

# Factors Leading To `Unsatisfactory Performance of Pupils in Mathematics at Grade 9 And 12: A Case of Three Selected Districts in Eastern Province of Zambia.

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**Abstract:** This research study focused on establishing the reasons behind the unsatisfactory performance of learners in mathematics at Grade 9 and 12 in three Districts namely Lundazi, Lumezi and Chasefu. This was premised against a background where on a national level, performance in mathematics had been marked by very poor results. It was against this background that the researcher sought to establish the reasons why performance in the selected schools of Eastern province were unsatisfactory with a view to getting answers that would help addressing the situation. The study utilised a descriptive survey design as it was considered as the most suitable research design. The term survey designated any research activity in which the researcher gathered data from a portion of a population for the purpose of examining the characteristics, opinions or intentions of that population. The findings revealed that negative attitudes, lack of teaching materials and crowding in classes were the biggest challenges that led to unsatisfactory performance in Mathematics.

**Key Words:** Performance, Attitude, Stems, Quantity, Availability, poor, ZAME, Motivate, Overcrowding.

## I) INTRODUCTION

Mathematics was one area that plays a significant role in the development of science and technology in any country. This subject stands at the centre of progress in any country's development trajectory. Mathematics was seen by society as the foundation of scientific and technological knowledge that was critical in social- economic development of the nation. This being the reason, Mathematics was a compulsory subject at both primary and secondary levels in Zambia like many other countries in the world. Mathematics was also used as a basic entry requirement into any of the prestigious courses such as medicine, architecture and engineering among other degree programmes. Despite the important role that Mathematics plays in society, there had always been poor performance in the subject at national examinations (MOE, 2003).

ZAME (2019) in Solwezi asserted that mathematical demanded on learners to increases as their progress through school and took up their adult lives at home and in the workplace. In order to function in a mathematically literate way in the future, students ought to have a strong foundation in mathematics. A strong foundation involved much more than the rote

application of procedural knowledge. Students needed be able to understand, make sense of, and apply mathematics; make connections between concepts and see patterns throughout in mathematics. Students must be able to communicate their reasoning, the flexibility of thinking that allowed them to tackle new areas of mathematics and be willing to continue in doing mathematics (Ministry of education report, 2004). Studies had shown that there was a relationship between performance of learners in mathematics and their attitudes towards the subject itself. This situation was further accentuated by factors such as cultural background of learners, availability of learning materials, personal characteristics, teachers' attitudes and teacher qualifications in handling mathematics classes.

It should suffice to mention that performance in mathematics hinges on many factors such as teaching and learning methods that the learners were predisposed to. Teaching methods were such as teacher centred method, students' centred method and type of homework assignments offered to students. Learning methods such as group discussions when solving problems and individual work as provided by the teacher or as in textbooks. The relationship between teachers and students, the way students were punished and homework assignments tend to influence student's performance in mathematics (MOE report, 2013). The learning environments also play a critical role in determining the performance of learners in mathematics. The most pronounced factor that influenced teaching and learning of mathematics was attitude. According to Olatunde (2009) attitude was a concept that was concerned with an individual's way of thinking, acting and behaving. Attitude had very serious implications for the learner, the teacher, the immediate social group with that the individual

learner related and the entire school system. This was very true especially when the attitude towards something was negative and pessimistic. Attitudes were formed as a result of some kind of learning experiences and had also been learned simply by following the examples or opinion of teachers, parents and learning situation.

In Zambia today, mathematics stands as a basic requirement for entry into tertiary education. This being the case, mathematics was a compulsory subject from primary school through to secondary school. Poor results in mathematics had characterised results at Grade seven, Grade Nine and Twelve. This being the trend, many programmes to improve the fortunes in Mathematics had been hatched in the Ministry of Education from way back. For instance, in a quest to improve performance and teaching of mathematics, there was a programme under the Ministry of Education as late as in 1996 called Action to improve English, Mathematics and Science (AIEMS). This programme saw the establishment of teacher resource Centres in all the provincial centres of Zambia where teachers would meet and brain storm ideas and come up with effective ways of improving performance in the three subject areas using local resources (MOE, 2012).

In 2019, the Ministry of General Education came up with yet another effort in order to improve mathematics where certain schools have been turned in what is termed STEM schools. This stands for Science, Technology, Engineering and Mathematics schools. This programme was introduced in a few selected technical secondary schools in each Province with a view to improve the above stated areas. Mathematics was a very important subject in the Zambian education system, since it helped in imparting relevant skills for technological development or in the promotion of creative and

critical abilities. Fatima (2012) affirmed this assertion by citing an English Franciscan Friar, Philosopher, Scientist and scholar of the 13th century Roger Bacon (1214-1294) who in his wisdom argued that “neglect of mathematics works was an injury to all knowledge, since he who was ignorant of it could not know the other sciences or the things of the world.” Despite this being the case, the Examinations Council of Zambia (ECZ) (2016) report indicated that the performance of learners in mathematics countrywide had continued deteriorating. For instance, the Performance in mathematics in Zambian secondary schools had been poor at Grade 9 and 12.

**Table 1: The percentage performance in Eastern Province Grade Twelve mathematics.**

YEAR	Percentage of candidates with Grade distinction to credit (1 to 6)	Percentage of candidates with Satisfactory score (7 and 8)	Failed completely
2015	48%	12%	40%
2016	46%	16%	38%
2017	35%	20%	45%
2018	47%	14%	39%
2019	49%	16%	35%

**Source: Chipata District Examination Analyses 2015 to 2019**

The above table show the aggregate performance percentages in Mathematics in Eastern Province. It was seen that the failure rate was quite high in mathematics and there was need to be concerned. Suffice to mention, the importance of mathematics worldwide could not be overemphasised as it was one of the subjects that had a direct implication and

application to all business related, science and engineering programmes in post-secondary school education programmes. The lack of people who were well grounded in mathematics implied the lack of effective scientists, engineers and economists in the country in the near future. Despite the importance of mathematics in human life, several studies done in Zambia by scholars such as; Mwape and Musonda (2014), Kafata and Mbetwa (2016), ECZ (2012, 2016) and Sakayombo (2018) as well as studies that had been done outside Zambia by Mbugua et al., (2012), Mutai (2010) as well as Yara and Otieno (2010) had all indicated that learner performance in mathematics was poor. It was against this backdrop that the researcher sought to find out the factors that were leading to unsatisfactory performance in Mathematics in secondary school in three selected districts in Eastern Province, Zambia.

## II) LITERATURE REVIEW

The theory guiding this study was the Social Learning Theory of Albert Bandura as cited by Pajares and Schunk (2001). The theory explained that forces that influence one to behave in a certain way, in this case the influences that changed the learners’ and teachers’ attitudes to be either positive or negative towards Mathematics curriculum. The theory explained that human behavioural patterns were occasioned by reciprocal determinism that involved behavioural, cognitive, and environmental factors. Contemporary psychologists were in tandem on the point that attitudes were vital due to the fact that they acted as directive factors in daily endeavours of mankind. According to Jung (2006) the basic work of attitudes was to give some form of organization of the universe we exist in. Moreover, attitudes act as standards that tend to assist human beings to understand the world. Both the students and teachers were always forming certain opinion in regard to the tasks head of them. Mathematics had

therefore been viewed either negatively or positively and this determined the level of success in the task to be undertaken.

Bandura's self-efficacy theory asserted that people tend to judge their own capabilities to accomplish certain levels of performance in any undertaking. Bandura (1997) had defined self-efficacy as one's belief in one's ability to succeed in specific situations. Luszczynska and Schwarzer (2005) point out that one's sense of self-efficacy play a major role in how one approaches goals, and challenges particularly when handling Mathematics tasks. Understanding the mechanisms in Bandura's theory that determined perceived self-efficacy judgment was important. This reflected and shed some light when trying to understand students/teachers' attitude towards Mathematics curriculum and contributing reasons. The beliefs of personal efficacy influenced the time one spends on each concept taught in Mathematics. For instance, one was likely to spend more time to learn/teach algebra and ignore vectors if self-efficacy was higher in algebra than vectors. Maganga (2013) asserted that philosophers like Plato and Socrates held that children had knowledge of geometry prior to birth. This was referred to as priority that was one of strength point that teacher needed to tap into by arousing the children to build on it through exposure to questions and experiences that would eventually build on this knowledge. The implication of this was that students could become good at mathematics as teachers gave those more questions to awaken their knowledge and understanding on mathematics concepts already embedded in them naturally. It was premised on the declaration that ideas existed in children's mind even before their birth. Such knowledge was termed a priority, that meant that knowledge came prior to and independent of any experience (Maganga, 2013). Teachers ought to keep in mind that their learners

had concepts or ideas that they should help them harness, develop and cultivate in their experience as they immerse them in any given module or topic of study.

The other theory that had influenced this research study was the philosophy of Paulo Freire in his Pedagogy of the Oppressed. This was a theory that premised on the ground that learners should be exposed to learning experiences that were in line with the daily experiences of the learners so that they relate to them. This was also one area that the researcher wished to find out if the unsatisfactory performance in mathematics could be related to the point that learners fail to relate mathematics to their daily experiences and way of life in line with problem solving in day-to-day life. This was where banking education was not advocated for but rather where learners should be able to reliably relate their experiences through a dialogic experience. Maganga (2013) asserted that Freire was insisting on the use of dialogue method whereby teachers discussed with their students about their learning environments. The methods involved students discussing together or conversing, rather than using written books and syllabuses in a curriculum of study as what Paul Freire called banking education. Banking system of education was one where teachers deposited knowledge to the students. Banking education was a relationship of domination in which the teacher had knowledge that s/he deposited in the heads of the passive objects who happened to be his/her learners. Contrary to banking education, Freire proposed a problem posing education that encouraged students to become active in thinking. Problem posing education relied upon dialogue and critical consciousness, democratic teacher-student relationships, the concretization of knowledge through interaction, and a curriculum grounded in students' interests and experiences (Bartlet, 2008).

This was what was established by this research study to ascertain whether the poor results in Mathematics attributed to the banking type of education where the teachers belabour to pump knowledge in learners in a dominating way while learners take a passive role and absorb the knowledge being banked. It was in the interest of this research study to find out whether teachers in class had an attitude where they discuss mathematics concepts with learners in class to help them understand clearly and learners take an active role in their learning.

Another theoretical approach that had a bearing on this research study is Vygotsky's sociocultural theory. Lev Vygotsky's sociocultural theory maintained that children's knowledge was socially constructed. Children's acquisition of their culture's values, beliefs, and problem-solving strategies was in response to social interaction with more knowledgeable members of society. This could be applicable to Mathematics in secondary schools that were sociocultural contexts. Vygotsky devised the concept, the zone of proximal development to include the range of tasks that were too complex to be mastered independently by a child but can be accomplished with adult guidance or associations with knowledgeable peers. By introducing the influence of social environment, Vygotsky made a significant contribution to our understanding of children's development. It was hoped that this research study ascertained whether the sociocultural environments in the three districts of Eastern Province had a bearing on the performance of the learners vis-à-vis Mathematics.

Smith (2014) asserted that, family background tends to influence student performance in mathematics. It had been identified that students' cultural backgrounds differed and affected students' influences on the study of mathematics. Furthermore,

students from different cultural backgrounds were influenced differently based upon parental experiences, interests in mathematics and cultural views and attitudes of mathematics education. The research by Smith showed that students who study higher-level mathematics were influenced differently as compared to students who were studying lower-level mathematics or opt not to study mathematics at all. According to Sirin (2015), the most stable and consistently observed phenomenon in the realm of education was the impact of learners' home background on achievement. Students whose parents had a higher level of education, a more prestigious occupation, or greater income tend to had higher achievement than students whose parents had a lower standing on such socio-economic status indicators. Thus, an impoverished homestead tends to impact negatively on the academic achievements of children in most cases.

UNESCO (2018), reported that a necessary condition for teachers to teach mathematics was not only to know mathematics but also to be competent in understanding the basic contents, concepts and the associated skills. The teacher ought to know what it meant to do mathematics so as to make students achieve good results in the subject. Teachers needed to consider student's perceptions and the ideas the student brought into the classroom. It was therefore important that teachers should find what their students already know about the concepts or the principles that are to be introduced. The teacher needs to build on what the learners already know so that they can cascade from there to new realms of knowledge and understanding on introduced concepts in Mathematics. S/he should not assume that the learners are blank slates on which to write new knowledge. The study done by Tshabalala and Ncube (2013), showed that student's performance in mathematics was mainly affected by teaching



methods, material resources, teacher behaviour, grounding in the subject at lower levels as well as their fear of the subject. The mediating variables such as attitudes towards mathematics, perceived importance of mathematics and time spent on mathematics homework were influential predictors of student's performance in mathematics.

Another study in Lesotho by Iheanachor (2017) on the influence of teachers' background, professional development and teaching practices on students' achievement in mathematics in Lesotho, have positively associated students' performance in mathematics and teaching methods in mathematics. He revealed that teaching methods, teacher qualifications, subject majors and the years of experience were predictors of students' achievement in mathematics. The study revealed that some mathematics teachers had majored in mathematics or mathematics education and others had majored in professions other than mathematics but employed to teach mathematics. This implied that almost half of the mathematics teachers had not enough mathematics knowledge and skills that affected their teaching methods. The study in Lesotho by Iheanachor (2017) on the influence of teachers' background, professional development and teaching practices on students' achievement in mathematics in Lesotho, have positively associated students' performance in mathematics and teaching methods in mathematics. He revealed that teaching methods, teacher qualifications, subject majors and the years of experience are predictors of students' achievement in mathematics.

Mtutu, (2014), made an assessment on the implementation of learner centred teaching approaches as directed by the 2005 competence-based curriculum. Though his study was specifically in Geography subject, but the method was

recommended to be applied in teaching all subjects including mathematics. However, in this study it was observed that teachers in their teaching practices in classrooms, teachers dominated most of their instructional practices. When teachers assigned students into group activities, effective guidance and facilitation of students' group activities was notably absent.

However, the study made by Ali et al. (2010), came out with findings that problem solving method could help students perform better in mathematics than those taught by traditional method. The methods exposed students to take responsibility of their own with the teacher acting as the facilitator. This resembles to what Mtutu termed as learner centred teaching. Kitta (2004) explored a number of factors that consistently affect performance in mathematics among ordinary level secondary school students in Tanzania. These were such as schools being occupied by unqualified and under qualified teachers that had problems with pedagogical content knowledge and teaching skills. The role of teachers in effective teaching of mathematics is critical in many instances. The National Council of Teachers of Mathematics (2000) also reported that teachers who had mastery of content gave details in their lesson, linked the topic to other topics and most importantly they were able to motivate learners by creating good environment for learning. Ball (2003), contends that a teacher with good mathematical pedagogical content knowledge could break down mathematical knowledge into less polished and abstract forms, thus making it accessible to students who are at different cognitive levels. Through this, interest was created making learners to enjoy the content presented to them and at the same time it may influence a change of attitude as they got attracted to the presentation.

The other problem that faces the learning of Mathematics in secondary thus leading to wanting performance in exams was the methods used by the teacher. There were various viewpoints on the nature of Mathematics. It was asserted that teachers had insight and be resourceful in whatever methods they use. Classroom organization was very important in this case teaching Mathematics. Practical work, investigations, group experiments and individual assignments are required more frequently than the usual 40- or 80-minutes lessons of lecturing. Once these activities are through, it is hoped that overall objectives of positive attitudes and personal social development can be achieved.

Prominence must be given to the students' participation in class discussions. This could be done by allowing one student to demonstrate a concept and others to pay attention to what is said. It can also be done by trying to correct or improve upon the statements made. Wambui (2012), asserts that Mathematics is a complex social activity in the context of the society. He distinguishes between relational and instrumental understanding as far as Mathematics is concerned. Relational understanding includes all descriptions, classifications and understanding the relationship which help to explain the social phenomena. Effective teaching of Mathematics should pay attention to the following, Watson (2016): Facts and skills: facts in this case were the items of information that were essentially unconnected. Examples included conventions, rotations, conversions and factors. Skills included ability to use numbers and computations; Conceptual structures: these were richly inter-connected bodies of knowledge; General strategies: these are procedures, which guide the choice of skills.

A study carried out by Njoroge (2014) on teaching methodology in secondary schools and explained

that, teaching and learning of science and Mathematics had been subject of debate for a long time. Attitude being one of the key components that determined implementation of curriculum, the debate centred on the teaching approach and methodology. They observed that one particular method that brought some dislike of the subject was traditional or teacher centred methods of teaching which results in learners not enjoying lessons and missing the benefits of discovering what they know on their own. This has led to the low achievement in examinations. This was one area that this research study sought to find out in Lundazi, Lumezi and Chasefu Districts of Eastern Province in Zambia. Sentiments echoed by SMASSE (2018) observed that some Mathematics teachers were still using lecture methods and students were given rigidly formulated statements, which they had to memorize and regurgitate when required to do so by the teacher. In addition, little or no emphasis was placed on understanding. This made learners unable to conceptualize what was being taught in class and it led to the formation of negative attitude towards the subject. Bolaji (2015) in a study of the influence of students' attitude towards Mathematics found out that the teachers' method of teaching Mathematics and his personality greatly accounted for the students' positive attitude towards Mathematics.

Students expressed like or dislike of Mathematics depending on the manner in which the content was delivered. They naturally formed a given attitude on the subject that eventually determined the level of success in that particular course. When students positively perceived the content to be learnt as interesting, fun, meaningful, and relevant they got motivated to learn, were stimulated and their interest was aroused in readiness to understand the content being presented to them by the teacher. Willis (2010) asserted that positive attitude towards a subject was

related positively to performance. In Kenya, research done by some key stakeholders (Nui and Wahome, 2016) in secondary education, has showed that consistent failure in Mathematics and sciences might be attributed to attitudes of students and teachers had towards the subjects. Based on this research, it means, attitude was a key component that influences performance.

In consonance with this Manoah, Indoshi and Othuon (2016) in their study observed that attitudes played a critical role in students' performance. Students with positive attitude tended to perform well in exams. This was an indicator that attitude was a very essential element in good performance in Mathematics. The role of attitude showed that it had a key factor in determining how well a curriculum is implemented in learning institutions and in particular Mathematics subject.

One of the perennial problems of the education system in Zambia was high failure rate of students at grade 12 examinations in mathematics. Improving access to education had been also accorded a high priority in Zambia's education policies. Studies had shown that lack of education led to high fertility rates, low life expectancy and high illiteracy rates which in all affect national development (Wasanga, 2017). The importance of having a solid background in mathematics is well recognized as it serves as a gateway to future professions in a variety of fields. In other words, mathematical competence is an essential component in preparing numerate citizens for employment and it is needed to ensure the continued production of highly-skilled persons required by industry, science and technology. According to Steen (2001), mathematics does not only empower people with the capacity to control their lives but also provides science a firm foundation for effective theories; it also guarantees society a

vigorous economy. Zambian curriculum dating as back as early 1960s had incorporated sciences in the education system. These sciences comprised of general science at junior secondary and physics, biology, chemistry at senior level. Mathematics, science and technology are strongly influenced by the global context and in that proficiency in these disciplines is a pre-requisite to economic success (Maguswi, 2011).

The performance of students in mathematics among secondary schools in Zambia has remained poor for many years. Despite the important role that mathematics and science plays in society and in the field of engineering particularly, there has always been poor performance in the subjects at public examinations. According to a study conducted by the Southern and Eastern Africa Consortium for Monitoring Education Quality (SACMEQ) aimed at testing mathematics and reading achievements in 15 countries in Eastern and Southern Africa, Zambia was ranked as the worst with a decline in its performance alongside Malawi, Namibia, Lesotho and Uganda with difficulties in mathematics. Zambian pupils were ranked the worst in Mathematics and reading skills in Southern and Eastern Africa. According to 2014 Examination Council of Zambia report it was observed that Mathematics, Science and Biology only 9.98 percent of candidates obtained a credit or better, while 18.59 percent of the candidates obtained passes and 71.72 percent failed the examination. This reported continued poor performance in Mathematics and Science by the candidates required serious attention as the school of engineering depend largely on good performance in these key subjects. This is the more reason why the research sought to find the reasons for unsatisfactory performance in mathematics at Grade 9 and 12 examinations in three selected



districts in Eastern Province which are Lundazi, Lumezi and Chasefu Districts.

### III) METHODOLOGY

The study utilised a descriptive survey design as it was considered as the most suitable research design. A descriptive survey design was selected because of its high degree of representativeness and the ease with which a researcher could obtain the participants' opinion. (Schervish, 2019). The study was carried out in three Districts in Eastern Province that were Lundazi, Lumezi and Chasefu. The researcher picked on these locations because he resided in one of the said districts. As such, it was hoped that the researcher would encounter very minimal challenges in terms of movements. Additionally, the researcher was a teacher in a secondary school and thus had an in-depth knowledge on schools. In fact, Berg (2014) advised that the ideal setting for any study, was one where the researcher had interest in, easily accessible and one that allowed the researcher immediate support with the respondents.

In this study therefore, the population consisted of nine secondary schools that was three from each of the three districts which were the site of this research study total of 1080. Creswell (2018) defined population as all members of any well-defined class of people, events or objects. A target population referred to all the members of a hypothetical set of people, events or objects to which one wished to generate the results of a research. From the stated population, a sample that comprised four secondary schools; Head teachers, deputy heads and guidance teachers were targeted as the main respondents. 108 respondents were interviewed in order to obtain valid and reliable information. The sample comprised 9 Head Teachers, 9 6 Deputy headteachers, Heads of Mathematics Department, 9 Guidance teachers, 18

Teachers and 54 pupils drawn from the 9 secondary schools that were sampled. Purposive sampling technique was used to select the respondents from the secondary schools that were sampled in this research study. The use of purposive sampling technique was aimed at ensuring that each of the respondents selected would avail information that would answer the research questions. This saved time and resources.

Questionnaire was used as the main data collection instrument for this research and it was chosen because it helped the researcher to collect large amount of data in large areas within a short time thus saving time for the study (Orodho, 2019). The results were presented using frequency tables, pie charts and bar graphs. Qualitative findings were reported based on the objectives of the study and conclusions and recommendations were made based on study findings. Qualitative data was analysed using a combination of thematic and content analysis techniques. Under thematic approach, information was sorted out, classified and categorized under major themes identified.

### IV) FINDINGS

The study sought to find the factors leading to unsatisfactory performance of pupils in Mathematics at Grade 9 and 12 examinations in three selected districts in Eastern Province. This chapter present the data collected and the results of the analysis with corresponding interpretation.

#### **Does qualification of teachers affect Learner Performance in mathematics?**

One of the objectives of this research study was to find out whether the qualification of a teacher of mathematics did indeed affect the performance of learners. The findings were tabulated in table 1 as shown;

**Table 1: Does qualification of teachers affect Learner Performance in mathematics?**

RESPONSE	FREQUENCY	PERCENTAGE
YES	57	53
NO	40	37
NOT SURE	11	10
TOTAL	108	100

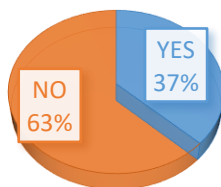
**Source: Field data, 2021.**

The responses were that 53% (n=57) indicated ‘Yes’ that teacher qualification in Mathematics did have a bearing on learner performance in the subject while 37% (n=40) that indicated that the qualification had no bearing on the performance of learners. 10% (n=11) were not sure.

### Availability of teaching and learning materials for Mathematics in the Districts of Lundazi, Lumezi and Chasefu

The research objectives clearly stated desire to investigate whether the schools in the three districts had teaching and learning materials for mathematics readily available so as to enhance the teaching and learning process. Figure 1 show the responses from the respondents;

**Figure 1: Availability Of Teaching And Learning Materials For Mathematics In The Sites.**



**Source: Field data, 2021.**

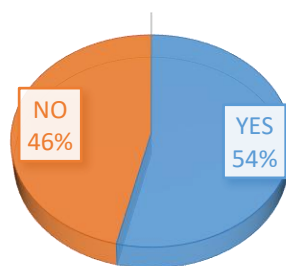
It is evident from the above chart that 63% (n=68) said ‘No’ and 37% (n=40) said ‘Yes’. This gives an

interesting finding in that the percentage variance between the two responses is not very high.

### Do teachers in the sites of the study have a positive attitude towards mathematics in schools sampled?

The research question sought to reveal the attitude that the teachers in the three districts have towards mathematics as a subject. Figure 2 below show that

**Figure 2: Do Teachers In The Sites Of The Study Have A Positive Attitude Towards Mathematics In Schools Sampled?**



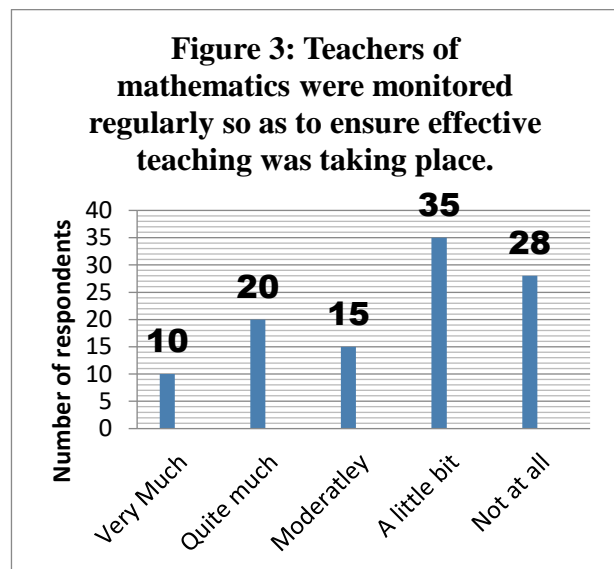
**Source: Field data, 2021.**

The responses indicate that 54% (n=58) ‘Yes’ respondents had indicated that the teachers had a positive attitude towards mathematics as a subject while 46% (n=50) ‘No’ respondents indicated that the teachers had no positive attitude towards mathematics.

### Teachers of mathematics were monitored regularly so as to ensure effective teaching was taking place.

Based on this premise, this study sought to find out whether teachers in the schools sampled in the three districts of Lundazi, Lumezi and Chasefu were monitored regularly so as to ensure that effective teaching was taking place in the schools. The

responses obtained from the respondents are indicative in figure 3 below;



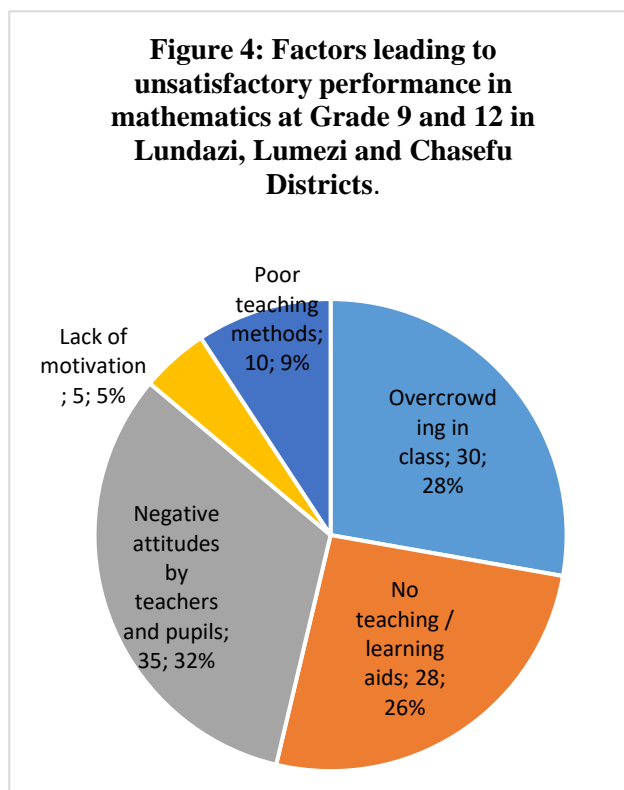
Source: Field data, 2021.

It is evident from the bar graph above that the majority of the respondents that is 35 respondents indicated that very little monitoring was happening in the schools. Then 28 respondents indicated that no monitoring was happening in the sampled schools. This was followed by 20 respondents that indicated that quite much of monitoring was happening in the schools. Then we have 15 respondents that said that moderate monitoring was going on in the schools sampled. The least response indicated by 10 respondents was that monitoring of teaching was going on very much.

### Factors leading to unsatisfactory performance in mathematics at Grade 9 and 12 in Lundazi, Lumezi and Chasefu Districts.

The sentiments shown in figure 4 below show what was obtained from the respondents in the sites where the research study was carried out;

Source: Field data, 2021.

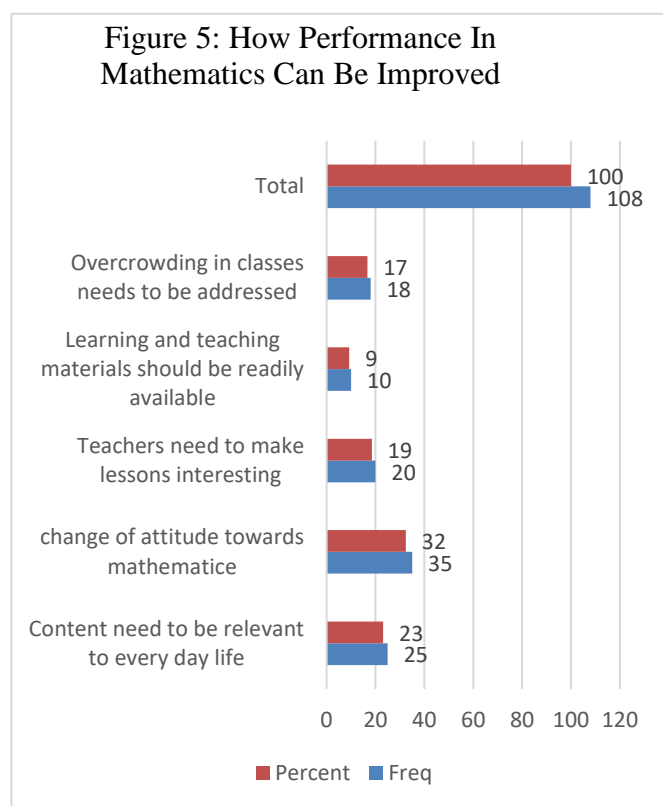


The figure shows that 32% of the respondents asserted that negative attitudes by teachers and pupils were the reason for unsatisfactory performance by learners in the sampled schools in Lundazi, Lumezi and Chasefu Districts. Then 28% of the respondents blamed the poor results at Grade 9 and 12 to overcrowding in classes which makes effective teaching and learning to be compromised. Then we have another 26% of the respondents who said that lack of teaching and learning aids was the reason for the unsatisfactory performance by the learner in mathematics at Grade 9 and 12 in the sites of this research study. It can be seen that 9% of the respondents blamed the poor performance on poor teaching methods followed by 5% that indicated that lack of motivation was the cause of poor performance in Mathematics.

## How performance in mathematics can be improved.

The research study endeavoured to find out from the respondents on what can be done in order to improve the results in Mathematics in the sites where this research study was carried out and the figure 5 below shows what was obtained from the respondents;

Improved



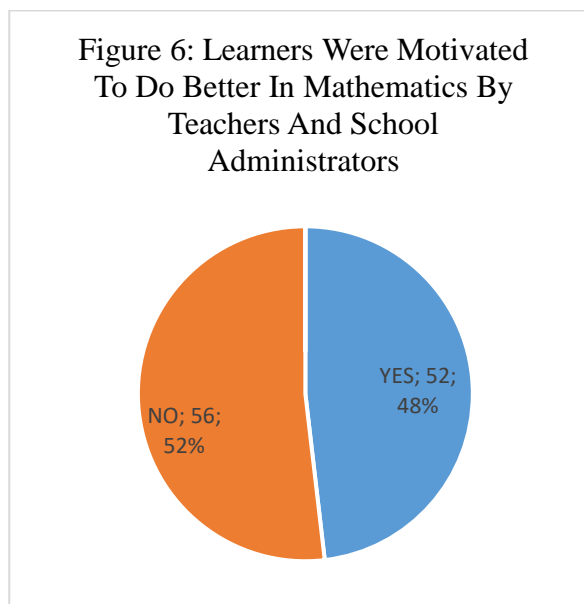
Source: Field data, 2021.

The responses were that 21.6% (n=23) said mathematics need to be relevant to everyday life, 29.6% (n=32) said change of attitude towards mathematics, 17.4% (n=19) Teachers need to make lessons interesting, 15.7% (n=17) said learning and teaching materials should readily be available and

15.7% (n=17) overcrowding in classes must be reduced.

## The learners were motivated to take mathematics seriously by teachers and school administrations

The study sought to find out if the school that were sites in this study had put in place mechanisms to motivate the learners so that performance in mathematics was improved. Figure 6 below shows what was obtained from the questionnaires that were administered to the respondents:



Source: Field data, 2021.

The chart above shows that majority of the respondents that is 52% (n=56) said that the learners were not being motivated to do better in mathematics. On the other hand, 48% (n=52) respondents contended that the learners were being motivated.

## V) DISCUSSIONS

To begin with, the first objective of established whether having trained teachers did have an influence on the performance of learners in Lundazi, Lumezi and Chasefu secondary schools. It was established that 57 respondents (53%) indicated that teacher qualification in Mathematics did have a bearing on learner performance in the subject. This was followed by 40 respondents (37%) that indicated that the qualification had no bearing on the performance of learners. Then there were respondents that indicated that they were not sure whether a teacher's qualification had a bearing on learner performance in Mathematics.

The findings above had brought about very strong debate among people especially in academics on whether one's qualification had a bearing on how one delivered lesson to learners. Many had argued that some people, had very good qualifications but when it came to delivering in class, there had been very little to write home about. There had been instances in schools where degree holders and diploma holders have confronted each other on effectiveness in their teaching methodologies. This argument came up from one of the respondents in the research sites code named X who had this to say:

Many teachers from the University of Zambia have very strong grounding in theory however when it comes to delivering lessons in class, they fail lamentably as they lack methodology compared to teachers with Diplomas from either Copperbelt Teachers training College (COSETTCO) now the Mukuba University and Kwame Nkurumah which is equally now the universities also Chalimbana University.

The above sentiment surely brings a lot of questions than answers in that it is worth noting that some people indeed have failed to perform despite the

glamorous qualifications they can boast to have. However, the point raised above showed that in the field of knowledge needed to understand mathematics, the Graduates have an edge. This was what ought to have a bearing on the performance of learners. This however brought to the fore the point that it was possible that those with Degrees were too theoretical than practical which made it impossible for learners to grasp concepts easily. This was the more reason why Continuous Professional Development helped to bridge the Gap between theory and application through sharing workable methodologies. According to Bell, (2008), a better trained and experienced teacher produced high academic performance than the untrained. It was revealed that there was a positive correlation between in-service training of personnel and performance. Thus, it was safely concluded that a well-trained teacher who understood his/her subject very well was in a better position to deliver lesson that learners grasped and thus led to better performance in the short and long term. Certainly, well trained teachers had a bearing on the results of learners in any given subject. This applied to mathematics as a subject. The training was to be through Continuous Professional development in schools or in universities and colleges.

The second and third objectives were dealing with the issue of learners' attitude towards mathematics and teachers' attitudes towards mathematics. It is important to note that in both cases the responses from the respondents indicated that attitude plays a very significant role in performance of learners in Mathematics. Adino (2015) asserts that attitude is one of the key components that determine implementation of curriculum. It has been asserted that a positive attitude correlates very well with positive results and that a negative attitude also correlates very well with negative results in any



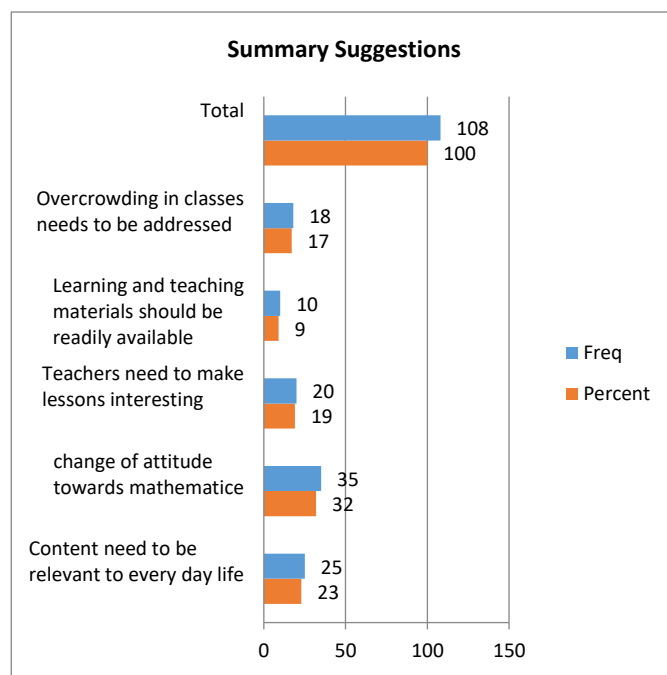
endeavour. Thus, if attitudes towards mathematics was worked on very well, the results would improve drastically. This change in attitudes applies not only to learners but to the teachers as well. Suffice to say that most studies carried out on reasons for poor performance in mathematics or sciences have cited the issue of negative attitude (Kinyua, 2015)

It was important to note that when students positively perceived the content to be learnt as interesting, fun, meaningful, and relevant they got motivated to learn, were stimulated and their interest was aroused in readiness to understand the content being presented to them by the teacher. Wills (2010) asserted that positive attitude towards a subject was related positively to performance.

The last objective was to find out whether availability of requisite learning and teaching materials in schools in Lundazi, Lumezi and Chasefu had a bearing on performance. It can be drawn from the study that certainly availability of learning and teaching materials does have an impact on the performance of learners in mathematics. Availability of teaching and learning aids is a very important consideration if results are to improve. This was equally cited by the respondents as one suggestion that can lead to better performance in mathematics. Schools certainly need relevant and up to date course books for reference. This can certainly be used as supplementary books apart from what is taught in class. This challenge is not only unique to Zambia but is prevalent in most Developing countries. It should be noted that 63% (68 respondents) had indicated that teaching and learning materials were not available in the schools sampled in the three districts of Lundazi, Lumezi and Chasefu. On the other hand, 37% (40 respondents) indicated that the schools had learning and teaching materials available in the schools.

In the light of the above it was also imperative to take note of the suggestions that the respondents made so as to improve performance in mathematics at Grade 9 and 12 in the three district that were sites of this research study. The most prominent suggestion on what could be done to improve performance in mathematics was change of attitude towards mathematics which solicited 35 responses (32%) of the total number of respondents. This was followed by need to make mathematics relevant to everyday life. This response was made by 25 (23%) of the respondents. Then 20 (19%) of the respondents indicated that teachers needed to make lessons in mathematics interesting and another 18 (17%) of the respondents indicated that overcrowding in classes needed to be addressed as it affected learning and teaching and consequently led to overall poor performance. The least suggestion was that there was need to make teaching and learning materials available which was indicated by 10 (9%) of the respondents.

**The Figure Below Sums Up What Was Suggested**



**Source: Field data, 2021**

The above finding seems to agree with what Adino (2015) asserted that attitude was everything as it made or break what need to be done. It had been asserted that a positive attitude correlates very well with positive results and that a negative attitude also correlates very well with negative results in any endeavour. Thus, if attitudes towards mathematics were worked on very well, the results would improve drastically. This change in attitudes applied not only to learners but to the teachers as well. Suffice to say that most studies carried out on reasons for poor performance in mathematics or sciences had cited the issue of negative attitude (Kinyua, 2015; Hambokoma, 2017; Kafata and Mbetwa, 2016). In consonance with this Manoah, Indoshi and Othuon (2016) in their study observed that attitudes played a critical role in students' performance. Students with positive attitude tended to perform well in exams. This was an indicator that attitude was a very essential element in good performance in Mathematics. The role of attitude showed that it had a key factor in determining how well a curriculum was implemented in learning institutions and in particular Mathematics subject.

The other conclusion that was drawn from the findings was that of making mathematics relevant to day-to-day life situation. It was worth noting that most of the subjects were too academic and less practical. Learners fail to apply the knowledge to solve real life problems. This certainly had led to poor performance in subjects and mathematics was no exemption. It was thus imperative that teachers made learners realise the relevance of mathematics in real life situations. This would make the subject very appealing. This had been the undoing of most of the subjects learnt in formal school.

Overcrowding was equally another problem that the respondents indicated and suggested that it needed

serious attention. Kafata and Mbetwa (2016) had referred to overcrowded classes as rally classes that made teaching and learning almost impossible. The classes had more than 70 pupils that brought a serious teacher to pupil ratio disparity. Class control was made very difficult. This certainly did not allow direct teacher to pupil attention. This made teachers to be unable to follow up on learners with problems or challenges on a personal level. This certainly led to poor performance in the short and long term.

## VI) CONCLUSION AND RECOMMENDATIONS

The study sought to find the factors leading to unsatisfactory performance of pupils in Mathematics at Grade 9 and 12 examinations in Lundazi, Lumezi and Chasefu Districts in Eastern Province. In the light of the conclusions drawn from the findings and the discussions thereof, the following are the recommendations:

- i. There was need for the Ministry of General Education Standard officers to regularly monitor teaching and learning in schools especially of core subjects like mathematics.
- ii. There was need for teachers of mathematics through Continuous Professional Development at school level to identify teaching methodologies that would make mathematics less feared subject in schools.
- iii. There was need for teachers of mathematics and curriculum specialists to make mathematics more relevant to everyday life of learners so as to enable learners solve real life problems using skills and knowledge acquired in mathematics.
- iv. There was need for a national symposium where teachers of mathematics can introspect on what is leading to poor performance in this key subject

- v. There was need for examination council of Zambia to include mathematics practical paper for our pupils to understand concept very well than memorising formulas
- vi. There was also need for mathematic classes to have few pupils so that teacher pupil's ratio in memorise.
- vii. The government to put measures that pupils should not progress minus mathematics grade seven, nine and twelve to the next level.
- viii. Government to employ more mathematics teachers cut the terrible shortage of mathematics teacher in schools.

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