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Secondary School Teachers' Perspectives on the Challenges of Implementing the Revised Mathematics Curriculum in Ohangwena Region, Namibia

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Abstract. The process of implementing a modified curriculum in the classroom is both rich with opportunities and fraught with difficulties that call for further research and creative solutions. This qualitative research investigates secondary school teachers' perspectives on the challenges of implementing the revised mathematics curriculum in Ohangwena Region, Namibia. Semi-structured interviews were employed to gather data from 14 purposively sampled participants, comprising seven Science, Technology, Engineering, and Mathematics (STEM) heads of department and seven mathematics teachers. Data from the interviews were analysed thematically using NVivo 14 software. Member checking was used to ensure data accuracy and strengthen the study's credibility. Study findings show that both STEM heads of department and mathematics teachers face significant challenges in implementing the revised curriculum which include the complexity of the curriculum, limited teaching resources, heavy workloads, lack of teacher training, insufficient teaching time, overcrowded classrooms, and low learner motivation, all of which hinder effective curriculum implementation. Recommendations are provided to address teachers' difficulties in implementing the curriculum, such as the provision of adequate materials to schools and teacher training, distributing syllabus content evenly throughout grade levels and dividing mathematics into core, extended, and higher levels, providing more time for instruction, motivating learners, and the implementation of the staffing standard policy. In summary, the study's findings are vital for improving education standards, especially in mathematics. They can inform the Ministry of Education's decisions on funding and resources and guide curriculum designers and policymakers in improving future policies.

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1. Introduction

Curriculum reform is an ongoing process within education, not only in Namibia but also around the world. Josua et al. (2022) identified appropriate and constructive education as being one of the key variables in transforming Namibia into an industrialised nation by 2030 (Vision 2030). Therefore, Namibia's curricula have been subjected to several revisions in an attempt to improve education. For example, after gaining its independence in 1990, Namibia amended its curriculum. A curriculum reform called the Pilot Curriculum Guide for Formal Basic Education was first implemented in 1996. Its objective was to confront the legacy of a racially discriminatory, social class-based educational system characterised by severe inequalities and injustices (Tubaundule, 2014). However, this curriculum failed because teachers lacked access to the necessary resources, space, and training to effectively execute it (Matiki et al., 2023). As a result, a new curriculum, known as the Pilot Curriculum Guide for Formal Senior Secondary Education, was launched in 1998. In addition to leveraging technology for research, education, and information exchange, this programme of study aimed to provide students with the appropriate life skills needed for their personal growth, social interactions, and integration in modern society (Kambeyo, 2018). Nonetheless, this curriculum also failed as a result of the misalignment between the objectives of the curriculum guide and the government's broad educational goals, diminishing the programme's legitimacy and relevance (Kayumbu, 2020).

In order to improve educational quality, diversity, and relevance, Namibia further revised its curriculum, introducing the National Curriculum for Basic Education in 2015; this is the current curriculum. Held in Windhoek, the National Conference on Education resulted in a five-day maximum revision of the new curriculum, which was put into effect between 2015 and 2022. The National Curriculum for Basic Education introduced the following key changes to education in Namibia: educational phases have been reorganised; the trimester system has been reinstated; technical and vocational education has been prioritised; Grade 10 has been phased out as an exit point; and advanced subsidiary levels have been introduced (Ministry of Education, 2014). These changes are aligned with Vision 2030, which aims to transform Namibia into an industrialised country by the year 2030.

As noted by the Ministry of Education (2015), the National Curriculum for Basic Education aims to facilitate the nation in achieving its developmental strategy, which seeks to advance and industrialise the nation by 2030, as well as address the national issues and requirements that remained unresolved under the previous curriculum. Additionally, the National Curriculum for Basic Education is intended to help achieve the Namibian Vision 2030, which aims to bring living standards in line with those of industrialised nations by 2030, with greater efficiency (Josua et al., 2022). Furthermore, The National Curriculum for Basic Education seeks to implement the learner-centred approach to education; this

refers to a philosophy and teaching methodology that views knowledge as being socially constructed, contextual, and interpretive, in contrast to the previous fragmented education system (Julius & Amupanda, 2017). Lastly, The National Curriculum for Basic Education focuses on Technical and Vocational Education and Training (TVET), whereby Grade 10 students are given the opportunity to choose any course they decide to pursue. TVET offers a range of courses in various fields such as welding, plumbing, car repairs, general electrical wiring, cabinet manufacture, bricklaying, technical design, hospitality, and office administration (Julius & Amupanda, 2017). As shown in Table 1 below, the National Curriculum for Basic Education in Namibia was implemented in phases (Ministry of Education, 2014).

Table 1: Implemented phases of the revised curriculum

Phase/Grade	**Year of implementation**
Junior Primary Phase (Pre-Primary, Grades 1-3)	
Pre-Primary, Grades 1-3	2015
Senior Primary Phase (Grades 4-7)	
Grades 4-7	2016
Junior Secondary Phase (Grades 8 and 9)	
Grade 8	2017
Grade 9	2018
Senior Secondary Phase (Grades 10-12)	
Grade 10	2019
Grade 11	2020
Grade 12	2021

Source: Adapted from the Revised National Curriculum for Basic Education (Ministry of Education, 2014)

The Ministry of Education (2015) acknowledges the importance of mathematics and requires all students to develop their mathematical understanding in phases, as follows. Pre-Primary students (Grades 1-3) are to master basic maths. Senior Primary (Grades 4–7) students gain permanent literacy and numeracy abilities and improve on their basic mathematics. Junior Secondary (Grades 8–9) students continue studying the same subjects as Senior Primary, consolidating and expanding their knowledge to prepare them for young adulthood and formal education. Grade 9 students will take the external Junior Secondary Examination in mathematics, one of eight subjects. Successful candidates will continue to senior secondary education, while unsuccessful candidates will retake Grade 9. Mathematics is compulsory in Senior Secondary Grades 10–11. All Grade 11 students must take the Namibia Senior Secondary Certificate Ordinary level (NSSCO). Grade 11 represents the official school system's first exit point. Students with A-C grades in mathematics from Grade 11 can attend Grade 12, while others can finish remotely. Students achieving a score of 80–100% in the examination receive an A grade; a B grade is given to those achieving 70–79%; and a C grade is awarded to students who obtain a score of 60–69%. Grade 12 students must take the Namibia Senior Secondary Certificate Advanced Subsidiary (NSSCAS) examination.

Mathematics is a crucial subject that deserves special attention. Mathematical knowledge is vital for students to develop critical thinking, a key 21st-century skill that facilitates engagement in a complex, rapidly changing environment (Ariza et al., 2024). According to Rogan and Grayson (2010), government and financial resources are unduly focused and confined when establishing curricula, with classroom implementation strategies being often ignored. The challenges faced by school leaders in adopting the new curriculum have not yet been fully explored (Pak et al., 2020). Effective curriculum implementation is crucial to successful instruction and learning; hence, this study is necessary in filling this research gap. This study examines secondary school teachers' perspectives on the challenges of implementing the revised mathematics curriculum in Ohangwena Region, Namibia. This study has the following two objectives: (a) to explore secondary school teachers' perceptions of the difficulties in implementing the updated mathematics curriculum in Namibia's Ohangwena Region; and (b) to identify strategies that could lessen teachers' difficulties in implementing the updated curriculum. Since teachers in the Ohangwena Region are the main implementers of the curriculum, it is crucial to understand their perspectives on the challenges they encounter when implementing new teaching strategies, resources, and assessment techniques.

The results of this study are relevant to efforts in raising the standard of education generally, not only in the field of mathematics education but also in other academic fields, as the curriculum is a key component of educational quality. Because the study aims to highlight various challenges to implementing the curriculum, the Ministry of Education will be better able to support and resource schools on the basis of this information. Furthermore, the results of this study will also help policymakers and curriculum designers to understand the challenges teachers face when applying the revised mathematics curriculum, which may improve future policies. Although previous research has noted difficulties in implementing the updated mathematics curriculum, this study is unique in focusing on the real-world experiences of secondary school teachers in Namibia's Ohangwena Region. Through semi-structured interviews, it distinctively reflects a range of viewpoints from both urban and rural educational environments. Additionally, this study offers context-specific insights that highlight localised issues and drive customised recommendations for better curriculum implementation, in contrast to earlier studies that provided only generalised conclusions.

2. Statement of the Problem

Poor curriculum implementation is evident in the considerable reduction in students' academic performance between the old and redesigned mathematics curricula. In 2018, 14365 of 22607 matric students passed mathematics with an A-D grade (Namibian Sun, 2020). This reflects a 63.5% pass rate. In the 2019 mathematics final exam, 14986 out of 23975 students received an A-D grade (Namibian Sun, 2020), producing a pass rate of 62.5%. A 1% decline in pass rates was seen in the final two years of the previous curriculum. Because COVID-19 greatly affected the 2020 and 2021 results, they were eliminated from the comparison. However, only 5812 of 38019 full-time maths students passed the

NSSCO final exam in 2022, reflecting a 15.3% national pass rate (Namibian Sun, 2022). In the same year, the education minister revealed that 420 students had received a score of zero on mathematics Paper 2 and that over 60% of maths students were ungraded (Nghipondoka, 2022). With so many students performing poorly in the NSSCO mathematics exams, it is important to examine the experiences and challenges of those who play a crucial role in imparting the knowledge and implementing the new curriculum. Otherwise, it seems likely that students' academic performance will continue to decline. In light of this, the present study examines secondary school teachers' perspectives on the challenges of implementing the revised mathematics curriculum in Ohangwena Region, Namibia.

3. Theoretical Framework

This study applied the Concerns-Based Adoption Model (CBAM) developed by Hall and Hord in 1987. This concept focuses mostly on defining, quantifying, elucidating, and comprehending the process of change that teachers undergo when applying the curriculum and teaching methods (Mugweni, 2020). In other words, the CBAM approach focuses on elucidating teachers' concerns regarding innovations and the reasons why they are not always widely embraced as the creators intended (Chanda, 2022). Therefore, CBAM is appropriate for recognising the difficulties teachers in the Ohangwena Region are experiencing since it specifically helps to understand how they accept and apply new curricula. According to the CBAM principles, change is a personal experience; hence, in order for a change process to be implemented successfully, the subjective experiences of those involved cannot be disregarded (Martin, 2024). This implies that, in order for the Ohangwena Region's mathematics curriculum to be successfully implemented, the experiences of the teachers responsible for implementing this change, including any difficulties they encounter when putting the new curriculum into practice, should be taken into consideration. Another CBAM principle states that, as change is a process, people need to be given sufficient time to prepare for it and develop as they go through it (Prigodich, 2021). Thus, maths teachers in the Ohangwena Region will need time to prepare for the process of change represented by the new curriculum and to execute it gradually in order to successfully adopt it.

Since teachers implement curriculum changes at varying rates and stages, some adopt and adapt curriculum implementation quickly at higher stages of the CBAM, while others lag behind at lower stages. Mugweni (2020) emphasises that teachers at high levels can serve as role models for others by providing support through in-service training and school management to help other teachers advance to higher levels of use and achieve effective implementation of the subject area in their classes. Additionally, the CBAM identifies and addresses the organisational and social impacts while placing the teacher at the centre of efforts to modify and implement the school curriculum (Mugweni, 2020). Three dimensions are included in the CBAM model: Levels of Use (LoU), Stages of Concern (SoC), and Innovation Configurations (IC). Each dimension is assessed at different phases of implementation, and the outcomes are utilised to track

developments and guide choices throughout the transformation process (Hall & Hord, 2014). Details of the individual dimensions are explained below.

3.1 Levels of Use (LoU)

In terms of LoU, CBAM assists in monitoring how actively teachers are utilising the updated curriculum. While some may not be using it at all, others may be implementing it completely but encountering certain difficulties, such as a lack of administrative support or a scarcity of resources (Hassan, 2020). According to Hall and Hord (2006), the LoU include Non-Use, whereby teachers are not involved in implementing the updated curriculum and have little or no understanding of it. Orientation is another LoU at which teachers learn about the updated curriculum and examine its requirements and worth (Hassan, 2020). Chanda (2022) argues that understanding these stages enables educational leaders to offer educators focused support, such as resources, training, or policy changes, enabling the successful implementation of updated curricula.

3.2 Stages of Concern (SoC)

According to Rogers (2021), this section of CBAM assists in understanding the concerns that educators may have at various stages of curriculum implementation. For instance, some educators may be concerned by their inadequate level of training, whereas others might be worried about how learners are reacting to the updated curriculum. As people participate in the change process, their emotions and perceptions are addressed by the SoC dimension (Prigodich, 2021). Prigodich (2021) states that these worries move from self-consciousness (how will this impact me?) to task-consciousness (how will I arrange all the parts of this?) to impact issues (How could this modification have the greatest beneficial effect?).

3.3 Innovation Configurations (IC)

Hall and Hord (2014) conclude that the legislators who design educational reform programmes invest heavily in change concepts without taking into account how those changes will be implemented. As a result, the envisioned result frequently differs from reality. Inconsistency in how change practices are implemented is a common issue (Martin, 2024). In other words, Ohangwena Region's mathematics teachers have different opinions about how they should introduce the new curriculum in the classroom. Therefore, the IC dimension provides the implementers of change with a means of measuring the application process to build a shared understanding of innovation (Martin, 2024). The IC dimension offers an IC map that consists of two elements that serve as a catalyst for collaborative comprehension and convey what an invention should or should not look like in real-world scenarios; these benchmarks are known as components and variations (Arrowsmith et al., 2021). Components are the major operational elements of an innovation. They are frequently based on resources, teacher behaviours, and student activities. In contrast, variants represent the many ways in which teachers might operationalise a component, helping to preserve the fidelity and quality of an invention (Hall & Hord, 2014).

For this study, all three conceptual frameworks of CBAM—the LoU, the SoC, and IC—are taken into consideration in an attempt to investigate the challenges that

maths teachers face regarding the adoption and implementation of the updated maths curriculum in the Ohangwena Region.

4. Literature Review

An explanation of curriculum implementation and its significance introduces this section. Additionally, the role of teachers in implementing the curriculum is further explained in this section. To conclude, a discussion of the literature on the challenges teachers face in implementing curriculum adjustments is provided.

Curriculum implementation encompasses the procedures used to apply recently created educational programs and materials (Flinders, 2023). Because a well-designed curriculum is useless if it is not effectively implemented, curriculum implementation helps to close the gap between policy and practice by ensuring that educational reforms and policies are implemented in classrooms (Omar, 2019). Moreover, curriculum implementation is crucial because it guarantees uniformity in education by ensuring that students in various schools and geographical areas receive instruction of the same calibre, thereby mitigating educational inequalities (Madani, 2019). Effective implementation of a curriculum also helps children to prepare for future challenges by giving them the digital literacy, critical thinking, and problem-solving abilities they need to succeed in college, the workplace, and various day-to-day obstacles (Shuaibu, 2021).

Teachers play an important role in the implementation of the curriculum because they interpret it by examining the curriculum materials, comprehending the learning objectives, and determining the most effective way to convey the material to learners (Remillard et al., 2019). Boadu et al. (2020) also assert that teachers play an important role in implementing the curriculum since they create lesson plans and instructional strategies that take into account the needs and learning preferences of their students while also aligning with the curriculum's objectives.

4.1 The Challenges That Teachers Face When Implementing a New Curriculum

Worldwide, educators face a range of difficulties when adopting curricular reforms. Some of these challenges are discussed below using examples from America, China, Kenya, South Africa, and Namibia.

4.1.1 Shortage of teachers

Curriculum revisions have caused a teacher shortage. More precisely, a lack of staff has been one of the implementation challenges that have been identified as negatively impacting teachers' experiences with the OBE curriculum in South Africa (Makhele, 2019). Namibia's Oshana area lacks enough trained teachers to enforce the curriculum, especially vocational subject teachers, due to the new curriculum's vocational and technical courses (Josua et al., 2022). As Julius and Amupanda (2017) point out, Namibia lacks trained teachers despite government measures such as the bush allowance. According to Tubaundule (2014), the misalignment between academic and practical curricular sections throughout the educational process has caused a shortage of trained teachers in Namibia. Thus,

the ongoing shortage of trained teachers is a major hurdle to curriculum implementation following revisions.

4.1.2 Lack of curriculum knowledge by teachers

Classroom instruction and student learning are hampered by teachers' lack of understanding of the new curriculum. Due to content and pedagogical inexperience, teachers are struggling to implement the updated curriculum (Akala, 2021; Lysenko et al., 2022; Nakanyala, 2020; Ngwacho, 2019; Sifuna & Obonyo, 2019). The revised mathematics curriculum requires competence in subject matter, which Namibian teachers lack, especially those adopting it for the first time (Nakanyala, 2020). In contrast, a study in Namibia's Khomas region found that special school mathematics teachers have professional backgrounds, pedagogical and subject matter expertise, and experience in teaching visually impaired secondary school students the updated mathematics curriculum (Mungunda, 2023). However, other researchers have observed that teachers in South Africa struggle to plan lessons because they do not know how to apply the CAPS curriculum, which leads to poor teaching and prevents students from learning the syllabus's knowledge and skills (Makhele, 2019). Additionally, Guo and Kong (2023) emphasise that Chinese teachers lack the critical thinking and questioning skills needed for constructivism and learner-centred education of the new English curriculum. As highlighted by Wu et al. (2020), another factor affecting the successful implementation of a mathematics curriculum in China is the lack of computer and coding skills among maths teachers, including an inability to use visual coding software such as Scratch and programming languages such as Python. American computer science teachers also lack pedagogical knowledge of the new curriculum (Yadav et al., 2016). Thus, many teachers lack the necessary pedagogical skills and subject knowledge to enforce curricular application.

4.1.3 Inadequate teacher training

Another difficulty that teachers encounter when implementing curriculum modifications is inadequate training. Empirical research indicates that teachers face obstacles, including insufficient education and training (Hakutumbulwa & Kadhila, 2022; Josua et al., 2022; Moyo et al., 2023; Mushelenga, 2020). For example, history teachers in Namibia lack content expertise in certain areas due to a lack of training that was provided to a very small number of teachers (Mothowanaga & Gladwin, 2022). In the same vein, Makhele (2019) reported that poor implementation of the South African OBE curriculum results from inadequate orientation, teacher training, and development. Hence, without sufficient teacher preparation and training, the viability of implementing any new curriculum is substantially compromised.

4.1.4 Lack of teacher involvement in the curriculum design process

Teachers who are not involved in curriculum design and development struggle to implement it. Josua et al. (2022) examined social realist educators' obstacles in implementing the redesigned curriculum in Namibia's Oshana Region. The study found that teachers disliked the curriculum reform because they had not been involved in its design and planning, which led to poor implementation (Josua et

al., 2022). In Kenya, teachers who did not help create the Competency-Based Curriculum felt ignored and as though they were merely implementing it, so they did not use it (Wanzala, 2019). South African teachers also disliked the redesigned curriculum due to their lack of participation in the reform process and their belief that their performance, challenges, unique experiences, and opinions were ignored (Gokmenoglu & Clark, 2015). American computer teachers felt isolated because they had not participated in designing the curriculum revision, which led to poor curriculum implementation (Yadav et al., 2016). Teachers who are not involved in curriculum development and modifications feel alienated and struggle to administer and adapt the curriculum to fit learners' requirements.

4.1.5 Insufficient educational resources

Another factor causing teachers to struggle in implementing updated curricula is a lack of teaching and learning materials. Studies show that Namibian schools lack sufficient textbooks, which hinders student learning and the implementation of the updated curriculum. According to a study conducted in Namibia's Kavango East Region's Rundu and Ndiyona Circuits, teachers face obstacles such as outdated textbooks and a lack of instructional resources that hinder the successful implementation of the Grade 6 Rumanyo first language (Moyo et al., 2023). As a result of poor teaching resources in Namibian schools, Mungunda (2023) found that mathematics teachers were compelled to utilise improper instructional methods, which hindered students' mathematics learning. Similarly, South African teachers also lacked instructional and learning resources when using Programme to Improve Learning Outcomes (PILO) toolkits, which focus on creating and implementing learning improvement initiatives to oversee district curriculum completion (Xulu, 2022). Similarly, teachers in China and Washington were reportedly hesitant to embrace the new curriculum due to a lack of resources (Kim et al., 2021; Momono & Guyett, 2023). Thus, inadequate educational resources result in inefficient curriculum implementation.

4.1.6 Overcrowded classrooms

Overcrowded classrooms hinder the implementation of curriculum updates. The literature shows that Namibian teachers struggle to enact the curriculum due to overcrowded classrooms. The Ministry of Basic Education, Sport, and Culture (2001) requires public schools to have one teacher for every 35 primary students and one for every 30 secondary students. However, Namibia's crammed classrooms are not conducive to the implementation of curriculum reform. Additionally, the ratio of learners per teacher is high in Kenyan schools, which hinders the implementation of the mathematics curriculum (Momanyi & Rop, 2019). Moreover, overcrowded classrooms make it hard for South African teachers to give individualised feedback, motivate learners, and give individual attention to students, especially those who struggle with learning (Govender, 2018). Thus, when classes are full, teachers cannot give students personalised help, which hinders their ability to apply the updated curriculum.

4.1.7 Overloaded curriculum content

The adoption of curriculum reform is hampered by excessive curriculum content. According to Hakutumbulwa and Kadhila (2022), Namibian teachers struggle to

apply the social studies curriculum due to the increased duties imposed by an overloaded curriculum. In South Africa, teachers with additional responsibilities must complete a lot of paperwork for the new curriculum (Molapo & Pillay, 2018). In Washington, workload issues prevent some native teachers from implementing the curriculum (Momono & Guyett, 2023). Thus, teachers' capacity to apply the updated curriculum is hampered by an overburdened curriculum, which causes them to be overworked.

4.1.8 Limited time for curriculum execution

Time constraints hinder the implementation of revised school curricula. Namibian history teachers struggle with time management when executing the curriculum (Mothowanaga & Gladwin, 2022). This also applies to Namibian physical science teachers who are having trouble executing the physics curriculum because they have insufficient time to cover all the learning objectives outlined in the syllabus (Mushelenga, 2020). Furthermore, time restrictions prevent Namibian teachers from properly assessing each student's ability and from providing differentiated academic help that takes into account each student's ability, according to Josua et al. (2022). Thus, time restrictions limit Namibian schools' ability to provide individualised academic support and implement curricula, which impacts student advancement.

4.1.9 Lack of learners' motivation

One of the most prevalent reasons that a new curriculum may be inefficiently implemented is low motivation among learners. According to Aggarwal et al. (2019), some learners purposefully choose not to pay attention in class, and others are reluctant to voice their opinions. As a result, the challenge of poor motivation among learners makes it difficult for any new curriculum to be adopted effectively.

In light of the difficulties outlined above, this study explores secondary school teachers' perspectives on the challenges of implementing the revised mathematics curriculum in Ohangwena Region, using semi-structured interviews. It offers a balanced perspective of the area by capturing voices from both urban and rural school settings. Moreover, the study adds context-specific insights to Namibian curriculum implementation research by concentrating uniquely on the lived experiences of maths teachers.

5. Research Methodology

This qualitative study examined Namibian mathematics teachers' struggles to adapt the redesigned curriculum in the Ohangwena Region. The study population includes Ohangwena secondary school Science, Technology, Engineering, and Mathematics (STEM) department heads and mathematics teachers. The investigation took place in the Ohangwena Region, where 27 secondary school teachers teach maths. Seven secondary schools in the Ohangwena Region that provide mathematics in Grades 8-12 and are in rural and urban areas were purposefully sampled for this study. The researchers purposively selected a total of 14 participants, including one mathematics teacher and one STEM department head from each of the seven schools involved in the

study. This sampling approach ensured that each school was represented by both a teacher and a department head, aligning with the study's objectives. The study needed 14 participants to fulfil its aim of guaranteeing data saturation and obtaining a range of viewpoints on the difficulties in executing the updated maths curriculum in the Ohangwena Region. Also, this number is manageable for qualitative analysis while enabling deep, rich insights. In terms of the inclusion criteria, the participants had to be Ohangwena Region STEM department heads and maths teachers who teach classes in Grades 8–12. The 14 participants included eight females and six males. Each of the 14 participants taught maths in Grades 8, 9, 10, 11, 12 or a combination of those. Finally, three schools were in the urban centre, while four were in the countryside.

The research design is a qualitative approach employing in-depth semi-structured interviews. Semi-structured interviews were used to collect data on the maths teachers' experiences, viewpoints, opinions, ideas, and motivations about specific issues or situations in order to better understand the phenomenon under study (Islam & Aldaihani, 2022). Before the interviews, each participant was given an information sheet outlining the study's goals, methods, voluntary nature, and ethical considerations. After reading the information leaflet, participants agreed to participate in the study by signing a consent form. Face-to-face interviews were held in a calm, private setting at the participants' schools to provide comfort and confidentiality. Each interview lasted approximately 45 minutes and was conducted according to a pre-designed interview schedule that included open-ended questions related to the goals of the study. To guarantee that the responses were accurately recorded, authorisation was sought in advance to audio-record the interviews, which were conducted in English. All information was safely kept on a password-protected computer and to preserve anonymity pseudonyms were used in reports and transcripts.

Interviews yielded qualitative data. Braun and Clarke's (2023) thematic analysis was used to analyse the data. Data was thematically analysed using NVivo 14. A combination of descriptive and in vivo coding was used for data analysis. The researchers explained various social phenomena using descriptive coding (Seal, 2016). In contrast, in vivo coding emphasises participants' voices and relies on them to offer context for study data (Manning, 2017). Category analysis was also conducted using NVivo 14 to organise and group interview data into meaningful patterns and themes. The major method of thematic analysis was an "inductive data-driven manner" (Braun & Clarke, 2006, p. 83), whereby themes were produced directly from interview data. This strategy was chosen since the phenomenon under inquiry is not well documented in the field. From the analysis of data, seven themes emerged, which represent the challenges faced by teachers in enacting the revised mathematics curriculum in the Ohangwena Region. These themes are challenging course material, insufficient educational resources, heavy workload, lack of teacher training, inadequate teaching time, overcrowded classrooms, and lack of student motivation. The researchers used member checking to ensure that the results accurately reflected the perspectives and experiences of the participants. In other words, the researchers shared the data,

analyses, and interpretations with participants, who confirmed their accuracy, thereby enhancing the study's validity and credibility.

In this study, one of the researchers considered herself a potential insider to participants because of her background and lived experiences, having worked as a mathematics teacher since January 2019. This positionality of being an insider influenced data collection and analysis, as she did not surrender her foreknowledge and prejudged apprehension (Mannay, 2010) in terms of how she was experiencing the enactment of the new mathematics curriculum. Thus, this potentially led to interpretation, data collection, and data analysis bias. However, the researcher was aware of her viewpoint and the ways in which her position and biases might influence the study and resolved to maintain the reflexive bracketing position to mitigate subjectivity throughout the research process (Mulqueeny & Taylor, 2019). Reflexivity is defined as the researcher's ideas, interpretation, cognisance of individual experiences, and overall impact during the study, while bracketing refers to the researcher setting aside personal beliefs regarding the matter being analysed (Mulqueeny & Taylor, 2019). For example, the researcher adopted bracketing in this research by ignoring her personal experiences of implementing the revised mathematics curriculum and focusing and reporting entirely on the participants' experiences.

6. Results and Discussion

This section presents the teachers' challenges in implementing the revised mathematics curriculum in the Ohangwena Region, Namibia. From the analysis of data, seven themes emerged, which represent the challenges faced by teachers in enacting the revised mathematics curriculum in the Ohangwena Region; these are presented in Table 2 below. The results are presented in themes, followed by a discussion and contextualisation of the results using relevant research. Mathematics teachers who participated in the study were identified by the letter "T" followed by a numerical identifier, and the heads of departments were identified by the letters "HOD" followed by a numerical identifier.

Table 2: Themes: Teachers' challenges in implementing the revised curriculum

Title	**Themes**
Teachers' challenges in implementing the revised curriculum	**Theme 1:** Challenging Course Material
	Theme 2: Insufficient Educational Resources
	Theme 3: Heavy Workload
	Theme 4: Lack of Teacher Training
	Theme 5: Inadequate Teaching Time
	Theme 6: Overcrowded Classrooms
	Theme 7: Lack of Student Motivation

6.1 Teachers' Challenges Implementing the Revised Curriculum

6.1.1 Theme 1: Challenging course material

T2 commented, "*The content is just challenging at Grade 12 where most of the topics in that syllabus required me to go deeper and deeper to the things I learned at University.*" This view was also supported by T5, who stated, "*There were those specific questions that I struggled and I asked my colleagues but I will get there.*" In the same vein, HOD4 mentioned, "*The colleagues that did not do high-level mathematics will find the new mathematics curriculum very difficult.*"

According to the input from T2, T5, and HOD4, mathematics heads of departments and teachers found the updated mathematics curriculum difficult to execute because they lacked the necessary skills and knowledge. This is consistent with the findings of Nakanyala (2020), who found that mathematics teachers in Namibia lack the pedagogical and subject matter expertise required by the updated mathematics curriculum, particularly those who are implementing the curriculum for the first time. In other nations such as South Africa, China, and America, teachers have also faced challenges related to difficult new curriculum content, not only in mathematics but also in other subjects. The difficult curriculum content that teachers in these countries face is likely the result of curriculum reforms in many subjects that were implemented without sufficient teacher preparation, making it difficult for teachers to understand new ideas, methods, or teaching strategies, especially if they received their training under another system of instruction. According to the CBAM model's SoC, teachers are concerned about difficult course material when implementing curriculum updates in mathematics and other courses. Hence, it is difficult for teachers to apply the mathematics curriculum and impart high-quality knowledge to students if they lack comprehension of the curriculum content and its requirements.

6.1.2 Theme 2: Insufficient educational resources

T7 mentioned that "*the textbooks are not enough. We have nothing. We have little that the school supported us with, but we got nothing from the region.*" This deficit is supported by HOD2, who mentioned, "*Textbooks are not sufficient. Learners are sharing textbooks.*" T5 expressed a similar insight, noting, "*It is even more difficult because some learners do not want to share the textbooks with other learners. In general, all the resources, including textbooks and the mathematics sets, we need them.*" HOD7 explained this issue in detail, stating:

> "*Mathematics textbooks are not enough … currently, the Grade 10s might not have the textbooks as they are being used by the Grade 11s. When the Grade 11s go, then we take the textbooks and give them to Grade 10s.*" T4 reinforced this concept, saying, "*The problem is that we only have one type of textbook and if there is an error in that textbook, that is the error that learners will carry on with, especially if the teacher did not cover all the examples in the textbook.*"

The feedback from T4, T5, T7, HOD 2, and HOD7 reveals that the Ohangwena Region's secondary schools lack the necessary instructional materials to implement the curriculum effectively. These findings confirm Mushelenga's (2020) research, which found that Namibian teachers are experiencing obstacles

in implementing the revised curriculum, such as inadequate textbooks and a scarcity of practical materials and apparatus. Resources for teaching and learning are similarly lacking in South African, Chinese, and Washingtonian schools. One explanation might be policy and budgetary priorities, with certain governments prioritising other areas such as healthcare over education. Resources are key operational components of an innovation, according to the CBAM model's IC dimension (Hall & Hord, 2014), which allowed the updated mathematics curriculum in the Ohangwena Region to be implemented successfully in the study at hand. Teachers will therefore find it more difficult to execute the amended mathematics curriculum if they have inadequate educational resources.

6.1.3 Theme 3: Heavy workload

HOD5 asserted that "*the content is too much … as I said, it is core level, extended level, and higher level combined. There are no longer levels where learners have to choose.*" T3 expressed a similar viewpoint, noting, "*The workload of the ordinary level and the advanced subsidiary is quite too much … as a result, we end up teaching during weekends, holidays, and in the evening just to make sure that learners master everything*." HOD2 reinforced this idea by stating:

> "*The content for mathematics for Grades 10-11 is too long and for Grade 12 is even longer as [it] is offered for one year only. So, Grade 12 content contains 13 topics which is just offered for 5 to 6 months because learners have holidays and examinations.*"

On the other hand, T2 made a counterargument, saying, "*I think the workload depends on the experience of the teacher. When I started, I thought the curriculum was too long but in my second cycle, I finished the syllabus. So, the more you are experienced, the faster you are*."

Nevertheless, it seems that mathematics teachers have a heavy workload as a result of the revisions to the mathematics curriculum, and the enormous amount of material makes it challenging to apply the changes. The views of T2, T3, HOD2, and HOD5 reflect the amended mathematics curriculum's excessive workload. Momono and Guyett (2023) discovered that teachers are reluctant to adopt a new curriculum because of their overwhelming workload. Curriculum modifications also result in a substantial additional workload for teachers of a variety of subjects in places such as South Africa and Washington. One explanation is that there is more content and novel approaches to teaching since curriculum modifications frequently add additional topics, instructional methodologies, and evaluation methods, which necessitate more preparation time from teachers. In the Ohangwena Region, maths teachers indicate that while some are having difficulty integrating a rigorous curriculum, others are doing well and have found that greater experience makes the process easier. According to Mugweni (2020), this supports the CBAM model, which emphasises that teachers implement curriculum changes at different rates and stages. While some accept and modify curriculum implementation quickly at higher stages of the CBAM, others struggle at the lower stages. Because of the curriculum's excessive workload, teachers are unable to finish teaching the syllabus and revising the content, which limits their ability to implement the updated curriculum.

6.1.4 Theme 4: Lack of teacher training

T3 commented, "*I did not receive any training or any kind of orientation before I started to teach this new curriculum. So I just relied mostly on the knowledge and experience I acquired when I was teaching the old curriculum.*" HOD4 presented a similar opinion, noting, "*We did not attend the workshops before the implementation. The workshops made after implementation were made in such a way that only a few teachers were allowed to attend. Most teachers who were teaching mathematics did not attend the workshop.*"

Thus, T3 and HOD4 emphasised that teachers in the Ohangwena Region received insufficient training, in the form of workshops that were only offered to very few teachers. Mothowanaga and Gladwin (2022) found that a small percentage of teachers were adequately trained, leaving most of them lacking in specific subject matter areas. Although the examined literature reports that South African teachers suffer from a lack of training, teachers in other nations, including America, China, and Kenya, did not mention a lack of training. One explanation might be disparities in the support structures for educators' professional growth. For example, in Namibia and South Africa, training initiatives may be irregular, underfunded, or not suited to the demands of teachers; on the other hand, it may be that professional advancement programmes in the United States, China, and Kenya are better planned and more continuous, offering teachers ongoing support. Teachers' lack of training in the Ohangwena Region supports the CBAM model's LoU, which observes that teachers may be fully implementing educational innovation but may be experiencing various obstacles, including a lack of support (Hassan, 2020). Thus, teachers who receive insufficient training are likely to execute the curriculum poorly because they lack the necessary skills and expertise.

6.1.5 Theme 5: Inadequate teaching time

HOD1 explained, "*The time allocated for teaching was never enough. So we hardly finish; if we happen to finish teaching the curriculum, there is hardly any time for revision.*" HOD2 agreed, adding, "*For Grade 12, we just rushed to complete the syllabus because of insufficient time. Now the learners are suffering in terms of catching up.*" T4 strengthened this idea, saying, "*… looking at the thickness of the syllabus and the time that was allocated to this syllabus, it was very little. By looking at the pace of learners, we have many slow learners. So, it is a short time.*"

These remarks, made by T4, HOD1, and HOD2, demonstrate that the time allocated for teaching the revised mathematics curriculum was insufficient. As a result, teachers rushed to complete the syllabus and infrequently revised the curriculum, with students struggling to keep up. These results are consistent with a study by Mushelenga (2020), which found that teachers of physical science were having difficulty implementing the physics curriculum because of the limited amount of time allocated to accomplishing all the particular learning objectives specified in the physics syllabus. However, in the literature studied from nations such as America, China, Kenya and South Africa, insufficient teaching time was not mentioned as an issue faced by teachers while implementing curriculum adjustments. One explanation for this might be contextual factors unique to Namibia's educational system, such as crammed classrooms that make classroom

management more difficult and cut down on productive teaching time compared to other nations. The CBAM principle states that change is a process and that individual teachers require time to prepare for it and grow during the process (Prigodich, 2021), thereby enabling the curriculum to be implemented effectively. Consequently, a shortage of instructional time restricts teachers' capacity to complete the curriculum and to give students the support they need to thrive.

6.1.6 Theme 6: Overcrowded classrooms

HOD1 indicated, "*Our classes are quite packed, with ±40 learners in the class, which is quite a hassle.*" T6 expressed support for this viewpoint, noting, "*I have three classes which are for Grades 10 and 11, and there are ± 48 learners in each class. If you split them in the ratio of teachers to learners, 1:30, that is probably going to be six classes.*"

The voices of T6 and HOD1 highlight that the classrooms in Ohangwena Region are overcrowded, with over 40 students in each class, making it challenging for teachers to help every student. These results support Mushelenga's (2020) findings that Namibian teachers' capacity to execute the curriculum is being hampered by issues such as overcrowded classrooms. Teachers in Kenya and South Africa also face the problem of overcrowded classrooms, whereas this issue was not addressed by the literature from nations such as America and China. One explanation for this might be that, in many African nations, overcrowding in classrooms is a result of rapidly expanding populations, a lack of financing, and inadequate infrastructure for learning. As a result, governments in these countries struggle to build adequate schools or recruit enough educators to keep pace with the growing number of students; on the other hand, nations such as the United States and China typically have more solid school systems with better investment, planning, and facilities. According to the SoC component of the CBAM model, which includes teachers' concerns when implementing educational innovations, overcrowding in classrooms is another issue that teachers in the Ohangwena Region experience when implementing a new mathematics curriculum. Hence, a congested classroom limits mathematics teachers' ability to provide students with individualised support.

6.1.7 Theme 7: Lack of student motivation

T3 reported, "*The majority of learners are not motivated. They rely too much on the teachers. They still want to be pushed to do what they are supposed to do.*" In alignment with this, HOD5 stated, "*Learners that we are receiving from Grade 10 from other schools tend to be less motivated at the beginning. We made them repeat a grade so that at least they could improve, and also for them to be motivated.*" T7 made a comparable observation, noting, "*Learners are not motivated. Some learners are coping, but some will tell you that, 'Miss, we came with our U's.'*" Another participant, T1, explained this concept briefly, stating, "*A lot of learners in the social field are rejecting the subject as they know that mathematics is not a requirement in any of the courses that they will take in the future. So, there is no motivation.*" Nevertheless, HOD4 provided opposing evidence, stating, "*The AS [advanced subsidiary] learners are a bit motivated and they are doing their level best without that push from their teachers. This is because the fear that the AS level is difficult motivated them to study.*"

Many students lack motivation to pursue mathematics, particularly those pursuing the social sciences, according to T1, T3, T7, HOD4, and HOD5. These results corroborate those of Aggarwal et al. (2019), who found that some students purposely fail to pay attention in class and are uninterested in learning mathematics. Unfortunately, the problem of low motivation among students is not addressed in the evaluated literature from nations such as Kenya, South Africa, China, and the United States. An explanation for this could be that schools in Kenya, South Africa, China, and America have sufficient resources and modern technology to support students' motivation, while many other schools—especially those in rural areas such as the Ohangwena Region—suffer a lack of educational materials, up-to-date technology, and fully furnished classrooms. The CBAM model's SoC dimension helps to understand the concerns that teachers experience at various stages of curriculum implementation (Rogers, 2021). For example, some teachers may be concerned about how students are responding to the updated curriculum (Rogers, 2021). According to reports from the Ohangwena Region, changes to the mathematics curriculum have caused students to become less motivated. Therefore, less motivated students who require encouragement to learn mathematics engage less with the curriculum content, making it difficult for teachers to implement the new curriculum successfully.

7. Limitations

One of the study's main limitations is its entirely qualitative research approach, which concentrated on a small, purposively chosen sample of just seven secondary schools in the Ohangwena Region. Therefore, the findings' applicability to other areas or a larger group of Namibian mathematics teachers is constrained by their narrow focus. Similarly, this study focuses exclusively on teachers, excluding students who are also primary participants in practising the newly revised mathematics curriculum. Consequently, the results solely represent the viewpoints of the implementers, omitting the experiences of students who interact with the curriculum daily. Another key limitation related to the data collection tools is the exclusive use of semi-structured interviews. The absence of classroom observation limited data triangulation and may have restricted the breadth of understanding of the real-world difficulties faced by teachers while putting the updated maths curriculum into practice. Finally, because thematic analysis was undertaken by a single researcher who also had insider status as a maths teacher, there is a risk that subjective interpretation will influence theme development and coding choices, despite the use of reflexivity and bracketing.

8. Recommendations

This study suggests certain measures to alleviate the challenges faced by teachers in Namibia's Ohangwena Region when implementing the updated mathematics curriculum. First, the Ministry of Education should provide sufficient educational resources to schools, such as mathematics tools and textbooks. Additionally, it should offer sufficient training to teachers to enhance their pedagogical and content knowledge. Furthermore, curriculum developers should provide additional instructional time. In addition to this, mathematics should be divided

into core, extended, and higher levels; syllabus content should also be distributed evenly throughout grade levels to lessen the workload. On the other hand, teachers should inspire learners by using positive reinforcement and bringing motivational speakers to schools. Similarly, to address overcrowded classrooms, schools should implement the staffing norm policy, which states that the teacher-learner ratio should be one teacher for every 30 secondary school learners. It is further recommended that future researchers should consider using a mixed-methods design that combines qualitative and quantitative approaches to capture a wider range of mathematics teachers' perspectives in implementing the revised curriculum and allow for the broader generalisation of results. Additionally, future research should involve students to supplement the findings and offer a more thorough grasp of the difficulties and efficacy of curriculum implementation from the perspectives of both implementers and learners. Moreover, future researchers should combine interviews and classroom observation to triangulate data and obtain a more comprehensive overview of the difficulties faced by teachers when implementing the updated maths curriculum. To minimise subjectivity and improve the dependability and credibility of the study, future researchers should consider employing collaborative data analysis or the involvement of numerous coders.

9. Conclusion

In summary, the findings of the study highlight the major difficulties faced by mathematics teachers in the Ohangwena Region of Namibia when implementing the updated mathematics curriculum. When adopting the updated curriculum, mathematics teachers faced several challenges, including challenging course material, insufficient educational resources, excessive workload, a lack of teacher training, inadequate teaching time, overcrowded classrooms, and learners' lack of motivation. Ohangwena Region's teachers believe that the following strategies would help them to overcome such challenges in curriculum implementation and would improve their experience with curriculum reforms: giving teachers adequate training and supplying schools with sufficient materials; dividing mathematics into core, extended, and higher levels; allocating more time for instruction; empowering students; and putting the staffing standard policy into practice. Collectively, these findings indicate that, in order to empower teachers to design more successful and fulfilling mathematics learning experiences, the Ministry of Education and policymakers should give teachers top priority by addressing these implementation challenges. Moreover, the findings of this study have wider implications for educational policies and practices, highlighting the need for funding training programmes for teachers and providing instructional resources that promote an all-encompassing and deeply engaging learning experience.

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