Factors affecting Mathematics teaching and learning at junior secondary schools in Katima circuit, Zambezi region: Teachers, learners, and administrators' perspective

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Abstract
This study examined factors affecting the teaching and learning of mathematics in junior secondary schools in Katima Mulilo, Zambezi region in Namibia. The study used a mixed methodology through the use of the survey design and a descriptive exploratory research design. The study used an in-depth face to face interview with nine teachers and seven learners in Katima Mulilo circuit who were selected through purposeful sampling strategy. The study also made use of a closed ended questionnaire which was administered to 120 participants (teachers and learners) who were selected through stratified random sampling. This study revealed that misconceptions on the part of the learners were one of the factors affecting the teaching and learning of mathematics in Katima Mulilo circuit. In addition, the study established that lack of adequate teaching materials and resources also affected the teaching and learning of mathematics. The study also revealed that low teacher qualifications and low working experience in the teaching and learning of mathematics affected the success of the learners in mathematics in Katima Mulilo circuit. The study revealed that there were several factors affecting the teaching and learning of mathematics in Katima Mulilo circuit. The study found that learners in Katima Mulilo withdrawing from mathematics and from school as a result of not are failing mathematics. In addition, the study also found out that these factors were the leading factors of the currently faced negative emotional effects in mathematics teaching and learning. More so, the study found that these factors lead to decreased learner enrolments in schools in Katima Mulilo and are also contributing to some of the currently experienced psychological impacts among the learners. The study recommended that the provision of the teaching and learning resources need to be done in Katima Mulilo circuit in order to improve the teaching and learning of Mathematics. In addition, the study also recommended that the improvement of syllabus coverage would also make an impact in improving the teaching and learning of mathematics in Katima Mulilo circuit. Apart from that, the study also recommended that improvement of parental involvement would also improve the teaching and learning of mathematics in Katima Mulilo circuit.

Keywords: *mathematics, factors, teaching, learning, Katima Mulilo*

Introduction

Before Namibia became independent in 1990, indigenous black Namibians were the colonialists were of the view that "Mathematics was not necessary for the black Namibian because their (the black Namibian's environment did not require the use of mathematics" (Kasanda, 2015, p. 78). After independence, the government decided to rapidly reform the education system. The challenge was due to the fact that not much preparation was done for a smooth transition. This was so because the new government was on a move to establish more and better schools and to break away from the South African Bantu system (Kasanda, 2015). As a result, within a short space of time, a range of policies were drawn and a lot of changes made. One such policy was the language English becoming a medium of instruction. The challenges that were encountered were: lack of competent and qualified teachers, lack of teaching and learning materials, poor learning facilities, and higher learner-teacher ratios (Kapenda, 2007).

In 1992 a new education system called Cambridge system was adopted and launched through the Education for All. It was based on the following pillars; equity, accessibility, quality and democracy with the purpose of suiting the needs of Namibian citizens. Mathematics was also one of the subjects that included for reformation as a compulsory subject. Apparently, despite the change in the education system, mathematics performance was still very low since the programme did not address the inherited problems nor provide adequate training for the teachers (Kasanda, 2015). The programme was rushed through

and educators were incompetent, thus failed to adequately equip teachers to properly impart conceptual understanding to learners (Kandumbu, 2005). The teachers in the service were also given a run through type of an in-service training which did not really made an impact in improving their pedagogical skills. The programme such as the Basic Education Teachers Diploma (BETD) required much attention to be given so that teachers would know how to teach, exercise and perform the rights and duties associated with real life situations (Kandumbu, 2005). The Ministry of Education should know that for educational transformation to take place there is a need for participation of teachers, parents, administrators and the community at large. In other words, there should be power sharing, participation and consultations at all levels of stakeholders in decision making. The purpose of this study was to investigate factors affecting the teaching and learning of mathematics in junior secondary schools in the Zambezi region in Namibia. The study sort answers to the following research questions: (1) What factors affect learner performance in mathematics at junior secondary school level in junior secondary schools in the Zambezi region in Namibia? (2) What are the effects of poor mathematics teaching and learning of mathematics in junior secondary schools in the Zambezi region in Namibia? (3) What strategies can be used to improve the teaching and learning of mathematics in junior secondary schools in the Zambezi region in Namibia?

Theoretical framework and literature review

The study utilised the constructivist theory as its theoretical lens. Constructivism theory is a theory of learning where learners construct their own learning through interaction with the phenomenon. It is believed that learners make sense of the phenomenon as they come into contact with it (Aipinge, 2007; Bécares, 2015). They evaluate its evidentiary merits, experiences and as they attempt to make sense of it within the acceptable context which is prior knowledge. It is a theory that is grounded on observations and scientific study (Kandubu, 2010). Constructivists regard learning as a process which is active. This is where learners construct and internalize new concepts, knowledge and ideas that are based on the learners' own past and present experiences and knowledge is constructed and not received by learners' cognitive processes and structures (Cohen et al., 2010). Constructivism view point is mostly based on different methodologies that are used in teaching to lead learners to relate their learning to real life situations. It also involves the scientific method that enables learners to acquire knowledge through discussions, and in this case a teacher acts as a facilitator when learners are on task (Cohen et al., 2010).

Some of the characteristics of constructivism are that "learning is not passively received, but it is actively assembled by a learner, learning is self-directed and is active; it also involves high order thinking skills that enable a learner to make sense of the world" (Cohen et al., 2010, p. 182). Jacobs, Vakalisa, and Gawe (2010, p. 134) contend that "constructivism is based on the belief that learners should be helped to construct knowledge that is meaningful and useful in their own lives". This means that the knowledge that the learners gain must be used in their daily lives since the learnt or mastered skills must be important than the content. Conceptual understanding is required for knowledge to become meaningful to be used in learners' daily lives for improved performance, particularly conceptual understanding of a subject like mathematics that is applicable in all aspects of life. Learners are assisted to develop new knowledge through an active construction process, and to go beyond rote learning, which is memorization (Miranda, Nakashole, & Chirimbana, 2013). Constructivism is a theory that blends well with learners' understanding of mathematics and therefore this study is underpinned by this theory.

Factors affecting learner performance in mathematics

The performance of learners in Mathematics seems to be generally declining for the majority of countries. For example, the 2019 Kenya National Examination Council (KNEC) report emphasized that 'for many years' performance in mathematics has been declining hence the need for immediate intervention. Kenya National Examination Council (KNEC) report (2019) reports that, "there is an unhealthy education system competition and much emphasis is on teaching for examination instead of teaching for understanding and that there is no correlation between curriculum content and the time allocated to cover the content' (p. 4). The study

by Wang (2014) indicates that students with high socio-economic status (SES) achieve higher than those students from low socio-economic status. In the same vein, Spaull (2011) asserts that "there is a big performance gap between learners with low socio-economic status (SES) as compared to those learners with high socio-economic status in South Africa" (p. 1).

In Nigeria the concern of high failure rate in public schools' dates back to decades ago (Chirimbana, 2014). Factors such as lack of necessary skills, inadequacy of teachers, lack of qualified teachers, learners' negative attitudes, and unsuitable textbooks among others, were identified as contributing to poor performance of the learners in Mathematics in schools, and it is revealed that the above factors contribute much to the poor performance of learners in mathematics (Avong, 2018). The factors that contribute to poor performance in Nigeria seem to be some of the factors that contribute to poor conceptual understanding of mathematics at junior secondary schools in Katima Mulilo circuit, Zambezi Region. In a study done in the United Kingdom by Karingi and Wario (2015) it was revealed that a positive attitude is acquired through the learners' interaction with the curriculum and the learning process, learners' attitude towards mathematics as a subject. The study conducted by Karingi and Wario (2015) shows that learners' attitude towards mathematics creates a big impact on mathematics as a subject. Karingi & Wario also indicate that when mathematics teachers get into a class, learners make comments such as, "I have been performing poorly in mathematics, I will never pass this subject" (p. 320). It is therefore the duty of teachers to show positive attitudes when teaching mathematics, that learners develop a positive attitude towards the subject which may help them to learn mathematics for conceptual understanding and better performance (Northwest Regional Laboratory, 2018). Cotton (2018) contends that "standards for classroom behaviour are explicit. Teachers should let the learners know that there are standards for behaviour in the classroom, and consistent, equitable discipline is applied for all students" (p. 67). Furthermore, personal interactions between teachers and learners should be positive; teachers should pay attention to learners' interests, problems and accomplishments in social interactions both in and out of the classroom. Teachers should also show learners that they really care for them (Cotton, 2018). A high ratio of learners to the teacher makes teaching and learning for conceptual understanding difficult. Such a high learner/teacher ratio leads to failure for the teacher to give individual attention (Chirimbana, 2014). This has a high impact on learners with respect to learning facilities and receiving individual attention. The high learners to teacher ratio would likely result in a sabotage of attention for each learner by the teacher. The result of such a status quo would likely have a negative impact on learners' performance since inadequate assistance would be given by a teacher in such large classes.

The teacher's teaching method and the classroom atmosphere greatly affect students' performance. A properly arranged method and environment likely to motivate learners (Even & Bruckheimer, 2004). Students will pay attention and follow the content being taught if a classroom is well managed and the teacher uses clear pedagogical language in the teaching and learning of mathematics. The method of teaching must be able to address the students' personal needs (Jalbani, 2014). Rote learning methods of teaching dampen the learners' zeal to learning for conceptual understanding, hence the poor performance. Teachers' knowledge of the subject – research has confirmed that teacher content knowledge has an impact on learners' performance (Pia, 2015). Thus, high quality teachers should be a prerequisite for cultivating learning of mathematics for conceptual understanding and improved performance in secondary schools generally. This has had a negative impact on the learners leading to their poor performance. Chirimbana (2014) noted that teachers who have low knowledge levels in the teaching and learning of mathematics face challenges in teaching the subject and thereby leading to learners' poor performance in mathematics. Such teachers are likely to be the ones who make the learners develop negative perceptions towards the learning of mathematics thereby impacting on the performance of the learners negatively.

Michael (2015) recommends that video recording, various mathematical teaching concepts and techniques can improve the teaching and learning of Mathematics. Mbugua et al. (2012) take a firm stand that mathematics performance of learners can be improved by making sure that teachers working conditions are improved, teaching and learning materials are provided, curriculum,

motivation and attitudes. On the other hand, Gitaari et al. (2013) postulated that, ways of improving performance of students in mathematics include creation of positive attitude towards mathematics, administering of more examinations and quizzes, provision of adequate teaching and learning materials, motivation, completion of the syllabus on time, provision of adequately trained mathematics teachers, using variety of teaching methods as well as monitoring of lesson by the school administration. Care and Amukowa (2013) assert that the provision of instructional materials, library, laboratory and other physical facilities, developing good rapport with parents by the head teachers, reducing students and teacher ratio of manageable size are some of the ways of improving performance in mathematics.

Methodology

The study used a mixed methodology through the use of the survey design and a descriptive exploratory research design. The study used an in-depth face to face interview with nine teachers and seven learners in Katima Mulilo circuit who were selected through purposeful sampling strategy. The study also made use of a closed ended questionnaire which was administered to 120 participants (teachers and learners) who were selected through stratified random sampling. This study followed a mixed methods approach design by using a quantitative descriptive survey method which is in the form of a questionnaire and a qualitative research strategy where interviews were used in order to describe and explore the factors that affect teaching and learning of mathematics at junior secondary school level. The qualitative dimension of the study utilized a descriptive exploratory research method, while the quantitative dimension of the study used the survey method. Cresswell (2017) identifies two types of mixed methods research designs which are the convergent parallel and the explanatory sequential method. In the convergent parallel method both the qualitative and quantitative methodologies and instruments are administered at the same time, while in the explanatory sequential is administered and the findings are analysed leading to the development of the second method. The current study employed the convergent parallel mixed method where both qualitative and quantitative instruments were administered at the same time to the participants. The targeted population comprised all the 10 junior secondary schools in Katima Mulilo circuit, which they included teachers offering mathematics at junior secondary school level.

The schools were purposely sampled and involved seven grades 8 to10 classes (2 grade 8, three grade 9 and two grade 10 learners). Schools were purposely sampled because they were within reach. The participating schools were those schools where learners' poor understanding of mathematics was observed to be low as established from the Examination Reports for 2017 and 2018 academic year. Due to a high number of class sizes, convenience and simple random sampling were used in this study to select participating classes and teachers. Convenience sampling is done in situations where elements are selected based on the fact that they are easily and conveniently available (Maree, 2012). In the current study, nine teachers and seven learners for mathematics were purposefully sampled to participate in the interview. That is the quantitative tool had 120 participants while the qualitative tool had 16 participants. Questionnaires and interviews were used to collect data from learners and teachers on factors affecting the teaching and learning of mathematics in Katima Mulilo circuit, Zambezi region. Firstly, quantitative data was analysed using Microsoft Excel and SPSS and presented in the form of tables, graphs and charts (Creswell, 2012). All the qualitative responses from the teachers and learners in this study was read carefully, codes were identified by the researchers and the identification of subthemes and themes was done, and these themes which emerged in the study were aligned to answer the research questions of the study.

Results and discussion

Theme 1: Factors affecting the teaching and learning of mathematics in Katima Mulilo circuit in Zambezi region

Sub-theme 1.1: Misconceptions

Misconception is a term used to describe deep, intuitive misunderstandings about mathematics. This form when students get an idea in their heads about how something works that makes intuitive sense to them (Chilenje & Mwanza, 2012). This sub-theme provided views of the participants on what a misconception is perceived to be accepted among learners or Mathematics teachers which might be wrong and need to be corrected as such. With regard to this subtheme, one

principal said that *"there is a higher level of misconception among learners that Mathematics is difficult and it cannot be studied"* (Principal 15). Whilst, Teacher 14 indicated that *"the misconception stemmed from early years at primary level where learners could possibly not attain the basic competencies"*. Teacher 13 was of the opinion that "*the culture of fear among learners is hindering their perception to deepen the mathematical philosophy".* In addition, the learners added their voices that some developed negative attitudes towards Mathematics understanding from the teachers as well as peers who discouraged them; "*there is still time I feel like, I will never learn anything mathematics"* (Learner 2). Another learner said that *"I have encountered many challenges with Mathematics subject since my primary education, sometimes I feel like it is not my favourite subject at all"* (Learner 8).

Sub-theme 1.2: Lack of teaching and learning materials

This sub-theme provided the responses from the participants on the lack of teaching and learning materials. Participants believed that teaching and learning materials were some of the factors that have contributed to poor performance in Mathematics at Grade 8-10 level. Almost every participant narrates their own experiences of the situation at their school. Although schools may differ in their needs and wants in terms of teaching and learning materials there are general patterns of similarities. For instance, almost every participant alluded to the need to have a functional computer lab where learners engage themselves with internet sources where they can learn a lot and discover simpler methods of approach in calculations. One of the teacher participants added that *"sometimes I feel like the school is not exposing us to more supportive learning material like computer games, reading more books with challenging Mathematical calculations all the school provided with a library"* (Teacher 2). Teacher 12 also commented that *"our school need new facilities like library, computer lab and to acquire new books as reference materials"*. Whereas, Teacher 15 said that *"it will be more appropriate if a fund for the school library, science lab and computer lab can be secured than our school will be fully equipped"*. In addition, Teacher 12 expressed the view that *"to some certain degrees some teachers misinterpret the syllabus, give less practical activities".* In the same vein, Principal 16 was of the same opinion to say that *"whenever she goes for classroom observation teachers sometimes are found with no daily preparation"*. As a result of teachers' unpreparedness in some extreme cases where learners still lack basic skills of Mathematical calculations can contribute immensely to poor performance. Teacher 14 revealed that "*poor performance in Mathematics is fuelled by lack of supervision and monitoring of mathematics and that, bad attitudes are observed by teachers".*

Sub-theme 1.3: Teachers qualifications and work experiences

This sub-theme provided the views of the participants on qualifications and work experience that could be the factor contributing to poor performance of learners (Channon, Smith, Head, Macrae, & Chasakara, 2003). Participants were of the view that, qualifications and work experience determined the competency of the teacher to perform as expected. The reviewed literature reviewed also revealed that teachers with higher qualifications and teaching experiences boost performances in Mathematics (Dhillon & Wanjiru, 2013). According to Teacher 13, *"teachers must challenge themselves with new skills and knowledge to be able to provide a better technique in teaching learners Mathematics at an advanced level*". This fact was further strengthened by Teacher 15 who indicated that *"sometimes, their problem is the weakness of inexperienced teachers to approach well experienced teachers in the field of Maths and Science to tap from their wisdom and their pedagogical approaches".* Learner 7 indicated that *"sometimes I have a tendency to question whether our teacher really understands the contents for Mathematics. Or even ask myself why almost half of the class is still struggling"*. Teacher 14 commented that "*the more the teacher gives easy work, the fewer learners feel challenged to grow mentally in most cases it creates doubts whether such teacher has received adequate training before qualifying to be a professional teacher".* While Teacher 14 opined that "*sometimes poor performance in Mathematics is caused due to lack of pedagogical skills by the teachers, to demonstrate higher order of thinking capacity that infuse critical thinking among learners themselves".*

Sub-theme 1.4: Poor learner discipline

This sub-theme provided verbatim expressions by participants on learners' indiscipline in school as well as to a lesser extent at home and how it affects or influences learning. Teacher 15 and literature reviewed revealed that barriers to learning are largely too contributed by lack of discipline among learners (Geoge, 2014). A learning environment becomes more favourable when the teacher has disciplined learners. Absenteeism, social problems, misbehaviour while the teacher is teaching, these are some of the common indiscipline that leads to poor performance as identified by the teacher, principals and learners' participants. Principal 15 also indicated that *"dealing with indiscipline decisively creates an aura of harmony between the staff members and learners*". And Principal 16 mentioned that *"in the past discipline of learners used not to be the problem since many of the learners were fearful of the authority and power that learners have towards teachers*". Whereas, Principal 15 stated that *"this is not the case today, since many of our learners misbehave starting from home, disrespecting their parents and then when they come to school they do not longer fear teachers".*

Sub-theme 1.5: Teachers high workloads

Workloads are some of the factors that continue overburdening the teachers especially when they work in an environment that is overcrowded and not conducive. Participants in the study had these to say about workloads. Teacher 11 argued that *"sometimes when you give a lot of activities to the learners it is your responsibility as a teacher to mark learners' activities and provide them with feedback this take up a lot of time because a class might be crowded"*. On this note Teacher 12 said that "*teachers should not be overburdened with a lot of administration work but their focus should about the teaching facts as well be there to give compensatory lessons to learners"*. This was echoed by Teacher 13 who noted that "*workload has killed the motivation and the appetite for teachers to be focused"*. On this note, Teacher 14 indicated that "*it is critically important teachers plan effectively and efficiently for time on task and so that time management cannot be ruled out"*.

Theme 2: Effects of poor performance by learners in Mathematics at JSC

This theme discusses and provides empirical evidence of the effects of poor performance by learners in Mathematics at Grade 8-10 level. Similarly, the views of the participants confirmed that indeed there is lack of interest in learning Mathematics as such teachers should instil and motivate learners to do better in Mathematics. Some participants responded to the issue as follows: For instance, Teacher 11 said that *"learners developed phobia for Mathematical challenges that they are exposed to everyday. Therefore, they are losing interest in this school"*. Learner 6 added that *"teamwork is not fully utilised as result, cooperative learning is not taking place in Mathematics lessons*". However, Principal 16 indicated that *"I observed several lessons for Mathematics teachers and made a number of recommendations on how they can enhance their teaching to be better; however, teachers do not consider the inputs. As a result, learners are repeatedly failing. This kind of attitudes has led to even some learners losing faith in the teachers' approach"*. On the other hand, Teacher 13 stressed that *"there is seems to be no proper teamwork in the department which created disunity and fall from grace to disgraceful results"*. In addition, Teacher 9 stated that *"there are some of us who are fully committed to do better, however some learners with negative attitudes are giving us bad influence"*. Furthermore, Teacher 13 recalled that "*whenever a learner repeats a subject there is negative feeling developing in such a learner which drastically makes a learner lose interest in learning*". Most significantly, Teacher 13 echoed the views of other participants by saying that *"when the performance going down, it forces more and more researches to be conducted in order to get to the bottom of the root cause".* According to Learner 2, *"if learners continue to perform poorly they start to develop a negative mind-set"*.

Sub-theme 2.1: Withdrawal of interest to learn Mathematics

Under this sub-theme, a comprehensive discussion centred on withdrawal of interest to learn Mathematics by learners. Participants were of the view that fear is the main problem as the students start to dislike mathematics and even went to an extent of disliking the mathematics teacher which eventually led learners to lose confidence and withdraw from the teaching and learning of mathematics. The participants' responses regarding the learners' withdrawal from mathematics as a school subject are indicated below. Principal 15

opined that "*since Maths is tough from Grade 1-12, as a compulsory subject it brought some fear into learners who are not good with numbers; they start to have negative feelings of withdrawal and would never want a pass"*. This was supported by Teacher 13 who added that *"students have withdrawn their interest to discover, explore and investigate anything that has to do with quantities just because of fear and being afraid to be labelled".* Teacher 12 also had this to say *"when a learner starts to withdrawal they no longer have the capacity show eager, motivated, resilient and determined to learn*".

Sub-theme 2.2: Psychological impact on learners

This sub-theme provided comprehensive details of the psychological impact on children if learners continuously failed the subject. Mathematics being a requirement in some courses at tertiary level, it will not be appropriate if learners' foundation is not fully concretized or reinforced with best pedagogical approaches to remedy their performance in mathematics (Carrell & Hoekstra, 2009). Teacher 15 offered alternative approaches to restore learners' ego by stating that *"the overall performance of the learner is affected; learners may develop the notion that they are not good in Mathematics, leaners may not be able to choose career of their choice if they do not pass mathematics"*. Accordingly, Learner 6 indicated that *"in most cases whenever learners have failed a task, it leads to completely withdrawal which results in a learner being rebellious to carry out with correction"*. Whereas, a brilliant answer from Learner 8 was that *"it has a psychological effect sometimes when a learner gets stuck with Mathematics he/she can develop hate feelings towards the teacher, eventually when the learner starts to dislike the teacher, it multiply into disliking the subject as well"*.

Sub-theme 2.3: Emotional negative effects on the learners

Beneath, is the discussion about emotional negative effects, the participants elucidated that the main effects of negative emotions are that it leads to poor performance. The main concern here is also the poor interpersonal relationships among learners themselves (Osaki, 2007). Geoge (2014) and Khalid and Mehmood (2017) reiterate that learners' emotions and its effects affect learners' performance. Some responses of participants on the issue were that *"the culture in Mathematical domain of learning should be maintained to distil fear so that learners accept the right of attitudes for best learning practices"* (Principal 15). According to Teacher 13, *"learners seem not to be prepared mentally and physically to challenge the intellectual capacity"*. And *"when I reflect back at the lesson, I question learners' fear so much. I create a scene at the back of mind to try to find a solution to their problems but it seems to be insurmountable*" (Principal 15). Poor interpersonal relationship will start to develop, poor performing learners will feel isolated, rejected, dumped and eventually withdraw completely from the task as Principal 15 elaborated that *"when one become emotional, it causes depression and stress to both the learner and the parents or parent"*. On the other hand, *"emotional intelligence is what most learners need to learn in order to associate with others and due to withdrawal* (Teacher 13).

Enrolment of learners at school has been always a subject of contention for sometimes now. Therefore, when it comes to the decrease in enrolment, the root cause of this is drop outs (Dhillon & Wanjiru, 2013). The views of the various participants on the issue were as follows as Learner 1 remarked that *"learners are losing interest in Mathematics because they failed in numerous topics that they attempted"*. Learner 2 narrated that *"sometimes I felt giving up on learning Mathematics because all along with my friends and classmate always talk of Mathematics as a difficult subject"*. Teacher 14 opined that *"the problem with Mathematics is that, most of my classmates do not perform well, they are demotivated to learn. Again, there are times when some withdraw from group work activities"*. Learner 7 stressed that *"some learners are not progressing to the next grade because they either fail Mathematics or English and these subjects are compulsory in calculating the minimum required points for one to be promoted to the next grade. As a result, these have led to most learners dropping out of school"*.

Strategies that can be used to improve the teaching and learning of mathematics in junior secondary schools in the Zambezi region in Namibia

Improving on parental involvement

Parental involvement means the participation of parents in regular, two-way, meaningful communication involving student academic learning and other school. This including ensuring that parents play an integral role in assisting their child with learning activities (Dhillon & Wanjiru, 2013).

Parental involvement not only enhances academic performance, but it also has a positive influence on student attitude and behaviour. A parent's interest and encouragement in a child's education can affect the child's attitude toward school, classroom conduct, self-esteem, absenteeism, and motivation (Hamukoto, 2016). Parents can support their children's schooling by attending school functions and responding to school obligations (parent-teacher conferences, for example).

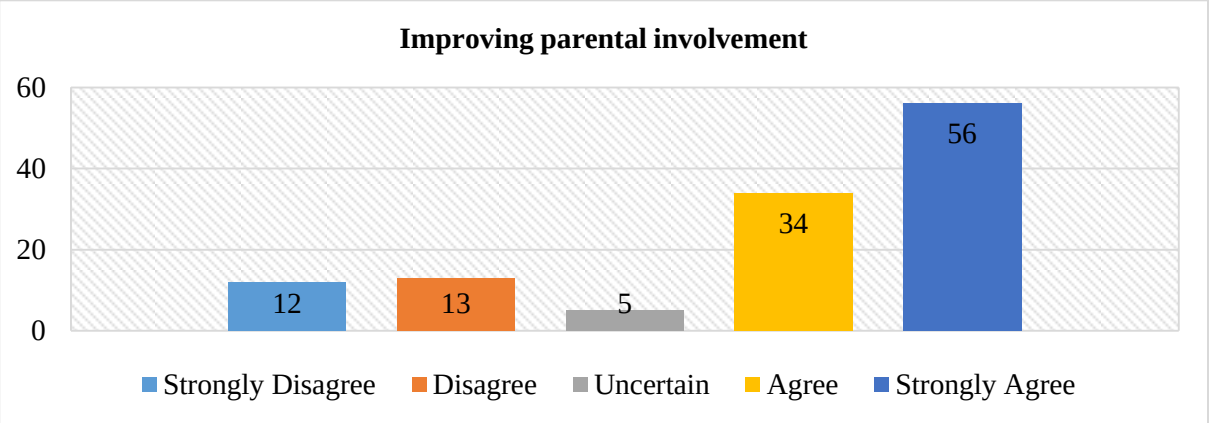

Figure 1: Improving parental involvement

Figure 1 shows that 56 learner participants strongly agree that improving parental involvement in the teaching and learning will improve the learners' performance, 34 agree, 13 disagree, 12 strongly disagree, five were uncertain about this assertion. After combining the responses (agree and strongly agree, then disagree and strongly disagree), it was found that 90 learners agreed while 25 disagreed. On the issue of parental involvement, Ernest (2009) noted that many parents have almost handed over their parental role/responsibilities to the teachers and school authorities forgetting that the school alone cannot be able to provide all the necessary support to the learners without the involvement of the parents. A school that creates a good networking between the teachers and parents on a one-on-one mutual agreement contract become more involved in helping their children improve their school work by providing encouragement, arranging for appropriate study time and space, modelling desired behaviours (such as reading for pleasure), monitoring homework, and actively tutoring their children at home. Parental involvement in their children's education appears to be a constant in children's academic achievement and social adjustment (Joel & Ruhan, 2006).

Improving syllabus coverage

The well-designed syllabus provides a solid beginning to the semester, sets the tone for the course, provides a conceptual framework for the course, serves as a "virtual handshake" between the instructor and students, and becomes a resource that is referred to over the course of the semester (Chilenje & Mwanza, 2012). Since the syllabus guides the content that has to be taught, this means that teachers need to make sure that the whole syllabus content is covered and as such, time needs to be availed to make sure that the intended content is fully covered (Crossman, 2019).

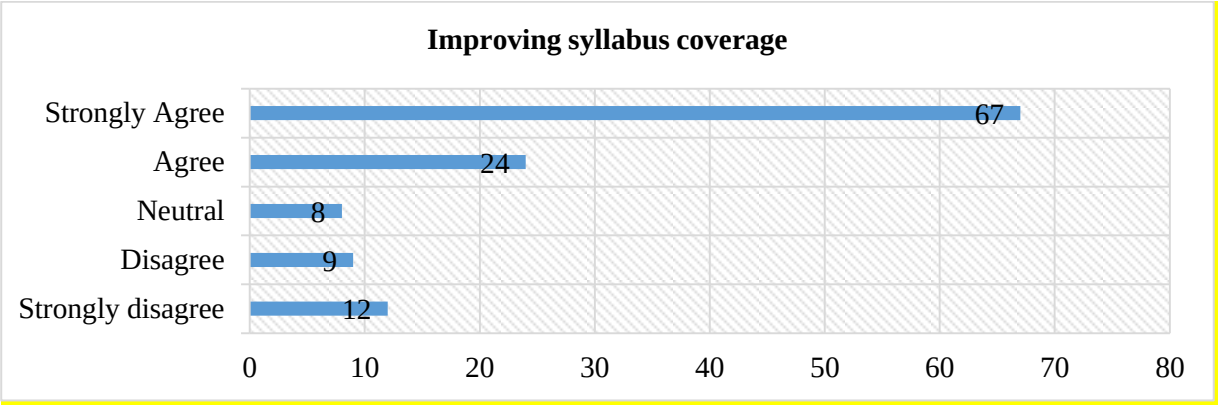

Figure 2: Improving syllabus coverage

After the responses were combined (agree and strongly agree, then disagree and strongly disagree), Figure 2 shows that 91 of the participants agreed and 21 disagreed with the statement of improving syllabus coverage would improve the teaching and learning of mathematics in the Katima Mulilo circuit among the Grade 8-10 learners. These findings support the findings by Even and Bruckheimer (2017) who indicated that the syllabus is an important ministerial document that guides how competencies and learning objectives of Mathematics can be achieved through teaching the right subject content as prescribed by the National Curriculum for Basic Education (NCBE). Syllabus completion is a key important factor in fulfilling the curriculum intents, objectives as well as making sure that learners achieve their basic competencies/learning objectives as set out in the syllabus for Mathematics for junior secondary school. On this note, Brodie (2013) recommends that teachers should plan well, cater for the slow learners, learners with challenges in the teaching and learning of mathematics should set up plan or program for holiday classes, evaluate and reflect whether they are on the right track. The most critical component is that many learners have developed phobia for Mathematics because of the pressure and the stress they have on the process of learning Mathematics topics at the pace outlined in the scheme of work and the syllabus and the inadequacies of time and attention given to learn (Brodie, 2013; Chirimbana, 2014).

Changing teaching strategies

Strategies promote flexible thinking, encourage independent learning and teach students the importance of shifting their approaches to different tasks (Ganaprakasam & Karunaharan, 2020). Students need to understand their own learning profiles and needs as learners and to recognize how and why strategies can help them attain academic success (Even & Bruckheimer, 2004).

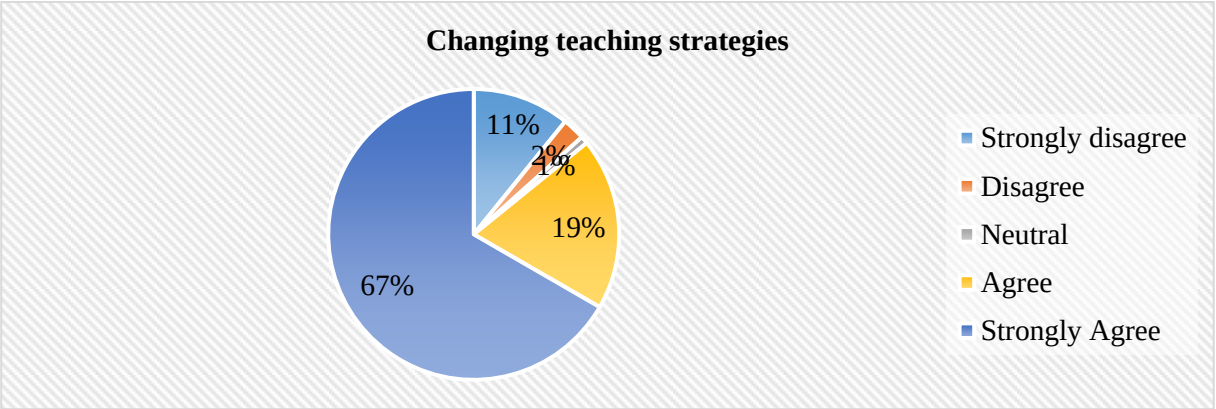

Figure 3: Changing teaching strategies

Figure 3 shows that 67% of the participants strongly agreed that changing teaching strategies would help improving the teaching and learning of Mathematics at Grade 8-10 level in Katima Mulilo circuit, 19% agreed, 11% strongly disagreed, two percent disagreed and one percent was neutral. After these responses were combined (agree and strongly

agree, then disagree and strongly disagree), it was found that 83% agreed and 13% disagreed. These findings substantiate the findings by Miranda, Nakashole, and Chirimbana (2013) who indicated that the use of different teaching strategies help to capture the learners various and diverse learning strategies. Miranda et al. (2013) further argue that the school must come up with Mathematics Clubs that brings learners together to compete when the teachers organize Maths games and competitions and that the schools within the circuit should organize a Mathematics symposium whereby learners can be taught for a period of time during the holidays. This should particularly involve learners who are struggling most of the time.

Improving learner motivation strategies

Motivation is described as a state that energizes, directs and sustains behaviour. Motivation involves goals and requires activity. Goals provide the impetus for and the direction of action, while action entails effort: persistence in order to sustain an activity for a long period of time (Geoge, 2014). There are recognised indices of motivation that are important to be aware of. Indices typically place a value or quantity on an idea; in this case, we can understand the value or quantity of motivation for an individual by these four indices (Himonga, 2018).

Motivation impacts the desired effect of learning by the student, including goals, effort, persistence, and performance. The importance of motivation in an educational environment can be characterized by indices that are fuelled by situational motivation wherein the learner is already partial to specific subject matter.

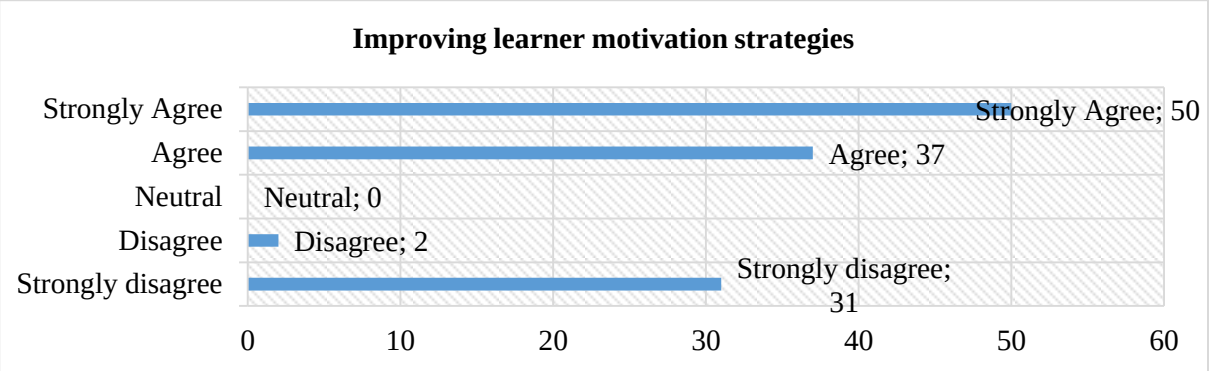

Figure 4: Improving learner motivation strategies

Figure 4 shows that 50 participants strongly agreed that improving learner motivation strategies would improve the teaching and learning of mathematics; whereas, 37 agreed, 50 strongly disagreed, and two disagreed. After putting these responses together (agree and strongly agree, then disagree and strongly disagree) it was found that 87 of the participants agreed while 33 disagreed. These findings are in support of the findings by Chirimbana (2013) which demonstrated the importance of the domains of motivational orientations, self-regulated learning strategies, and social/interpersonal abilities in facilitating academic performance. Chirimbana (2013) further reported that students who became more self-aware and confident regarding their learning abilities, who were more motivated, who set learning goals, and who were organized in their approach to work (self-regulated learning) performed better in schools.

Improving learner behaviours

Behaviour learning is linked to improved social language, better communication skills, and more peer interaction or social play. On the academic side, autistic children can develop greater focus, increased class participation, and enhanced motor development (Channon, Smith, Head, Macrae, & Chasakara, 2003). Learning Behaviour emphasises the crucial link between the way in which children and young people learn and their social knowledge and behaviour. In doing this the focus is upon establishing positive relationships across three elements of self, others and curriculum (Geoge, 2014).

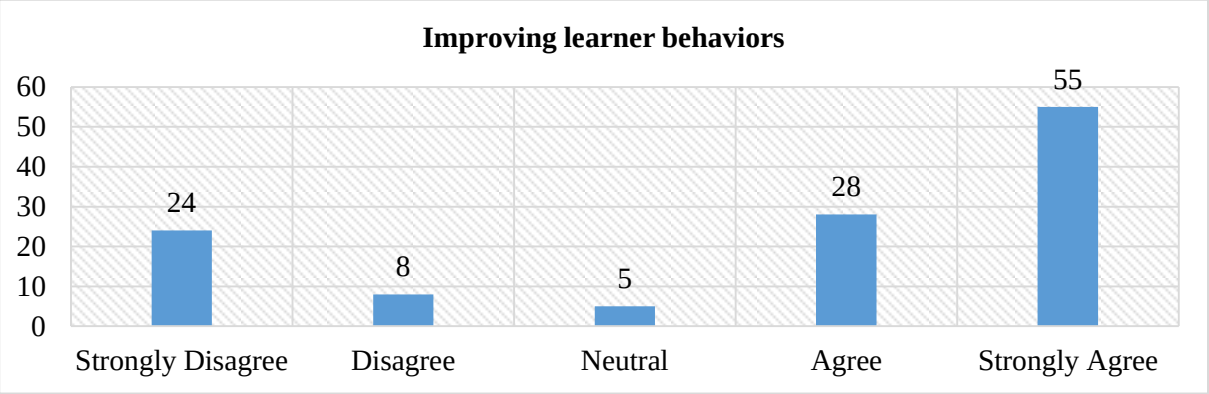

Figure 5: Improving learner behaviours

Figure 5 shows that 55 learners strongly agreed that improving learner behaviours would improve the teaching and learning of mathematics. After the responses were combined (agree and strongly agreed, then disagreed and strongly disagreed) the study found that 83 participants agreed and 32 disagreed to the statement. These findings are in agreement with the views of Han and Carpenter (2014) who claimed that attitudes which are negative towards mathematics will always make learners fail to perform well in mathematics. On this note, Chirimbana (2014) argues that learners feeling confident in doing mathematics are linked with being successful in mathematics, which is regarded as a positive behaviour. This issue is further supported by Baldirstone (2000) who indicated that when students are not confident in doing mathematics, they may not experience success, and unsuccessful behaviour is regarded as negative feelings.

Provision of more teaching resources

A teaching resource is a material that is designed to help facilitate learning and knowledge acquisition (Bécares, 2015). The purpose and importance of teaching and learning materials is to make lessons interesting, learning easy and enable teachers to easily express concepts. Learning materials can significantly increase learners' achievement by supporting learning (Geoge, 2014).

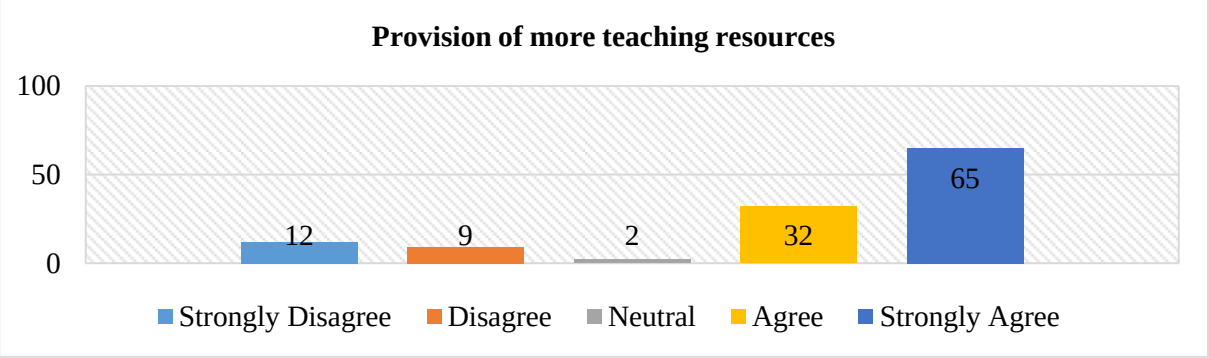

Figure 6: Provision of more teaching resources

Figure 6 shows that 65 participants strongly agreed that provision of more teaching resources would mitigate on the predicaments encountered in the teaching and learning challenges in mathematics in Katima Mulilo circuit. The study established that 97 participants agreed and 21 disagreed with the statement. These findings validate the findings of Ernest (2019) who indicated that teaching resources are needed in the teaching of mathematics if successful teaching and learning is to be achieved. On this note, Chirimbana (2014) argued that most schools in Namibia are under resourced and this could be one of the main factors contributing to learners' poor performances in schools.

Overall ranking of the recommendations for improving teaching and learning in Katima Mulilo circuit

The study established the overall ratings of the various factors affecting the teaching and learning of Mathematics in Katima Mulilo circuit in Zambezi Region. The table below gives the results on this aspect.

Table 1: Overall ranking of the recommendations for improving teaching and learning in Katima Mulilo circuit

Recommendation	Agree	Disagree	Rank
Improving on parental involvement	90	25	3
Improving syllabus coverage periods	91	21	2
Changing teaching strategies	84	13	5
Improving learner motivation strategies	87	33	4
Improving on learner behaviours	83	32	6
Provision of more teaching resources	97	21	1

Table 1 shows that the commonest recommendation was the provision of the teaching and learning resources (1) followed by the improvement of syllabus coverage (2), improvement on parental involvement (3), improving learner (4), motivation strategies in the teaching and learning of mathematics (4), improving teaching strategies for mathematics (5) and finally improving learners' behaviours in the teaching of mathematics (6).

Discussion of the results

The findings in the study support the findings by Baldirstone (2019) who attributed poor performance in mathematics to parental attitude, interrupted teaching, poor teaching and miscalculate. Furthermore, more misconception surrounding understanding mathematical concepts remain a terrain of fear as some participants expressed that, poor/low understanding will demoralize many learners to learn. The findings also uphold the findings of Brodie (2013) who pointed out that, lack of meaningful libraries and laboratories qualified teachers, home environmental factors and family backgrounds as well as little participation of parents in the education of their children as the main causes of poor performance in mathematics. In support of this view, Chirimbana (2013) attributed poor performance in mathematics to parental attitude, interrupted teaching, indiscipline and poor teaching. The study findings also corroborate with the findings by Collins (2020) who pointed out that lack of meaningful library and laboratory, qualified teachers, home environmental factors and family backgrounds as well as little participation of parents in the education of their children were the main causes of poor performance in mathematics. Most participants further indicated that, to build a strong foundation in mathematics, schools do not possess the following; libraries, mathematics laboratories, lack of teaching games and mathematical sets. Even and Bruckheimer (2017) argues that teacher knowledge is supreme and repeatedly discussed as being encompassed of three elements: content knowledge, pedagogical knowledge, and didactical knowledge.

Furthermore, Joel and Ruhan (2006) explicate that content knowledge pertains to mathematical concepts, use of mathematical techniques, mathematical reasoning, proof, and so forth. Pedagogical knowledge is subject independent and deals with general principles of education, such as theories of learning; sociological, psychological, and ethical aspects of education and its functions (Baldirstone, 2000). Chirimbana (2013) states that it is important for teachers to be highly trained and skilled to enable them demonstrate didactical knowledge that shape conditions and ways of mathematics teaching and learning. But, the main challenge is whether teachers are well equipped to give relevant knowledge and skills in mathematics. The findings of the study are in line with the findings of Channon et al. (2003) who stated that best performing teachers in mathematics should share their strategies.

Conclusion

This study revealed that misconceptions on the part of the learners are some of the factors affecting the teaching and learning of mathematics in Katima Mulilo circuit. In addition, the study established that there is lack

of adequate teaching materials and resources which also affect the teaching and learning of mathematics. The study also revealed that low teacher qualifications and low working experience in the teaching and learning of mathematics affect the success of the learners in mathematics in Katima Mulilo circuit. Apart from that the study also found that poor learners' discipline affects the success of learners in mathematics. In terms of availability of teaching and learning materials, learners share books in the ratio 1:10. Results obtained through observations and interviews indicate that, learners in most of the schools change to other classes to borrow books in order for them to do class, assignments and home work.

The study also revealed that there are several effects of the factors that affecting the teaching and learning of mathematics in Katima Mulilo circuit. The study found that learners in Katima Mulilo are withdrawing from mathematics and from school as a result of not achieving any successes in mathematics. In addition, the study found that these factors are the leading causes of the currently faced negative emotional effects in mathematics teaching and learning. More so, the study found that these factors lead to decreased learner enrolments in schools in Katima Mulilo and are also contributing to some of the currently experienced challenges in the teaching and learning of mathematics.

Recommendations

The study recommends that the provision of the teaching and learning resources need to be done in Katima Mulilo circuit in order to improve the teaching and learning of mathematics. In addition, the study also recommends that the improvement of syllabus coverage would also make an impact on improving the teaching and learning of mathematics in Katima Mulilo circuit. The study also recommends that improvement of parental involvement in their children's education would also improve the teaching and learning of mathematics in Katima Mulilo circuit. The study also recommends that improving learner motivation strategies in the teaching and learning of mathematics would improve the teaching and learning of mathematics. Finally, the study recommends that improving learners' behaviours in the teaching of mathematics would ultimately improve students' performance in mathematics.

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