

STRATEGIES OF IMPROVING THE PERFORMANCE OF GIRLS IN MATHEMATICS AT SECONDARY SCHOOL: A CASE OF LUSAKA DISTRICT SCHOOLS

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ABSTRACT

In Zambia it has generally accepted that good performance in mathematics has become a prerequisite for one entry into tertiary education regardless of one's sex. In a bid to find themselves places in colleges and universities, many more girls are victim of rejection because of poor grades in mathematics compared to boys. The study looked on strategies of improving the performance of girls in Mathematics at secondary school. The study adopted a descriptive design Approach, which will employ research methods, questionnaires and interviews. The target population comprised learners, mathematics teachers, Heads of Department and School managers at secondary level. Probability sampling techniques were used to select pupils and teachers from Secondary Schools. The total study sample was 50. Two instruments were used for data collection in the study: the questionnaire and interviews. Qualitative data were collected and analyzed on an on-going process as themes and sub-themes that emerged through thematic analysis. The findings showed that quality of instruction, teacher motivation, teacher qualification, learners' attitude, low parental involvement had bearing on girls' poor academic performance in mathematics. Based on the findings of the study, it was concluded that, the barriers to improving learning outcomes in Zambia are many and cut across both the demand and supply side, and interact across the school, district, provincial and national levels. The study recommended that parents should get involved in pupil's education in order to help monitor children's performance through homework as well as monitoring the time spent on social media and other vices. With regard to parental support to girls' mathematics education, the study established that many parents believe that girls were poor performers in mathematics hence they do not help them. In order to improve teaching and learning practices secondary school, the study recommends that the school management sensitize mathematics teachers not to be gender biased in their lessons by involving both boys and girls equally in mathematics lessons. Secondary School mathematics teachers need to present to girls' scientific theories that suggest that mathematics performance is the result of experience and not genetics as well as guidance teachers 'need to work in collaboration with teachers of mathematics and the school head teacher in secondary schools must provide girls with many efficacy-building experiences in mathematics.

Key words: Performance, Strategies, Attitudes, Learning outcomes, Improved teaching

1.0 Introduction

Research suggests that changes in education policies, such as the No Child Left Behind law and accountability movement, may have contributed to smaller gender gaps in mathematics (Miller, 2016). Another factor that could be responsible for the diminishing gender difference in math performance is the closing of gender gaps due to cultural shifts and social changes. Given the ever-changing nature of socio-cultural, gender, economic, and political gender parities, there is a need for more up-to-date cross-national analyses of gender differences in math achievement and mediators of these differences (Nsama and Daka, 2023). Using large, valid, and respected international databases that are representative of the population could result in more generalizable findings.

Gender differences in interest in schoolwork may be influenced by a societal factor, the achievement culture, which tends to drive interest in schoolwork down, in combination with a gender difference in conformity, with girls tending to conform more than boys. The outcome, would be a specific, complex pattern. In high-achievement cultures, it would be common for students to have a low level of interest in mathematic schoolwork and, due to conformity, a low level of interest would be especially common among girls. In low-achievement cultures, by contrast, it would be common for students to have a high level of interest in mathematics schoolwork and, again due to conformity, a high level of interest would be especially common among girls (Mulenga and Daka, 2022). Thus, high-achievement cultures would exhibit gender gaps in mathematics schoolwork interest that favor boys, while gender gaps would be reversed in low-achievement cultures.

Mathematics is an essential subject in school curriculums worldwide. It has a direct relationship with other subjects, especially sciences and technical subjects. Therefore, every student, regardless of gender, should have equal opportunities to excel in it. Unfortunately, many girls tend to fall behind in mathematics due to their own silence and desire to please. As a result, they may not pick up on more efficient mental strategies, leading to a lowering of their confidence. In the long run, this can negatively impact a girl's future achievement, as mathematics preparation is at the core of college success. Research has shown that girls tend to perform poorly in mathematics compared to boys. This research proposal aims to investigate strategies that can help to improve girls' performance in mathematics in secondary schools.

Policy makers and educators have long been concerned with improving the teaching and learning of Mathematics. The United Nations Educational, Scientific and Cultural Organization

(UNESCO) has highlighted the importance of focusing on this subject in their World Survey of Education (UNESCO, 2004). Despite efforts to improve the teaching of Mathematics, the performance in this subject remains poor in Lusaka province, with particular concern in the city of Lusaka where the Provincial Education Office is located. The poor performance of learners in Zambian Secondary Schools, especially in Mathematics, has been a major concern for teachers, parents, Mathematics specialists, and other stakeholders for a long time (ECZ, 2022).

At grade twelve level in 2022 the percentages passing rates favors boys than girls. Those who got grading one to six, that distinctions, merits and credits in mathematics majority were boys with 48.53% and girls got 39.93%. Grading seven to eight which is satisfactory were dominated by girls with 14.52% and 12.77%. The failure percentage for girls at grade twelve in Mathematics was 45.53% against boys who had 38.67%. The failure percentages are evidence enough that girls are not doing well in Mathematics. Hence, researching on strategies to improve girl’s performance in Mathematics.

Table 1. 1: 2022 performance review report school certificate examination for grade 12

Distinction, Merit and Credit		Satisfactory)		Unsatisfactory	
GIRLS	BOYS	GIRLS	BOYS	GIRLS	BOYS
39.93%	48.53%	14.52%	12.77%	45.53%	38.67%

Source: Field Data, 2023

At grade 9 level, in 2022 males performed better than their female counterparts in Mathematics. The percentage of boys who got division one was 5.51% against 4.28% for girls. Boys dominated in division two category with 12.4% against girls with 10.2%. In division three category boys had 14.6% and girls had 12.7%. Girls only dominated in division four with 13.38% against boys with 13.28%. The number of failures in 2022 in terms of percentage was 45.79% for boys and 59.44% for girls. The data shows that girls have challenges in mathematics which needs to be attended to.

Table 1.2: 2022 grade nine performance of boys and girls in mathematics

Division 1		Division 2		Division 3		Division 4		Fail	
Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
5.51	4.28	12.4	10.2	14.6	12.7	13.28	13.38	45.79	59.44

Source: Field data, 2023

1.2 Statement of the Problem

Mathematics is a key subject in the Zambian school curriculum, as it is intended to develop individuals who are able to live and integrate well in society. The subject is aimed at creating ideal citizens, promoting the development of social skills, beliefs, values, and traditions, and preparing boys and girls for the world of work. It is also seen as an important tool for gaining employment and entering into better universities and faculties. However, despite the equal opportunity for boys and girls to gain knowledge, there are still social and cultural factors that affect their learning achievements. This has resulted in a wide gap between male and female students, with female students being underrepresented in fields such as engineering, polytechnic, and mathematics. Therefore, there is a need to explore strategies that can be used to improve the performance of girls in Mathematics. This can help level the playing field for both boys and girls in secondary schools, and ensure that the subject serves its intended purpose of developing holistic and mature individuals who can contribute positively to their communities.

1.3 Research Objectives.

1. To investigate the causes to low performance of girls in Mathematics in selected schools in Lusaka District of Zambia.
2. To suggest strategies to improve girl's performance in Mathematics in selected schools in Lusaka District of Zambia.

1.4 Theoretical Framework.

It is believed that theoretical and conceptual frame work contributes to the success of any research work. This study adopted the liberal feminist theoretical framework. Liberal feminism was thus born in Western countries from the contact of educated women with liberal ideas. Liberal feminists want to apply the philosophy of liberalism to gender equality (Debra Satz, 2010). Liberal feminism is a form of feminist theory which focuses on women's ability to maintain their equality through their own actions and choices. Liberal feminists argue that society holds the false belief that women are by nature less intellectually and physically capable than men: thus, it tends to discriminate against women in the academy, forum and market place (Lorber 2010).

Liberal feminists believe that the gap between males and females in society is a consequence of the dominance of males. This dominance is reflected in the way customary and legal constraints block women's entrance to and success in the so-called "public World" (Tong,

2009). Liberal feminism is a particular approach to achieve equality both for men and women that emphasizes the power of an individual person to alter discriminatory practices against women. Liberal feminists believe that women led lives that were unfulfilling, if not stifling. Women could enjoy a family with children but needed to get involved in pursuits outside the domestic sphere as soon as possible by entering into public life. This can only be done by girls performing well in mathematics related subjects. Liberal feminists urge that girls be prepared to enter more advanced career fields. Liberal feminism we be used because it explains the rationale educational interventions aimed at improving female learners in Mathematics. The theory we help to work as a catalyst to improve girls' performance in mathematics, because the theory is primarily concerned with equality between the sexes and believe equality is possible through hard work. Consequently, various stakeholders including the Government of Zambia through Ministry of Education have introduced Educational interventions to improve female performance in Mathematics in Secondary schools.

2.0 Literature Review

2.1. Causes of the Challenges leading to poor performance by girls in Mathematics.

Poor performance by girls in Mathematics has been a comprehensive concern that has prompted developing countries to participate in initiatives to bring positive change in their communities (Sinyosi, 2015). Mathematics quality can bring positive change in developing countries to develop their education systems for shaping the future and prospects of young girls, to develop infrastructure, and to improve economic knowledge, culture and morality, as well as the living standards of their people (Roohi, 2012). However, Mathematics underperformance has become a perennial concern which can prevent Zambia from achieving its developmental goals and equality for all.

The factors that affect poor performance in the teaching and learning of Mathematics to girls vary from those that are teacher centered, learner centered, school centered, to family and environmental factors, among others. Studies conducted internationally have revealed that learner-centered factors that cause poor performance in Mathematics among secondary schools include learners' misconceptions about mathematics as a difficult subject, and fear and anxiety (Olalekan, 2010; Kanchebele-Sinyangwe and Daka, 2022).

Hlalele (2012) have stated that learners often develop Mathematical anxiety in schools, often as a result of learning from teachers who are themselves anxious about their Mathematical abilities in certain areas. In the South African context, research by Khatoun and Mahmoud (2010) indicated that learners' inferior performance in Mathematics is influenced by their negative attitudes towards the subject that emanate from societal views that it is a difficult

subject. International studies by Olalekan (2010) found that, in Britain, the reasons for poor performance in Mathematics are a lack of learning support; principal teachers' dissatisfaction with the in-career training of teachers in Mathematics; and learners taught by teachers who have not participated in career professional development. This is in agreement with Kajala and Daka (2022) in their study on the quality of education offered in higher learning institutions where they found out also that lack of learner support contributes to poor performance of learners.

In the South African context, the research by Schanzenbach (2013) and Daka, Chipindi, Phiri, Mulenga, Mvula and Chirwa (2021) found that educators play a significant role in learners' school performance; for example, if the educator lacks experience or passion about teaching, the learners might not be able to develop comprehensive understanding of the subject material. It is further assumed that, if the educator does not have effective classroom management skills and applies extreme authoritarianism, the classroom environment might hinder fruitful class discussions and collaborative learning from learners. It can also deter learners from applying themselves to the best of their abilities. It is therefore clear from the existing research that educators have an impact on the deficient performance in mathematics because if the teacher does not have a good subject knowledge and pedagogical content knowledge she or she might deliver incorrect content or even skip content, which could also lead to poor performance (Asikhia, 2010).

Forrest et al. (2019) and Daka (2023) argue the quality of teachers, influences learners in learning. Strong evidence exists showing that teacher diligence, dedication, and adherence to basic educational policies and processes can lead to good teaching and learning. Chen, et al. (2017) and Mwamba, Musonda, Daka and Mulenga (2021) further assert that issues around the maximization of contact time with learners in class, and the presence of both learners and teachers at school and in class, have a positive impact on performance.

In Zambia, the instructional time in the secondary for Mathematics is 6 hours (360 minutes) a week. Most teachers go to class later, others thirty minutes later. Some leave the class thirty minutes before time. Teachers miss one two hours a week. This means about an hour of mathematics teaching is lost per week. This is a significant amount of time lost per term and per year, which results in a chronic and systemic reduction of teaching and learning in class that affects performance in the subject.

The literature also indicates that learners' positive attitude towards Mathematics is enhanced by teacher-related factors such as teachers' enthusiasm, teachers' resourcefulness, helpful behaviour and teachers' thorough knowledge of the subject-matter and their making Mathematics interesting (Mensah et al., 2013). Lack of pedagogical knowledge in the subject has a great impact on girls' performance because the teacher who lacks knowledge is more

likely not to teach the topic that he or she does not understand. Teacher-centered methods have a role in the low performance of the learners because the teachers teach learners by using a question-and-answer method without allowing learners to solve Mathematical problems with their peers and find solutions on their own.

2.2. Strategies for improving Mathematics grades among girls.

There have been many attempts to find the most effective strategies for developing a positive mathematical identity in girls. According to Anderson (2005), potentials Mathematical identity strategies promoting the retention or pursuit of STEM and math related fields. Weinberg et al, (2011). As empowered learners of Mathematics who perceived themselves as confident, capable, independent, and persistent, girls have an improved chance of participating and remaining in Mathematics Anderson (2005). However, they need to see the link between what they are learning in Mathematics and the careers they are planning Fredricks et al. (2008). Girls desired to learn how Mathematics can be applied to other fields and to everyday life activities. Enjoyment of mathematics also played a role in women's persistence in the field Piatek-Jimenez (2015). However, a survey of women majoring in math-related fields revealed that women who believed that status differences between the sexes are legitimate were more likely to endorse stereotypes about women's Mathematics abilities. This, in turn, predicted more negative self-perceptions of mathematics competence and less interest in continuing study in one's field Schmader et al. (2004).

Anderson (2005) states that girls became more engaged in learner-centered classrooms with hands-on learning, group work, real-world applications and problem-solving activities. Collaborative environments, with cooperative group work and authentic instruction were particularly beneficial for girls' engagement Fredricks et al. (2008). Fun was also a factor. However, in studies involving both girls and boys, interesting differences emerged. Expectancy beliefs whether they thought they understood the content and could do well – were more strongly linked to boys' cognitive engagement in science but were a stronger predictor of girls' emotional engagement in Mathematics. In studies where self-efficacy for both improved, the gain was greater for males. In another, girls' confidences in their own skills and potential was significantly more positive than the boys' confidence in the girls (Redmond, 2011).

Girls relied more heavily than boys on conventional solution strategies to Mathematics problems. Combining performance accomplishment and belief-persistence had a greater effect on self-efficacy for boys than girls Cordero et al. (2010), indicating that ingrained messages for girls and women about Mathematics may need a lengthier intervention. Weinberg et al.

(2011) studied the effectiveness of experiential learning at residential summer programmes and found that interest gain, utility gain, cost value gain, attainment value gain and expectancy for success were equally successful for both sexes.

Learning environments should be created that promote active learning and teaching. Additionally, classroom discourse, small-groups and whole-group learning. Cooperative activities are useful for girls. It helps them to learn Mathematics, it may make them and girls because girls under participation and boys' over participation effect on math related careers (Watt, 2007). There might be relationship between Mathematics achievements, belief, and ability. Moreover, boys may have more confidence, and they estimate their abilities of mathematics too high. These attitudes of boys have benefits for advanced math preparation (ibid). Afghan females have more problems with Mathematics because there are lacks of professional math teachers in all schools even in capital of Afghanistan.

The negative effect of stereotype threat on girls' Mathematical identity, in particular their self-perception, self-confidence, and career intentions Christy & Fox (2014). In a study of a virtual classroom with leader boards that had either female or male majority names, Christy and Fox found that a social comparison process had a stronger influence than stereotype threat. In another study, Gresky et al. (2005) found that the influence of stereotype threat can be lessened through exercises in self-concept that underscore women's many social roles and identities.

Girl's achievement in Mathematics can be improved when teachers of Mathematics create classrooms that include, substantial emphasis on mathematics instruction and girls' engagement in Mathematics tasks, whole-class instruction, effective question-answer and individual practices, minimal disruptive behavior, high teacher expectations and substantial positive feedback to both boys and girls (Changwe, Mwanza, Daka and Ng'onomo (2023). Furthermore, girls need to learn in classes that are not overcrowded as overcrowded classes tend to make teachers concentrate on higher achievers leaving the rest unattended to.

To improve girl's performance in Mathematics motivation is the key. Motivation should be used by learners as the attribution or determinant to their behavior in learning and performance. Behaviors that are related to academic motivation such as the desire to do difficult tasks and stay longer in difficult situations will be the determinant for learners' ability in facing daily school life challenges.

3.0 Methodology

A descriptive design was used because the research aimed at getting people's experiences and perceptions under the natural setting. Kombo and Tromp (2006) define descriptive design as one used when collecting information about people's attitudes, opinions, habits or any of the variety of social issues. The design helped to understand, in detail, the methods used by the teachers and learners in the teaching and learning of Mathematics as well as the benefits of Mathematics to the girls.

The population of this study comprise of learners, Mathematics teachers, Head of Departments (HODs) and School Managers of selected secondary schools in Lusaka District. This study will be conducted in Lusaka district. Lusaka is one of the largest and populated towns in Zambia

Information was gathered from 10 schools in the district. The participants were both male and female pupils, Mathematics teachers and administrators. A sample is a group of subjects selected from a larger population (White, 2008). The sample for this study comprises of 50 respondents, namely 30 pupils, 15 mathematics teachers' staff and 5 Head of Departments and School Managers. The 50 participants were picked using the random number method. Using the random number method, the researcher assigned every respondent a number.

This study employed purposive sampling to select academic staff and key informants. The researchers used convenient sampling to sample the students. Convenience sampling (also known as availability sampling) is a specific type of non-probability sampling method that relies on data collection from population members who are conveniently available to participate in study Saunders (2012).

Interview guides were used in this study to collect data from all the respondents, that is, learners, Mathematics teachers, Head of Departments and School Managers in the selected secondary schools and the key informants from the Managers of secondary schools. However, the researchers did not use the same interview guide to collect data from the aforementioned groups. The researchers used different interview guides that was administered to the respective groups (Learners, teachers, HODs and school managers). Interview guide provides questions within which the researcher is free to explore, probe, and ask questions that will to come-up strategies to improve girl's performance. This study used semi-structured interview guides because it enables the researcher to ask follow up questions to seek clarification from the respondents.

Thematic data analysis was used to analyze data for this particular study. This was achieved by generating themes that emanate from the data collected. Thematic analysis is simple to use

which lends itself to use for novice researchers who are unfamiliar with more complex types of qualitative analysis. It allows for flexibility in the researchers' choice of theoretical framework. Some other methods of analysis are closely tied to specific theories, but thematic analysis can be used with any theory the researcher chooses. Through this flexibility, thematic analysis allows for rich, detailed and complex description of your data. The researcher was familiarized with the data. This phase involves reading and re-reading the data, to become immersed and intimately familiar with its content. Then, the researcher proceeds into coding. This phase involves generating succinct labels (codes) that identify important features of the data that might be relevant to answering the research question. It will involve coding the entire dataset, and after that, collating all the codes and all relevant data extracts, together for later stages of analysis. Thereafter, generating initial themes was be done. Quantitative data was analysed statistically using Chi – Square. With quantitative data analysis the researcher reduces risks of making the wrong decision but relying more on facts.

The researchers strictly observes the acceptable norms of the environment throughout the study. Respondents were not be coerced to participate in the research and were assured that the data collected will be kept confidential. On the other hand, respondents were assured that findings of the study will only be used for academic purposes. Before the actualization of data collection, the researcher seek for approval and clearance from the University of Zambia.

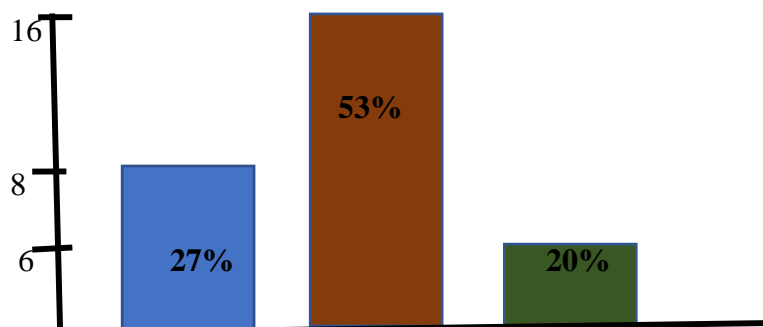
4.0 Research Findings

This section presents the results in accordance with the objectives outlined in the first section.

4.2 Causes of low performance of girls in Mathematics

4.2.1. Quality of instruction

The bar chart below shows the responses, whether learners understand Mathematics with the teaching methods used by teachers.



Yes sometime No

Figure 4.1: Understanding of Mathematics by Girls

Source: Field Data, 2023

The bar chart presents some interesting findings. According to the data, only 27% of learners fully understand their teachers' teaching methods, while 53% of them sometimes understand the methods being used. On the other hand, 20% of learners indicated that they do not understand their teachers' teaching methods at all. The study also found that the quality of instruction has a direct impact on the academic performance of learners in mathematics. The three key informants who were interviewed for the study emphasized that good teaching methods lead to good academic performance, while poor teaching methods result in poor academic performance. They believe that teachers have an important role to play in ensuring that learners receive quality instructions that can help them perform well in challenging subjects such as mathematics. One administrator suggested that:

“The quality of instruction could influence learners' thinking and academic performance in a significant way. Poor instructions can lead to poor academic performance, while good instructions can result in better academic results”.

4.2.2. Girls attitude towards Mathematics.

Another factor that was prominent among the teacher respondents regarding low performance of girls in Mathematics is the attitude of the girls towards the subject. Several teachers have pointed out that girls' attitudes towards mathematics greatly affect their academic performance in the subject. One teacher mentioned that most girls lack the enthusiasm to learn mathematics, which negatively impacts their performance. One teacher shared a similar view, stating that:

Learners who have a negative attitude towards mathematics tend to perform poorly, which is often due to a lack of interest in the subject.

However, the sentiments of the school above were in line with one HOD who pointed that:

Learners could learn mathematics, and it is a subject suitable for all learners. Although dealing with numbers may come naturally to some, it is the negative attitude towards the subject that prevents some girls from performing well.



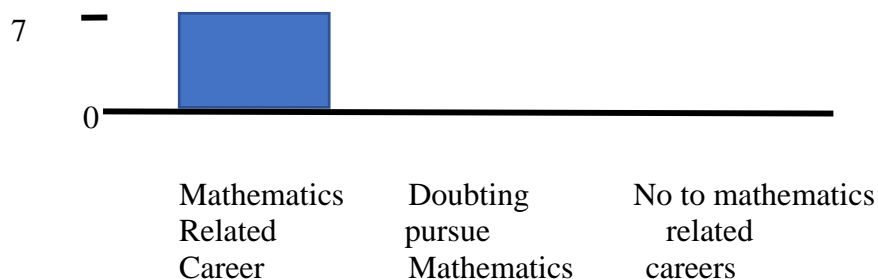


Figure 4.2: Interest of Girls in Mathematics

Source: Field Data, 2023

Seven girls had interest of pursuing mathematics career. Ten girls said that they maybe to, pursue Mathematics related careers and the 13 said no, to pursue Mathematics related careers.

4.2.3 Low teacher qualification.

The researcher sought to investigate teachers' qualification, as one of the factors which has been stated to influence girl's performance in Mathematics. According to the research results, 40% of the teacher respondents reported having degrees, while 60% had diplomas. It was also observed that the knowledge base of teachers increased with higher academic qualifications. A well-qualified teacher plays a crucial role in the education system, as face-to-face interactions with humans cannot be replaced by technology. The manager from one of the schools noted that:

“Well-qualified teachers make learning fun and exciting for students as they have been trained to use effective teaching methods. These teachers also can connect with their students on a personal level, which helps to develop self-esteem and personal confidence in learning and solving mathematical problems.

4.3. Strategies to improve girl's performance

4.3.1 Teacher Motivation

The research question guiding the third objective was "What are the strategies to improve girl's performance in Mathematics?", which aimed to suggest ways to enhance girls' performance in the subject. The respondents, including the Head of Departments, emphasized the need for teacher motivation to achieve this goal. The findings showed that teacher motivation plays a crucial role in girls' performance in Mathematics. During the interview, one of the teachers stated that:

Good management relationship and a healthy work culture among teachers can enhance learner performance. Conversely, de-motivated teachers may not deliver as expected in the classroom.

This view was echoed by the HOD who believed that:

Schools should motivate teachers improve girl’s good learner performance. Providing an enabling environment, administering support, and commitment to providing learning materials are also vital in enhancing learner performance.

The aspect was also covered by the study and according to the research findings different views as per key informants were revealed regarding relationship between motivation and performance of mathematics teachers.

Table 4.2: Relationship between motivation and performance of Mathematics teachers.

Responses	Frequency	Valid Percentage	Cumulative percent
YES	19	95%	95%
NO	1	5%	5%
TOTAL	20	100%	

Source: Field Data, 2023

Based on the information provided, the researchers perform a chi-square test to determine whether there is a significant relationship between the two categorical variables: “teacher’s opinion on whether motivation contributes to learners’ performance” and “number of teachers who hold that opinion”. The contingency table for this scenario is as follows:

Table 4.5: Chi – Square of motivation against performance

Opinion	Number Of Teachers	Expected Frequency
Yes	19	18.95
No	1	1.05

Critical value = 3.84 at 0.95 and significance level 0.05

Source: Field Data, 2023

Since the calculated chi-square value of 0.95 is less than the critical value of 3.84, the researcher fail to reject the null hypothesis. Therefore, the researcher concludes that there is no significant relationship between the two categorical variables at a significance level of 0.05. Basing on the findings from most of the key informants, this led to the conclusion that there is a relationship between motivation and performance of mathematics teachers.

4.3.2 Parental support to girls' Mathematics education

The study found that only 30% of learners receive parental support with mathematics homework and projects. This lack of support for girls in particular highlights the need for holistic parental support, which can be difficult for girls who already have a lot of work to do. Although many girls are capable of doing well in mathematics, they often lack motivation and support from their parents. The study showed that parents are not encouraging their daughters to take mathematics seriously by not helping them or providing guidance. Additionally, the questionnaire responses from girls revealed that they do more household chores than boys who are day-scholars.

4.3.3. Individual attention given to Learners

Most teachers suggest that individual attention is important in the classroom because it helps learners grow and achieve their fullest potential, but the time and number learners does not all. Another key informant suggested individual attention, enables educators to spot talent among the girls and give them their due credit. Suitable encouragement and attention from teachers can go a long way in allowing the learners to shine.

One teacher suggested that:

Individual attention in teaching girl's mathematics helps foster a healthy classroom environment by making the learners feel seen and heard. Teachers should per attention to girls when teaching mathematics because it keeps learning learner-paced and enhances focus among learners by teachers.

The suggestions by the aforementioned HOD were also agreed the school manager, who said:

"individual attention is crucial in teaching mathematics as it helps teachers identify gaps in learners' understanding and provide them with the necessary guidance to nurture their skills. By paying individual attention, teachers can create a good bond between girls and themselves, which can lead to improved academic performance, increased motivation and engagement, enhanced self-esteem, and improved social and emotional well-being".

4.3.4. Teachers views on Strategies to improve girls' grades.

According to some teachers, one of the most effective strategies to improve girls' grades is to provide them with a supportive and inclusive learning environment. This includes creating a classroom culture where girls feel comfortable and confident to participate, ask questions, and share their opinions. Additionally, teachers can focus on building girls' self-esteem and promoting a growth mindset, which can help girls approach challenges with a positive attitude and persevere through difficult tasks. One HOD suggested:

The strategy of providing girls with targeted support and resources. This can include offering extra one-on-one help, providing additional practice materials, and tailoring instruction to meet their individual learning needs. Teachers can also work to identify and address any biases or stereotypes that may be impacting girls' performance in the classroom.

Some teachers suggest that it is important to involve parents and guardians in the process of improving girls' grades. This can include regular communication about their child's progress, as well as providing resources and strategies that parents can use to support their child's learning at home.

The aim of the study was to identify effective strategies that can be implemented to improve girls' performance in mathematics at secondary school level. Teachers were asked to suggest methods to help girls who struggle with mathematics. The HOD responded by stating that:

Encouraging girls to develop more interest in mathematics by teaching them in a way that matches boys' performance, using a variety of teaching methods that involve hands-on learning, motivating them by telling them that it is possible to get a distinction in mathematics, and reassuring them that no one is dull, and they too can excel if they put in the effort:

It's interesting to note that many teachers prioritize the practical application and real-life situations when helping their students. Additionally, a lot of them focus on improving their pupils' attitudes and interests in Mathematics by breaking down concepts into simpler terms and utilizing various teaching methods. By doing so, it seems that teachers can effectively engage their students and help them understand the importance of Mathematics.

5.0 Discussion of Findings

5.1 Causes of low performance of girls in Mathematics

The study revealed that some of the factors that were found to affect the teaching of girls Mathematics were related to the teachers. According to the study, inadequate experience in teaching the subject and a lack of pedagogical content knowledge and skills were the main factors that contributed to poor learner performance. To effectively engage learners in mathematical practices, it is important that teachers possess expertise and experience in the subject. This enables learners to develop a deeper understanding of mathematics. Teachers have a duty to teach learners mathematical instructions or language and its meaning based on the topic. The research revealed that teacher factors contributing to poor learner performance of mathematics are also encountered by international countries. For instance, in Pakistan, teachers' rigid teaching styles while teaching mathematics and students' lack of commitment and concentration in learning mathematics were identified as the major causes of poor achievement in mathematics (Hafiz & Hina, 2016). Similarly, in West Indies, factors such as ineffective teacher-centered methods that are employed in the classrooms were identified as contributors to girl's poor performance in mathematics (Harries & Bourne, 2017). It is evident that the traditional approach to teaching and learning is still dominant in these countries and has a negative impact on the teaching and learning of mathematics.

The findings of the research show that teachers' attitudes towards learners had an influence on performance. Majority of the managers said that if there is no good relationship between teachers and girls' learners then learners will grow negative attitudes towards mathematics these teachers teach and this will make it problematic for them to learn. This is in line with Wekesa (2013) who said that teachers' attitude towards Mathematics influence learners' attitude towards Mathematics as well as their success. In the same vein, Yara (2009) deep-rooted that teachers' attitudes towards the teaching of Mathematics plays a critical role in determining the attitudes of girls towards the learning of Mathematics. Adino (2015) who claims that a teacher's principles will inspiration his choice of Mathematics content, which he perceives contented or easy to teach, supports this. This finding is supported by the assertion that learners care more about how much a teacher relates to them than how much the teacher knows.

The literature confirmed that a significant factor that affects learners' performance in mathematics is the medium of instruction or language of learning and teaching in the subject and the learners' home language. It is difficult for the learner to read the questions with understanding and interpret the questions in the correct way since the language used in the

question paper is English. This leads to girl's poor performance, because learners will give incorrect answers because they do not understand the language. The literature also confirms that when learners are taught in a language that is not their mother tongue, learning becomes more difficult for them (Baker & Jones, 2011; Kafusha, Mwelwa, Mkandawire and Daka, 2021).

Most of the girls did not seem to identify shortcomings from their side. Blame was for example apportioned to parents, who according to Bandura (2009) and Kalumba, Daka, Kalimaposi, Phiri, Mulenga-Hagane and Mugala, (2023) their perceptions of girls 'competence predict girls own mathematics self-concept and performance. According to Schunk (2009) if teachers attend to boys more than they do with girls in mathematics classes, then girls are likely to have negative attitude towards the learning of mathematics. May be girls were right to say whatever, the teacher was unable to see and recognize the presence of girls in his class. Even when a girl raised her hand first, the teacher would wait until there was a boy whose hand was up so that he could point at him for an answer.

5.2. Strategies to improve girl's performance in Mathematics.

Findings further showed that female learners admired good personal qualities and techniques as well as teachers who are patient and explained things clearly. Desirable teacher qualities are reportedly linked to good subject knowledge, teaching skills and classroom managements, relationships with learners, dedication, accessibility, and hard work. It has been argued that "a common maximum in the educational profession is that one teaches the way one is taught" Thomas and Pedersen (2003). This suggests for example that an educator who was educated in an incompetent manner will have learnt bad practice and is likely to use such in teaching others. About this, Hiebert, Morris and Glass (2003:201) have stated, "People learn to teach, in part by growing up in a culture by serving as passive apprentices for 12 years or more when they themselves were students". When they face the real challenges of the classroom, they often abandon new practices and revert to the teaching methods their teachers used.

Van de Walle (2007), suggests that a learner-centered approach to teaching and learning mathematics is more effective than a teacher-centered approach. According to Mensah et al. (2013) and Silwamba and Daka (2021) positive attitudes towards mathematics are fostered by teacher-related factors such as teachers' enthusiasm, resourcefulness, and thorough knowledge of the subject matter. On the other hand, a lack of pedagogical knowledge in the subject can have a negative impact on learner performance, as a teacher who is not knowledgeable in a particular topic is less likely to teach it effectively. Teacher-centered methods can also contribute to low learner performance, as they often rely on a question-and-answer format

without allowing learners to work collaboratively or find solutions on their own. However, traditional professional development that is offered as a once-off event is often insufficient in providing teachers with the necessary pedagogical content knowledge (Chapman, 2015).

It was suggested that government employ more teachers (especially females) of Mathematics to handle the increasing number of pupils in schools. The government should provide all the necessary teaching and learning materials and give incentives to teachers of Mathematics as a way of motivating them so that they can effectively teach the subject.

Other strategies that teachers can use to motivate students in mathematics include, creating an engaging environment that connects learning to real-world meaning can help students to dream big and be lifelong learners, effective teachers focus attention on the less interested students as well as the motivated ones and teachers can develop creativity by encouraging students to think outside the box and come up with their own solutions to problems.

In conclusion, motivation is a key factor in teaching girls mathematics. By using effective strategies, teachers can help girls to engage and persevere in mathematical activities, and develop a lifelong love of learning mathematics.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The purpose of this study was aimed at coming up with strategies which can improve girls performance in mathematics Based on the findings and discussions, the following conclusions were drawn: After a careful analysis of the findings in the light of the study purpose, the researchers are of the view that, the strategies of improving girls performance in mathematics at secondary school level has the potential to improve the results in Mathematics drastically, the following major findings pose a serious threat to learner academic achievement: Poor pupil attitude, High Teacher-Pupil Ratio, low Parental Involvement and high Exposure to Social Media influence poor academic performance in pupils. The large classes of pupils have a negative bearing on the teaching and learning process in relation to quality of teaching. Consequently, the massive enrolment of school pupils leads to shortage of resources both human and material resources which constitute problems in the overall teaching and learning process in secondary schools.

Remedies to improve girl's performance in mathematics as mentioned in the findings of the study include, proper guidance to change the girls' negative attitude towards mathematics, Motivating the girls' and employing more qualified teachers of Mathematics to reduce the

teacher pupil ratio in schools. Reducing the amount of paper work for the teachers to give them time to prepare and to increase the number of hours for the final examination will also help to improve the performance of the pupils. Use of variety of teaching methods and the formation of mathematics clubs in the schools would be a great booster to the achievement of students in the subject.

6.2 Recommendations

In the light of the major findings above, the following recommendations are being proposed to ensure good academic achievement for girls in Mathematics at the school. Moreover, Parental involvement in education management must be strengthened and encouraged in order to enhance and improve pupils' performance. Other than that, Parental involvement must further be enhanced in order to regulate abuse of social media by pupils. Over and above, the enrolment of pupils in schools by the administrators must be commensurate with available human resource in order to minimize the high teacher-pupil ratio. In the same line, there is need to build more secondary schools in the country by both the government and cooperating partners to absorb the high number of pupils in the existing secondary schools and those in the out of school.

Furthermore, there is need for the administrators in schools to see to it that teachers in secondary school stimulate interest in Mathematics with different teaching methods. In a similar manner, there is need to train more teachers by the Examination Council of Zambia in the marking of Grade 8 and 12 mathematics examinations so that they could get insight of what is needed during marking. Since the findings in line with supply factors, pose a challenge, it would be prudent to enhance teacher training in marking to enhance quality instruction; to empower them with knowledge that would be transmitted to the pupils, who are key in the equation of academic performance in mathematics. In that way, pupils would know what to expect, which approach to use and how to present the work in the examinations for better results at Grades 8 and 12 level.

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