beyond their current capabilities—plays a vital role. Vygotsky also emphasises the influence of cultural tools, such as language and symbols, in shaping cognitive processes and problem-solving skills.

Ultimately, social interaction is fundamental, as cognitive growth is deeply rooted in social contexts. Learning is further enhanced through collaborative dialogues and exchanges with peers and adults. This theory is especially pertinent to this study since it underscores the necessity for learners to receive support to attain the levels expected by their teachers. However, for students to reach these expectations, teachers must possess confidence in their mathematics instruction. This confidence stems from a strong knowledge base about the subject matter, as a lack thereof can lead to anxiety and hinder the ability to provide effective support. Additionally, addressing potential barriers requires attention from school management to create a conducive learning environment.

5. Methodology

This research utilises a qualitative approach to analyse teachers' experiences in teaching mathematics at the intermediate phase. Qualitative research is beneficial for understanding complex phenomena by deeply exploring participants' perspectives, feelings, and contextual elements (Creswell & Poth, 2018). The study aims to collect comprehensive narratives from teachers about their experiences, challenges, and techniques in mathematics teaching through in-depth interviews.

The study adopts an interpretive approach, emphasising the need to understand the unique meanings and experiences that individuals attach to their lives. As Adu (2019) points out, it is essential to delve into these personal perspectives to truly grasp how people perceive and make sense of their experiences. This paradigm is suitable for the study as it examines how educators view their responsibilities, the impact of these views on their teaching methods, and their emotional reactions to teaching mathematics. Furthermore, the study seeks to understand teachers' personal experiences to illuminate the elements that influence their practices and the effects on student learning.

A qualitative approach is a research methodology that focuses on understanding the nature of phenomena through the collection of non-numerical data, such as words, experiences, and perceptions (Dehalwar & Sharmam, 2024). This approach aims to explain how and why certain events happen, rather than merely measuring them. Additionally, Dehalwar & Sharmam (2024) indicate that the qualitative approach is useful for exploring complex issues, such as emotions and social interactions. It helps researchers gain insights into the intricate narratives of individuals, allowing them to discover the personal meanings that people attach to their unique experiences (Muzari et al., 2022).

In the context of studying mathematics anxiety among intermediate phase teachers in the Chris Hani East Education District, a qualitative approach is selected because it allows for the exploration of the nuanced and subjective experiences of teachers. This method is crucial for understanding the emotional and psychological factors that contribute to maths anxiety, which cannot be fully captured by quantitative measures alone. By using qualitative methods, the study aims to gather detailed,

descriptive data that can help inform strategies to support teachers and enhance mathematics education.

A phenomenological design is particularly appropriate for studying mathematics anxiety among intermediate-phase teachers in the Chris Hani East Education District, South Africa. Phenomenology seeks to understand how individuals make sense of their experiences and the meanings they assign to them (Barnes & McCreanor, 2022). The authors also note that this design emphasises understanding and interpreting the experiences of teachers through in-depth interviews, allowing researchers to capture the emotional and psychological effects of mathematics anxiety. This method reveals common trends and offers a deeper understanding of the issue at hand. The insights gained can help in developing more tailored interventions and support programmes that truly cater to the unique needs of these teachers. By doing so, they can make a meaningful impact that will enhance their professional lives.

5.1 Sampling and data collection

In this research, a purposive sampling technique was utilised to identify a varied group of 10 teachers from a pool of 60 teachers in different schools within the Chris Hani East Education District. In the current literature, Nyimbili and Nyimbili (2024) note that purposive sampling methods are commonly employed in research papers because they are applicable across various research paradigms. Moreover, the authors highlight that these procedures help to identify high-quality samples without biases, thereby enhancing the reliability and trustworthiness of the results. This method ensured that the chosen participants reflected a range of experiences and viewpoints related to mathematics anxiety. By deliberately selecting teachers with diverse backgrounds, teaching methods, and school contexts, the study aimed to gain a more thorough understanding of how mathematics anxiety impacted educators in this area. This focused sampling allowed for in-depth qualitative insights, which were crucial for addressing the distinct challenges encountered by intermediate-phase teachers.

Semi-structured interviews were conducted, lasting approximately an hour each. An interview guide was developed to facilitate discussion, covering topics such as resource constraints, curriculum challenges, learner diversity and barriers, professional development needs, and the school environment and support. Data was collected through semi-structured interviews with mathematics teachers in the intermediate phase, allowing for flexibility in discussing topics while focusing on their experiences. To analyse the data, thematic analysis was applied to in-depth interviews with 10 teachers selected from a total of 60 in the Chris Hani East Education District. The process included familiarisation with the data, initial coding of significant phrases, and the development of key themes such as personal experiences of anxiety, the impact on teaching practices, and the importance of support systems. The analysis revealed how mathematics anxiety affected the teachers' professional lives, highlighting the need for targeted support to help educators manage their anxiety effectively. Data was coded and categorised to enable thematic analysis in order to organise and make sense of the information acquired. To ensure trustworthiness, the researchers adopted several measures, such as credibility, transferability, dependability, and confirmability.

5.2 Ethical consideration

The study adhered to strict ethical protocols and received approval from the university's ethics committee. To establish credibility in examining teachers' experiences in teaching mathematics at the intermediate phase, transferability was achieved by providing detailed descriptions. These descriptions included in-depth information about the context and the participants' experiences, allowing readers to evaluate the relevance of the findings to different situations. Dependability was maintained by keeping an audit trail throughout the research process, documenting decisions, modifications, and reflections, and ensuring the stability and reliability of the findings over time,

thereby providing reassurance and confidence (Badley, 2024). Literature confirms that at this stage, researchers reflect on their biases and assumptions, ensuring that the findings are grounded in the participants' experiences rather than the researchers' preconceived notions (Creswell & Poth, 2018). Therefore, the researchers shared interview transcripts with participants to ensure their words were accurately captured. This provided participants with the opportunity to review, clarify, or add any missing details, making them active contributors to the research and fostering a sense of collaboration and trust. Lastly, letters were carefully written to seek consent from the principals, ensuring their agreement to proceed with conducting interviews in their respective schools.

6. Presentation of Data

We begin this section by explaining the demographic information of the participants. A diverse group of 10 intermediate teachers, selected from a pool of 60 teachers across various schools within the Chris Hani East Education District, participated in the study. The participants included six females and four males, with teaching experience ranging from 5 to 25 years. All participants held teaching qualifications; eight had bachelor's degrees, while two held postgraduate diplomas in mathematics education. The teachers worked in diverse school contexts, including rural, semi-urban, and urban settings, providing a broad perspective on the factors shaping their teaching experiences. The participants were coded as TR1 to TR10.

Hence, themes were drawn from the participants' responses on the teachers' experiences in teaching intermediate-phase mathematics

6.2 Theme 1: Resource constraints

This theme highlights the persistent shortage of essential teaching resources that hampers effective mathematics instruction. Participants reported inadequate textbooks, a lack of mathematical tools, and overcrowded classrooms, all of which make lesson delivery and learner engagement difficult. These resource constraints significantly limit teachers' ability to provide quality education and individual support to learners.

> *TR 1: "I don't have any resources to teach our learners; they come to school without even rulers. In addition, we do not even have enough textbooks for all learners. Sometimes I must write everything on the chalkboard, which takes up valuable teaching time."*
> *TR3: "My school struggles with resources. The lack of mathematical tools affects our practical lessons. How do you teach geometry without proper geometric instruments? It's very challenging. We rely mostly on borrowing from other teachers in other schools."*
> *TR7: "With 45 learners in my class and limited resources, ensuring everyone gets hands-on experience with learning materials becomes a nightmare."*

Analysis of the interview data revealed that resource constraints significantly impact teachers' experiences in teaching intermediate-phase mathematics. Teachers face substantial challenges due to a lack of basic teaching resources, overcrowded classrooms, and insufficient teaching aids. These constraints severely hinder their ability to deliver effective lessons and provide individual attention to learners. This theme emerged prominently from several participants' responses, particularly evident in TR1's statement about insufficient textbooks, where they expressed frustration about having to write everything on the chalkboard, consuming valuable teaching time. TR3 further emphasised this challenge by highlighting the lack of mathematical tools, especially for teaching geometry, while TR7's experience with managing 45 learners in a single classroom with limited resources underscored the severity of these constraints.

6.3 Theme 2: Curriculum challenges

The study revealed that curriculum-related factors significantly contribute to teachers' experiences of mathematics anxiety, influencing both instructional quality and learner outcomes. Participants

emphasised that an overloaded curriculum and insufficient instructional time impede effective teaching and learning processes:

> *TR4: "The curriculum is too packed. We're expected to cover too much content in a limited time, which affects the quality of our teaching and learners' understanding."*
>
> *TR5: "Some topics require more time than allocated. When learners struggle with basic concepts, it becomes challenging to move forward while ensuring no one is left behind."*

The data analysis highlighted significant curriculum-related challenges that shape teachers' experiences. The packed curriculum and limited time allocation create substantial pressure on teachers, directly affecting the quality of instruction and learners' understanding. This theme was particularly evident in TR4's concern about the overwhelming curriculum content and the limited time available to cover it effectively. TR5's observation further reinforced this theme, noting that certain topics require more time than allocated, especially when learners struggle with basic concepts. The author supports the idea that a teacher's role is to spark a love for learning by using engaging materials and meaningful tasks that draw students in (Mtsi, 2016). Therefore, it's vital to consider the factors that shape a supportive and inspiring environment for every learner.

6.4 Theme 3: Learner diversity and barriers

A prominent theme that emerged from the data highlights the challenges teachers face in addressing learner diversity and barriers in intermediate-phase mathematics classrooms. Participants reported difficulties in accommodating varying learning styles and abilities, which are often compounded by language barriers and inadequate home support. These factors collectively hinder effective teaching and learning, placing additional emotional and instructional demands on teachers who strive to meet diverse learner needs:

> *TR6: "Language is a big barrier. Many learners struggle to understand mathematical concepts because English is not their first language."*
>
> *TR9: "Some learners come from homes where they get no academic support. We have to be both teachers and parents."*

A significant theme that emerged from the analysis centres on the challenges teachers face in addressing diverse learning needs and barriers. Teachers consistently reported struggling to accommodate various learning styles and abilities within their classrooms, a situation further complicated by language barriers and insufficient academic support at home. This theme was particularly evident in TR6's reflection on language barriers, highlighting how non-English-speaking learners struggle to grasp mathematical concepts. TR9's observation about the lack of home support further emphasised this challenge, noting that teachers often need to assume both teaching and parental support roles to ensure effective learning outcomes.

6.5 Theme 4: Professional development needs

A recurring theme that emerged from the participants' responses highlights the pressing need for continuous professional development among intermediate-phase mathematics teachers. Many participants expressed that current training opportunities are inadequate and fail to align with the evolving nature of mathematics education. This gap limits teachers' confidence and effectiveness, underscoring the importance of targeted, ongoing professional learning to enhance pedagogical skills and subject mastery:

> *TR2: "We need more training on modern teaching methods. Mathematics teaching is evolving, but our training isn't keeping pace."*
>
> *TR10: "I sometimes feel inadequate when teaching certain topics. We need specialised training in mathematics pedagogy." Also, we are given this subject without any knowledge or support."*

The analysis revealed a strong emphasis on professional development needs among intermediate-phase mathematics teachers. Teachers consistently expressed a need for ongoing training to enhance their teaching skills and adapt to modern pedagogical approaches. This theme emerged clearly from TR2's articulation of the necessity for training in contemporary teaching methods, acknowledging that mathematics education is evolving more rapidly than professional development. TR10's candid admission of feeling inadequate when teaching certain topics further reinforced this theme, highlighting the critical need for specialised training in mathematics pedagogy to build teacher confidence and competence.

6.6 Theme 5: School environment and support

Another central theme that emerged from the study highlights the significant influence of the school environment and support systems on teachers' experiences in teaching mathematics. Participants emphasised that limited administrative support, inadequate resources, and insufficient opportunities for collaboration negatively affect teaching effectiveness. These challenges underscore the importance of supportive leadership and a conducive school climate in enhancing teacher performance and learner achievement.

> *TR8: "Our school management doesn't understand the unique challenges of teaching mathematics. We need more support in terms of resources and training."*
>
> *TR10: "I sometimes feel inadequate when teaching certain topics. We need specialised training in mathematics pedagogy."*

The final theme that emerged from the analysis focuses on the crucial role of the school environment and support systems in shaping teachers' experiences. The level of support from school management and opportunities for collaboration among teachers were identified as significant factors influencing teaching effectiveness. This theme was particularly evident in TR8's observation about school management's limited understanding of the challenges of teaching mathematics, highlighting the need for better administrative support. TR10's emphasis on the benefits of teacher collaboration, while noting the need for more structured collaboration time, further reinforced the importance of a supportive school environment in enhancing experiences in mathematics teaching. The thematic analysis has presented a comprehensive view of the factors shaping teachers' experiences in teaching intermediate-phase mathematics in the Chris Hani East Education District. The five identified themes—resource constraints, curriculum challenges, learner diversity and barriers, professional development needs, and school environment and support—provide valuable insights for educational stakeholders and policymakers.

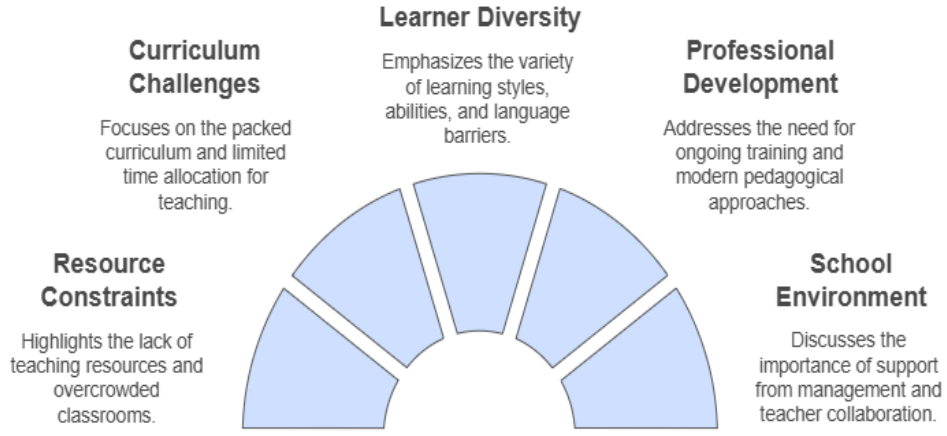

Figure 2: *Factors shaping intermediate-phase mathematics teaching*

Figure 2 depicts five key themes shaping intermediate-phase mathematics teaching: resource constraints manifested through overcrowded classrooms and material shortages; curriculum challenges stemming from content overload and time limitations; issues of learner diversity complicated by language barriers; professional development needs for enhancing pedagogical skills; and the critical role of the school environment and support systems. These interconnected factors significantly influence teachers' effectiveness and students' mathematical learning experiences, suggesting that comprehensive solutions are needed to address these challenges in mathematics education.

7. Discussion of Findings

This study's investigation into teachers' experiences in intermediate-phase mathematics instruction yields significant insights that complement and extend existing literature in the field. Through the theoretical lens of Vygotsky's Sociocultural Theory, the findings reveal the intricate interplay of personal, institutional, and societal factors that shape mathematics teaching practices, aligning with the theory. The emergence of five distinct yet interconnected themes provides a comprehensive framework for understanding the complexities of mathematics instruction at the intermediate phase.

Resource constraints were identified as a primary challenge by the participants in the study. Our research extends this understanding by illuminating how resource limitations intersect with overcrowded classrooms to create compounded challenges that significantly impact pedagogical effectiveness (Ndlovu & Tait, 2019). This finding is particularly pertinent in contexts where resource disparities between schools remain a pressing concern (Novak & Tassell, 2017). Vygotsky's social theory observes that resource constraints can lead to larger class sizes or a shortage of support staff, which reduces opportunities for meaningful interactions between students and more knowledgeable individuals, such as teachers or peers. Additionally, this lack of interaction can hinder the learning process, as students may not receive the guidance they need to progress within their Zone of Proximal Development (ZPD). As the present authors, we believe that the findings align with other studies, including the theory. We also maintain that a lack of resources negatively affects learning and teaching, preventing learners from achieving the expected learning outcomes.

Literature notes that curriculum challenges manifest through content density and time constraints (Heissel, Adam, Doleac, Figlio, and Meer, 2021) and echo broader observations in mathematics education regarding external pressures on teachers. These challenges are particularly acute when teachers attempt to balance comprehensive content coverage with ensuring deep conceptual understanding, especially in diverse classroom settings (Gázquez et al., 2021). Subsequently, the findings align well with other studies. The theme of learner diversity and barriers provides crucial insights into the sociocultural dimensions of mathematics teaching. Participants in the study expressed concerns about language serving as a significant barrier. Through Vygotsky's theoretical framework, we understand how language barriers and diverse learning needs interact with pedagogical approaches. The theory posits that scaffolding and collaborative learning support learners facing barriers in order to meet the expectations set by more knowledgeable peers. Research indicates that teaching mathematics inclusively and diversely aligns with the core principles of differentiated instruction, as highlighted by Bobis, Russo, Downton, Feng, Livy, McCormick, & Sullivan (2021). In the current literature, Maphumulo and Biccard (2025) note that there have been significant strides in updating curriculum policies to prioritise and celebrate diversity in education. However, it is evident that many maths classrooms still rely heavily on traditional, teacher-centred teaching methods. This means that even with these new initiatives in place, the way maths is often taught remains more focused on the teacher's authority rather than engaging students in a more inclusive and interactive manner. Consequently, creating a more interactive classroom can enrich the learning experience in mathematics (Herner-Patnode & Lee, 2021). Moreover, the aforementioned authors (Herner-Patnode & Lee, 2021) highlight the importance of embracing diversity and

inclusivity in maths education. When students engage more actively, they not only grasp concepts better but also feel more valued and included in the learning process. This approach enhances understanding and fosters a supportive environment for all.

The study revealed that some teachers are allocated mathematics to teach without any knowledge or support. Professional development needs emerged as a critical theme, highlighting the importance of continuous teacher training and support in adapting to evolving educational demands. The theme of the school environment and support systems underscores the vital role of institutional backing and collaborative opportunities in enhancing teaching effectiveness. These findings have significant implications for practice, policy, and research. At the practical level, we recommend implementing structured professional development programmes focusing specifically on mathematics pedagogy and content knowledge, developing targeted language support strategies for mathematics instruction, and creating collaborative teaching networks to share resources and best practices (Borko, 2024). For policy considerations, we suggest reviewing and revising curriculum time allocations, establishing guidelines for optimal class sizes, and developing frameworks for resource allocation that address existing disparities.

Ball, Thames, and Phelps (2008) present the idea of mathematical knowledge for teaching (MKT), which combines a strong understanding of the subject with effective teaching abilities. MKT is about having a deep understanding of mathematics alongside the skills to teach it effectively. Therefore, it suggests that great teachers make mathematics relatable and engaging, helping their students not only to learn but also to understand and appreciate the beauty of the subject. This study contributes significantly to understanding the challenges and opportunities in intermediate-phase mathematics teaching. By illuminating the complex interplay of various factors affecting teaching experiences, our findings provide a foundation for evidence-based improvements in mathematics education (Chiu, 2024). The theoretical grounding in Vygotsky's Sociocultural Theory offers a framework for understanding how social, cultural, and institutional factors influence teaching experiences, while the practical recommendations provide actionable steps for enhancing mathematics education in resource-constrained environments.

Regarding the school environment and support, the study shows that there is limited assistance from management concerning mathematics challenges. The participants revealed that the role of the school environment and support systems is the most crucial aspect in shaping teachers' experiences. Literature suggests that a positive working environment can reduce some factors that contribute to anxiety (Gölogluet al., 2021). Moreover, Agir (2019) confirms that the relationship between teachers and students can be positively influenced by school culture, climate, and relevant resources that promote deep learning. Indeed, creating a positive school environment and having strong support systems are key to helping students thrive and feel good about themselves. When students feel safe, respected, and valued, they are more likely to engage in their learning with enthusiasm and develop confidence in what they can achieve. It's all about ensuring they know they matter and have the support they need to grow.

The findings of the study align positively with Vygotsky's Sociocultural Theory, highlighting the significance of navigating language barriers in educational settings. This theory sheds light on how various social, cultural, and institutional factors influence teaching and learning experiences. Additionally, the practical recommendations proposed in the research present concrete strategies aimed at enhancing mathematics education, especially in environments facing resource constraints. By addressing these challenges, we can foster a more inclusive and effective learning atmosphere for all students.

7.1 Implications for the Study

The identified themes provide valuable insights into the factors shaping teachers' experiences in teaching intermediate-phase mathematics. These themes highlight critical areas that require attention to improve teaching effectiveness and learner outcomes. The issue of resource constraints underscores the urgent need for targeted interventions to improve resource allocation in schools. Teachers face significant challenges due to overcrowded classrooms and a lack of basic teaching materials, which hinder their ability to deliver effective lessons. Addressing these constraints can empower teachers to provide more engaging and individualised instruction, ultimately enhancing learner outcomes.

Curriculum challenges, such as the packed curriculum and limited time allocation, suggest the necessity for curriculum reform. Teachers struggle to balance the demands of covering extensive content while ensuring learners grasp fundamental concepts. Policymakers should incorporate teacher feedback into curriculum design to create a more manageable and effective framework that allows for in-depth teaching of key topics. The diversity of learners' needs and the barriers they face, including language challenges and a lack of academic support at home, highlight the importance of equipping teachers with strategies for differentiated instruction. Training programmes should focus on helping teachers address these diverse needs effectively. Additionally, schools should engage parents to foster a supportive home environment that complements classroom learning.

The expressed need for professional development emphasises the importance of ongoing training for teachers. Professional development programmes should prioritise modern teaching methods, subject-specific pedagogy, and the integration of technology into mathematics instruction. These initiatives can enhance teachers' confidence and competence, enabling them to adapt to evolving educational demands. Finally, the role of the school environment and support systems is critical in shaping teachers' experiences. Supportive school leadership and opportunities for collaboration among teachers can significantly enhance teaching effectiveness. School leaders should actively engage with teachers to understand their challenges and provide resources and support. Promoting a culture of collaboration and resource-sharing among staff can further improve teaching practices.

8. Conclusions and Recommendations

In conclusion, this study elucidates the multifaceted challenges confronted by intermediate-phase mathematics teachers, revealing issues such as limited resources, overloaded curricula with unrealistic time frames, language barriers, inadequate subject knowledge among assigned teachers, and minimal institutional support. These findings underscore the necessity for a holistic response that integrates resource provision, curriculum reform, professional development, and enhanced leadership support. By deepening the understanding of these barriers, the study establishes a foundation for interventions aimed at improving mathematics education in the Chris Hani East Education District. Future research should investigate the efficacy of professional development models that address resource constraints, curriculum demands, and learner diversity, as well as examine the long-term impacts of resource allocation strategies on teaching effectiveness. Additionally, exploring how school leadership and teacher collaboration influence instructional practices could further elucidate the role of institutional support.

From a practical and policy perspective, actionable recommendations arise to tackle these challenges. Schools should develop professional development programmes that integrate pedagogy and technology, establish mentoring systems to foster collaboration, and create school-to-school resource-sharing networks to mitigate material shortages. Flexible curriculum pacing guides are also required to accommodate diverse learner needs while maintaining academic standards. At the policy level, urgent reforms should include adjusting curriculum time allocations to better reflect classroom realities, introducing language support programmes specifically for mathematics instruction, and

setting guidelines for optimal class sizes to enhance individualised teaching. Collectively, these measures provide a roadmap for improving practices, learner outcomes, and institutional support. Grounded in Vygotsky's Sociocultural Theory, the study highlights how social, cultural, and institutional contexts shape teaching and learning while offering practical recommendations and systemic reforms to strengthen mathematics education in resource-constrained environments.

Several limitations should be considered when interpreting these findings. First, the study's focus on the Chris Hani East Education District may limit the transferability of the results to other contexts, particularly urban settings with different resource profiles. Second, relying on self-reported data through interviews may not capture the full complexity of classroom dynamics. Third, the timing of the study during the academic year may have influenced teachers' perspectives on certain challenges, particularly those related to curriculum pacing and time management.

9. Declarations

Author Contributions: Conceptualisation (N.M., S.C., L.N., A.N., T.I.M., N.Y.B.A.); Literature review (N.M., S.C., L.N., A.N., T.I.M., N.Y.B.A.); methodology (N.M., S.C., L.N., A.N., T.I.M., N.Y.B.A.); software (N.M., S.C., L.N., A.N., T.I.M., N.Y.B.A.); validation (S.C. & N.M.); formal analysis (N.M., S.C., L.N., A.N., T.I.M., N.Y.B.A.); investigation (N.M., S.C., L.N., A.N., T.I.M., N.Y.B.A.); data curation (N.M., S.C., L.N., A.N., T.I.M., N.Y.B.A.) drafting and preparation (N.M., S.C., L.N., A.N., T.I.M., N.Y.B.A.); review and editing (N.M.); supervision (N/A); project administration (N.M); funding acquisition (N/A). All authors have read and approved the published version of the article.

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Data Availability: The data supporting the findings of this study are available from the corresponding author upon reasonable request. Access will be granted to researchers who meet the criteria for data sharing established by the institutional review board or ethics committee.

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