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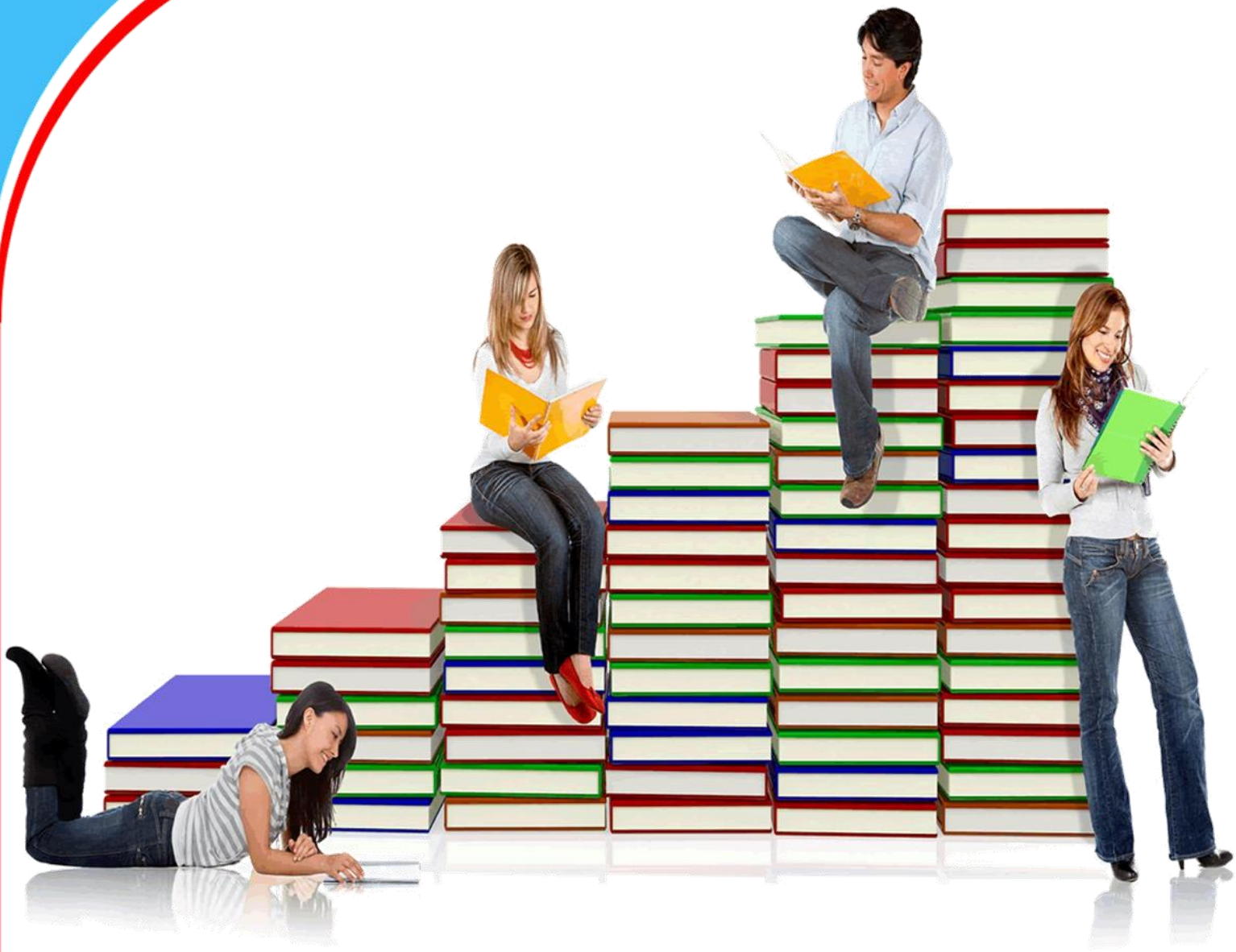

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Coverage of Core Mathematics Syllabus among Senior High Schools in Ghana: The Case of Sagnarigu Municipality

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Abstract

As far as students' academic performance in the West Africa Secondary School Certificate Examination is concerned, coverage of syllabus among other factors has been identified as key. The purpose of the study was to investigate the perceived factors that influence core mathematics syllabus coverage in Senior High Schools in Ghana. A qualitative research approach with case study design, guided by four research questions and semi-structured oral interview guide as well as questionnaire were used in the study. Participants were selected using a purposive and convenient sampling techniques. The data was analysed in themes and presented on frequency tables. The study found that national education policies, Covid 19 pandemic, school programs, and teacher/students-related issues were the perceived factors that influenced coverage of the core mathematics syllabus. The study employed the Goal Setting and self-Efficacy theories. The instrument was pretested by the researcher to determine its validity. It was therefore recommended that government should provide schools with textbooks, furniture, teaching and learning materials, more classrooms, library, laboratories as well as motivate teachers with better conditions of service.

Keywords: *Syllabus Coverage, Core Mathematics, Double Track, Covid 19*

1.0 INTRODUCTION

Mathematics education is considered essential for everyone. According to Isack (2015), mathematics can be seen as the science of reasoning and calculations. To Isack, mathematics enables a person to make the unseen more visible hence, resolving difficulties that would have been difficult to solve. The continuous decline in students' performance in mathematics is a global challenge. Dennis et al, (2018) revealed that performance in Mathematics continues to decline globally. For Example, Isack, (2015) revealed that students' performance in Mathematics in Tanzania continued to decline over the years. According to Rasmussen, Heck, Tarr, Knuth, White, Lambdin & Barnes, (2011) the demand for mathematics among students rises as they move higher through the academic ladder; take up life responsibilities at home as adults and in their workplaces. In other to fit properly into the recent mathematically inclined society, school children should build a very solid basis in mathematics much better than the mere request of routine information. The increasing demand of balancing the globalization and traditions drove education policy-makers to concern about how the curriculum could achieve the sustainable development for the young (Namukasa, I., 2004).

The major purpose of the mathematics syllabus in Ghana will encourage all young people in Ghana to improve their precise abilities, intuitions, attitudes, and ethics in mathematics that they would need to succeed in their selected occupations in their everyday lives (CRDD, 2010). As the mathematics syllabus is a spiral one and gets more complex as the years go by, if at the end of every year certain topics in the syllabus are not completely covered, there will be breaks in the students' understanding and that will definitely have an impact in their performance as stated in the basic (JHS) syllabus (Dennis, Mereku and Alhassan, 2018 ; Mereku, 2012). It was for the improvement of performance that the government of Ghana and other stakeholders in the education sector launched a number of initiatives to encourage efficient and effective mathematics instruction, with the goal of making the subject more enjoyable and exciting to study. For example, in 2003, the Ministry of Education (MoE) reviewed the teacher education syllabus in collaboration with the Teacher Education Division (TED) and converted all Initial Teacher Training Colleges (ITTCs) to diploma awarding institutions with the goal of improving teachers' content knowledge and pedagogical skills in a variety of areas of study. In addition, the senior high school syllabus was revised in 2010. In order to improve the quality of teachers produced in the country, teacher training colleges were elevated as accredited institutions to award degrees in 2018.

All these contributions, however, have not yielded the needed results as performance still declines as the years pass by. Studies in Ghana such as Eshun-Famiyeh (2008) and Denis et al (2018), revealed that mathematics remains one of the most difficult subjects in the school curriculum. This was reflected in students' performance over time. According to the report of the chief examiner (2018), students' performance in core mathematics in WASSCE (2017) has declined, especially when compared to 2016. Similarly, in the WASSCE group, performance in mathematics decreased in 2021 compared to the previous academic year. Considering a report from 2022 EN analytics on top 100 SHS for Mathematics and Science the only school in the region which has been considered as one of the best schools in the region ranked 18th.

Although literature abounds on many of these factors, there is insufficient literature on factors that influence the coverage of the core mathematics syllabus in Senior High Schools in Ghana. Since coverage has been identified as one of the factors that influences students' performance in mathematics, this work sought to examine the factors that influence coverage of the core mathematics syllabus in Senior High Schools in the Sagnarigu Municipality in the Northern Region of Ghana.

Problem Statement

Being a determining subject for schools in most countries, passing mathematics has widely been considered as a pre-requisite for onward progression on the academic ladder and ultimate effective functioning as a citizen. Isack (2015) revealed that the performance in Mathematics had been poor that government had to adopt a technique to improve students' performance in the subject through maximum utilization of teachers of mathematics accessible as per strategies. To enhance teaching pedagogy, the study revealed that teaching practices like problem-solving and use of visual aids in mathematics class could motivate students and increase their desire to learn. Isack revealed that teachers were encouraged to use student-centred approach, a method that necessitates teachers to vigorously involve students in the teaching and learning procedure (Isack, 2015). A study conducted by Musasia, Nakhanu and Wekesa (2012) revealed that performance in mathematics in the Kenya Certificate of Secondary Education Examination (KCSE) was so poor that greater efforts were put into coverage of the syllabus. They revealed that in attempt to improve performance, some parents arranged and paid for extra tuition for their children to complete the syllabus. They recommended that for teachers and students to cover the syllabus, they had to put in extra teaching time, maximum standard of discipline, better past academic records, frequent teaching to ensure all topics in the syllabus are completely covered.

It is worth noting however that, works on syllabus coverage and performance in mathematics are rare in the Ghanaian context. For instance, and Musasia et al. (2012) , Kipyegon (2013), and Mutegi (2014) conducted their studies in Kenya. The only related research done in the central region of Ghana is attributed to Dennis et al. (2018). This suggests that, no such study has so far been conducted at the Northern part of Ghana, the study therefore intends to fill the geographical gap identified. Aside the geographical gap, some key differences were seen from the limited studies conducted from the body of literature. While Musasia identified learner and teacher absenteeism as a major factor to have caused lack of coverage of the syllabus, Dennis et al identified that some teachers had difficulties in teaching some topics thereby skipping them. Kipyegon and Mutegi on the other hand worked against some pre-planned objectives as the influence of teaching methods and mathematical language, availability of textbooks, teacher motivation, teachers' strike, planning, school resources and time management.

These few differences in the identifiable factors responsible for the coverage of the mathematics syllabus provide some level of suspicion regarding the possibility of discovering more interesting findings. The current study therefore situates itself within an entirely different geographical area coupled with a different target group in comparison with the work of Dennis et al. (2018) to find out what the outcomes could be. These gaps from the related literature, provided the justification for the current study which sought to investigate the factors that influence coverage of the core mathematics syllabus in Senior High Schools in Sagnarigu Municipality in Northern Ghana.

Objectives of the Study

The study sought to:

i) Determine the extent of coverage of the core mathematics syllabus at Senior High Schools in Ghana.

ii) Identify the factors that influence the coverage of the core mathematics syllabus at Senior High Schools in Ghana.

Research Questions

i. What is the extent of coverage of the core mathematics syllabus by the 2022-year group among senior high schools in the Sagnarigu Municipality?

ii. What are the factors that influence the coverage of the core mathematics syllabus among senior high schools in the Sagnarigu Municipality?

2.0 LITERATURE REVIEW

Theoretical Underpinnings

The study was guided by the goal-setting theory. According to Mutegi (2014) goal-setting theory is one of the fundamental theories governing performance. Edwin Locke propounded the Goal-setting theory in 1968. The theory believes that one of the most essential roles for goal-setting is that it inspires one for superior performance. The reason is that the employee is working towards attaining their goals and if not successful, the employee either advance their performance or adjust the goals and ensure they are much representative; that way the performance is enhanced and that is expected in the performance managing scheme. This also suggest that a person who has a goal work so hard to achieve it and that motivates them for higher achievements. Goal-setting is not a panacea to achievement however, it guides one through the path of success. A failure after a goal calls for more efforts and precautions for a better success. This then suggests that there will be lack of focus, indecisiveness, boredom and idleness if one fails to set a goal in life. Goal-setting motivates us to achieve higher goals which we may or may not have targeted. According to Ahmed, Kola and Yurtkoru (2017), the elementary grounds of the theory claim that a prearranged goal could serve as performance persuader. In this study the *Goal* refers to the total number of contents earmarked by the core mathematics syllabus to be covered within the period of three academic years, which comprise six (6) academic semesters. *Goal setting* therefore imply the long-term mandate placed on both mathematics teachers and their students to cover the required mathematics contents. The WASSCE serves as the official summative assessment body that measures the extent to which the goal is achieved by teachers and students.

Another theory guiding this study is the self-efficacy theory propounded by Albert Bandura in 1977. Self-efficacy is one's seeming proficiencies for learning or accomplishment of actions at a chosen level (DiBenedetto, Miele, Schunk and Wentzel , 2022). According to Bandura, the self -efficacy theory is the theory that states that people judge their competence to achieve certain levels of performance. This theory relates to our feeling and altitude of the confidence that we can achieve from desired outcomes. Self -efficacy is one's belief in one's ability to succeed, understanding self- efficacy one will be able to understand teachers and student's altitude towards mathematics. The altitude one has will help in the way one view the objectives, content, methods and evaluate strategies in solving mathematical problems (Kamau, 2020). Schunk and Usher (2012) asserted that self -efficacy has an impact on learning, motivation, achievement, and self- regulation. They revealed that self-efficacy can influence students' desired activities, efforts-expanded, persistence, interest and achievement. Students with higher self-efficacy are active participants, hardworking, have longer persistence, have much desire for learning and perform better as compared to their counterparts who doubt their own capabilities (Wentzel et al., 2022).

A persons believe in their self-efficacy is governed by command of experiences, vicarious experiences, communal persuading and expressive states. Self-efficacy theory underpins the current study in the sense that, since self-efficacy is a function of one's proficiency for learning (DiBenedetto, Miele, Schunk and Wentzel , 2022), it explains why the extent of coverage of the core mathematics syllabus influences one's feelings, attitudes and confidence towards the WASSCE core mathematics. As explained by Bandura (1977), people, and WASSCE candidates in this case, judge their competence to achieve in the WASSCE core mathematics even before they take the paper. A student who covered the entire syllabus three months before the exam is obviously more confident than his/her counterpart who covered only half of the contents to be covered within the period. The experience of high self-efficacy is associated with people with resilience, misfortune and pressure, hale and hearty life conducts better workers' presentation, and instructive attainment. The combination of goal-setting and self- efficacy theories are the theories underpinning the current study. Thus, the extent of coverage of

the core mathematics syllabus produces, to some extent, feelings of competency, preparedness and readiness for the WASSCE. The factors that determine coverage of the syllabus, when identified scientifically could lead to other related variables such as preparedness and good performance as far as the WASSCE is concerned.

Teacher/Student Related Issues

Dennis et al., (2018) investigated the extent to which the proportions of syllabus covered by teachers affect student's performance, it was revealed that teachers in high performing schools were able to complete about 62% of the Mathematics Curriculum Material (MCM) in the previous year meaning about 38% of the MCM was not taught according to the questionnaire. The findings also revealed that about 50% of the teachers had challenges in two topics, Linear Equations and Inequalities in JHS 2 and Enlargement and Similarities in JHS 3. Further observation revealed that there were collectively two contents in each year's curriculum that were skipped by most teachers during execution. The skipping was as a result of challenges faced by those teachers to teachers to handle such topics (Dennis et al., 2018). The stated that the mathematics syllabus is a twisting one and widens in context and cope and get more complex as the learner climbs up, if some topics are therefore left untaught at the end of the years, there will be a disconnection in students' learning with regards to the curriculum and that will have a great impact on their performance (Mereku, 2003).

Disruption of contact hours is a conscious or unconscious interference in teaching and learning due to planned or unplanned co-curricular activities, illness, meetings, workshops, strikes etc. Teachers and learners sometimes stay away from class during contact hours to attend to several things aside teaching and learning and these habits influence syllabus coverage. Example, the municipal organized sporting activities take about two weeks to end and a qualifying school proceeds to the regional and even national level. A space of about one month disruption of contact hours. Union organized workshop and seminars such as GNAT/CTF workshop though meant to update teachers and improve performance, take from three days to a week to end. In a study, Mutegi (2014) revealed that a notable number of respondents in his study agreed that events like sporting, music and drama festivals occur during regular lessons' periods. The participants noted that their schools lost some considerable amount of time participating in such activities hence, limiting their syllabus' coverage.

Absenteeism is one of the most challenging factors with negative effects on education such as low performance, school dropout and early marriages in developing countries. A study conducted by Ameeq, Fatima,Hassan, & Jabeen (2018) stated that there has been a considerable efforts by developing countries to put their children in the school. They asserted that Elementary education and instructive achievement are outward as one of the major vehicles for encouraging economic development and improving the standards of living. Though they revealed that students' absenteeism has no significant impact on performance, it can reduce the pace of teacher in the lesson delivery. A recent study by Gul, Niamatullah, Rab, Shah & Shaheen (2020) affirms that absenteeism had no any significant influence on students' performance, rather teachers absenteeism does. The study revealed that inadequate teacher motivation and low salary were foremost reasons for absenteeism among teachers which influence learners' absence and disturb value teaching and learning, and influencing learners' academic achievements. Their work opines that there are numerous factors that influence teacher absenteeism at the lower level such as class structure, family causes, superiority and professional standing, ill health, teachers attending to other social functions, inadequate accommodations forcing teachers to look for accommodation outside the community, distance from school, improper service condition, teachers' further education, scarcity of water and the slow processing of new recruited teachers' salaries were some of the causes of teacher absenteeism in that community. Their study proposed that all teachers be supervised appropriately and given both financial and non-financial motivations that will regulate absenteeism of teachers. This study also appeals for

better treatment that will minimalize teacher absenteeism and improve learners' performance in the lower level (Shaheen et al., 2020).

Though Musasia et al. (2012) argue that both teacher and learner absenteeism influence non-coverage of the syllabus others researchers such as (Shaheen et al., 2020) believe that teacher absenteeism has higher impact on learners' performance even if all other factors remain unchanged. Absenteeism of teachers was noted to be obviously connected to the performance of students. The study shows that greater level of teacher absenteeism rate attracts lesser performance in academic work, and lesser teacher absenteeism rates causes better students' scores. The researcher asserted that the continues absenteeism of teachers was noteworthy adverse influence on the students' class accomplishment; causes the learner not to progress to a higher educational level, affects students' success, it is considered the most essential learners tend to distract their class activities in the absence of their teacher, teacher absenteeism as a matter of fact, is the cause of syllabus incompleteness due to reduction of instruction period (Ameeq et al., 2018; Shaheen et al., 2020).

Time management refers to the method of planning and exercising mindful control of time consumed on precise activities, particularly to upsurge success, efficiency, and productivity. It is the constant and goal-oriented submission and exercise of showing labour methods in such a way that handling oneself and location becomes unproblematic while the period available for one is spent in the utmost expressive means probable. Abdul , Kadri, & Eissa1 (2015) identified that time management involves goal- setting, arrangement, preparation, hesitation and ways of managing with it, note taking, perusal and knowledge strategies, managing pressure affects people's aptitude for better use of time and giving sense of concerns control power to them. Oliejniczak (2013) stated that the persons who misuses their time the maximum, frequently grumble about deficiency of time. Our time, time of other colleagues and family should be preserved as a treasured, but limited wealth. A good strategy is the foundation for ideal and eloquent use of time. Some activities teachers engage in, before, during and after the lesson delivery are serious distractors of time. It is on the basis of effective time management that Ghana Education Service (GES) advocated for the preparation of Lesson notes before delivery. Musasia et al. (2012) in a study revealed that parents pay for extra tuition for their wards to cover the syllabus. They argued that coverage is not just enough but there is the need for teachers and students to revise the syllabus before the final examination. So many factors were considered by the Curriculum Development Division before the writing of the syllabus, if only teachers manage their time well, the syllabus would be covered on time. Dennis et al. (2018) in a study revealed that Ghanaian teachers have more teaching hours in mathematics than the internationally accepted time.

Teaching method is the over-all principles, pedagogy and management strategies used during an instruction. Teaching methods can be seen as the set of procedures, activities and resources used during an instruction. The type of teaching methods used are influenced by the teacher-characteristics (gender, age, experience and competencies), learners, learning environment and resources. Kipyegon (2013) identified teacher experience and competences as factors influencing students' performance. This revelation suggests that teaching methods of a teacher is influenced by his experiences and competencies. Mabena, Mokgosi & Ramapela (2021) explains that Mathematics provides an advantage to outshine as a teacher and to impact the knowledge with egotism and sureness to learners, as a lifetime experience one gets a sense of becoming a better and more excelling teacher on daily basis, emphasizing that experience is actually a good teacher. There is no doubt that a teacher with several years' work experience has more knowledge in the subject and better teaching methods than newly trained teachers. Mark (2015), stated that teacher effectiveness is as a result of motivation. Though the 'type of students' can affect Teaching method, if a teacher is motivated to teach, his effectiveness would call for more teaching strategies to handle every type of student at any level.

Covid-19 Pandemic

The Coronavirus (2019) also known as Covid-19 disease was a world- wide pandemic that affected the 2022 candidates while they were in their first year. The disease was caused by SARS-CoVID-2, a new strain of coronavirus from SARS-CoVID. The disease started in a city call Wuhan in China somewhere around the last quarter of 2019. According to (Upoalkpajor & Upoalkpajor, 2020), the World Health Organization (WHO) Director-General publicized the outburst of the pandemic on 30th January, 2020. They opine that, the COVID-19 widespread on the earth has affected multitudes of students, whose school closings have further caught them, their families and teachers by surprise. From January- May 2020, about 90% of African countries were on lock-down which effect was so massive on the 2022 candidate students who were in form one and had to stay at home for almost a year confirming the assertion by (Upoalkpajor & Upoalkpajor, 2020) who revealed the outcome of the lock down to be; loss of classes for some students, while others were trying online education regularly with its opposing challenges with networks and also psychosocial comfort and motivational effects. These difficulties point to a dangerous breach in school-based necessity preparation inside broader education sector eagerness arrangement and alternative management (Upoalkpajor & Upoalkpajor, 2020).

National Policies/School Schedules

Supervision remains one of the most effective ways of ensuring productivity in any organization and education is not an exception. (Whincup et al., 2016), explained supervision as the professional accountable, two-way procedure, which ropes, inspires and allows development of upright repetition for individual social care workers. This in effect deliver excellences of facilities provided by the organization. According to (Idogho & Agholor, 2013) inspectors and Supervisors do not check school archives such as lesson notes, scheme of work, diary, attendance registers as well as teaching facilities such as chalk boards, projected and non-projected aid, infrastructural and non-infrastructural materials that will not only improve and accelerate teaching and learning process, but creates a comfortable and enabling environment for the teachers and the students. For Supervision and inspection of schools to be effective all stakeholders should change their orientation towards the running of schools. The ministry should assign credible supervisors and inspectors to schools for inspectorate services (Idogho & Agholor, 2013)

In order to bring about improvement in school, teachers have an important role to play. The teachers are vested with authority to implement the tasks and activities that would promote effective growth and development of students. They need to implement the teaching-learning methods in such a manner that would not only enable the students to achieve academic goals, but also turn out to be effectual citizens of the country. To carry out their job duties in an appropriate manner and accomplish the desired outcomes, it is essential for the teachers to be motivated towards the implementation of their job duties. They need to augment their skills and competencies, primarily required in enhancing the overall system of education. In addition, it is vital for the teachers to enhance their professional skills and abilities. Depicting professionalism in their conduct would enable them to render an effective job performance.

The 2010 Ghana Education Service Core Mathematics Teaching Syllabus

The syllabus comprises of 29 units to be covered in three academic years with SHS 1 being assigned 13 units; SHS 2 covering 12 units while SHS 3 covering four (4) units. The units' topics have been arranged in a teaching sequence for each year. In all, the major areas of the content to be covered in the Senior High School classes are; Numbers and Numerals, Plane Geometry, Mensuration, Algebra, statistics and Probability, Trigonometry, Vectors and Transformation. Table 1 below shows the breakdown of the topics.

Table 1: Core Mathematics Contents/Units

Unit	SHS 1	SHS 2	SHS 3
1	Sets & Operation of sets	Modular Arithmetic	Construction
2	Real Number System	Indices & Logarithms	Mensuration II
3	Algebraic expressions	Simultaneous Linear Equations	Logical Reasoning
4	Surds	Percentage II	Trigonometry II
5	Number Bases	Variations	
6	Relations & Functions	Statistics II	
7	Plane Geometry	Quadratic Equations	
8	Linear Equations & Inequalities	Mensuration I	
9	Bearings & Vectors in a plane	Plane Geometry II (Circle Theorems)	
10	Statistics I	Trigonometry I	
11	Rigid motion I	Sequence & Series	
12	Ratio & Rates	Rigid motion II & Enlargement	
13	Percentage I		

Source: (CRDD, 2010)

3.0 METHODOLOGY

The study used the qualitative research approach. A self-administered semi-structured interviews guides and oral interviews were used to generate the data for the study. The interview guide constituted both closed and opened -ended items. The validity (trustworthiness) of the instrument (structured interview) was established before the field work. Trustworthiness is the main extent to which a concept, conclusion, or measurement is well-founded and likely corresponds accurately to the real world. In otherwise, it is the degree to which an idea is precisely measured in a quantitative study (Heale & Twycross, 2015). The instrument was pre-tested for its dependability and students and teachers' responses were analysed. During the pre-test, the researcher established that some items needed more explanation for better clarification. Mutegi (2014) pointed out that the combination of positive comments makes an instrument apprehensively suitable, valuable and trustworthy; thus, producing statistics whose discovery and interpretations can be a factual replication of the study's sample. There was a peer review and scrutiny of the interview guide to ensure its trustworthiness.

To ensure credibility, the word sequencing, arrangement as well as the questions on the document were skilfully controlled in the interview in a way that all participants answered the same questions. Cohen et al. (2012) explained wording as a crucial factor when dealing with matters that affects the attitude of a person. He further explained the reliability (trustworthiness) been interfered with when words, situation and accents are different. It happens so because the questions are not the same for all participants. The researcher subjected the students to the same questions for both written and oral interviews, the same applied to teachers as they equally answered the same set of questions (Teddlie & Tashakkori, 2011). The interview questions included opened ended question to be able to ascertain the sentiments, feelings and insights of the participants. There were also closed ended questions. The researcher varied the questions to certify the instrument's validity and reliability (Cohen et al., 2012). They confirmed that all the items in the tool are demonstrative of the whole document area being measured as epitomized by the variables and objectives of the study (Silverman, 2015).

It was determined by guaranteeing that all the purposes and variable quantity of the study were addressed as stated in the study. Brink, (1993) opines that validity in research should be about the accuracy and honesty of scientific findings. For example, the researcher scanned through various responses before taking the interview guides and where there was an unclear response, there was as a

follow up question to avoid misinterpretations and falsifications of findings. To guarantee the credibility of the instruments, it was established under a clear direction of the supervisor. Schools and teachers were purposefully selected. In each school, teachers who had taught in the school for three (3) or more years were selected. Four (4) teachers from five schools and three (3) selected. In all, twenty-three (23) mathematics teachers and 91 form three (3) students, a total of 114 participants from six (6) selected senior high schools participated in the study. For the students, a minimum of three students were conveniently select from each programme in the schools.

The sampled students per program of study comprised of 44 males and 47 females giving a total of 91 students. The number of students selected in each programme was a proportion of the total enrolment in the programme. Participants were interviewed about the factors perceived to influence syllabus coverage in their schools. The first research question sought to establish the level of syllabus coverage. The content of topics to be covered as stated in the 2010 teaching syllabus for core mathematics was attached to the interview guide for both teachers and students to indicate the topics taught and those yet to be treated. The interpretive case study analysis was used to analyse the data which were thematically analysed on frequency tables.

4.0 FINDINGS

Research Question One

What is the extent of coverage of the core mathematics syllabus by the 2022-year group among senior high schools in the Sagnarigu Municipality?

The table below show the extent of coverage of the SHS 1 syllabus by the 2022 candidates which was taken about three (3) weeks before the final exams. Out of the 91 students who participated in the study only about 4.3% covered the entire syllabus and also, out of the 23 teachers only about 1% covered the syllabus. The data on the table showed that so much was yet to done in form one. The 2010 syllabus is designed such that students need to study some topics to enable them progress to the next level so if at the end of the day students have all 13 topics in arrears, it means that students need to do a lot on their own in other to be able them understand the next topic or pretend to progress with the class. Dennis et al, (2018) affirms that mathematics is spiral and if at the end of the certain topics are left and untaught, there will be breakages in students' learning.

Table 2: Extent of Coverage of SHS 1 Core Mathematics Topics by Student

SN	Uncovered Topic	Frequency	Percentage
1.	Ratio and Rates	46	51%
2	Percentages I	38	42%
3	Rigid Motion I	32	35%
4	Bearing and Vectors in a plain	28	31%
5	Relations and functions	20	22%
6	Linear Equations and Inequalities	12	13%
7	Plain Geometry I	11	12%
8	Algebraic Expressions	10	11%
9	Real Number System	10	11%
10	Surds	10	11%
11	Sets and Operations	9	10%
12	Number Bases	9	10%
13	Statistics I	9	10%

Source: Field Data, 2022

The data from the table of SHS 1 extend of coverage above shows that all 13 topics in form 1 classes were not completely taught in all the schools. Though some schools completed most of the topics, it was observed that some form 1 topics were still in arrears throughout the municipality. The most untaught topic was Ratio and Rates. Sets and operations, Number Bases and Statistics I were the topics that were mostly taught in the schools. In an interview, some students revealed that though Set and Operations of sets was the first topic in the syllabus, it was not handled as their first topic. The study revealed that though the private schools still had some form one topics to cover, they had better coverage than the public schools.

The table below shows the extent of coverage for the form two topics. Similarly, each of the topics were still in arrears from one class to another. The private schools were still doing better in terms of coverage as compared to the public school. Some of the students through the interview complained that they still had most of their form two topics untaught and that was worrying because most of the exam questions usually come from form two topics. In an interview a teacher in school revealed that since the GES had their syllabus and WAEC also had theirs and time was so limited, they concentrated on the WAEC syllabus to prepare the students to write the exams.

Table 3: Extent of Coverage of SHS 2 Core Mathematics Topics by Student

SHS 2	Uncovered Topics	Frequency	Percentage
1	Percentages II	47	52%
2	Rigid Motion II and Enlargement	41	45%
3	Sequence and Series	39	43%
4	Mensuration I	34	37%
5	Variation	25	28%
6	Trigonometry I	19	21%
7	Quadratic Functions	16	18%
8	Plain Geometry II (circle Theorem)	15	17%
9	Statistics II	13	14%
10	Simultaneous Equations	10	11%
11	Modular Arithmetic	8	9%
12	Indices and Logarithms	8	9%

Source: Field Data, 2022

A similar experience was revealed in the form two data. All the 12 topics were still in arrears throughout the municipality. No topic was completely taught by all the schools. Percentages I was in much arrears while Modular Arithmetic and Indices and Logarithms were mostly taught with a percentage of 9% uncovered.

The table below shows the analyses of form three extend of coverage. Also, all the four topics were still in arrears from one school to the other and one class to another. Level of coverage here was equally not a good story because about three weeks to the commencement of the WAEC some teachers were yet to start with form three topics.

Table 4: Extent of Coverage of SHS 3 Core Mathematics Topics by Students

S/N	Uncovered Topics	Frequency	Percentages
1	Logical Reasoning	53	58%
2	Mensuration II	46	41%
3	Trigonometry II	33	36%
4	Construction	31	34%
5	No Responses	8	9%

Source: Field Data, 2022

Table 4 represents the Extent of Coverage of SHS 3 Core Mathematics Topics. The responses of the students showed that much was yet to be done in the form three (3) class though they were just about to commence the WASSCE. Though the responses revealed that each of the students had covered more than half of the topics in the syllabus, the results showed that the form three (3) topics were the most uncovered topics and Logical Reasoning was the modal untaught topic.

The table 5 below shows the level students' syllabus coverage in core mathematics. Out of the ninety-one (91) students, ninety (90) of them representing 99% had not covered their syllabus. The extent of coverage was about 99% no and only 1% yes even though it was through private tuition. During an interaction with one of the private school's principal, the retired educationist revealed that the syllabus are usually on uncovered.

Table 5: Interview Responses of Students' Extent of Coverage of Core Mathematics Topics

S/N	Coverage	Means of coverage	Frequency	Percentage
1	No	-	90	99%
2	Yes	Private	1	1%

Source: Field Data, 2022

The researcher also sought to discover the mathematics teachers' extent of syllabus coverage. The topics were also presented to them to select the topics that were completely covered and their responses were also recorded and displayed on the table 6 below. Unlike the students' interview, the teachers' responses showed that about nine (9) topics were completely taught and discarded and that lead the researcher into probing further. After assessing the interview results, it was discovered that even in the same schools, some classes had better coverage than others. It was also observed that the convenient sampling techniques used by the researcher may have caused the variation in results. If the researcher had interviewed each teacher and their own students the result may have been closed. It was as a result of that variation that the researcher could not calculate the percentages of coverage for each school.

Table 6: Extent of Syllabus Coverage of Topics at the End of the Three (3) Year Course by Teachers

S/N	Uncovered Topics	Frequency	Percentage
1	Logical Reasoning	12	52%
2	Percentages II	9	39%
3	Bearing and vectors in a plane	7	30%
4	Ratio and Rates	7	30%
5	Sequence and Series	7	30%
6	Rigid Motion II and Enlargement	7	30%
7	Rigid Motion I	6	26%
8	Percentage I	6	26%
9	Plane Geometry II	6	26%
10	Trigonometry I	6	26%
11	Mensuration II	5	22%
12	Mensuration I	4	17%
13	Trigonometry II	4	17%
14	Statistics II	4	17%
15	Variation	4	17%
16	Relation and functions	4	17%
17	Construction	3	13%
18	Quadratic Function	2	9%
19	Statistics I	2	9%
20	Plane Geometry I	1	4%

Source: Field Data, 2022

That notwithstanding, it is still clear from the data that logical reasoning remained the most untaught topic in the Senior High Schools in the municipality. In an interview, some teachers admitted that logical reasoning was one of their challenging topics and they help themselves by calling colleagues to help them. In some schools they organised in-services training to help such teachers. The following responses were recorded from students and teachers regarding syllabus coverage.

i. *Student BBU2: No, we have not even finished some form one topics.*
ii. *Student CBU2: We just started with form three topics last week but our teacher is good so we will finish.*
iii. *Student BAS3: Because I didn't have a math teacher in my first and second years. We still have more to cover.*
iv. *Student CAS1: After the Corona, GES could have removed the double track and allow us to stay in school to learn.*
v. *Student FGS3: They have made our syllabus so broad that some of our teachers organize extra classes and yet cannot cover.*
vi. *A1: Previously when we were running the termly programme, we could cover the syllabus but ever since we started with double track, we are not able to cover the syllabus due to the breaks.*

Conclusion

The research results revealed the extent to which the core mathematics syllabus was covered by the 2022 candidates. The interviews brought to light that all 29 topics, each was in arrears in one school or the other with Logical reasoning being the most untaught topic from both teachers and students' responses representing 58% of students' responses and 52% of teachers' responses. Modular arithmetic and Indices and Logarithms both representing 9% of students' responses and Plane Geometry I representing 4% of teachers' responses were the most treated topics according their responses. During an interview with some of the teachers, the researcher wanted to know whether it was only because of time that some of the topics such as Logical Reasoning, Mensuration I & II, Rigid Motion I & II, Percentages I & II and so, were mostly untaught. Some of the teachers revealed that a number of teachers had challenges handling some of the topics confirming (Dennis et al., 2018) who revealed that teachers skip content because they have challenges handling one or two of the topics in the syllabus. The interview also revealed that the 2022 batch of candidates had a lot of untaught topics outstanding before their final paper though their responses revealed that some of them did not even know the number of topics taught and those yet to be taught following lack of textbooks. This affirms Behnke (2018) who stated that textbooks do not only control what topics and ideas are imparted; they also suggest how they should be taught.

Out of 91 student participants who were asked whether their syllabus was covered, 90 students representing 99% had not covered the syllabus, the only student who had covered the syllabus admitted he did that through extra classes affirming (Musasia et al., 2012) who opine that to cover the mathematics syllabus, both teachers and students need to put on extra teaching and learning time. On the teachers' interviews, level of coverage was revealed to be better than the students' report though there was no coverage. Unlike the students' report, teachers interview responses revealed that nine (9) out of the 29 topics were completely taught, 12 teachers could not teach Logical Reasoning and one (1) teacher was yet to teach Plane Geometry I. Though one (1) teacher revealed that out of the number of classes he handled, he had covered the syllabus in one of the classes but that did not reflect in the students' interview, probably, no student from that class was covered in the study. Generally, syllabus coverage as was revealed by both teachers and students was less than 5% meaning that there was nothing like revision of syllabus as proposed by (Musasia et al., 2012) who revealed that students who finished the syllabus had a better mean than those who could not and those who finished early and

revised before the exams had better mean than even those who finished without revision confirming (Cross, Mittelmeier & Whitelock, 2016) who asserted that as students revise, they reflect back their learning, discover new learning and prepare for their exams.

Research Question Two

What are the factors that influence the coverage of the core mathematics syllabus among senior high schools in the Sagnarigu Municipality?

This research question sought to identify the factors that influence coverage of the Syllabus. The 2010 Core Mathematics Syllabus for Ghana Senior High Schools currently has seven (7) scopes which are divided into 23 content areas with some content being divided into two. In all, twenty (29) topics are to be covered within three academic years. The Ghana second cycle (Senior High Schools) academic calendar comprises two (2) semesters with each lasting for 16 weeks. The WASSCE Core Mathematics paper comprises of two written papers with paper I been 50 multiple - choice questions and paper II, the essay (subjective) typed questions. All the questions are drawn from each of the 29 topics in the syllabus. To ascertain the factors influencing coverage of the syllabus, both teachers and final year students were interviewed and the identified factors were classified under the following broad themes: National Education policies, Covid-19 Pandemic, School policies, teacher and student-related issues.

Table 7 below displayed the factors that influence coverage of the syllabus classified under the various themes. Ninety-three (93) different factors were revealed by the teachers to have influenced the coverage of the Core mathematics syllabus and out of which 33, representing 36.3% were related to the Ghana National Education policies directed by the GES. The Covid 19 pandemic which was a natural phenomenon rated second with a percentage of 29.7% on the list. School programmes/schedules rated 23.1%. Teachers and students- related issues were the least on the list both rating approximately 7% each. It was gathered from both teachers and students' responses that if all the factors classified under national and school programmes are addressed, the teacher and student related factors will be reduced if not resolved.

Table 7: Factors that Influence Syllabus Coverage as Perceived by Mathematics Teachers

S/N	Themes	Frequency	Percentages
1	National Policies	33	36.3%
2	Covid 19 Pandemic	27	29.7%
3	School Programmes/ Schedules	21	23.1%
4	Teacher-Related Issues	6	6.6%
5	Student-Related Issues	6	6.6%

Source: Field Data (2022)

Ghana as a nation runs a central educational curriculum where, major planning, decisions and policies are formulated from the central educational administration, Ministry of Education (MOE) in Accra and Ghana Education Service (GES) which is the main agency that is responsible for implementation of policies in basic school is expected to implement such decision and policies. The results of the study suggested that National Education policies were one of the major factors that influenced coverage of the syllabus. The results obtained by both final year students and the mathematics teachers identified the following as the specific National Education Policies that influenced the coverage of the Coverage Mathematics Syllabus; lack of supervision, double track system, intermitted school breaks, removal promotion and repetition, inadequate school resources and teachers.

The novel Coronavirus (2019) also known as Covid-19 disease was a one-time world- wide pandemic that affected the world from 2019-2022 which effects still linger around the globe. The disease was caused by SARS-CoVID-2, a new strain of coronavirus from SARS-CoVID. The disease started in a

city of Wuhan in China somewhere around the last quarter of 2019. According to Upoalkpajor & Upoalkpajor (2020), on 30th January, 2020 the World Health Organization (WHO) director-General declare the outbreak. They opine that, the COVID-19 widespread on the face of the earth has affected multitudes of students, whose schools were closed in amazement of their teachers, parents and stakeholders of education. From January- May 2020, about 90% of African countries were on lock-down which effect was so massive and affected the current form three students who were in form one and had to stay at home for almost a year confirming the assertion by Upoalkpajor & Upoalkpajor, (2020) that the outcome of the lock down brought loss of classes for some students, while others were trying on-line education regularly with its opposing challenges of network and power outages, psychosocial comfort and motivational effects. These difficulties point to a dangerous breach in school-based necessity preparation inside broader education sector eagerness arrangement and alternative management (Upoalkpajor & Upoalkpajor, 2020). The students and teachers admitted that the Covid 19 break affected lesson for a period of about nine months.

The interview also revealed that school programmes such as sporting activities, Morning Assemblies, Weeding, Quiz and Competitions, Home Science Practical etc were activities which wasted more contacted hours. They also added that lack of school facilities such as classrooms, furniture, and library and computer laboratories was also of the determining factors that affected syllabus coverage. The HOD of one of the schools revealed there always a delay in commencing classes in morning because some students sometimes occupy some of the classes and the teacher will have to look for another place for the class or wait for them to close. He added that lack of furniture also distracts lessons in the sense that when the children don't have furniture, the teacher would have to wait for students to get furniture from other classroom before the lesson commences. To him, due to lack of furniture, sometimes two students can sit on a single dusk and while a lesson is going on, they also engage in their own activities and that can distract the teacher.

Both students and teachers also affirm that teacher and students' related issues such as absenteeism, time management, teaching method, disruption of contact hours, punctuality, truancy, indiscipline, laziness etc also affected syllabus coverage. Absenteeism is one of the most challenging factors with negative effects on education such as low performance, school dropout and early marriages in developing countries. A study conducted by Ameeq, Fatima,Hassan, & Jabeen (2018) stated that there has been a considerable efforts by developing countries to put their children in the school. Musasia et al. (2012) argue that both teacher and learner absenteeism influence non-coverage of the syllabus. Both teachers and students believe that due to removal of corporal punishment, the in disciplinary cases among teachers and students are too much leading to lack of syllabus coverage. A number of students and teachers had the following points to make on factors that influence syllabus coverage.

i. *EBU3: The school management should make sure both teachers and students are in class and there is effective teaching and learning.*
ii. *DBU1: GES should always visit the schools to know their difficulties about teaching and learning.*
iii. *E: Due to the ban on promotion and repletion, the students are no longer interested in students but the teacher too cannot punish them due to the removal of corporal punishment*
iv. *D2: A teacher; school management should improve in supervising all classes to ensure that teachers are always available to available to deliver their duty.*
v. *BHE2: The pandemic was a factor and the government too did not organize any classes for us when we were at home.*
vi. *A3: The Covid 19 affected these students when they were in form 1, they returned and were pushed to form 2. We had to teach form 1 topics in form 2 and that was why we could not cover.*

5.0. CONCLUSION AND RECOMMENDATIONS

Conclusion

The core mathematics syllabus defines the topics a student in senior high school in Ghana needs to cover and the behaviour such student should exhibits. The inability to cover the syllabus therefore meant that such students would not be able to exhibit such characteristics. The WAEC set their questions across the 29 topics in the syllabus and students are expected to answer the questions with confidence. The study revealed that there was a limited inspection and supervision in scope and frequency from authorities of both GES and schools. Regular inspection and supervision improves both quantity and quality of work. Shaheen et al. (2020) opines that performance in the school is greatly influence by teacher absenteeism and emphasized supervision of teachers to minimize absenteeism. Supervision remains one of the most effective ways of ensuring productivity in any organization and education is not an exception. Patterson, Rothwell & Whincup (2016) explained supervision as the professional accountable, two-way procedure, which ropes, inspires and allows development of upright repetition for individual social care workers. This in effect deliver excellences of facilities provided by the organization. According to (Idogho & Agholor, 2013) inspectors and Supervisors do not check school archives such as lesson notes, scheme of work, diary, attendance registers as well as teaching facilities such as chalk boards, projected and non-projected aid, infrastructural and non-infrastructural materials that will not only improve and accelerate teaching and learning process, but creates a comfortable and enabling environment for the teachers and students.

Ironically, the study indicated that the Ghana National Inspectorate Board (NIB) and GES go to schools to inspect teachers' certificates, schools attended and programmes, years completed, lesson note books and attendant registers to the neglect of classroom work. The content and how it is delivered to the student in the classroom is as well important. One of the participants indicated *"our mathematics teacher receives calls in class and end up doing no meaningful teaching. I wished the headmasters would go to around one day to find out about the progress of work in the classes".* The main aspects that are taken into account in this research paper are, significance of teacher motivation and teaching effectiveness, and motivation and teacher professional development resource categories. (Kingful & Nusenu, 2015) stated that motivated is a usual active force that originates inside and outside the person's being to induce work connected behaviours and regulate its procedure, route, strength and length. Mutegi (2014) revealed that teachers lost much of the teaching time on Union organized industrial strikes, sports, music festivals and drama festivals. This research work was slowed down by a National Teacher Unions Strike which lasted for two weeks, a month before the WASSCE exams. As teachers were struggling to cover the huge content that was still left for them to, the strike took them away for another two weeks.

The inability to cover the topics will therefore impair the student's ability to answer the questions with confidence. The time available for teaching and learning under the double track system is insufficient due to the double track and semester programmes. The 2022 candidates' syllabus was also affected by the Covid 19 pandemic.

Recommendations

The government should provide schools with resources such as textbooks, TLMs, infrastructure and so on to help in teaching and learning and also ease the congestions in the classrooms.

GES should establish work-related in-service training for teachers who have issues with some topics to help them handle such topics.

The GES should reverse the ban on repetitions, withdrawal and caning to help bring decency and comportments of students in the schools.

The NaCCA should review the syllabus to merge related topics and also increase the school period from three years to four years.

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The GES should reverse the ban on repetitions, withdrawal and caning to help bring decency and comportments of students in the schools.

The NaCCA should review the syllabus to merge related topics and also increase the school period from three years to four years.

For supervision and inspection of schools to be effective all stakeholders should change their orientation towards the running of schools. The ministry of education should assign credible supervisors and inspectors to schools for inspectorate services (Idogho & Agholor, 2013)

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