The Use of Animal Metaphors to Reveal Beliefs of Grade Three Namibian Learners Who Experienced Mathematics Learning Difficulties During the COVID-19 Pandemic

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Abstract

This chapter examines the use of animal metaphors to explore the beliefs of six grade three learners in a rural Namibian school. The study was conducted during the COVID-19 pandemic. The learners had been observed by their teacher and had been found to be experiencing difficulties in learning mathematics. The teacher, therefore, labelled the learners as experiencing mathematics learning difficulties (MLD) and believed they were not mathematically talented. The grade three learners had missed out on some essential basic mathematical competencies in the previous grades due to a lockdown during the pandemic, an unplanned school closures, and the implementation of a rationalised syllabus/COVID-19 emergency curriculum. A qualitative research method was used to collect data through semi-structured interviews and learners' drawings using animal metaphors. Findings revealed that learners associated mathematics with dangerous animals or situations, and they believed mathematics to be a difficult subject to learn. The learners' beliefs indicated that they struggle to learn mathematics; however, all the learners considered knowledge of the subject to be an essential part of life.

Keywords: mathematics, COVID-19, animal metaphor, beliefs, MLD, learning difficulties

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Introduction

Many countries across Africa are experiencing the challenge of poor performance in mathematics (International Mathematics Union Report, 2014). Indeed, Sandefur (2016) points to the underperformance of African countries at the Southern Africa Consortium for Monitoring Education Quality (SACMEQ II and III) of 2000-2004 and 2006-2011 respectively and argues that they perform below the countries ranked in the Trends in International Mathematics and Science Study (TIMSS) in 2015. This has been corroborated by (Saal et al., 2019), who concluded that mathematics performance among South African students was shocking. Similarly, (Hadi et al .,2018), states that students have difficulties solving mathematics problems, and many perform poorly due to low higher-order thinking skills. The situation is not different in Namibia, a country that obtained the lowest scores of all the countries that participated in TIMSS (Sandefur, 2016). Namibia was ranked the lowest among fifteen countries in the SACMEQ test reports in mathematics (Ministry of Education, 2006, p. 12). However, Namibian learners managed to reach the benchmark of 500th in the fourth SACMEQ assessment, which was conducted in 2012-2014. This may suggest that learners did not perform well in the mathematics assessment, possibly MLD may be one of the causes of the low achievement.

As in many other countries, in Namibia, mathematics is a compulsory subject throughout the school curriculum (Ministry of Education, 2016). Mathematics is one of the requirements for passing to the next grade level, and the subject is perceived by learners as a gatekeeper to many

careers (Ministry of Education, Sport, Art and Culture, 2015). (Naidoo & Kapofu, 2020), whose work focuses on the South African context, identifies mathematics as an entry requirement for many careers, including law, medicine, and science, and such jobs as land surveyor, pilot, geologist, and architect. Meaning learners may not have careers if they do not pass mathematics Similarly, (Hadi et al., 2018) identifies mathematics as a key compulsory subject because of its high relevance and practical value in everyday life applications. However, according to the Organisation for Economic Co-operation and Development (OECD), mathematics becomes a dead-end and a stumbling block for many students (OECD, 2014), especially those who experience mathematics learning difficulties (MLD).

Hadi et al.(2018) has further observed that a high percentage of learners at all school levels experience difficulties in comprehension which worsen their mathematics learning and understanding. Sanders (2009) references mathematics as a subject that many students find hard to cope with, lose their interest in, and develop negative attitudes toward, and this is apparent in the Namibian context. Furthermore, Nambira et al. (2009) explore reasons for low performance in mathematics in grades six, seven, and eight in Namibia. These results showed poor performance in mathematics and learners' difficulties in attaining certain competencies caused by poor mathematics foundation laid at lower primary school level (Nambira et al., 2009). Thus, the study also shows that learners' difficulties in mathematics at high grades was not eccentric, it keeps increasing as learners progress to higher grades (Nambira et al., 2009). Nambira et al. (2009) indicates that MLD is caused by the language of instructions and lack of parental support, among other issues.

Preliminary research shows that little is known about Namibian lower primary learners' experiences of MLD. Many studies have focused on high school learners, pre-service teachers, or

in-service teachers (e.g., Ellion, 2016; Mukwambo et al., 2018; Nambira et al., 2009). Therefore, in this chapter, we use metaphors to examine the beliefs (about mathematics) of Namibian grade three learners who had been observed by their teacher to experience MLD. Grade three is part of the junior primary education in Namibia, which consists of grade zero (pre-primary) to grade three. These grades lay the foundation for childhood education. The language of instruction at the school participating in this study is the predominant local language, Oshindonga. Education focuses primarily on literacy, numeracy, broad knowledge of the learners' environment, and personal health (Ministry of Education Arts and Culture, 2016). Learner-centred teaching is the adopted approach; teachers use a class-teaching model, whereby the teacher is responsible for seven subjects in their class. Repeating a grade is recommended if a learner, as observed by their teacher, parents, or guardians, do not master the required minimum basic competencies.

Our own experiences of teaching mathematics influenced the focus of this chapter, as we have observed many Namibian learners experience MLD during their early grades. Our focus is on grade three learners because we believed they could express their views and thoughts better than grade one or two learners. Our purpose is to contribute to a better understanding of the learners' beliefs about mathematics and learning mathematics during the COVID-19 pandemic that may suggest potential types of intervention in lower grades.

Impacts of COVID-19 on Teaching and Learning in Namibia

The Namibian education sector was negatively affected by the COVID-19 pandemic, and basic education suffered more than higher education (Evelina et al., 2020). Namibia reported its first two COVID-19 cases on 14 March 2020: Romanian tourist couple who were visiting the country. Thereafter, the Ministry of Education Arts and Culture (MoEAC) announced the closure of all public and private schools in Namibia on 16 March 2020. Also in response, the Namibian

Head of the State declared a state of emergency on 17 March 2020. On 28 March 2020, the country went into a full lockdown. This brought an unimaginable disruption to the Namibian school calendar as no teaching or learning took place during the state lockdown; all schools were closed. The closure imposed difficulties in formally assessing learners for the academic year (Evelina et al., 2020). Parents were called on to facilitate learning and provide the necessary support for their children to study all their subjects at home (Bubb & Jones, 2020). This arrangement was challenging due to a lack of eLearning platforms that could have helped teachers remotely facilitate learning mathematics, for example (Angula & Mutelo, 2021). It was also unrealistic to expect schools, especially in rural areas with no internet access or electricity, to suddenly began to use online learning platforms. (Evelina et al., 2020).

In the absence of face-to-face teaching, parents were expected to take over the teachers' tasks, although some parents were illiterate and could not teach their children mathematics (Darragh & Franke, 2021). Of all the subjects that parents supported learners in during the COVID-19 lockdown, mathematics was the least enjoyed (Cahoon et al., 2021). Thus, there is a high possibility that some learners did not acquire any mathematics competency during the remote learning period. Even when grades 10–12 were permitted to proceed with face-to-face schooling, classes for pre-primary grades and grades 1–9 remained suspended. As of September 2020, Namibia was among the top 18 countries with the most COVID-19 cases in Africa. Although the schools have resumed face-to-face teaching, two (Khomas and Erongo) of the 14 regions of Namibia stayed in lockdown for a longer time due to a high number of COVID-19 cases. Learners in those two regions were thus left behind in learning mathematics and other subjects. When face-to-face teaching resumed, outbreaks of COVID-19 cases among teachers and learners in the schools continued to cause disruptions in learning (Wakui et al., 2021; Spaull & Van der Berg,

2020). There were even some cases where a COVID-19-related death of a teacher or learner slowed down learning (Jacob et al., 2020).

The MoEAC issued circulars to guide basic education and everyday schooling in response to issues caused by COVID-19. The COVID-19 pandemic forced mathematics teachers to reduce or soften the content and slow down the usual pace of teaching (Rodríguez-Muñiz et al., 2021). As referred to by Ferdyan et al. (2020) the COVID-19 emergency curriculum involved several topics in learning being reduced in the syllabus and lessons 7ocusing on the selected few. For instance, grades one to nine in Namibia were taught using a rationalised syllabus (Hamukwaya & Jatileni, 2022). The prolonged lockdown during COVID-19 widened the learning gap in school subjects including mathematics (Khan et al., 2021). Thus, the MoEAC removed some basic competencies/content from the normal syllabi, and issued a rationalised syllabus as a COVID-19 emergency curriculum. The rationalised syllabus or emergency curriculum aimed to reduce the subjects' content, which would result in shorter face-to-face teaching times so that the classes could meet the end of the school year calendar. Much of the content of the subjects had to be left out due to lost instruction time in the classroom (Kuhfeld et al., 2020).

In Namibia, at the junior primary level, instead of seven subjects, the new syllabus focused only on four subjects: first and second languages, mathematics, environmental studies, and a list of suggested topics (MoEAC, 2020). Since some basic mathematics competencies that are usually taught were excluded, it could be argued that a gap developed in learners' mathematical knowledge and skills required for completing grades was created. Lepp et al., (2021) state that it is more difficult for learners to acquire the missed basic competence in mathematics than in other subjects. This means that missed content creates a mathematical knowledge gap, unless learners continue with the same teacher the following year—then it would be possible for that teacher to know

specifically what was not learned, and they may aim to fill that gap (Lepp et al., 2021). The grade three learners discussed in this chapter had missed some essential basic mathematical competencies in previous grades due to school closures, cancellations of face-to-face learning, and the implementation of a rationalised syllabus. This knowledge gap and limited time for learning new concepts had the potential to negatively affect learners' mathematical performance and lead to MLD.

The Study Rationale

Grade three learners were in the final grade of their junior primary phase, which, in Namibia, is a transitional grade before the senior primary phase. Each learner's mathematics foundation must be firmly laid at this phase before they move on to grade four (MoEAC, 2016).

Identifying learners' beliefs about mathematics in early grades can help teachers support learners studying mathematics. Moreover, many studies have been conducted on beliefs about mathematics education and learning difficulties. Using animal metaphors, learners can express their beliefs about mathematics through the description of an animal. Despite learners having different educational needs, few studies have used animal metaphors to address learners' beliefs. Studies of this nature are scarce in the mathematics education community, especially in Africa. Specifically, no such study has been conducted in Namibia. Therefore, in order to understand gradethree learners' beliefs about mathematics as a school subject (their relationships with mathematics), this chapter addresses the following research question:

- Using animal metaphors, what do grade three learners who have been observed by their teacher to experience MLD believe about mathematics?
    - What do learners think about mathematics?

- What beliefs do learners have about mathematics?

Literature Review

Beliefs about mathematics education

In this chapter, we only discuss literature about students or learners' beliefs about mathematics; the one aspect of beliefs classified by researchers (e.g., McLeod (1992).

Students hold beliefs about what mathematics comprises, for instance, who they are as mathematics students (Ndlovu & Ngcobo, 2018). Based on the literature, the students' main source of mathematical experience is the classroom, and what occurs in mathematics classrooms influences their beliefs. Their beliefs are developed during the teaching and learning processes, and they influence the students' construction of knowledge and their academic performance (Steele & Ambady, 2006). This includes the way teachers teach (Black et al., 2018) and what both students and teachers do in class. This indicates that early experiences in mathematics are crucial in shaping students' beliefs.

One of the common categories of students' beliefs found in the literature is about mathematics as a subject. This refers to the way in which students perceive/see mathematics (McGregor, 2014; Op't Eynde et al., 2002). Some students may find mathematics easy while most believe that it is difficult, and some perceive mathematics as being founded on rules and that only bright students can succeed in the subject (Ndlovu & Ngcobo, 2018). Another common category of beliefs outlined by scholars is beliefs about oneself in relation to mathematics. These beliefs are related to the students' confidence and determination, and their understanding of success or failure in learning mathematics (McGregor, 2014; Ndlovu & Ngcobo, 2018). These beliefs significantly

influence students' mathematical learning and impact their interest and motivation in learning mathematics (Kele & Sharma, 2014).

Building on the literature, in this chapter, we consider beliefs about mathematics as individual learners' experiences in learning mathematics, and how their thinking may impact the desire to learn the subject. Specifically, we look at how learners associated mathematics to animals. We focused on grade three learners who had been observed to experience MLD, and how their beliefs (i) determined effort in learning mathematics (Kloosterman, 2002); (ii) influenced engagement in the learning of mathematics (Markovits & Forgasz, 2017); (iii) impacted interest and enjoyment towards the subject (Kloosterman, 2002); and (iv) contributed to academic achievement (Geisler & Rolka, 2020). Understanding learners' beliefs about mathematics may suggest potential intervention that could enhance their mathematics learning in early grades.

The Concept of Mathematics Learning Difficulties

Researchers define MLD as any limitation believed by researchers to hinder a student's mathematical learning. For example, limitations can be academic: students' fears based on negative past experiences, insufficient opportunities for learning mathematics, a lack of adequate mathematics knowledge, or insufficient teaching practices or materials (Hadi et al., 2018). Hamukwaya (2021) and Hamukwaya and Haser (2021) investigated characteristics of learners experiencing MLD, such as lack of arithmetic skills, difficulty recalling arithmetic facts, and inability to build connections between mathematics concepts, which may influence the learners' beliefs about mathematics. Furthermore, researchers have made some of the following conclusions about learners experiencing MLD:

• Usually, learners believe mathematics is difficult (Zakaria et al., 2010).

• They have difficulty grasping concepts quickly (Gafoor & Kurukkan, 2015).

• They may relate mathematics to dangerous or poisonous animals or scary situations (Stanley et al., 2021; Haslam et al., 2011).

Moreover, the current chapter regards grade three learners experiencing MLD as struggling to grasp the basic mathematics knowledge and skills required to comprehend the subject effectively (Jitendra et al., 2013). However, if learners receive learning support, they can improve their understanding of mathematical concepts (Hamukwaya & Haser, 2021) and consequently may change their beliefs towards mathematics. Therefore, this chapter focused on grade three learners' beliefs about mathematics. It aimed to contribute to other studies about beliefs in mathematics education, especially in the Namibian context – a countries under-represented in mathematics research studies. We aimed to aligned learners' beliefs with animal metaphors because if leaners experience MLD at early grades, they may have difficult understand mathematics at high grades and they will consequently make inadequate progress in learning mathematics which may negatively affect their career path.

Metaphors in Mathematics Education

Over the years, educational researchers and practitioners have used a collection of quantitative and qualitative methods to interpret the world of mathematics education to better understand educational theory and practice (Jensen, 2016). In the current chapter, we use metaphor analysis as a possible means for qualitative educational inquiry. Types of metaphors include symbols, figures of speech, similes, images, and allegories. A metaphor occurs when a unit of discourse is used to indicate an object, animal, process, or concept (Woodside, 2008). Metaphors can be used to depict aspects of who someone is or what they are like, and the animal that first

comes to mind in different situations can be telling (Magaña & Matlock, 2018). Metaphors also can be used to identify and select someone's inner animal companion (Dove & Fayard, 2020, April). Thus, we used animal metaphors in our investigation to explore which animal learners depicted as relating to them or that they believed impacted their lives in the way mathematics did. We chose animal metaphors because the metaphors that learners form and encounter have been shown to exert a powerful influence on how they think about mathematics (Olsen et al., 2020). For instance, Hendriana and Rohaeti (2017) contributed to the role of metaphors in the understanding of mathematical concepts and how types of metaphors can provoke interpretations of mathematical problems for learners. Thus, when a learner participates in forming a metaphor representing themselves in the way they view mathematics. The source and the target domains can be dissected to determine the concepts, properties, and relationships from the source domain to the target domain. Hence, in the context of this chapter, the target domain of the animal metaphor is grade three learners who had been observed by their teachers to experience MLD.

Learners hold various beliefs about mathematics, which influence how they learn the subject (Ndlovu & Ngcobo, 2018); the systemic view of animal metaphors can reveal learners' beliefs about mathematics learning (Latterell & Wilson, 2016). Such beliefs can be associated with understanding the role mathematics plays in the lives of learners in and outside the classroom. While beliefs can influence learners' mathematics learning, the challenge is to determine a specific learner's beliefs about mathematics. Thus, contemporary metaphor theories such as animal metaphors can provide a means of unpacking the beliefs that specific learners have about mathematics (Markovits & Forgasz, 2017). Detecting and understanding learners' metaphors for mathematics can give mathematics teachers a hint about learners' internalised views about mathematics (Olsen & Weber, 2020). For instance, there can be an underlying reason a learner is

associating mathematics with a sweet than chilli. Thus, a better sense of learners' beliefs can inform teachers' understanding of how learners' beliefs influence their acquisition and practice of mathematics as a school subject (Latterell & Wilson, 2016; Markovits, & Forgasz, 2017; Presmeg, 2020; Soto-Andrade, 2020; Schinck et al., 2008).

Research in mathematics education uses metaphors to gain insight into learners' beliefs about mathematics (Al Said et al.,2019; Cassibba et al.,2020; Olsen et al., 2020). Also, the metaphors that learners form and encounter have been shown to exert a powerful influence on how they think about mathematics (Olsen & Weber, 2020). Furthermore, Çetinkaya et al. (2009) state that metaphor assessments help reveal learners' attitudes on learning mathematics and can provide opportunities for learners to critically analyse their mathematics learning beliefs. According to Latterell and Wilson (2016), mathematics learning metaphors illuminate learners' beliefs about mathematics. Therefore, through animal metaphors, we can discuss learners' beliefs and perceptions about mathematics in unique ways in this chapter (Markovits & Forgasz, 2017).

Animal metaphors are a dominant type of metaphor in research and are mostly used in negative discourse (Hart, 2021). They can convey a wide range of meanings, such as those centred on depravity, insulting slurs, expressions of love, disagreeableness, and stupidity (Haslam et al., 2011). In their study, Haslam et al. (2011) found that the offensiveness of an animal metaphor is projected by the revolt felt towards the animal and by the dehumanising view of the target to which it was applied. Their study also revealed that the offensiveness of animal metaphors differs with the tone of expression and the gender of the target domains. These differences influence the offensiveness by altering the extent to which animalistic properties are attributed to the target (Haslam et al., 2011). As in the study by Stanley et al. (2021), metaphorical animal descriptions were used in the current study to reveal grade three learners' beliefs towards mathematics.

This study only targets grade three learners experiencing MLD in the year 2021 as they learned during the COVID-19 pandemic. Results from research carried out using animal metaphors in cross-cultural comparison studies may differ to a certain extent since many aspects, such as language, are culture-specific (Belkhir, 2021; Hijazo-gascón, 2020). However, similarities and differences in the understanding of the six animal metaphors in this study among the participants can be assumed to have not been influenced by culture or language as the participants all shared the same culture and language. Thus, the conceptual metaphors used in this study are grounded on learners' experiences and are not culture dependent (Schaerlaeken et al., 2019).

Methodology

Research Design and Approach

We conducted qualitative research by employing in-depth semi-structured interviews to allow data to emerge from participants as they explained their beliefs towards mathematics (Selvi, 2008; Sohn et al., 2017) in terms of animal metaphors. Also, we explored the data in detail to understand how the grade three learners experiencing MLD perceived mathematics.

The Context and Site

The study was conducted in 2021 at Yambeko Combined School (YCS is a pseudonym). The school accommodates grades zero to 11 learners in a rural area of Omusati, a northern region of Namibia. At the time of this study, the school had two grade three classes, one with 34 learners and one with 35. In each class, learners were divided into two groups, which meant fewer than 20 learners were in the class at a time. This arrangement was necessary to adhere to social distancing requirements and health protocols due to the COVID-19 pandemic. There were nine mathematics lessons per week at YCS before the pandemic. However, lessons were reduced to three per week during the pandemic, plus one lesson for learning support.

Grade three at YCS was unique compared to that of other schools in the region. The two teachers responsible for teaching grade three shifted from whole-class teaching to the subject teaching model: one taught mathematics and environmental studies, and the other taught language and reading. They were committed to supporting their learners to help them achieve sufficient understanding during the COVID-19 pandemic—a significant reason for why we selected YCS for this study.

Participants

Six grade three learners (two boys and four girls) observed by their teacher to experience MLD participated in this study. Learners had not been diagnosed or assessed by a health professional to have MLD. Five of the learners were nine years of age, and one was 11 years of age (Iyaloo, pseudonym). Based on her parents' request, Iyaloo was repeating grade three. During the final grade three assessment in 2020, Iyaloo had performed below the average (30%) in all school subjects. Iyaloo's parents felt that she would not benefit from being transferred to grade four. Although professionals did not clinically diagnose Iyaloo, her parents observed that she had learning difficulties in all content subjects: Oshindonga (native language), English as a second language, mathematics, and environmental studies.

Instrument

Analysing (i) learners' drawings and (ii) their interviews is a unique method for exploring young learners' beliefs about mathematics as a subject (Markovits & Forgasz, 2017; Batchelor et al., 2019). Hence, the learners' drawings using animal metaphors and semi-structured interviews were used as instruments to collect the data among the grade three learners. By depicting an animal, learners expressed their feelings, beliefs, and imagination regarding mathematics. The questions

were designed to produce belief statements about mathematics, and the interview guide was based on the two themes that elicited learners' beliefs:

- The learners' beliefs about mathematics (e.g., Draw an animal that you think mathematics is like and explain why.)
- The learners' beliefs about learning mathematics (e.g., How good are you at mathematics?)

Procedure

The Namibian MEAC granted permission for the study, and voluntary participation was sought. Ethical issues were considered, such as anonymity, the participants' willingness, and signed consent by the parents of the participating learners. In Namibia, in the first six weeks of the first semester, the junior primary grades one to three begin with readiness lessons to review the content previously covered. In 2021, after the readiness lessons, the grade three mathematics teacher at YCS designed a readiness test as part of the lower primary policy. Since mathematics teachers may vary in their understanding of reasons why learners may experience MLD (Hamukwaya & Haser, 2021), we requested that the teacher identify learners they observed as experiencing MLD based on readiness; ten learners were identified. Permission requests were sent to parents for their children to participate in the study, and six parents responded positively. These learners were interviewed, and their drawings were used in this study.

Data Collection

We developed a common interview framework about beliefs based on other scholars in mathematics education (e.g., Baccaglini-Frank & Papadastos, 2014; Karagiannakis et al., 2014; Lewis, 2014). We arranged the guided interview in a manner that promoted comfortability

in the discussions and that encouraged learners to share their beliefs about mathematics as a subject.

Due to travel ban because of the COVID-19 restrictions at the time, the grade two teacher assisted with data collection. We provided the teacher an interview guided on how to tailor subsequent questions, and the espoused interview technique, we requested that the grade two teacher assist us with data collection. The interviews were conducted in Oshiwambo (the learners' native language and the medium of instruction in grade three). They were recorded and then translated into English.

Data Analysis

We analysed the transcripts of the six audiotaped interviews based on (i) the learners' beliefs about mathematics and (ii) the learners' beliefs about learning mathematics. To reiterate, we were interested in grade three learners' feelings, imagination, and expressions of how they perceived mathematics using animal metaphors. For trustworthiness, all authors analysed the data, and the learners who participated in this study were treated as individuals. The analysis was conducted in the following order:

6. The interviews were transcribed, during which the recordings were replayed several times to ensure accuracy.

2. We employed open coding that enabled qualitative data reduction to understand the learners' expressions and how they perceived mathematics (Creswell, 2009).

3. The transcriptions were read thoroughly, and significant words and common phrases based on the aim of this study were highlighted. The learners provided common expressions, and keywords were identified, including "mathematics is difficult", "struggle", "scary", and "fear".

4. We selected data about each theme (The learners' beliefs about mathematics and the learners' beliefs about learning mathematics).

5. We gathered quotations to ensure the accuracy of the coding process in the qualitative research, which helped preserve the learners' voices.

6. For validity, feedback from fellow researchers in mathematics education was used to revise the data analysis, which increased the repeatability of the findings.

In the following section, a sample of the learners' statements to support our analysis is presented. The names of the learners used in this paper are pseudonyms.

Findings

Metaphors revealed by learners

The animal metaphors were used to explore learners' beliefs about mathematics and learning mathematics. When the learners were asked to draw an animal that they thought mathematics was like, three learners (two boys and one girl) drew snakes, one (a girl) drew a lion, and another (a girl) drew a bee as shown in Table 15.1. The drawing by Iyaloo, differed from the others. Iyaloo did not draw an animal; she drew fire to represent mathematics.

Learners' name	Learners' metaphor	Learners' beliefs about mathematics

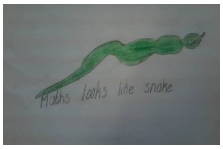
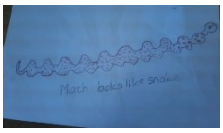
Betty	 Figure 1.15 Lion	"I am not good at mathematics because it's difficult. [...] I don't know how to do all the calculations."
Aina	 Figure 2.15 Snake	"I don't know mathematics. Mathematics is difficult [...]. It's like a snake because the snake bites."
Tomy	 Figure 3.15 Snake	"I struggle with mathematics. [...] Mathematics is like a snake because it bites."
Festus	 Figure 4.15 Snake	"I am not good at mathematics. [...] I am scared of mathematics like I am scared of a snake."
Maria	 Figure 5.15 Bee	"I don't know how to do the calculations. Mathematics is difficult [...]. It is like a bee because the bee stings people."
Iyaloo	 Figure 6.15 Fire	"I am not good at mathematics. [...] I struggled with math. It's difficult. [...] Math is like fire."

Table 15.1 Learners' metaphors and their beliefs about mathematics

Learners' beliefs of Learning Mathematics in relation to animal metaphor

During the interviews, learners gave reasons for each drawn animal metaphor (as shown in Table 15.1) that included the fear of mathematics in the same way as they would fear snakes, lions, bees, or fire because of the danger associated with them. For example, Festus expressed his beliefs to the grade two teacher, who served as a Researcher Assistant (RA), that mathematics is like a snake: "I am scared of mathematics like I am scared of a snake." Another example is Maria, who thought mathematics was like a bee "because it stings people."

Nearly one-fourth of the learners' metaphors suggested negative views about mathematics and mathematics learning (Latterell & Wilson, 2020). There were no significant differences between girls and boys noted in the responses.

The following example shows how Iyaloo and Maria expressed their beliefs about learning mathematics to the RA. The follow-up questions in the excerpt builds a conversation about their feelings, beliefs and views. In the following excerpt, Iyaloo characterises learning mathematics as difficult. The excerpt indicates that Iyaloo "struggled with math".

RA: Iyaloo, can you please tell me how good you are at learning mathematics?

Iyaloo: I am not good at mathematics.

RA: Okay. Can you explain to me why you are not good at learning mathematics?

Iyaloo: I struggled with math. It's difficult.

Another example is from Maria, who shared her belief that she was experiencing difficulty and did not know the subject:

RA: Can you please tell me how good you are at learning mathematics?

Maria: I don't know how to do the calculations.

RA: You don't know how to do the calculations?

Maria: Yes.

RA: Why?

Maria: Mathematics is difficult.

RA: Okay. Maria you drew a snake, that mathematics is like a snake. Can you please tell me why you drew a snake?

Maria: It's like a snake because the snake bites.

All participating learners saw mathematics as a difficult subject; they struggled when solving mathematics tasks. However, Aina stated that the difficulty with mathematics might occur because she "does not know how to write well". Interestingly, all the learners believed mathematics was an important subject that must be learned and indicated that they wanted to excel in mathematics, but that mathematics is scary. For instance, Festus stated, "I am scared of mathematics".

Discussion

In this chapter, we explore six Namibian grade three learners experiencing difficulties in learning mathematics to better understand learner beliefs: what beliefs the grade three learners held about mathematics and what they thought about learning the subject. Our discussion sheds light on mathematics as a scary animal or subject.

Examining mathematics representations through pictures allowed grade three learners observed to experience MLD to express their beliefs about mathematics. Their descriptions of the

animals play a significant role in the current study. It was surprising that one of the participants drew fire instead of an animal, but it is still an image often associated with danger. In relation to Figure 6.15 Iyaloo's imagination aligns with the views of Ernest (2018), who states that different forms of imagery or symbols may be used in ways that make abstraction and generalised views of mathematics. Dangerous animals or situations learners associate with mathematics may determine their effort in learning mathematics. The way learners associate themselves with learning mathematics may influence their success or failure in this subject. For this reason, if learners have maths anxiety-if they are afraid to learn mathematics at such an early grade-this may negatively affect their academic performance and achievement in mathematics (Joseph et al., 2019; Luttenberger et al.,2018) as they progress with schooling. Consequently, this anxiety could lead to not participating in class, having difficulty in learning mathematics, and poor overall performance in the subject (Hamukwaya, 2021).

These findings further indicate that MLD may begin to pose a problem in primary or elementary grades. The types of beliefs shared by grade the three learners, led us to believe that an effective and supportive mathematics system that aids grade three learners experiencing MLD is needed, before they move to grade four (the first grade of the senior primary phase). If teachers do not take measures to decrease a learner's MLD in the early grades, the learner may have trouble understanding mathematics as they progress in school, and they may make inadequate progress in mathematics.

Based on the findings, learners felt that they did not want to associate themselves with mathematics. Their metaphors described mathematics and learning mathematics as something that one must not engage in. All the figures created by the learners connected mathematics to external features or characteristics associated with negative connotations. The types of symbols that the

grade three learners used in the metaphors revealed that they are afraid to learn mathematics because it is hard. This could also be taken to mean that the learners may not want to be associated with such animals, and therefore not the subject either.

Moreover, the excerpt that mathematics is a difficult subject indicates that learners struggled learning the subject. Although in some cases, for example Maria's excerpt, saying she did not know how to do the calculations, may mean that such a learner finds mathematics difficult because she struggled when solving the mathematics tasks.

Our findings are congruent with those of Markovits and Forgasz (2017), who used animal metaphors to explore the beliefs of grades four and six learners about mathematics and themselves as mathematics learners. Their study showed that certain learners perceived mathematics as difficult and complicated, while others saw it as connected to wisdom. Although there is consistency between their results and ours, the grade three learners' beliefs indicated a need for serious learning support and a change in negative beliefs. According to Luttenberger et al., (2018) such negative beliefs about mathematics may arise from environmental factors such as teachers' or parents' attitudes towards the learners' ability in mathematics, societal stereotypes (male/female mathematics abilities), or personal factors such as traits or gender.

The beliefs revealed in the study indicate the role that mathematics plays among learners. The results may also reveal what beliefs grade three learners have about mathematics or how they think about mathematics. Furthermore, learners' beliefs in this study may guide teachers to conduct their teaching practice in ways that may change the non-availing beliefs, i.e., that mathematics is a difficult, dangerous, and scary subject. Hence, the way learners perceive mathematics may influence the learners' construction of mathematical knowledge and their learning and

performance (Joseph et al., 2019). Moreover, the beliefs shared may also impact learners' interest, engagement, and motivation in learning mathematics. Learners may lose interest, and consequently fail mathematics.

Furthermore, COVID-19 has created some positive educational factors, such as a low teacher-learner ratios in the participating school (fewer than 20 learners per class). This has allowed teachers to reach every individual, leaving more time for teachers to provide learning support to those experiencing MLD (Zafarnejad & Griffin, 2021). We are suspicious about the reasons for the beliefs that "mathematics is difficult" and the negative connotations that related mathematics to dangerous animals or situations resulted from the study. It is possible that unstable school calendars, the implementation of a rationalised syllabus/COVID-19 emergency curriculum, and the school closure due to the lockdown have resulted in learners developing a mathematics learning gap and an increase of MLD. In the absence of formal mathematics assessment during the remote learning period (Evelina et al. 2020), learners may not have acquired the necessary learning competency. Also, parents may not have taught them mathematics as they were expected because not all parents had that ability (Bubb & Jones, 2020).

Conclusion

Using the animal metaphor to understand the Namibian grade three learners' beliefs about mathematics revealed two themes: (i) the learners feared mathematics, and (ii) they connected mathematics to poisonous and dangerous animals or situations. These patterns may have arisen from negative experiences in the early years of schooling, school closure due to COVID-19 and prolonged periods of not learning mathematics, or the implementation of the COVID-19 emergency curriculum. The beliefs held by grade three learners could have been influenced by the meanings they attributed to mathematics. Additionally, their choices of animals may have been

influenced by their personal experiences and familiarity with particular animals. Furthermore, home and school factors shape learners' beliefs and how they view mathematics. The associated animal metaphors indicated that the young learners had a negative attitude towards mathematics education. This revealed a need for serious learning support and motivation for learners experiencing MLD that would help them develop a positive attitude towards mathematics in early grades.

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