Challenges Facing the Effective Use of Pedagogical Strategies to Enhance Mathematics Performance of Pupils with Moderate Intellectual Disability in Inclusive Settings in Dodoma City Council in Tanzania

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ABSTRACT

This study aim to explore challenges that face the effective use of pedagogical strategies used by teachers in enhancing mathematics performance of standard four pupils with Moderate Intellectual Disability (MID) in Inclusive Settings. The study involved 80 respondents whereby 40 were mathematics teachers, 8 heads of schools and 38 pupils with moderate intellectual disabilities selected from eight inclusive primary schools. The study employed a case study research design (qualitative research approach) in which data were collected using interviews, focus group discussion, observation and documentary review. The data from focus group discussion, interviews and observation were coded by using qualitative data analysis software called NVivo. Findings of this study established that there were various challenges which hindered effective utilization of the pedagogical strategies identified in this research. Among those challenges were: inadequate number of qualified teachers coupled with poor resources allocation (both material and human resources). It was further discovered that, the nature of classrooms which seemingly appeared overcrowded together with high teacher-pupil ratios were among the challenges. For example, on average a class was observed to accommodate 113 pupils inclusive. Based on these findings, the study recommends that the school management should organize indoor seminars and workshops to empower teachers with the current teaching and learning strategies and this could better be facilitated by the respective Council.

Keywords: Effectiveness; Pedagogical Strategies; Mathematics Performance; Pupils; Moderate Intellectual Disability

INTRODUCTION

The global agenda on the right to quality education emphasizes the need for inclusive education for individuals with disabilities, a commitment highlighted by UNESCO in 2002 [16]. Key international frameworks, including the 1990 Education for All (EFA) and the 1994 Dakar Framework, stress the importance of accommodating students with disabilities within mainstream educational systems [15]. The Universal Declaration of Human Rights (UDHR) of 1948 also advocates for educational provisions for people with disabilities, emphasizing the removal of barriers to learning [4]. Additionally, the 1994 Standard Rules on the Equalization of Opportunities for Persons with Disabilities reinforce the need for integrating children with disabilities into regular education settings [1].

Despite these global commitments, many children with disabilities remain excluded from education. The World Health Organization (WHO) reports that only 20% of the estimated 93 to 150 million school-aged children with disabilities worldwide are receiving education [19]. In Tanzania, only 5% of the 1.7 million children with disabilities are enrolled in school, primarily due to negative parental attitudes, inadequate disability policies, and misconceptions among teachers about the capabilities of students with disabilities [10] and [2].

Research indicates that inclusive education promotes better learning outcomes, enhances social awareness, and reduces stigmatization [3]. In response, Tanzania has taken significant steps, such as endorsing international declarations and implementing local initiatives like the National Strategy for Inclusive Education (NSIE) 2018-2021 [17]. Nevertheless, challenges persist, particularly in the performance of students with moderate intellectual disabilities (MID) in subjects like mathematics [17].

Studies from various countries reveal that student with MID face difficulties in mathematics due to challenges such as a lack of qualified teachers, insufficient resources, and overcrowded classrooms [6]. In the USA, strategies such as video modeling, in Hong Kong, the use of computers and calculators, in Zambia, task analysis, and in Burundi, active learning approaches have been implemented to address these challenges [3]. In Tanzania, efforts like practical problem-solving and increased teaching resources are being used; however, performance remains low, as shown by the Standard Four National Assessment results [17].

Meanwhile, while progress has been made toward inclusive education in Tanzania, further work is needed to improve outcomes for students with MID, especially in mathematics. Addressing the challenges facing the effective use of pedagogical strategies is crucial for enhancing the performance of these students in inclusive settings.

Theoretical Framework

In this paper two theories were used namely: Social Constructivism Theory (SCT) and Behaviorism Theory of Learning (BTL). The two theories were used concurrently so as to support each other. The SCT was used to emphasize that knowledge is socially constructed, that was to say pupils with intellectual disability (in this case children with moderate intellectual disability-MID) learn better when interacting with their peers in inclusive settings. Such interaction facilitates sharing of knowledge and experiences among them. On the other side, the constructivists hold that learners can construct their knowledge through their mental processes apart from social interaction. However, the two theories are prominent learning theories widely used to explain how learners learn and each theory has the potential of illuminating the extent in learning can take place in the learning environment amongst leaners.

EMPIRICAL REVIEW

Research has explored various challenges affecting the effective application of pedagogical strategies for improving mathematics performance among students with moderate intellectual disabilities, both nationally and internationally. Key studies include:

[13] examined the challenges impeding the effective teaching and learning of mathematics in Wa, Ghana. Their survey-based study, involving 130 participants, revealed that large class sizes and inadequate teaching resources significantly hinder the implementation of effective pedagogical strategies. The findings suggest that sufficient teaching and learning materials are crucial for the successful application of these strategies. Similar issues with inadequate resources have been reported in other developing countries, including Tanzania, highlighting the need for improved provision of educational resources by stakeholders.

[9] investigated the contextual challenges facing mathematics education in Ghana. The study identified several barriers to the effective use of pedagogical strategies, such as the presence of unqualified teachers, overcrowded classrooms, and students' attitudes and anxiety. The research indicates that negative student attitudes and anxiety, coupled with inappropriate teaching methods and harsh treatment, result in poorer outcomes. Conversely, positive teacher-student interactions and supportive language can enhance the learning experience.

[4] conducted research in Rwanda to assess the application of pedagogical strategies in mathematics instruction. Their study found that overcrowded classrooms and poor learning environments were major obstacles to the effective use of these strategies. They concluded that the primary issues contributing to poor performance are associated with these environmental constraints.

Contrastingly, [18] argued that despite efforts to address classroom overcrowding in Tanzania by building more

schools, mathematics performance remains problematic. Wajibu suggests that addressing this issue requires not only increasing the number of classrooms but also focusing on the quality and quantity of teachers to enhance teaching effectiveness.

[8] investigated teaching methods for students with low mathematical skills in primary schools in Arusha, Tanzania. Utilizing a qualitative case study approach, Michael observed that the context in which pedagogical strategies were applied often lacked support. Issues such as overcrowded inclusive classrooms and insufficient teaching materials hindered student performance, particularly for those with low mathematical skills and moderate intellectual disabilities. The study underscores the importance of a conducive and supportive teaching and learning environment for the effective application of pedagogical strategies.

METHODOLOGY

The study employed a qualitative research approach, which enabled a thorough exploration of social phenomena in natural settings, particularly focusing on the experiences of teachers and pupils with moderate intellectual disabilities (MID) in mathematics. This approach was chosen for its ability to provide deep insights into how pedagogical strategies are applied in inclusive classrooms, influenced by the specific needs of the pupils. The research employed a single case study design, which was particularly suitable for generating detailed, descriptive information about the effectiveness of these strategies within the context of Dodoma City Council.

The target population for the study included Head Teachers, Mathematics Teachers, and pupils with MID from inclusive primary schools in Dodoma City. The sample size comprised 80 participants: 8 Head Teachers, 32 Mathematics Teachers, and 40 standard four pupils with MID. Systematic sampling techniques were used to select eight schools from the 36 inclusive primary schools in the area, while purposive sampling was employed to choose key informants. Data were collected through interviews, focus group discussions, observations, and documentary reviews, providing a comprehensive understanding of the pedagogical strategies and their impact on pupils' mathematical performance. In addition, NVivo software was used in analysis.

FINDINGS AND DISCUSSION

This paper investigates the challenges facing the effective application of pedagogical strategies aimed at improving mathematics performance among standard four pupils with moderate intellectual disabilities (MID) in inclusive settings. The study collected data from head teachers (HTs), mathematics teachers (MTs), and pupils with MID through interviews, focus group discussions (FGDs), observations, and document reviews.

Qualification of Teachers

The study revealed that teachers' qualifications significantly impact the effectiveness of pedagogical strategies in enhancing mathematics performance for pupils with MID. Interviews with HTs and MTs highlighted how teachers' qualifications influence their ability to implement effective strategies. HTs reported that some mathematics teachers lacked the necessary skills to apply appropriate pedagogical methods. For instance, an HT from an inclusive primary school noted:

"*Qualified teachers bring a deeper understanding of diverse teaching methods. They adapt strategies to meet individual needs, which is crucial for pupils with moderate intellectual disability and enables them to grasp mathematical concepts effectively. The absence of qualified teachers can lead to learning difficulties*" (Interview with HT from school C, February 7, 2024).

HTs emphasized the need for mathematics teachers to have specialized training in special education or inclusive pedagogy to address the diverse needs of students with MID. They expressed concerns about the lack of such expertise, which often results in the recruitment of inadequately qualified teachers who struggle with appropriate strategies. An HT from another school mentioned:

"*When teachers lack proper qualifications, they often struggle to implement effective pedagogical strategies tailored to the needs of students with moderate intellectual disability. This results in limited support for students,*

affecting their ability to grasp mathematical concepts" (Interview with HT from school B, January 29, 2024).

MTs also noted that teachers with specialized training in special education or inclusive pedagogy were more confident and effective in supporting students with MID. For example, an MT from school G stated:

"*Qualified teachers undergo specialized training to tailor pedagogical approaches. This helps create inclusive learning environments where every student, regardless of ability, can thrive in mathematics*" (Interview with MT 3 from school G, March 8, 2024).

Conversely, unqualified teachers may struggle with adapting teaching methods for students with diverse needs, often defaulting to traditional approaches that are less effective for those with MID. An MT from school C observed:

"*Unqualified teachers may not have the necessary skills or knowledge to adapt teaching methods for students with diverse needs. Without proper training, they may resort to traditional methods that are unsuitable for students with moderate intellectual disabilities, hindering their mathematical development*" (Interview with MT 1 from school C, February 9, 2024).

FGDs revealed that ongoing professional development and specialized training are crucial for teachers to enhance their skills in supporting students with MID. Teachers recognized the importance of such training in providing effective pedagogical strategies. An MT from school F noted:

"*Teachers' background in teaching mathematics in inclusive classes equips them with diverse instructional strategies, allowing them to cater to the varied learning needs of students with MID effectively*" (FGD with MTs, teacher 3 from school F, February 30, 2024).

However, another MT admitted feeling unprepared due to inadequate training in inclusive pedagogy:

"*I often feel ill-prepared to address the specific needs of students with MID in mathematics. My training lacked sufficient focus on inclusive pedagogy*" (FGD with MTs, teacher 2 from school D, February 15, 2024).

Pupils with MID also expressed frustration with teachers lacking specialized qualifications, noting difficulties in understanding mathematical concepts and receiving individualized support. For example, a pupil from school E commented:

"*Being taught by a teacher who explains things in different ways helps us understand better. Some teachers make math easier for us*" (FGD with Pupil 3 from school E, February 22, 2024).

Another pupil from school A appreciated teachers who used visual aids and step-by-step explanations:

"*I like mathematics when the teacher uses visual aids and breaks down the problems step by step. It makes me feel like I can do it too*" (FGD with Pupil 1 from school A, January 26, 2024).

The findings align with [7], who found that teachers with higher qualifications positively impacted student achievement in Maryland. Canal's study demonstrated that higher teacher qualifications were linked to improved academic outcomes. Similarly, [5] found that the lack of training in Special Needs Education in Kenya limited teachers' effectiveness in inclusive settings. [14] also highlighted that unqualified teachers in Tanzania faced challenges in teaching students with developmental disabilities, affecting their performance.

Qualified teachers with specialized training in special education or inclusive pedagogy are better equipped to address the unique needs of students with MID and implement effective instructional approaches. The absence of such expertise can hinder their ability to support these students effectively. Ongoing professional development and training are essential to improve teachers' skills and support students with disabilities in mathematics education. Investment in specialized training for mathematics teachers is crucial for enhancing the educational experience and performance of students with MID in inclusive settings.

The Nature of Classrooms

The study also found that the nature of classrooms significantly affects the use of pedagogical strategies by mathematics teachers to enhance performance among pupils with MID. The physical environment, including classroom layout, space, and resources, plays a critical role in effective teaching.

HTs reported that classroom layout and available resources impact the implementation of pedagogical strategies. For example, an HT from school C described the challenges of inadequate space and resources:

"*The layout of the classroom greatly influences inclusive teaching. Flexible seating arrangements are necessary for interaction and engagement, but we lack desks to accommodate all pupils, hindering the use of effective strategies*" (Interview with HT from school C, February 8, 2024).

Another HT from school H noted:

"*Classrooms with ample natural light and space promote a conducive learning environment. However, our classrooms are poorly lit and overcrowded, making it difficult for teachers to provide individual support*" (Interview with HT from school H, March 13, 2024).

MTs also discussed how classroom size, layout, and resources impact their ability to implement pedagogical strategies. An MT from school G emphasized:

"*A clutter-free, organized space enhances students' focus and participation during math lessons. The physical setup of the classroom impacts our approach to teaching and supporting pupils with MID*" (Interview with MT 2 from school G, March 11, 2024).

Another MT from school D highlighted:

"*Well*-equipped classrooms enable us to implement differentiated instruction effectively. However, our classrooms do not support the necessary pedagogical strategies due to inadequate resources and layout" (Interview with MT 4 from school D, February 15, 2024).

FGDs with MTs revealed the importance of flexible seating arrangements, quiet areas for individualized instruction, and sufficient materials for effective teaching. An MT from school B mentioned:

"*Poor physical setup in our classrooms hinders effective teaching. Flexible seating and assistive technologies are crucial for creating an inclusive atmosphere, but our current setup makes it difficult to apply some pedagogical strategies*" (FGD with MTs, teacher 3 from school B, January 31, 2024).

Similarly, another MT stressed:

"*Classroom organization and visual aids are crucial. Simplified instructions and designated areas for group work help create a conducive learning environment for all students*" (FGD with MTs from school E, February 21, 2024).

Pupils with MID also noted how overcrowded classrooms and limited resources affected their learning. For instance, a pupil from school A stated:

"*We would like to learn mathematics in a less crowded classroom. It helps us focus better and reduces our feeling of being overwhelmed*" (FGD with Pupils with MID from school A, January 26, 2024).

Another pupil from school C added:

"*Overcrowding and noise make learning difficult. Big clocks and other resources help us manage our time better and reduce stress*" (FGD with Pupils with MID from school C, February 12, 2024).

Observations revealed that many inclusive classrooms were overcrowded and lacked sufficient desks, with some

pupils sitting on the floor. For instance, a classroom in school D had 102 pupils, including those with MID.

Figure 1: The nature of classrooms in inclusive schools under study

Figure 2: The nature of classrooms in inclusive schools under study

The findings indicate that classroom size, layout, and resources significantly impact the effectiveness of pedagogical strategies. Overcrowded classrooms and limited resources hinder the ability of mathematics teachers to provide individualized support and effective instruction. Creating supportive and inclusive classroom environments with adequate resources and flexible layouts is essential for enhancing mathematics performance and engagement among pupils with MID. Collaborative efforts among educators, administrators, and policymakers are needed to ensure that classrooms are equipped to meet the diverse needs of students with disabilities.

Pupils' Attitudes

The study highlighted that pupils' attitudes towards mathematics play a crucial role in the effectiveness of pedagogical strategies used by mathematics teachers (MTs) in inclusive settings. Interviews with Head Teachers (HTs) and MTs, as well as Focus Group Discussions (FGDs) with MTs and pupils with moderate intellectual disabilities (MID), underscored the impact of these attitudes on teaching and learning outcomes. HTs noted that pupils' negative attitudes towards mathematics could significantly impede the effectiveness of pedagogical strategies. For instance, an HT from School F commented:

"*Negative attitudes towards mathematics often hinder the implementation of effective teaching strategies. Pupils who view math as difficult or irrelevant are less likely to engage with the material and benefit from tailored pedagogical approaches*" (Interview with HT from School F, February 23, 2024).

Another HT from School H shared similar concerns:

"*The challenge of addressing negative attitudes is evident. Without positive attitudes, even well-designed pedagogical strategies struggle to achieve their intended outcomes, impacting pupils' learning experiences*"

(Interview with HT from School H, March 13, 2024).

MTs echoed these observations, noting that pupils' negative attitudes can lead to decreased motivation and engagement. An MT from School B stated:

"*Enthusiastic and positive attitudes towards mathematics make it easier to implement diverse teaching methods effectively. When pupils are disengaged or have a negative view of math, it undermines the effectiveness of our strategies*" (Interview with MT 1 from School B, January 31, 2024).

In contrast, positive attitudes facilitate a more responsive and adaptable teaching approach. An MT from School G remarked:

"*Positive attitudes towards mathematics are crucial. When pupils are open and interested, it allows us to employ a range of pedagogical strategies and better meet their individual needs*" (Interview with MT 3 from School G, March 8, 2024).

Focus Group Discussions with MTs further highlighted the need to address pupils' attitudes to enhance engagement and learning. An MT from School C noted:

"*Building positive attitudes through engaging and supportive interactions is essential. It allows for the effective application of pedagogical strategies and helps pupils with MID to better understand and enjoy mathematics*" (FGD with MT 3 from School C, February 9, 2024).

Conversely, FGDs with pupils with MID revealed a range of responses to mathematics instruction. Some pupils expressed frustration and a lack of interest, while others showed enthusiasm when provided with engaging and supportive teaching methods. A pupil from School E shared:

"*Math feels really hard sometimes, and it's easy to get frustrated. When the teacher tries different ways to explain things, it makes a big difference*" (FGD with Pupil 2 with MID from School E, February 22, 2024).

Another pupil from School G commented:

"*Understanding math is tough, but when the teacher is patient and uses different approaches, it helps me feel more confident and interested*" (FGD with Pupil 4 with MID from School G, March 12, 2024).

Insufficient Materials

The study identified insufficient materials as a significant challenge affecting the effectiveness of pedagogical strategies in mathematics instruction for pupils with MID. Interviews with HTs and MTs, as well as FGDs, revealed the impact of limited resources on teaching practices. HTs reported that inadequate materials and budget constraints hinder the implementation of effective pedagogical strategies. An HT from School C noted:

"*Lack of materials is a persistent issue. Without the right resources, it is challenging to implement strategies that cater to the diverse needs of students, particularly those with moderate intellectual disabilities*" (Interview with HT from School C, February 7, 2024).

Another HT from School F observed:

"*Insufficient materials limit our ability to provide hands-on learning experiences, which are crucial for engaging students with MID and helping them understand mathematical concepts*" (Interview with HT from School F, February 23, 2024).

MTs also highlighted the difficulties posed by insufficient materials, particularly the absence of manipulatives, visual aids, and assistive technologies. An MT from School D stated:

"*Without adequate materials, such as manipulatives and visual aids, it becomes difficult to implement effective instructional strategies. These resources are essential for helping pupils with MID grasp mathematical*

concepts" (Interview with MT 4 from School D, February 15, 2024).

FGDs with MTs revealed that despite the challenges, teachers employ creative solutions to overcome material shortages. An MT from School H mentioned:

"*Resource shortages require us to be resourceful. We seek external funding and share materials to ensure that our students have the tools they need for effective learning*" (FGD with MT 2 from School H, March 14, 2024).

Similarly, an MT from School E noted:

"*Having sufficient materials is crucial. When we have the resources we need, it allows us to implement differentiated instruction and support pupils with MID more effectively*" (FGD with MT 4 from School E, February 21, 2024).

Pupils with MID also expressed concerns about the lack of materials. A pupil from School B remarked:

"*I find it hard to learn math without enough materials to work with. More manipulatives would help me understand better*" (FGD with Pupil 2 with MID from School B, February 2, 2024).

Another pupil from School C added:

"*Visual aids and hands-on materials make math lessons easier to follow. When there aren't enough, it's harder to keep up*" (FGD with Pupil 4 with MID from School C, February 12, 2024).

The findings align with previous research indicating that inadequate materials negatively impact teaching effectiveness. For instance, [7] and [5] have highlighted the importance of sufficient resources in enhancing educational outcomes. Similarly, [14] found that lack of materials in Tanzanian schools hampers effective instruction for students with disabilities

To improve teaching effectiveness for pupils with MID, it is essential to address the issue of insufficient materials. Investments in resources, including manipulatives and visual aids, are crucial for supporting diverse learning needs and enhancing educational outcomes.

Unequal Ratio between Pupils and Teachers

The findings explored the unequal ratio between pupils and teachers as a factor affecting the pedagogical strategies used by mathematics teachers (MTs) to enhance performance among pupils with moderate intellectual disabilities (MID) in inclusive settings. Head Teachers (HTs) acknowledged the challenges posed by unequal pupil-teacher ratios in inclusive classrooms, emphasizing the need for adequate staffing to ensure effective implementation of pedagogical strategies.

HTs reported that the high pupil-teacher ratio significantly impacts their ability to provide individualized support and implement effective pedagogical strategies. For instance, an HT from School D stated:

"*The high pupil-teacher ratio significantly impacts our ability to effectively implement pedagogical strategies. In inclusive classrooms, where diverse needs must be met, individualized attention is crucial, and it becomes challenging*" (Interview with HT from School D, February 13, 2024).

Similarly, an HT from School F noted:

"*The disparity between the number of students and teachers directly affects our ability to implement inclusive pedagogical strategies. It's challenging to adequately address the individual needs of students with diverse learning requirements when our material resources are stretched thin*" (Interview with HT from School F, February 23, 2024).

MTs also highlighted the difficulties posed by large class sizes and unequal pupil-to-teacher ratios. The impact on their ability to provide personalized support and differentiated instruction was evident. MT 3 from School E

commented:

"*As a mathematics teacher, I strive to employ various pedagogical strategies to cater to different learning styles and abilities. However, with large class sizes, it's difficult to provide the necessary support and personalized instruction, hindering the effectiveness of these strategies*" (Interview with MT 3 from School E, February 21, 2024).

Another MT echoed these concerns:

"*With a large class size, it's challenging to implement interactive pedagogical strategies effectively. Personalized attention and tailored instruction are crucial for students with varying levels of mathematical proficiency, but it's difficult to achieve this in overcrowded classrooms*" (Interview with MT 4 from School G, March 11, 2024).

Focus Group Discussions (FGDs) with MTs further emphasized the challenges of adapting pedagogical strategies in classrooms with unequal pupil-to-teacher ratios. Teachers discussed the importance of collaboration with support staff, peer tutoring, and small group instruction to address diverse learning needs. MTs from School A remarked:

"*It's incredibly challenging to cater to the diverse needs of students when there's just one teacher and so many of them. Individualized attention becomes nearly impossible*" (FGD with MT 1 from School A, January 25, 2024).

Other MTs added:

"*It is obvious to find oneself constantly torn between delivering the curriculum and providing necessary support for pupils who struggle with concepts. There's just not enough time in the day*" (FGD with MT 3 from School C, February 9, 2024).

Pupils with MID also expressed their experiences of feeling overwhelmed and overlooked in classrooms with high pupil-to-teacher ratios. They voiced frustration with the lack of personalized attention and support. A pupil from School D shared:

"*When the class size is too big, I feel lost. I want to ask questions, but there are always other pupils who need help too, so I do not want to bother the teacher*" (FGD with Pupil 3 with MID from School D, February 16, 2024).

Another pupil from School A stated:

"*Sometimes, I wish there were more teachers in the class so that they could explain things to us in a way that makes sense. It is frustrating when we do not understand*" (FGD with Pupil 2 with MID from School A, January 26, 2024).

These findings highlight the significant impact of unequal pupil-teacher ratios on the effectiveness of pedagogical strategies in inclusive mathematics classrooms. Large class sizes and unequal ratios limit teachers' ability to provide individualized support and differentiated instruction tailored to the diverse needs of pupils with MID. Addressing this issue requires systemic changes, including reduced class sizes and increased support staff. Advocating for these changes can help create inclusive environments where pupils with MID receive the attention and support they need to succeed.

Tiredness and Hunger among Pupils

The study found that tiredness and hunger among pupils are significant challenges facing the effectiveness of pedagogical strategies used by mathematics teachers to enhance performance for pupils with moderate intellectual disabilities (MID) in inclusive settings. Interviews with HTs and MTs highlighted how these issues impact pupils' ability to engage with mathematics instruction effectively.

HTs acknowledged the impact of tiredness and hunger on pupils' concentration and overall engagement in lessons. An HT from School B noted:

"*I have noticed a concerning trend of tiredness and hunger among our pupils, particularly those with moderate intellectual disabilities. Many of them struggle to concentrate for extended periods, which impacts their overall engagement in mathematics lessons*" (Interview with HT from School B, January 29, 2024).

HT from School E added:

"*Pupils are coming from families with different economic statuses. Many come to school without breakfast or any food, causing persistent tiredness and affecting their mood. This situation makes it difficult to employ engaging pedagogical strategies, as pupils often become frustrated or angry when they are hungry*" (Interview with HT from School E, February 19, 2024).

MTs also observed the impact of tiredness and hunger on pupils' focus and participation in mathematics lessons. Strategies to mitigate these issues included incorporating movement breaks and adjusting lesson pacing. MT 1 from School D stated:

"*When teaching pupils who are tired and hungry, it's like trying to teach pupils who are weak. They find it hard to focus and participate. Although we try to use engaging strategies, their lack of energy hampers their understanding*" (Interview with MT 1 from School D, February 14, 2024).

Another MT added:

"*Tiredness and hunger affect not only the pupils but also us teachers. Managing tiredness and angry outbursts is draining, disrupting the lesson flow and impeding progress*" (Interview with MT 3 from School G, March 7, 2024).

FGDs with pupils with MID revealed that fatigue and hunger impact their ability to concentrate and engage in lessons. Pupils expressed frustration with their inability to focus. A pupil from School C remarked:

"*When I am tired, I find it hard to focus on what the teacher is saying. The numbers seem to blur together, and I cannot concentrate*" (FGD with Pupil 1 with MID from School C, February 12, 2024).

Another pupil from School D noted:

"*Sometimes, when I do not understand something, I get really frustrated and angry. Lack of understanding is often due to tiredness and hunger. It's like my brain just shuts down*" (FGD with Pupil 2 with MID from School D, February 16, 2024).

MTs in FGDs discussed strategies for addressing tiredness, such as incorporating active learning and providing frequent breaks. They stressed the importance of a supportive classroom environment. MTs from School B said:

"*When pupils come to class tired, it's challenging to maintain their attention. Even well-planned lessons fall short because fatigue affects their ability to absorb information*" (FGD with MTs from School B, January 31, 2024).

Another MT from School C added:

"*Hunger among pupils interferes with the application of pedagogical strategies. When we force engagement, it can lead to anger outbursts, disrupting the learning environment*" (FGD with MTs from School C, February 9, 2024).

These findings indicate that tiredness and hunger significantly impact the effectiveness of pedagogical strategies used by mathematics teachers for pupils with MID. Addressing these issues requires creating supportive learning environments, incorporating movement breaks, and adjusting lesson pacing to accommodate varying energy

levels. Investing in measures to address tiredness and hunger can enhance pupils' engagement and performance in mathematics education.

CONCLUSION

This study explored six key challenges facing the effective use of pedagogical strategies by mathematics teachers to enhance the performance of Standard Four pupils with moderate intellectual disabilities (MID) in inclusive settings. These challenges include unequal pupil-teacher ratios, limited resources and support, teacher knowledge and skills, parental involvement, pupils' attitudes and behavior, and pupils' tiredness and hunger. Each of these elements plays a critical role in shaping the success of instructional methods, with challenges like overcrowded classrooms, insufficient training, and lack of parental engagement hindering teachers' ability to provide individualized and effective support. Additionally, pupils' fatigue and hunger further disrupt their ability to concentrate and engage in learning, complicating the teaching process. Addressing these issues holistically is essential to creating inclusive environments that support the academic success of pupils with MID in mathematics.

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