

Tackling Mathematics Underperformance: A Roadmap for SOS Herman Gmeiner School in Asiakwa

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ABSTRACT

This study examines the underlying causes of poor performance in mathematics among pupils at SOS Hermann Gmeiner Basic School in Asiakwa, Eastern Region of Ghana, and proposes effective strategies to address these challenges. Basic education serves as a crucial foundation for lifelong learning, equipping students with essential skills in literacy and numeracy, which are vital for personal and national development. Despite its importance, many students struggle with mathematics, leading to significant educational disparities. Employing a descriptive case study design, the research utilized questionnaires and unstructured interviews to gather data from students, teachers, and the head teacher. The analysis revealed several contributing factors to poor performance, including inadequate teaching methods, lack of qualified mathematics teachers, and negative student attitudes towards the subject. Additionally, environmental factors such as classroom conditions and parental involvement were found to play a significant role in shaping students' academic experiences. The study highlights the necessity for targeted interventions to improve mathematics education. Recommendations include the recruitment of qualified teachers, provision of adequate teaching resources, and the implementation of in-service training programs focused on innovative teaching methodologies. Furthermore, fostering a positive learning environment through the use of pupil-centred approaches and engaging activities can significantly enhance students' interest and performance in mathematics. By addressing these issues, the research aims to contribute to the broader discourse on educational reform in Ghana, providing insights that can inform policy decisions and teaching practices. Ultimately, this study seeks to empower students with the mathematical skills necessary for their future academic and career pursuits, thereby promoting overall educational equity and national development.

Keywords: Mathematics underperformance, student attitudes, teacher attitudes, learning environment, teaching methods, mathematics education, pupil-centered approach

INTRODUCTION

In Ghana, basic education is fundamental and compulsory for every child. It is expected to enable pupils acquire basic skills in literacy, numeracy and creativity. Additionally, it allows for personal development, intellectual autonomy, integration into professional life and participation in the development of the society and it also allows for a basis for lifelong learning and initial vocational guidance. It also offers a platform for diversity for children in the area of interest in order to master in skills and knowledge for the service of the country and the individual's personal existence [1].

Mathematics, which is one of the oldest fields of study in the history of mankind, has long been one of the most central components of human thought. It has been believed for centuries that mathematics sharpens the human mind, develops their logical thinking; enhances their reasoning ability and spatial power. It influences

an individual's personal development and contributes to the wealth of the country. This is mainly because it is at the heart of many successful careers and successful lives.

It is a way of life as it allows learners to organize experiences and use them in life, thus being useful to oneself and to the society. Mathematics gets widely regarded as one of the important subjects for entry into most of the careers or when intending to get further training. [2] stated that Mathematics is the bedrock and an indispensable tool for scientific, technological, and economic advancement for any nation. Mathematical skills for daily life are developed in school mathematics curriculum. For this reason, mathematics is one of the core subjects in all schools worldwide as explained by the amount of time devoted to it in schools. In many countries, it is compulsory in primary and secondary levels of education. Mathematics as a discipline has great input in the scientific and technological development of any nation [2]. Knowledge in mathematics is applied in almost every school subject. It is, therefore, significant that a lot of emphasis is laid on the teaching and learning of the mathematics from the basic level to the senior high school level. The study of mathematics in Ghana starts at the primary level through to the senior high and it is compulsory for all students because it is recognized as a tool in many other subjects (like chemistry, physics, geography, economics, and so on).

A major reason for the persistence of the special place held by mathematics in the school curriculum is the way in which it has been used in the last two centuries as a screening device, or filter, for entry to numerous professions [3]. In Africa, as in other parts of the world, mathematics enjoys a very prestigious position in school curriculum. In Ghana, efforts to enhance the effectiveness of mathematics education have included making mathematics a compulsory subject during the formative years of education [1]. Similarly, mathematics was and still is one of the core and compulsory subjects in basic education in Ghana. Furthermore, in all basic schools in Ghana, a student cannot pass to the next level unless he/she passes in mathematics. Here, it is privileged both in terms of the time devoted to it and the weighted mark assigned to it.

Despite the fact that mathematics is essential for daily life and plays a crucial role in school curriculum, student's performance generally remains very low [3]. This causes an outcry from educational authorities, mathematics teachers, mathematics educators, parents, and students. The importance of mathematics to an individual and society is acknowledged worldwide [4]. In Ghana, Mathematics is compulsory for every student sitting the West African Examinations organized by the West African Examination Council (WAEC). The trend of low performances in mathematics at both West African Secondary School Certificate Examination (WASSCE) and the Basic Education Certificate Examination (BECE) in the country is a case for concern. Implications are enormous as a good number of students may not gain admission to pursue career study of their choice and that may consequently affect the human resource base of the country.

Statistics from the Ghana Education Service and the Examination Council indicate that over the years, a significant majority of students—between 51% and 60%—have failed in mathematics [5]. At a 2016 conference for head teachers, Kandakai, Chairperson of WAEC, voiced her concerns regarding what she termed the “poor performance in mathematics” among candidates taking the West African Senior School Certificate Examination (WASSCE) and the Basic Education Certificate Examination (BECE) in the country. According to her, the results of candidates in Mathematics, over the years had not been encouraging with most candidates failing this subject which was critical in national development. Dr. Kandakai called for a concerted approach by stakeholders to address the challenge. Citing some examination results in Ghana from 2007 to 2018, [3], indicates that a graph representation of candidates results nationwide showed a fluctuated performance over the period and a sharp decline in the percentage aggregate of students that sat for mathematics. He said for instance the performance of candidates moved from 25 per cent passes in 2007 through 43 per cent in 2011, 49 per cent in 2012 and started declining from 36 per cent in 2013 to 32 per cent in 2014, 24 per cent in 2016, 20 per cent in 2017 and 15 per cent in 2018. According to him, the situation was not only peculiar to WASSCE but to various mathematics examinations written from primary level up to the university saying “the source of this problem begins in primary education”.

Also, a National Education Assessment (NEA) test carried out in 2013 in Ghana showed that students in Primary class three and six had difficulty in understanding numbers and numerals, basic operations in mathematics, measurement, shape and space as well as collect and handle data. Pupils who scored 35 percent on the NEA test were considered as having minimum competency in the subjects while those who scored 55

percent or even better had proficiency in the subject. This study however revealed that, for Primary Six Mathematics that year, only approximately 11 percent of pupils reached proficiency while 22 percent in Primary Three attained same. For both classes approximately 40 percent of pupils failed to achieve even minimum competency in Mathematics [1].

In summary, for any nation to progress and catch up with other developing countries, it should attach great importance to the teaching and learning of mathematics. Mathematics plays an important role in scientific and technological development of a nation. Indeed, mathematics is vital as it serves as training in itself, with the development of new techniques and concepts having scientific, economic, and sociological consequences for societal development needs.

Statement of the Problem

The performance of pupils in mathematics in the B.E.C.E in East Akim municipality of Ghana has remained poor for many years with an average score less than 49 percent. B. E. C. E results in mathematics over the past years 2012-2017, ranges between 19.2% to 48.2% the maximum [6]. The persistent poor performance in mathematics among pupils in the district, of which SOS Hermann Gmeiner basic school is not an exception, has raised concern over the years. Available B.E.C.E statistics from SOS Hermann Gmeiner basic school revealed the percentage of pupils who had at least grades one to six in mathematics to be: 2017 (32%); 2016 (34%); 2015 (37%); 2014 (41%); 2013 (46%) and 2012 (51%). [3] stressed on the need for educational institutions to adopt a new approach in the teaching and learning of mathematics. Although, there have been studies conducted on causes of poor performance in mathematics in a number of districts, no studies have been done to find out factors that contribute to pupils' poor performance in the subject mathematics in SOS Hermann Gmeiner basic school-Asiakwa, hence the impetus for this study.

Purpose of the Study

The purpose of the study is to investigate the causes of poor performance in mathematics among pupils of SOS Hermann Gmeiner Basic School in Asiakwa in the Eastern Region of Ghana. If the causes are ascertained, there will be a need to find strategies that can help deal with the problem.

Objective of the Study

The study has the following objectives:

- i. to examine school environment factors that contribute to poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school.
- ii. to examine teacher factors that contribute to poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school.
- iii. to investigate pupil factors that contribute to poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school.
- iv. to identify strategies to curb poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school.

Research Questions

The main questions that the research seeks to answer are as follows:

- i. What school factors contribute to poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school-Asiakwa?
- ii. What teacher factors contribute to poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school-Asiakwa?

- iii. What pupil factors contribute to poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school-Asiakwa?
- iv. What strategies can be used to curb poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school-Asiakwa?

Significance of the Study

The findings of the study will help students to identify the causes of poor performance in mathematics and make use of suggested remedies to enhance improvement. It will also provide mathematics teachers with information on the selection of suitable methods and resources for teaching and learning mathematics. The findings of this research will add to literature and provide evidence for further studies.

Delimitation

The scope and boundaries of this research covers the perceptions of pupils and teachers on the causes of poor performance of pupils in mathematics (school environment factors, teacher factors and pupils' factors) and strategies to curb poor performance. The research setting was limited to SOS Hermann Gmeiner basic school-Asiakwa in the East-Akim Municipality in the Eastern Region of Ghana.

Limitation of the Study

Ideally research of this nature should have covered majority of respondents but it was limited to Mathematics teachers, and pupils of SOS Hermann Gmeiner basic school at Asiakwa. Hence the findings were not generalized to other schools in the East-Akim District because not all of the learners in the area were used in the study. This may not, to the extent required, represent the view of the entire basic school population in the country. However, the findings of this research can be used as basis for further educational research.

METHODOLOGY

Introduction

The study employed two main tools for data collection: questionnaires and unstructured interviews. Questionnaires were selected to efficiently gather quantitative data from a large number of participants [7]. This method allowed the researcher to collect structured responses that could be analysed statistically to determine common perceptions and challenges related to mathematics performance. To complement this, unstructured interviews were used to collect qualitative data from teachers. As [8] suggests, interviews offer a conversational style that helps uncover deeper insights, particularly regarding teachers' attitudes and challenges in teaching mathematics. This qualitative data provided a richer context for understanding the root causes of underperformance, which would not have been captured through quantitative data alone.

Research Design

This study adopted a case study design to explore the causes of poor mathematics performance at SOS Hermann Gmeiner Basic School. Case study research, allows the exploration and understanding of complex issues. The case study method was selected because it gives an in-depth examination of real-life issues within their specific contexts [9]. As noted by [10], case studies are particularly useful when the boundaries between the phenomenon and context are unclear, making them an ideal choice for educational research, where the school environment, teaching methods, and student behaviours are closely interrelated. Recognized as a tool in many social science studies, the role of case study method in research becomes more prominent when issues with regard to education are raised. Through case study method, the researcher would be able to go beyond the quantitative statistical results, involving the causes of poor performance of pupils and strategies to curb the poor performance, and understand the behavioural conditions through the pupils and teachers' perspectives. Case study helps explain both the process and the outcome of a phenomenon through complete observation, reconstruction, and analysis of the case under investigation [10]. It is as a result that this study used the

descriptive case study design.

To gather data, both quantitative and qualitative methods were employed, ensuring a comprehensive understanding of the problem. Questionnaires were used to collect data from a broad sample of students and teachers, allowing the study to quantify perceptions and attitudes toward mathematics. As [11] argue, questionnaires are an efficient way to collect data from a large population and can be easily analysed to identify patterns and trends. In addition to the questionnaires, unstructured interviews were conducted with teachers to gather qualitative insights. This method was chosen for its flexibility and ability to elicit detailed, personal experiences from participants, which were crucial for understanding the subjective factors influencing teaching efficacy and student engagement [12]. By combining these methods, this study employed a mixed-methods approach, which [13] recommend for addressing complex issues. The use of both quantitative and qualitative data allowed for triangulation, which enhanced the reliability and depth of the findings

Population of the study

The population of this study comprises of 289 pupils and 18 teachers of

SOS Hermann Gmeiner basic school in Asiakwa totalling 307 as contained in Table 1.

Table 1 Population of Pupils and Teachers

| Levels | Male | Female | Total |
|--------------|------------|------------|------------|
| Primary 1 | 23 | 14 | 37 |
| Primary 2 | 12 | 18 | 30 |
| Primary 3 | 12 | 19 | 31 |
| Primary 4 | 15 | 20 | 35 |
| Primary 5 | 15 | 11 | 26 |
| Primary 6 | 17 | 15 | 32 |
| JHS 1 | 19 | 15 | 34 |
| JSH 2 | 22 | 11 | 33 |
| JHS 3 | 15 | 16 | 31 |
| Teachers | 10 | 8 | 18 |
| Total | 160 | 147 | 307 |

(Source: SOS Hermann Gmeiner Basic School, 2018)

As shown in Table 1, the target population was 307 made up of 191 Primary pupils, 98 Junior High School pupils and 18 teachers.

Sample and Sampling Technique

The sample frame comprised of 80 (81.63%) out of 98 JHS pupils using Krejcie and Morgan’s Table for determining sample size from a given population. Additionally, 10 (83.33%) teachers out of 12 from the junior high school were selected for the focus group discussion, making a total of 90.

Sampling is a method of obtaining representative data or observations from a group (lot, batch, population or universe) [14]. A stratified random sampling technique was used to ensure all classes JHS 1, JHS 2 and JHS 3 pupils were equally represented from the school respectively. [15] noted that stratified sampling assist to overcome situations where a section of the population was under or over represented. Each identified strata of

the population were taken into account by stratified random sampling. According to [16], at times it is advisable to subdivide the population into smaller homogeneous groups to get more accurate representation.

Simple random sampling was subsequently employed in each subgroup. Each pupil in each class was given a number as they appear in the register and cards were put in a box. Random sampling was then used for selecting 27 pupils each from JHS two and three and 26 from JHS one accordingly. 80 pupils were selected in all, thus 45 boys and 35 girls. Two JHS teachers of mathematics, the administrator and the head teacher of the school who were perceived to be relevant to the study were consequently purposively selected as respondents in addition to other 6 JHS teachers making a total of 10. In all 10 teachers participated in the study. [17] says Purposeful sampling allows the researcher to select those participants who will provide the richest information, those who are the most interesting, and those who manifest the characteristics of most interest to the researcher. It is the researcher's firm opinion that considering the structure of the population of study, the sample is very representative of the population as possible and the sampling techniques employed considered other relevant factors (all things being equal) in the population that might threaten the validity of the study.

Research Instrument

The questionnaire and an unstructured interview guide were the main instruments used in data collection in this study. The questionnaire for the study was divided into five (5) main sections: A, B, C, D and E under the major headings: demographic information, school environment factors that cause poor performance in mathematics, teacher factors that cause poor performance in mathematics, pupil factors that cause poor performance in mathematics and strategies to curb poor performance in mathematics. Section A was used to elicit responses on participants' demographic characteristics. Section B: was used to elicit responses on school environment factors. Section C: considered the teacher factors. Section D: was on pupil factors and finally Section E: dealt with participants' views on strategies to improve performance in mathematics. The questionnaire was made up of both open and closed ended items. The five points Likert rating scale of strongly agreed, agreed, uncertain, disagreed and strongly disagreed was adopted for the study.

In order to consolidate the information that was obtained from the questionnaires, an unstructured interview guide was used to conduct a focus group interview with 10 teachers. The instruments were first subjected to criticisms by experts in education faculty, University of Cape coast. This was done in order to make the instrument measure what it was set to measure. A pilot study was carried out at one Basic School in Asiakwa in the East Akim Municipality which was not included in the main study. This involved 20 pupils and 7 teachers to ensure the validity (face and content) and reliability of the questionnaires and focus group interview schedule. A pilot study was conducted to estimate the predictive validity of some type of questionnaires by follow up observations of respondent behaviour at the present time or at some time in future [17].

The pilot study was carried out to check the appropriateness of the language used in the questionnaire as well as determining the difficulty of the instrument items. This enabled the researcher to update the research instruments by making corrections and adjustments based on observations made. This enhanced the face and content validity of the instruments before their final administration. The purpose for the pre-test also was to ascertain the suitability of the items on the questionnaire and also to aid in refining it if found unsuitably. [18] asserts that the needed alteration also can be made in the data collection methods so that data in the main study may be analysed more effectively. On the basis of the pre-test results, the researcher was able to determine the suitability of the questionnaire in measuring the variables of the study. The pre-testing also provided an insight into the strategies of the field work to the researcher. It also afforded the researcher an idea about the time to be allotted to complete the final questionnaire. The Statistical Package for Social Sciences (SPSS) was used by the researcher to analyse the responses of the respondents. The reliability of the instrument was determined using Cronbach alpha. The internal consistencies in the various variables obtained were very high. The Cronbach alpha value obtained for school environment factors, teacher factors, pupil factors, and strategies to curb poor performance in mathematics are all above 0.7.

Data Collection Procedure

The questionnaire was self-administered by the researcher. The questionnaire was administered to pupils with

the help of Guidance and Counselling teacher. The pupils were then assembled in a class. Then the instructions were read to the pupils and the purpose of the research was explained to them. Teachers' questionnaires were also administered through the head teacher. These were followed by the focus group discussion. Adequate time was spent with respondents as they go through and answered the questions and those who needed help in terms of clarifications, interpretation and writing were assisted accordingly.

However, 80 copies of the questionnaire were administered but 79 copies were returned. Out of the returned copies of questionnaire, only 78 were completely filled. Thus, a total of 78 copies completed which represent 97.5 % of the total number of the administered were collected and utilized for the purpose of the study. A Focus Group interview was conducted with a group of 10 teachers. Questions were asked to teachers and the responses were recorded word by word as they were given. This was to consolidate the information that was obtained from the questionnaires earlier on.

Data Analysis

In relation to the related research questions and the items displayed in the questionnaire, descriptive statistics was used to analyse the questions. Data collected was analysed in two ways. Data from the questionnaire (pupils) were analysed quantitatively. Also, Data from the focus group interview (teachers) were analysed qualitatively by categorizing, describing and explaining. Quantitative data collected on research questions one to four on the pupils' questionnaires were analysed using simple statistical procedure like distribution tables and percentages. Data gathered on the questionnaire were edited and collated. The completed questionnaires were serially numbered for easy identification and the statistical package for social sciences (SPSS) was used to analyse the data based on tables, frequencies, and percentages. Frequency distribution tables and percentages used were for the purposes of summarizing or reducing the data gathered from the field to manageable form. Percentage was used as a single indicator to provide simple summaries about the perceptions of the respondents on research questions one, two, three and four accordingly. Summaries of all responses under each item was then given, thus illustrating the percentages that Strongly Agreed, Agreed, were Undecided, Disagreed or Strongly Disagreed. This approach was appropriate for easy application of the assessment criteria. Also, data from the focus group interview were transcribed, edited, and organized under emerging themes.

Ethical Issues

The purpose of the research was explained to the respondents before they were allowed to give any piece of information. Great efforts were made to protect the participant's privacy. Prior to administering the questionnaire or interviews, all participants were asked to sign a letter of informed consent. The form clearly outlined what would be happening in the study, and informed them that they had the right to refuse to participate. Firstly, permission was sought from the head teacher to carry out a study in the school. After permission was granted by the head teacher, permission was also sought from each individual class teacher of SOS Hermann Gmeiner School-Asiakwa.

RESULTS AND DISCUSSION

Introduction

The research focused on causes of poor performance in mathematics among JHS pupils of SOS Hermann Gmeiner School in Asiakwa. This section presents and analyses the data collected for the study. Discussions of the findings are also presented. The results are presented and discussed in accordance with the research objectives and questions in various sections. A total of 78 copies of the questionnaire fully completed by the JHS pupils which represent 97.50 percent of the total number administered, were collected and utilized for the purpose of the analysis.

Analysis of the Main Data

Research Question One: what school factors contribute to poor performance in mathematics among pupils of

SOS Hermann Gmeiner basic school-Asiakwa?

Several studies have either shown a positive or negative effect of school environment factors on learners’ performance in mathematics at school. Items 4 – 11 on the pupils’ questionnaire were used to elicit responses from participants. A summary of the responses is presented in Table 2

Table 2: School Environment Factors that Contribute to Poor Performance in Mathematics

| Items | Response | | | Category | | |
|--|-----------|----------|-----------|-----------|-----------|---------|
| | SA | A | Und. | D | SD | T |
| Ineffective career counselling | 39(50) | - | - | 5(6.4) | 34(43.6) | 78(100) |
| Bad assessment strategies | 6(7.6) | 23(29.5) | - | 3(3.9) | 46(59) | 78(100) |
| Inadequate qualified teachers/less experienced staff | 71(91.03) | 7(8.97) | - | - | - | 78(100) |
| Inappropriate or poor teaching methods | 28(35.9) | 14(18) | - | 36(46.1) | - | 78(100) |
| Inadequate teaching materials of math | 42(53.85) | 26(33.3) | - | 10(12.85) | - | 78(100) |
| Overcrowded or large classes | 23(29.48) | 4(5.13) | 6(7.7) | - | 45(57.69) | 78(100) |
| Inadequate facilities like libraries | 11(14.1) | 15(19.2) | - | 29(37) | 23(29.7) | 8(100) |
| Infrequent supervision by authorities | 19(25) | - | - | 29(37) | 30(38) | 78(100) |
| Overloaded syllabi/curriculum | - | 25(33) | - | 23(29) | 30(38) | 78(100) |
| Vision of the school | 13(16.7) | - | 11(14.07) | 54(69.23) | - | 78(100) |
| Overloaded syllabus | 8(10.26) | - | - | 70(89.74) | - | 78(100) |

(Source: Field Data, 2018)

Key: SA-Strongly Agreed, A-Agreed, Und-Uncecided., D-Disagree, SD-Strongly Disagree

Table 2 illustrates the responses of 78 respondents (pupils) with regards to the school factors that contribute to poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school in Asiakwa. A look at the Table shows that all the respondents (100%) were of the opinion and agreed/strongly agreed that inadequate qualified teachers/less experienced staff is the main school environment factor that contributes to poor performance in mathematics among pupils. In addition, majority of the respondents strongly agreed 42(53.85%) and agreed 26(33.3%) that inadequate teaching materials and resources of mathematics is a school environment factor that contributes to poor performance in mathematics among pupils. On the issue of ineffective career counselling 39 (50%) strongly agreed, 5 (6.4%) disagreed and 34 (43.6%) strongly disagreed. In addition, 11 (14.1%) of the respondent strongly agreed; 15 (19.2%) agreed, 29 (37%) disagreed and 23 (29.7%) strongly disagreed to ‘inadequate facilities like libraries. On the other hand, a total of 49 (62.9%) strongly disagreed/disagreed and were not of the view that bad assessment strategies is a factor that cause poor performance in mathematics and only 29 (37.1%) agreed. Also, on the factor ‘overcrowded or large classes’ whereas 45 (57.69%) strongly disagreed, only 23 (29.48%) strongly agreed and 4 (5.13%) agreed and 6 (7.7%) were undecided. A whopping majority 53 (67%) disagreed that ‘overloaded syllabus’ is a factor that cause poor performance in mathematics while only 25 (33%) agreed to that factor.

Key findings from Table 2 identify both general and teacher-specific factors affecting student outcomes, particularly in the areas of teacher availability, instructional methods, attitudes, and professional support.

Teacher Availability and Qualifications: The availability of qualified mathematics teachers plays a crucial role in students’ understanding and engagement. Schools with adequately trained teachers tend to report better performance outcomes as qualified teachers can present complex mathematical concepts more effectively. The shortage of qualified teachers limits instructional depth and can lead to disengagement and confusion among students. This finding supports prior research by [11], which shows a strong link between teacher qualifications and student performance.

Teaching Methods and Pedagogical Approaches: Effective pedagogy is essential for fostering positive learning experiences in mathematics. Teacher-centred methods—primarily lecture-based instruction—often reduce student engagement by limiting opportunities for active learning. In contrast, student-centred approaches, such as problem-solving and collaborative activities, encourage students to interact with the material directly, leading to higher engagement and understanding [19]. Supporting teachers in adopting interactive teaching methods could, therefore, create a more conducive environment for learning mathematics.

Teacher Attitudes and Expectations: Teachers’ attitudes toward students significantly shape student motivation, self-confidence, and performance. When teachers hold positive views of their students' abilities and set high, yet attainable expectations, they create a classroom culture that promotes resilience and engagement. Conversely, low expectations may unintentionally discourage students, leading to a cycle of disengagement and underperformance [20]. Thus, fostering an environment where teachers maintain high expectations is vital for enhancing student achievement.

Professional Development and Support: Professional development is a key strategy to enhance teaching quality and subsequently improve student performance. Regular training that focuses on student-centred methods and effective classroom management can equip teachers with the skills needed to engage students fully. Providing opportunities for teachers to develop and refine their instructional techniques is essential for supporting a positive learning environment in mathematics.

Overall Impact of Teacher-Related Factors on Student Performance: Collectively, these teacher-related factors within the school environment—availability, teaching methods, attitudes, and professional support—are integral to student outcomes in mathematics. Addressing these factors with targeted interventions can significantly improve students' engagement and success in the subject.

Research Question Two: what teacher factor contributes to poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school-Asiakwa? Items 12 – 23 on the pupils’ questionnaire and 15-26 on the teachers’ questionnaire were used to elicit responses from participants. Table 3 presents the summary of the responses

Table 3: Teacher Factors that Cause Poor Performance in Mathematics

| Items | Response | | | Category | | |
|--|-----------|-----------|--------|----------|--------|---------|
| | SA | A | Und. | D | SD | T |
| Negative attitude of math teachers | 62(79.48) | 16(20.52) | - | - | - | 78(100) |
| Teachers’ knowledge of mathematics content | 11(14.1) | 23(28.9) | - | 27(35) | 17(22) | 78(100) |
| Designing teaching methods in conjunction with learners’ thinking and ability teachers’ beliefs about pupils | 66(84.62) | 12(15.38) | - | - | - | 78(100) |
| Ability to do mathematics is low | 20(57.7) | 25(32.1) | 1(1.3) | 32(41) | - | 78(100) |

| | | | | | | |
|--|----------|-----------|---------|----------|--------|---------|
| Teachers use textbooks directly in class to teach | - | 31(39.74) | 2(2.56) | 45(57.7) | - | 78(100) |
| Low expectations in relation to pupils learning | 11(14.1) | 23(29.4) | - | 30(38.5) | 14(18) | 78(100) |
| Low pedagogical content knowledge and poor teaching strategies | 49(62.8) | 23(29.5) | - | 4(5.1) | 2(2.6) | 78(100) |
| Striking pupils in class as a way of punishment | - | - | - | 73(93.6) | 5(6.4) | 78(100) |

(Source: Field Data, 2018)

Key: S.A-Strongly Agreed, A-Agreed, Und-Undecided., D-Disagree, SD-Strongly Disagree

With regards to teacher factor that contribute to poor performance in mathematics among pupils, it is observed from Table 3 that all the respondents 100% unanimously agreed and were of the view that negative attitude of mathematics teachers and the inability of teachers to design teaching methods in conjunction with learners' thinking and ability were teacher factors that affects the achievements of pupils in mathematics. 57.7% of the respondents indicated that they strongly agree/agree that 'teachers' beliefs about pupils' ability to do mathematics is low', while 41% disagree, and 1.3% were however undecided. On the issue of low pedagogical content knowledge and poor teaching strategies, while 62.8% strongly agreed and 29.5% agreed, only 7.7% disagreed/strongly disagreed. Also, all the respondents 100% disagreed that caning is not a teacher characteristic that influence pupils' performance in mathematics. The study sought to find out teacher factors that cause poor performance of pupils in mathematics in SOS Hermann Gmeiner basic school in Asiakwa. The research revealed that, most of the respondents indicated that negative attitude of mathematics teachers; the inability of teachers to design teaching methods in conjunction with learners' thinking and ability; and poor teachers' beliefs about pupils' ability to do mathematics; were identified as the major teacher factors that contributes to poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school-Asiakwa.

The findings align with the views of [19], who examined the attributes of mathematics teachers that can facilitate changes in the teaching and learning of mathematics, as well as in students' attitudes toward the subject. The study also considered best practices for mathematics instruction, such as knowledge of content and pedagogy, in conjunction with understanding learners' thinking, which can stimulate and sustain students' interest in mathematics.

Research Question Three: what pupil factors contribute to poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school-Asiakwa? Table 4 provides information given by respondents.

Table 4: Pupils Factors that Contribute to Poor Performance in Mathematics

| Factors | Response | | | Category | | |
|--------------------------------|-----------|-----------|--------|-----------|---------|---------|
| | SA | A | Und. | D | SD | T |
| Negative attitude of pupils | 37(47.43) | 39(50) | - | 2(2.57) | - | 78(100) |
| Low academic ability of pupils | 47(60.25) | 23(29.48) | - | 5(6.41) | 3(3.86) | 78(100) |
| Negative Self-concept | 30(38.45) | 34(43.6) | 1(1.3) | 8(10.25) | 5(6.4) | 78(100) |
| Cultural background | 13(16.67) | 11(14.1) | - | 54(69.23) | - | 78(100) |
| Anxiety and fear | 64(82.05) | 8(10.25) | - | 6(7.7) | - | 78(100) |
| Lack of interest | 42(53.84) | 26(33.3) | - | 10(12.86) | - | 78(100) |

| | | | | | | |
|-------------------------------|-----------|----------|---------|-----------|-----------|---------|
| Bad experiences | 45(57.7) | 4(5.13) | 6(7.69) | 23(29.48) | - | 78(100) |
| Failure to accept counselling | 11(14.1) | 15(19.9) | - | 29(37) | 23(29) | 78(100) |
| Pupils see math as difficult | 48 (61.5) | 8(10.25) | - | - | 22(28.25) | 78(100) |

(Source: Field Data, 2018)

Key: S.A-Strongly Agreed, A-Agreed, Und-Undecided., D-Disagree, SD-Strongly Disagree

From Table 4 it is clear that majority of the respondents 60 (82.05%) strongly agreed, 8 (10.25%) agreed and only 6 (7.7%) disagreed to the factor ‘anxiety and fear’. On the issue of negative attitude of pupils towards mathematics 47.43% of the respondents strongly agreed, 50% agreed, only 2.57% disagreed and none strongly disagreed. A total of 49 (62.83%) strongly agreed/agreed and were of the view that bad experiences of mathematics lessons cause poor performance in it and 23 (29.48%) disagreed. However, 6 (7.69%) were undecided.

Further, on the issue of lack of interest and bad study habit, whereas 42 (53.84%) and 26 (33.3%) strongly agreed or agreed and were of the view that lack of interest and bad study habit cause poor performance in the subject, only 10 (12.86%) strongly disagreed. In addition, 48 (61.5%) of the respondents strongly agreed; 8 (10.25%) agreed; and 22 (28.25%) disagreed to the fact that pupils see math as a difficult subject. 14.1% strongly agreed; 19.9% agreed; 37% disagreed and 29% strongly disagreed to the factor ‘failure of pupils to accept counselling’. Finally, on ‘negative self-concept’, 30 (38.45%) strongly agreed; 34 (43.6%) agreed; 8 (10.25%) disagreed; 5 (6.4%) strongly disagreed and 1 (1.3%) remained undecided.

Ranking the responses of the respondents, it is obvious that anxiety and fear of the subject is the main pupil factor that contributes to poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school-Asiakwa. Pupils negative attitude toward mathematics, bad experience witness during mathematics lesson and negative self-concept were other factors revealed in the study that causes poor performance in mathematics among pupils.

Research Question Four: What strategies can be used to curb poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school-Asiakwa? Table 5 presents the responses of pupils

Table 5: Strategies to Curb Poor Performance in Mathematics among Pupils

| Suggestions | Freq. | Percent |
|--|-------|---------|
| Developing positive attitude towards mathematics | 76 | 97.44 |
| Provision of qualified and trained mathematics teachers | 74 | 94.87 |
| Using appropriate methods of teaching mathematics | 71 | 91.03 |
| Provision of adequate and relevant mathematics materials | 66 | 84.62 |
| Proper supervision and inspection by authorities | 63 | 80.77 |
| Provision of additional libraries and mathematics laboratories | 58 | 74.36 |
| Provision of additional classrooms and furniture | 33 | 42.31 |
| Helping pupils do homework | 32 | 41.02 |
| Motivating pupils to learn | 31 | 39.74 |
| Adopting and using of computers by mathematics teachers | 30 | 38.46 |

| | | |
|---|----|-------|
| Learners may combine several approaches to learning | 27 | 34.61 |
| Pupils need to do the work required of learners. | 23 | 29.48 |
| Helping learners to develop a positive self-concept | 19 | 24.36 |

(Field data, 2018)

A critical examination of the data in Table 5 indicates that, majority 97.44% of the respondents were of the view that developing positive attitude by both pupils and teachers; motivation and proper guidance to pupils can help in improving pupils’ performance in mathematics. 94.87% were of the view that provision of qualified and adequately trained mathematics teachers can help in improving the performance of pupils in the subject. 91.03% were of the view that using appropriate methods of teaching, particularly child-centred approaches can help in improving the performance of students in the subject. 84.62% were of the opinion that provision of adequate and relevant mathematics teaching materials can help in improving the performance of students in the subject. 74.36% were of the view that provision of libraries and mathematical laboratories can help in improving the performance of students in the subject. 80.77% were of the opinion that proper supervision and inspection of mathematics teachers can improve the performance of students in the subject.

Ranking the perceptions of majority of the respondents it could be adduced from the study that: pupils developing positive attitude towards mathematics, provision of qualified and adequately trained mathematics teachers; using appropriate methods of teaching were identified as the major strategies to curb the poor performance of pupils in mathematics. Developing positive attitude by pupils and teachers, motivation and proper guidance to pupils; particularly child-centred approaches; provision of adequate and relevant mathematics teaching materials; provision of libraries and mathematical laboratories; and proper supervision and inspection of mathematics teachers are some other ways suggested as ways of improving the performance in mathematics among the pupils of SOS Hermann Gmeiner.

The finding is quite consistent with the views of [20] who found out that creation of positive attitude toward mathematics, provision of proper staffing, provision of instructional materials, developing good rapport with the parents, provision of libraries and laboratories, reducing teacher-student ratio, cooperative and child-centred approaches in teaching mathematics are some of the ways of improving performance in mathematics in students. Other areas where this study tally with the studies cited include the monitoring of mathematics lessons, completion of syllabus as well as administering more examinations and quizzes as ways of improving performance in mathematics in students.

Responses from Focus Group Discussion.

To support the findings of the quantitative analyses on the causes of poor performance in mathematics among pupils in SOS Hermann Gmeiner basic school-Asiakwa, focus group discussions were held with 10 teachers. This portion presents the findings on the focus discussions.

Teachers’ Responses from Focus Group Interviews

Question One: What do you think makes pupils lack interest and develop negative attitudes toward Mathematics?

Several teachers pointed out that pupils’ reluctance to seek clarification when they face challenges significantly contributes to their negative attitudes toward the subject. One teacher remarked: "Many students are afraid to ask questions in class because they fear embarrassment. This leads them to stay confused, which eventually turns into disinterest."

Another teacher echoed this sentiment, stating: "When students don't understand a concept and don't ask for help, they start thinking they're not good at math. Over time, this belief makes them disengage."

Question Two: What do you think makes pupils perform poorly in Mathematics?

The teachers consistently identified lack of interest and negative attitudes as key reasons for poor performance. One teacher noted: "Students often come into the class already thinking they can't do math, and that mindset is hard to change."

Another added: "When students lose interest, it's difficult to get them back on track. They stop paying attention and fall behind, which only reinforces their belief that they're bad at math."

Question Three: How can you help pupils who have no interest or develop negative attitudes toward Mathematics?

Teachers suggested several ways to rekindle students' interest in mathematics, with an emphasis on making lessons more engaging and providing additional support for struggling students.

One teacher mentioned: "We need to make the lessons more practical and relatable to their daily lives. When students see the relevance, they are more likely to engage."

Another teacher said: "Helping students understand concepts they struggle with is crucial. Sometimes they just need a little extra attention to gain confidence."

Some teachers also stressed the importance of having the right resources: "We don't have enough materials to make the lessons interactive. If we had more teaching aids, like visual tools and technology, it would be easier to keep students interested."

Analysis of Interview Feedback

The responses from the teachers provide valuable insights into the challenges they face in fostering student engagement with mathematics. Many of the teachers identified students' fear of asking for help and preconceived negative attitudes toward the subject as major barriers to learning. This highlights the need for creating a classroom environment where students feel comfortable seeking clarification and are encouraged to take ownership of their learning. Moreover, the teachers' reflections on their own responsibility in cultivating a positive attitude among students demonstrate an awareness of the impact their teaching methods have on student outcomes. One teacher admitted: "Sometimes we're part of the problem, especially if we don't make an effort to make the lessons interesting or fail to support students who are falling behind." This candid acknowledgment suggests that teachers recognize the need for a shift toward more student-centred teaching practices, which could help change students' perceptions of mathematics.

The feedback also reveals a lack of resources as a recurring issue, further contributing to the challenges faced in the classroom. Teachers expressed a strong desire for more interactive tools and materials to make learning more enjoyable and effective for students.

The feedback from the focus group interviews paints a clear picture of the factors contributing to poor mathematics performance: student attitudes, teaching methods, and inadequate resources. The teachers' insights align with the findings from the student questionnaires, reinforcing the need for targeted interventions such as enhanced teacher support, better classroom resources, and a focus on creating a more inclusive and engaging learning environment.

SUMMARY OF KEY FINDINGS

The main findings of the research were that:

1. Inadequate qualified teachers/less experienced staff and inadequate teaching materials and resources of mathematics are the main school environment factors that contribute to poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school in Asiakwa.
2. Negative attitude of mathematics teachers and the inability of teachers to design teaching methods in conjunction with learners' thinking were identified as the major teacher factor that contribute to poor

performance in mathematics among pupils of SOS Hermann Gmeiner basic school in Asiakwa.

3. anxiety and fear of mathematics is the main pupil factor that cause poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school-Asiakwa.
4. Developing positive attitude towards mathematics, provision of qualified and adequately trained mathematics teachers; using appropriate methods of teaching were identified as the major strategies to curb the poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school-Asiakwa.

CONCLUSION

On the basis of the findings of the study the following conclusions are drawn. The research findings have established that pupils have interest and positive attitude as they come to school. They however lose interest and develop a negative attitude due to the way some mathematics teachers deliver their lessons; using teacher centred methods and not assisting pupils who lag behind or are faced with challenges.

The factors which were found to have changed the nature of pupils interest and attitude towards learning mathematics and causes poor performance were identified as inadequate qualified teachers/less experienced staff and inadequate teaching materials and resources of mathematics; negative attitude of mathematics teachers and the inability of teachers to design teaching methods in conjunction with learners' thinking; and anxiety and fear of mathematics were revealed to be the factors (school environment, teacher and pupils factors) that contribute to poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school-Asiakwa. This study also sought to establish strategies to curb the poor performance in mathematics at SOS Hermann Gmeiner basic school in Asiakwa. The study found that pupils developing positive attitude towards learning mathematics, provision of qualified and adequately trained mathematics teachers and teachers using appropriate methods of teaching were the major strategies to curb the poor performance in mathematics among pupils of SOS Hermann Gmeiner basic school-Asiakwa

RECOMMENDATIONS

In the light of the findings of the study and conclusions, the following recommendations are made:

1. the appropriate authorities and management should employ qualified teachers, provide enough teaching and learning resources and organize in-service trainings for mathematics teachers with regard to teaching methods and use of teaching resources.
2. teachers should be encouraged and resourced to use pupil centred methodology in most of their teaching time to arouse pupils' interest and positive attitude in the learning of Mathematics.
3. The school should improve staffing of qualified mathematics teachers to curb the pupils' poor background at this level and provide an opportunity for in-service activities in the school for non-professional teachers. In addition, there should be regular refresher courses organized for the qualified teachers as well.
4. Guidance and counselling unit should be set up in the school to guide and counsel students on academic, personal and social issues affecting students. This will help them change their views with regard to mathematics and can help in improving their performance in it.
5. Quizzes and competitions among pupils should be organized.

Suggestions for Further Research

This study could not investigate into how interest and attitude affect performance in schools, the type of teaching methods employed by the teachers, whether the textbooks in use at schools arouse the interest and attitudes of learners and teachers and how teachers could cultivate and maintain interest and attitude in

learning mathematics in basic schools. These are areas that could be investigated in future. This will enable stakeholders have a comprehensive view about the topic.

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