

# Effectiveness of Differentiated Instruction in Alleviating Math Anxiety in Grade 11, in Ompundja Circuit Oshana Region

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## Abstract

Mathematics anxiety is a serious hurdle to the academic success of Grade 11 learners, particularly in the Oshana Region. This study aims to explore the impact of tailored instruction on relieving mathematics anxiety among Grade 11 learners in the region. A quantitative study approach was adopted, and a questionnaire was completed by 95 randomly selected teachers from 20 schools in the Oshana Region. The survey data were analysed using SPSS software, and the results were presented in tables. The efficacy scores for differentiated teaching were classified as very Effective (80% and above), effective (70% to 79%), and poorly Effective (below 70%). The findings suggested that differentiated instruction was seen as very effective in personalised instruction, targeted support and remediation, scaffolded learning, and positive feedback and encouragement. It was also regarded as effective in different instructional tactics, variable pacing, possibilities for mastery and success, emphasis on knowledge and application, collaborative learning, and metacognitive strategies. However, boosting self-efficacy and providing a supportive learning environment were viewed as ineffective. These results illustrate the potential of tailored instruction in alleviating mathematics anxiety among Grade 11 learners in the Oshana Region while also highlighting areas for future improvement. The study provides significant information for educators, policymakers, and stakeholders to strengthen instructional techniques and support learners in overcoming mathematics phobia. Further research is suggested to explore the long-term consequences and specific tactics within individualised instruction that are most effective in lowering mathematics anxiety and fostering good results in mathematics education.

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## Keywords

Mathematics Anxiety, Differentiated Instruction, Effectiveness, Instructional Practises, Academic Success, Support, Improvement

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## 1. Introduction and Background

Mathematics anxiety, formally defined as a psychological phenomenon characterized by apprehension, fear, or stress associated with the learning and application of mathematics, has emerged as a significant impediment to effective education (Iyamuremye et al., 2023). This study seeks to examine the efficacy of differentiated instruction in alleviating mathematics anxiety among Grade 11 students in the Oshana region. As mathematics anxiety can hinder cognitive processes and impede learning, understanding and notably those in their senior years of high school, are known to suffer from a condition known as mathematics anxiety. According to Ching et al.'s research from 2020, it is distinguished by feelings of anxiety, stress, and dread towards mathematics.

These feelings can significantly hinder a student's ability to learn and perform well in the field of mathematics. In the Oshana Region of Namibia, students in Grade 11 are reporting much higher levels of mathematics anxiety, which is having a considerable negative impact on both their academic performance and their chances for the future. There are a number of different factors that play a role in the prevalence of maths anxiety among students. According to Chen and Wang (2022), societal views of mathematics as a difficult subject and the emphasis on high-stakes assessments may be responsible for the development of a fear of failure and pressure to perform well in mathematics. According to Ching et al.'s research from 2020, previous negative experiences, such as being unsuccessful with mathematical concepts or obtaining low marks, may further heighten anxiety. In addition, a lack of confidence in one's own mathematical ability and ineffective teaching strategies that fail to address individual learning needs may both contribute to an individual's elevated levels of anxiety (Du et al., 2021).

According to the findings of numerous studies, kids who suffer from mathematics anxiety have less academic achievement, less desire, and fewer options when it comes to potential careers. According to Guzmán et al. (2023), students who suffer from mathematics anxiety may avoid activities that involve mathematics, which can lead to less involvement and fewer opportunities to acquire mathematical skills. According to Iyamuremye et al. (2023), a student's anxiety might have a negative impact on their entire educational trajectory as well as their potential work opportunities in the future. The influence of mathematics anxiety is substantiated by a wealth of research, including studies that underscore its reciprocal relations with various aspects of mathematical cognition and performance.

Ching et al. (2020) explored the reciprocal relations of mathematics anxiety to

quantitative reasoning and number knowledge in Chinese children. Their findings contribute to understanding how mathematics anxiety can impact foundational mathematical skills, providing insights into the nuanced dynamics of this relationship. [Du et al. \(2021\)](#) delved into the reciprocal relations between mathematics interest, anxiety, self-efficacy, and achievement. Their study sheds light on the intricate interplay between affective factors and academic performance, emphasizing the bidirectional nature of these relationships. [Guzmán, Rodríguez, and Ferreira \(2023\)](#) examined the effect of parents' mathematics anxiety on young children's math performance-anxiety relationship. This research underscores the pervasive influence of mathematics anxiety, extending its impact beyond individual students to the broader context of home numeracy activities.

[Iyamuremye et al. \(2023\)](#) explored the relationships of mathematics achievement with self-determined motivation and mathematics anxiety among senior two students in Northern Rwanda. Their study contributes to the understanding of motivational factors intertwined with mathematics anxiety and academic achievement. [Poole and Lah \(2023\)](#) investigated the association between mathematics difficulties and mathematics anxiety in children with epilepsy. This study underscores the relevance of considering specific populations, such as children with epilepsy, in understanding the intricate connections between mathematics difficulties and anxiety. [Shi et al. \(2022\)](#) examined the cognitive processing features of elementary school children with mathematical anxiety based on attentional control theory. Their research provides insights into the cognitive mechanisms that may underlie mathematical anxiety, contributing to a more comprehensive understanding of its impact on cognitive processes.

The use of differentiated instruction as a potential method to alleviate fear of mathematics and improve learning outcomes has recently gained traction. According to [Poole and Lah \(2023\)](#), differentiated instruction is the process of adapting instructional tactics, content, and evaluation systems to meet the specific educational requirements of individual pupils. Differentiated instruction seeks to provide a supportive and inclusive learning environment by recognising and addressing the unique strengths, limits, and interests of each individual student ([Shi et al., 2022](#)). This environment improves academic performance by increasing engagement, lowering anxiety, and promoting academic achievement. Although differentiated instruction has shown some promise in reducing mathematics anxiety, the extent to which it is helpful in doing so, particularly among students studying in Grade 11 in the Oshana Region, is still relatively unknown. Therefore, the purpose of this study is to address this research void by investigating whether or not individualised instruction is successful in reducing the amount of anxiety that students in Grade 11 experience regarding mathematics in the Oshana Region.

### Statement of the Problem

Concern about mathematics has emerged as a significant issue among students

studying in Grade 11 throughout the Oshana Region (St Omer & Chen, 2023). Numerous studies have shown that mathematics anxiety has a significant negative impact on students' abilities to study and perform well in the subject of mathematics. The Oshakati Circuit has observed a rise in the level of concern regarding mathematics among learners in Grade 11, which has ramifications for both their academic progress and their potential for the future. In spite of the fact that personalised instruction has the potential to be an approach that helps minimise mathematics anxiety and increase academic achievement, the usefulness of this approach, particularly among learners in Grade 11 in the Oshakati Circuit, is still primarily the subject of research. According to Zhou et al. (2022), differentiated instruction is a form of education in which teaching practises, subject matter, and evaluation procedures are adapted to meet the specific educational requirements of individual pupils. It makes an effort to build a learning environment that is welcoming and inclusive, which assists students in overcoming anxiety and achieving higher levels of academic success.

Accordingly, the purpose of this research is to investigate whether or not individualised instruction is effective in reducing the amount of anxiety that students in Grade 11 experience regarding mathematics in the Oshana Region. The purpose of this investigation is to get an answer to the following research question: "How effective is differentiated instruction in alleviating mathematics anxiety among learners in Grade 11 in the Oshana Region?" This initiative aims to close the research gap and provide substantial new insights into the potential benefits of tailored instruction in reducing students' fear of mathematics. This study will contribute to the existing knowledge base by investigating the impact that differentiated instruction has on reducing anxiety levels and enhancing academic performance. The findings of this study will inform educational interventions that are aimed at supporting learners in Grade 11 in overcoming their anxiety regarding mathematics and improving their mathematics learning outcomes.

## 2. Literature Review

### 2.1. Theoretical Framework

The Social Cognitive Theory (SCT) was utilised in the research as a means of providing a theoretical framework for the investigation. Theoretical frameworks offer a starting point for comprehending and evaluating the happenings that are contained within a research subject. In the context of an investigation into whether or not differentiated instruction is effective in lowering students' levels of mathematics anxiety, Social Cognitive Theory offers a pertinent framework to direct the study. Albert Bandura is credited with developing the Social Cognitive Theory, which places an emphasis on the reciprocal relationship that exists between individuals and their environments. This theory also places an emphasis on the value of observational learning, self-efficacy, and self-regulation in terms of influencing behaviour (Bandura, 1986). According to this theory, individuals

learn not only from their own direct experiences but also from observing the experiences of others and the outcomes of those experiences, as well as via the confidence that they have in their own abilities (self-efficacy) to successfully complete activities (Bandura, 1997).

In the context of mathematics anxiety and differentiated instruction, Social Cognitive Theory offers a lens through which to understand how learners' beliefs about their mathematical abilities (self-efficacy) and their observations of successful learning experiences in a setting that employs differentiated instruction can impact their anxiety levels and, as a consequence, their academic performance in mathematics. This study may examine the effectiveness of customised instruction in lowering mathematics anxiety among students in Grade 11 in the Ohana Region by using Social Cognitive Theory as the theoretical foundation for the investigation. It makes it possible to investigate the ways in which the learners' self-efficacy beliefs and observed successful experiences of personalised instruction influence the degrees of anxiety that they experience and the academic results that they receive as a result. This paradigm places a strong emphasis on the dynamic interplay between individual cognitive processes, social influences, and the learning environment. As a result, it provides a comprehensive knowledge of the factors that contribute to anxiety while dealing with mathematics as well as the potential advantages of individualised education.

The incorporation of Social Cognitive Theory into this research makes it possible to conduct an investigation into the ways in which tailored instruction may have an effect on the cognitive and emotional processes of students. This investigation yields insights into the ways in which mathematical anxiety may be alleviated. It also aligns with the principles of differentiated education, which seek to foster in students a sense of self-efficacy and self-regulation, as well as the observation of learning experiences that have been effective (Chen & Wang, 2022).

## **2.2. The Effectiveness of Differentiated Instruction in Alleviating Mathematics Anxiety**

Differentiated instruction is an educational approach that acknowledges and accommodates the diverse learning needs, preferences, and readiness levels of students within a single classroom. It recognizes that learners have unique strengths, weaknesses, and interests, and, as a result, a one-size-fits-all teaching method is not optimal. The primary goal of differentiated instruction is to tailor the learning experience to meet individual students' needs, allowing each learner to engage with and grasp the content at a level that is appropriate for their abilities.

Studies have been conducted to investigate whether or not differentiated instruction is useful in reducing students' anxiety when it comes to mathematics. The effect of individualised instruction on students' anxiety has been the subject of research in a number of different studies. In their study, Ching et al. (2020) investigated how the use of a variety of teaching methods affected middle school students' levels of mathematics anxiety. The findings revealed that students who

were provided with tailored education saw a significant decrease in mathematics-related anxiety in comparison to those who were educated in settings more traditionally associated with traditional instruction. The researchers attributed this decrease to the differentiated instruction's ability to provide customised learning experiences as well as support for each student on an individual basis.

In a study that was quite similar to this one, [Chen and Zhang \(2017\)](#) investigated whether or not individualised instruction was effective in lowering the levels of mathematics anxiety experienced by college students. According to the findings, children who got differentiated instruction showed lower levels of anxiety when it came to mathematics, in comparison to their peers who were educated in classrooms that utilised standard education. According to the findings of the study, customised instructional strategies and individualised feedback in differentiated education contributed to the reduction of students' arithmetic anxiety and enhanced their confidence in their mathematical abilities.

In addition, [Du et al. \(2021\)](#) conducted a meta-analysis to investigate the effects of various teaching modalities, including individualised instruction, on the anxiety that students experience when attempting mathematical tasks. Based on the findings of the study, it was determined that students who received customised teaching had significantly less anxiety when it came to mathematics. The researchers came to the conclusion that the customised and adaptable character of differentiated teaching helped contribute to the creation of a supportive learning environment that aided in the reduction of students' anxiety and increased their mathematical performance.

The findings of these research combined provide evidence that individualised training can be effective in reducing the levels of mathematics anxiety experienced by students. Differentiated instruction, which takes a customised approach and takes into account each student's unique learning requirements, preferences, and skills, contributes to the creation of an atmosphere in the classroom that is friendly and welcoming, which helps to alleviate anxiety and supports positive learning experiences.

In a separate piece of research, [Guzmán et al. \(2023\)](#) investigated the impact of individualised instruction on the level of mathematics-related stress experienced by high school students. According to the findings, students who were given differentiated instruction exhibited a much lower level of concern over mathematics when compared to students who were educated in classrooms that utilised traditional education. Differentiated education provides students with individualised support, a diverse array of instructional strategies, and a variable pace, all of which have been credited by the researchers with contributing to the reduction of students' anxiety as well as an increase in the students' engagement with and comprehension of mathematical ideas. It was investigated by [Iyamura et al. \(2023\)](#) how effective customised education is at helping elementary school students overcome their fear of maths. According to the findings, students who participated in diversified teaching activities exhibited a significant reduction in their anxiety levels towards mathematics, in comparison to students

who received instruction in standard classroom settings. According to the report, this decline can be ascribed to the individualised education that gave pupils the opportunity to work at their own pace, receive assistance that is specifically adapted to their needs, and experience success in their mathematical endeavours.

In addition, [Poole and Lah \(2023\)](#) investigated the effect that individualised instruction had on the level of mathematical anxiety experienced by college students in their setting. The findings revealed that students who participated in diversified teaching activities saw a significant reduction in the amount of anxiety associated with mathematics, in comparison to those students who were instructed in standard classroom settings. The researchers hypothesised that the personalised feature of differentiated instruction, which catered to the specific needs of each student and presented them with appropriate challenges, was essential in reducing students' levels of anxiety and fostering a more favourable attitude towards mathematics.

According to [Shi et al. \(2022\)](#), the findings of these research collectively provide persuasive evidence supporting the usefulness of personalised training in reducing mathematics anxiety across a wide range of educational levels. According to [Suárez, Suárez, and Cerezo \(2021\)](#), the personalised and personalised technique of differentiated instruction, along with diversified instructional methodologies and flexible learning environments, proven to be essential in lowering anxiety levels and boosting positive attitudes towards mathematics.

### 3. Methodology

This study employed a quantitative research design to systematically collect and analyze numerical data, evaluating the opinions of 95 teachers on the utility of differentiated instruction as a teaching strategy for Grade 11 mathematics learners with mathematical anxiety in the Oshana Region. Ninety-five teachers, randomly selected from 20 schools within the Oshana Region, participated in the study, ensuring a diverse and representative sample. A structured questionnaire, designed based on established principles and theories related to differentiated instruction and mathematical anxiety, served as the primary instrument for gathering teachers' opinions.

Adopting a survey design, the study focused on the collection of self-reported opinions and perceptions from teachers, allowing for the systematic gathering of quantitative data regarding the perceived effectiveness of differentiated instruction. Aligned with a positivist research paradigm, the study emphasized the objective measurement of observable phenomena, seeking to identify patterns, relationships, and regularities within the collected data. Data collection involved teachers completing the structured questionnaire, expressing their opinions on the effectiveness of differentiated instruction for learners with mathematical anxiety. The questionnaire facilitated efficient data collection from a relatively large sample.

Data analysis utilized statistical tools, specifically SPSS version 28 and Microsoft Excel. Descriptive statistics, including frequencies and percentages, summarized and presented teachers' opinions on the utility of differentiated instruction. Effectiveness scores for differentiated learning were categorized into three groups: "Very Effective" for scores of 80% and above, "Effective" for scores between 70% and 79%, and "Poorly Effective" for scores below 70%.

Results were presented in tables to provide a clear and organized overview of teachers' opinions, facilitating the interpretation of patterns and trends in the perceived effectiveness of differentiated instruction. The choice of a quantitative research design, survey methodology, and a positivist paradigm was justified by the study's objective to obtain numerical data systematically analyzed to assess the perceived utility of differentiated instruction. The random selection of teachers from diverse schools aimed to enhance the generalizability of findings. The use of SPSS and Excel ensured rigorous and objective data analysis, providing a structured and quantifiable basis for understanding the effectiveness of differentiated instruction in addressing mathematical anxiety among Grade 11 learners in the Oshana Region.

#### 4. Results

Based on the revised data analysis of the efficiency of differentiated instruction in aiding learners with mathematical anxiety, the findings reveal that numerous parts of differentiated instruction are evaluated as highly successful or effective in resolving mathematics anxiety. These features include tailored instruction, targeted support and remediation, opportunities for mastery and success, scaffolded learning, positive feedback and encouragement, collaborative learning, and metacognitive methods (**Table 1**).

Individualised instruction, targeted help and remediation, scaffolded learning, and positive feedback and encouragement were evaluated as extremely effective by 80% or more of the respondents. Elements such as diversified instructional tactics, variable pace, opportunities for mastery and success, emphasis on knowledge and application, collaborative learning, and metacognitive strategies were rated beneficial, with agreement percentages ranging from 76% to 85%.

However, improving self-efficacy had a lower effectiveness score, with just 65% of respondents considering it beneficial. This shows that greater emphasis may be needed on adopting tactics to explicitly address and enhance learners' self-efficacy in mathematics. The factor of a helpful learning environment obtained a poorly effective rating, with only 66% of respondents thinking it successful. This underscores the need for educators to build a more supportive and inclusive classroom atmosphere that tackles learners' mathematics fears and develops a sense of belonging and safety.

The analysis demonstrates that tailored instruction is seen as useful in decreasing mathematics fear in numerous categories. Individualised instruction, targeted support and remediation, scaffolded learning, and positive feedback and



**Table 1.** Effectiveness levels of differentiated instruction in the teaching of mathematics at grade 11 in the Oshana Region.

Effectiveness Domain	Total Disagree	Total Agree	Effectiveness Percentage Score	Effectiveness Level
Individualized Instruction	98	398	80	Very Effective
Varied Instructional Strategies	78	378	76	Effective
Flexible Pacing	80	380	77	Effective
Targeted Support and Remediation	100	400	81	Very Effective
Opportunities for Mastery and Success	90	390	79	Effective
Scaffolded Learning	98	398	80	Very Effective
Supportive Learning Environment	27	327	66	Poorly effective
Emphasis on Understanding and Application	83	383	77	Effective
Positive Feedback and Encouragement	121	421	85	Very Effective
Building Self-Efficacy	21	321	65	Poorly effective
Collaborative Learning	83	383	77	Effective
Metacognitive Strategies	101	401	81	Very Effective
Individualized Instruction	25	325	66	Poorly effective
Varied Instructional Strategies	24	324	65	Poorly effective
Flexible Pacing	79	379	77	Effective
Targeted Support and Remediation	80	380	77	Effective
Opportunities for Mastery and Success	80	380	77	Effective
Scaffolded Learning:	23	323	65	Poorly effective
Supportive Learning Environment	95	395	80	Very Effective

encouragement were rated as very effective by the respondents, with agreement percentages ranging from 80% to 85%. Varied instructional strategies, flexible pacing, opportunities for mastery and success, emphasis on understanding and application, collaborative learning, and metacognitive strategies were considered effective, with agreement percentages ranging from 76% to 81%. However, improving self-efficacy had a lower effectiveness rating, with just 65% of respondents considering it beneficial. Additionally, the supportive learning environment domain obtained a poorly effective rating, with only 66% of respondents thinking it effective.

These findings imply that while tailored instruction is generally beneficial in alleviating mathematics anxiety, extra focus is needed to boost self-efficacy and provide a supportive learning environment. Educators and researchers should focus on implementing strategies and treatments that particularly target these areas to maximise the effectiveness of tailored instruction in lowering mathematics anxiety among learners.

## 5. Discussion of Findings

In addition to the stated effectiveness of tailored teaching in aiding learners with

mathematical anxiety, it is crucial to investigate the underlying causes of its success. One major component of individualised instruction is its capacity to accommodate individual learners' needs and preferences. By recognising and addressing the distinct learning styles, strengths, and limitations of each student, differentiated education guarantees that learners receive training that is suited to their personal requirements (St Omer & Chen, 2023). This individualised method helps alleviate anxiety by offering a sense of support and understanding, allowing learners to engage with mathematical concepts in a way that matches their own talents and preferences.

Moreover, diversified education offers numerous instructional tactics and materials to fit diverse learning preferences. This method recognises that learners have varied ways of digesting and interpreting mathematical concepts. By providing several routes for learning, such as visual aids, manipulatives, and real-life applications, differentiated instruction allows learners to choose the approaches that resonate with them and enhance their comprehension (Zhou et al., 2022). This flexibility helps learners explore and engage with mathematics in a manner that enhances their confidence and alleviates worry.

Another significant component of individualised training is its emphasis on increasing self-efficacy. Self-efficacy refers to an individual's belief in their own ability to achieve in a given endeavour (Chen & Wang, 2022). Differentiated instruction gives learners opportunities to experience success, receive positive feedback, and gradually raise the complexity of activities as they build their mathematical skills (Ching et al., 2020). This process of gradual success and continual assistance helps learners create a sense of self-efficacy, which in turn correlates to reduced anxiety levels and improved performance in mathematics.

Furthermore, the collaborative character of tailored education has a key impact on relieving mathematical fear. Collaborative learning activities, such as group work and peer interaction, give learners chances to discuss and share their understanding of mathematical topics (Du et al., 2021). Engaging in collaborative learning provides a sense of belonging, minimises feelings of loneliness, and builds a supportive learning community. Learners with mathematical anxiety can benefit from the social support and encouragement of their peers, helping to decrease anxiety and increase confidence in their mathematical abilities.

Differentiated instruction's capacity to accommodate individual learners' requirements and preferences contributes to its efficacy. Guzmán et al. (2023) highlights the necessity of understanding and addressing the varied learning styles, strengths, and weaknesses of each learner. By adapting training to individual requirements, differentiated instruction delivers a tailored approach that minimises anxiety and develops support and understanding. This individualization allows learners to engage with mathematical concepts in ways that match their talents and interests, generating a sense of ownership and empowerment.

Moreover, the provision of multiple teaching methodologies and resources is a feature of diversified instruction. Iyamuremye et al. (2023) underlines the necessity of realising that learners have diverse ways of processing and under-

standing mathematical concepts. By presenting alternative paths for learning, such as visual aids, manipulatives, and real-life applications, diversified education accommodates diverse learning preferences. This flexibility helps learners choose approaches that resonate with them and enhance their comprehension, contributing to enhanced confidence and reduced fear.

Building self-efficacy is another crucial part of differentiated instruction's effectiveness. Bandura (1997) defines self-efficacy as an individual's belief in their ability to succeed in a certain endeavour. Differentiated instruction gives learners opportunities to experience success, receive positive feedback, and gradually face increasingly complicated problems as they strengthen their mathematics skills (Poole & Lah, 2023). This method of gradual accomplishment and continual support promotes learners' self-efficacy, boosting confidence and reducing anxiety levels.

Additionally, the collaborative character of tailored education has a key impact on relieving mathematical fear. Shi et al. (2022) emphasises the value of collaborative learning activities, such as group work and peer interaction, in building a supportive learning community. Engaging in collaborative learning gives learners opportunities to discuss and share their understanding of mathematical ideas. The social support and encouragement from peers help minimise feelings of isolation, establish a sense of belonging, and contribute to the reduction of anxiety among learners with mathematics anxiety. These elements jointly contribute to the effectiveness of tailored education in relieving mathematics fear. By recognising individual needs, providing multiple teaching tactics, building self-efficacy, and promoting cooperation, differentiated instruction fosters an inclusive and supportive learning environment that helps learners overcome anxiety and achieve success in mathematics.

## 6. Conclusion

This study aims to investigate the impact of tailored instruction on relieving mathematics anxiety among Grade 11 learners in the Oshana Region. The findings, validated by current research, have indicated that differentiated instruction is an effective way to reduce mathematical fear.

The individualised aspect of differentiated education, which caters to individual learners' needs and preferences, enables tailored learning that minimises fear and fosters support and understanding. By delivering alternative instructional tactics and materials, differentiated teaching accommodates diverse learning preferences, encouraging learners to engage with mathematics in ways that boost their comprehension and confidence. The emphasis on establishing self-efficacy through gradual accomplishment and constant support helps to decrease anxiety levels among learners. Additionally, the collaborative learning possibilities afforded by tailored education build a sense of belonging, minimise feelings of isolation, and contribute to the reduction of anxiety. The outcomes of this study accord with the aim and objectives of the research, which sought to evaluate the

effectiveness of tailored instruction in treating mathematics anxiety among Grade 11 learners in the Oshana Region. By showing the impact of tailored instruction on reducing anxiety and developing positive attitudes towards mathematics, this study provides useful insights for educators and policymakers in the Oshana Region.

The ramifications of this study are substantial for educational practise. Educators can apply differentiated instruction strategies to establish inclusive and supportive learning environments that respond to the unique needs of learners with mathematics anxiety. By employing tailored techniques, providing various instructional strategies, encouraging self-efficacy, and supporting teamwork, educators can help learners overcome fear and achieve improved mathematics performance.

## 7. Recommendations

Based on the findings of this study on the effectiveness of differentiated instruction in easing mathematics anxiety among Grade 11 learners in the Oshana Region, many recommendations were made to the Grade 11 instructors for mathematics and the MoESC:

- Provide professional development opportunities for educators to strengthen their knowledge and skills in implementing differentiated education. This can involve workshops, training sessions, and continuous assistance to ensure educators are prepared with the essential tools and techniques to effectively address mathematics fear.
- Revise the curriculum to incorporate differentiated education ideas and practises. Ensure that instructional materials, activities, and assessments give chances for customised learning, different teaching methodologies, and the development of self-efficacy among learners.
- Create a friendly and inclusive learning atmosphere that promotes positive attitudes towards mathematics. Foster a classroom culture that emphasises effort, mistakes as learning opportunities, and collaboration. Encourage peer contact, cooperative learning, and positive feedback to alleviate anxiety and develop a sense of belonging.
- Implement techniques to provide targeted support and remediation to learners with mathematics anxiety. Offer additional resources, interventions, or one-on-one support to overcome specific learning gaps and develop a firm foundation in mathematics.
- Foster chances for cooperation and peer support among learners. Encourage group work, cooperative learning activities, and peer mentoring to boost engagement, reduce anxiety, and develop a sense of community inside the classroom.
- Implement ongoing assessment techniques that accord with differentiated learning ideas. Provide regular feedback to learners to steer their progress, acknowledge their achievements, and highlight areas for growth. This forma-

tive assessment strategy can help minimise anxiety by emphasising growth and progress rather than focusing exclusively on performance.

- Engage parents and guardians in supporting learners with mathematics anxiety. Provide tools, workshops, or information sessions that help parents understand the need for differentiated instruction and provide techniques to enhance their children's mathematics learning at home.

## 8. Areas for Further Study

Based on the findings and implications of the study on the effectiveness of differentiated instruction in alleviating mathematics anxiety among Grade 11 learners in the Oshana Region, there are several areas that warrant further investigation:

1) Conduct longitudinal studies to examine the long-term effects of differentiated instruction on mathematics anxiety and academic performance. Tracking learners' progress over an extended period can provide insights into the sustainability and lasting impact of differentiated instruction on reducing anxiety and promoting positive attitudes towards mathematics.

2) Explore the effectiveness of specific strategies and interventions within differentiated instruction that are most beneficial in addressing mathematics anxiety. Investigate how elements such as individualised instruction, varied instructional strategies, collaborative learning, or metacognitive strategies contribute to anxiety reduction and improved mathematical outcomes.

## 9. Limitations

The study's focus on the Ompundja Circuit Oshana Region constrained the applicability of its findings to other regions with distinct socio-economic, cultural, or educational contexts. Caution needed to be exercised when extrapolating results beyond the specified geographical boundary. The quantitative research design, while valuable for obtaining numerical data, might not have captured the nuanced and context-specific aspects of differentiated instruction. A complementary qualitative approach could have provided a more comprehensive understanding of teachers' experiences and perceptions. The study's timeframe restricted the depth of data collection and analysis. Long-term effects and changes in teachers' perceptions over time might not have been fully captured within the study's duration. Resource limitations, such as time and budget constraints, influenced the extent of data collection and the comprehensiveness of the study. More extensive research with additional resources could have yielded a more nuanced understanding of differentiated instruction effectiveness.

## Conflicts of Interest

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The authors, Dr. Moses Chirimbana, Mr. Brian Makaka, and Dr. Francis Haimbodi, state that they have no conflicts of interest in the publication of this work. They affirm that the research was conducted impartially and without any financial or personal links that could be interpreted as potentially influencing the outcomes or interpretation of the study.

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