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Editorial Comment

The Oguaa Educator is a peer reviewed journal that provides the platform for tutors of Colleges of Education, school teachers, headteachers and educational researchers to disseminate their insights into innovative teaching and learning as well as educational leadership practices at the pre-tertiary level. The journal therefore publishes original research on innovative and best practices in teaching and learning in all school subjects as well as school management and leadership. Four (4) well researched topics from seasoned and well experienced academics make up this volume. The articles discuss various issues that relate to curriculum delivery at the school level. They provide great insight into the issues raised, whilst the authors bring their rich and varied backgrounds to bear in their respective articles.

Ernest Ampadu used the survey research design to examine Ghanaian Junior and Senior High School mathematics teachers problem-solving strategies and their professional development needs about problem-solving in the Cape Coast Metropolis of Ghana. The results of the study showed, amongst others, that, although teachers appreciate the importance of problem-solving in improving mathematics teaching and learning, there has not been the needed problem-solving training to support teachers in this regard. The author provides the implication of the findings of the study for professional learning programmes for mathematics teachers

Ernest Kofi Davis, Mark Owusu Amponsah, Christopher Yaw Kwaah and Christopher Beccles report on a study that draws on conceptualization of levels of curriculum as planned, implemented and attained curriculum to explore the alignment between the planned and implemented English Language, Mathematics and Science curricula in Ghana. The authors used the survey research design to carry out their investigation. The results from their study revealed amongst others that gaps existed between the planned and the implemented English Language, Mathematics and Science curricula. The authors provide implications of the findings from their research for practice, policy and research in Ghana and countries that share similar situation as Ghana.

Donusem Yao Asamoah and Godwin Kwame Aboagye used the survey research design to examine how practical work is integrated into the teaching and learning of physics at the senior high school level in the Volta Region of Ghana. Results from the study showed that though

teachers accept practical work as an essential ingredient for students' understanding of concepts, they are not up-to-date on how practical work should be integrated into the teaching and learning of physics as prescribed by the syllabus for physics. Also, the teaching of practical work is done via group work, hands-on activity, interactive demonstrations, discussion and lecture. The authors recommend the need for teachers to integrate practical work into lessons instead of separating them from theory.

Amadu Musah Abudu reports of a study that examined the effects of curriculum planning activities of heads of senior high schools on students' academic performance in Ghana using a cross-sectional survey research design. The results from the study revealed that of the eight predictors of high academic performance, four predictors emerged as significant. Based on the findings of the study, the author argues that the curriculum leadership roles played by heads of schools contribute to the academic performance of their students directly and recommends that only competent and committed people should be appointed as heads of schools.

Eric Nyarko-Sampson, PhD
(Editor-in-Chief)

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Alignment of the planned and implemented curricula in Junior High School English Language, Mathematics and Science in three Districts in Ghana

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Abstract

This paper draws on conceptualization of levels of curriculum as planned, implemented and attained curriculum to explore the alignment between the planned and implemented English Language, Mathematics and Science curricula in Ghana. A survey of curriculum delivery by 124 Junior High School Form 2 English, Mathematics and Science teachers, with 1268 of their students from 51 public and private schools, made up of a mix of below-average, average and above-average schools in terms of academic achievement of the students from three districts in the Central Region was carried out. A multi-stage sampling technique involving purposive and stratified random sampling methods were used in the selection of the research participants. The data were collected through documentary review, questionnaire survey for teachers and interviews with students. The data collected were analysed using both quantitative and qualitative methods. The quantitative data were analysed using frequency counts and descriptive statistics, while the qualitative data were analysed qualitatively and presented as narrative description with illustrative examples. The study revealed that gaps existed between the planned and the implemented English Language, Mathematics and Science curricula. Discussion of the findings and implications for practice, policy and research in Ghana and countries that share similar situation as Ghana are provided.

Key words: Planned Curriculum; Implemented Curriculum; Alignment; English Language, Mathematics and Science; Junior High School; Ghana.

Introduction

The importance of English language, Mathematics and Science (EMS) to the academic progression of school children and for that matter their opportunities in life in future cannot be overemphasised. Proficiency in these subjects is therefore a major determinant of how far one can develop academically and the academic opportunities one gets in future in many countries, including Ghana. Good knowledge in EMS opens the avenue for students to access both science and arts related courses and therefore holds the key to the development of quality human resource needed to transform the country's economy. The Government of Ghana recognises the role of Science and Mathematics in the attainment of the developmental agenda of the nation, and has therefore identified the development of Science, Mathematics and Technology education as one of the pillars for national development (Ministry of Education, Youth and Sports, 2004).

Despite the importance of EMS to the national developmental agenda of the country in general, and the future of the learners in particular, the quality of learning outcomes in these subjects continue to be a matter of concern to all stakeholders in Education in Ghana. Ghanaian students' performance in EMS has not been good (Mullis, Martin, Foy, & Arora, 2012; West African Examinations Council, 2013, 2014, 2015). Chief examiners' report in the Basic Education Certificate Examination (BECE) conducted by the West African Examination Council (West African Examinations Council) in EMS for grade nine students often lament students' poor performance in these subject areas. In 2015, for example, the report in English language indicated that "most candidates simply lacked the ability to construct simple readable sentences", "Most candidates showed that they did not have a good grasp of basic grammar such as tenses, concord, complementation, etc …". The report in Mathematics identified the following topics as being problematic for students: "word problems involving fractions", "determining the rule of mapping", and "distinguishing between the total surface area of a closed cylinder and ...". The report in Science highlighted the following areas as being difficult for students: "types of soil", "poor spelling of key terms such as distillation" and measurement (consideration of the precision of the meter rule). In 2014, the following were highlighted as being difficult

for students in Mathematics: finding word problems involving fractions, probability and making stem and leaf plot. The report for English Language mentioned poor expression, construction of simple sentences, punctuation and basic grammar. The report for Science mentioned wrong spelling of scientific terms, poor grammar, lack of understanding of scientific concepts and inability to write balanced chemical equations. In 2013, the report for Mathematics indicated that vectors was a problem for students, whiles in Science, spelling of technical terms was highlighted. In English, the report highlighted poor grasp of language and lack of vocabulary, poor grammar and construction.

The low levels of students' attainment in EMS have been attributed to a number of factors such as the quality of teacher preparation curriculum (Akyeampong, Lussier, Pryor & Westbrook, 2013), quality of teaching in the Primary and Junior High schools (Davis & Seah, 2016), among others. However, no comprehensive study has been carried out to provide detailed diagnosis of the problem by looking at the curriculum delivery in EMS to ascertain whether there are gaps between the planned, the implemented and the attained curriculum, and the implication of such gaps may have on learning outcomes of students. A growing body of literature shows that alignment between these levels of curriculum is important for the realisation of the aims and the objectives of the curriculum and hence quality of learning outcomes (Phaeton & Stears, 2017; van der Akker, Fasoglio & Mulder, 2010). Phaeton and Stears (2017, p. 726), for example, argue that "the coherence between the intended, implemented and the attained curriculum is important as it determines the kind of product the teaching and learning process yields". This indicates that mismatch between any of these levels of curriculum could have consequence on students' learning outcomes (Travers, 1988). We, therefore, position the alignment between the planned, implemented and attained curriculum as having effect on students' learning outcomes in EMS. However, for the purpose of this paper, the alignment between the planned and the implemented curriculum will be considered because of limited space. The study is intended to be a baseline study aimed at exploring issues relating to the delivery of EMS curricula, focusing on the planned, implemented and the attained curriculum in Ghana.

Theoretical Framework

There are several conceptualisations of curriculum (Wilson, n.d.). However, in this study we conceptualised curriculum to mean the overt or written curriculum, which Wilson (n.d.) defines as:

Simply that which is written part of formal instruction of schooling experiences. It may refer to a curriculum document, texts, films, and supportive teaching materials that are overtly chosen to support the intentional instructional agenda of a school. Thus, overt curriculum is usually confined to those written understandings and directions formally designated and reviewed by administrators, curriculum directors and teachers, often collectively. (p. 3)

This conceptualisation affords us the opportunity to analyse the status of the written curricula in EMS and their implementation to ascertain the alignment between the two.

Different researchers have looked at levels of curriculum from several perspectives (Robitaille & Garden, 1989; Thijs & van den Akker, 2009; van den Akker, 2003, 2010). In this study, conceptualisation of three levels of curriculum by Robitaille and Garden (1989) namely, the planned, implemented and attained curriculum formed the theoretical lens for our research. There is an extant literature on these levels of curriculum. We would therefore not re-invent the wheel by repeating what is already available in the literature. However, we would provide just highlights of these levels of curriculum. According to Robitaille and Garden (1989), the planned curriculum deals with what is expected to be taught as outlined in the curriculum. In the context of the present research it is the learning experiences students are expected to acquire through their education in EMS in school. The implemented curriculum constitutes what teachers are able to teach from the plan. In the context of this study it constitutes how much of the planned EMS curricula teachers are able to implement, while the attained curriculum is what the students are able to abstract/learn. In the context of this study it forms how much of the implemented curriculum the students are able to abstract.

Robitaille and Garden's (1989) levels of curriculum formed the theoretical basis for this study because it provided the frame to understand the alignment between the various levels of curriculum.

Also, recent literature on levels of curriculum that aims to understand the congruence between the various domains of curriculum still ends up relating their levels to Robitaille and Garden's conceptualisation of these levels of curriculum, that is, the planned, implemented and attained curriculum (see van den Akker, 2003, 2010, for example).

Several studies have employed the framework of the planned, implemented and attained curriculum to investigate the alignment between these levels in several disciplines in Africa and elsewhere. In each of these studies, the findings pointed to gaps between one or more of these levels of curriculum and the effect of such gaps on students' learning outcomes (Hallow, 2011, Phaeton & Stears, 2017). A study involving grade eight students in mathematics by Travers (1988), for example, found gaps between the planned and the implemented curriculum. The study further revealed that the areas students performed poorly in were actually the areas they did not have the opportunity to learn. Other studies have found gaps between planned and implemented curriculum and attributed the gap to teachers' misinterpretation of the planned curriculum (Phaeton & Stears, 2017). Lack of a clear link between planned and implemented curriculum that are enabled by national professional standards has also been highlighted in the literature (Jorgensen & Thelma, 2012).

In Ghana, a study in the area of ICT has shown that gaps exist between the intended and the attained curriculum and the implemented and the attained curriculum (Mereku, 2011). Similar studies carried out in ICT in some selected Sub-Sharan African countries also revealed gaps between these levels of curriculum. While it is clear from literature that gaps exist between the planned, implemented and attained ICT curriculum in Ghana particularly and some selected sub-Saharan African countries generally, very little is known about the situation in EMS, especially at the Junior High School level. This study contributes to literature on the alignment/congruence of the planned, implemented and attained curriculum in these subject areas.

The Purpose of the Study and the Research Questions

The purpose of this study was to investigate how the EMS curriculum is delivered in both public and private schools to ascertain whether there are gaps between the planned and implemented curriculum, using Junior High School two (JHS 2)/grade eight students.

The study also sought to explore how such gaps, if they do exist, may explain the performance of Ghanaian students in EMS. The following research questions were posed to guide the study:

1. What is the status of the planned curricula in EMS at JHS 2?
2. What is the status of the implemented curricula in EMS at JHS 2?
3. What are the gaps, if any, in the planned and implemented EMS curricula?

Research Methodology

Research design

In this study, an exploratory survey design was employed to collect data from the research participants to address the research questions. This design was chosen since the study sought to explore the alignment between the planned and the implemented EMS curricula. Specifically, the concurrent mixed methods approach (Mertens, 2010) was used to collect both quantitative and qualitative data from a cross-section of the research participants. Literature suggests that a combination of qualitative and quantitative methodology provides insight and thorough examination of the research topic under investigation (Creswell, 1994). It also helps the researcher to converge and confirm findings from varying data sources (Creswell, 2003).

Research Participants

In this study, the target population consisted of Junior High School (JHS) English Language, Mathematics and Science teachers in all the 1,018 Junior High schools (both private and public) in the Central Region of Ghana and their students. A total of 124 JHS teachers comprising 45 English Language, 46 Mathematics, 48 Science teachers and 1,268 students from 51 different contexts of schools (Private and Public, Below-Average, Average and Above-Average achieving schools) participated in the study. Some of the teachers were teaching more than one subject. The majority of the teacher participants were trained teachers (80, representing 64.5%). The remaining (44, representing 35.5%) were untrained. The majority (67.5%) of the

trained teachers were degree holders. The remaining 32.5% were Diploma in Basic Education Certificate holders.

A multistage sampling procedure was employed to select the research participants. The first stage of the sampling procedure involved stratification by grouping the districts within the Central Region based on their performance in the BECE (i.e. above average, average and below average achieving districts), using the BECE results from 2014 to 2016. This was followed by random selection of one district each from the above average, average and below average achieving districts. Through these processes, three districts (out of the 20 districts) in the Central Region of Ghana, namely District A (Above Average), District B (Average) and District C (Below Average) were selected. In each of the selected districts, the schools were grouped into private and public. The next stage involved stratification of the private and public schools based on their achievement levels, that is, Above Average, Average and Below Average achieving schools. This classification was based on the District Education Office's categorization of basic (Primary and Junior High) schools within the district.

The total number of schools selected in each of the three districts depended on the total number of schools in the districts. As a result of that, 19 out of 384 schools were selected from District A. These schools were made up of a mix of above-average (3), average (7) and below-average (9) achieving schools. In District B, 13 schools were selected out of 287 schools comprising (3) above-average, (8) average and (2) below-average achieving schools. In District C, 19 schools were selected out of 347, comprising (6) below-average, (10) average and (3) below-average achieving schools. This was followed by purposive selection of JHS 2 English Language, Mathematics and Science teachers and their students. The JHS 2 students were selected because the JHS 3 students were busy preparing for their final (grade nine) national examinations (Basic Education Certificate Examination), so using them would have been a bother to them. The JHS 1 students were not considered because they had spent relatively shorter time in JHS. They were therefore seen to be trying to be acclimatised with studying at the JHS level. The JHS 2 students were therefore considered to be more appropriate for the study at the time of the research. The number of schools that were involved in the study constituted 20% of the total

number of schools in the three Districts. This percentage falls within the acceptable proportion of a given population that could be sampled for a survey (Krejcie & Morgan, 1970).

Research Instruments

Data sources for this study included documents (JHS 2 English Language, Mathematics and Science curricula, lesson plans from teachers, teachers' scheme of work, textbooks, students' exercise/notes/homework books and supplementary reading materials), achievement test, questionnaire for teachers, group interviews with students and observation of lessons. Consequently, five research instruments were used to collect the data. Four of the research instruments were developed by the researchers. These were documents analysis guide, questionnaire for teachers, interview guide for students and achievement test. One instrument (the observation guide) was adopted. This was the teaching practice assessment instrument developed by the Centre for Teacher Professional Development, University of Cape Coast. This instrument was used for the observation of lessons. In order to ensure that the developed instruments elicited valid responses they were given to experts in the College of Education Studies, University of Cape Coast to critically review the items after which they were forwarded to the Institutional Review Board (IRB) of the University of Cape Coast for further quality checks. In order to ensure that the instruments elicited valid responses, they were pilot-tested in two schools in a district in Central Region, different from the three where the main study was carried out.

Research Procedure

Ethical clearance was obtained from the Institutional Review Board (IRB) of the University of Cape Coast before the commencement of the research. Permission was later sought from Ghana Education Service and sampled schools. Three research teams were formed for the purpose of data collection. Each research team was made up of five members. One team was assigned to each of the three Districts. In each of the schools, the rationale for the project and the potential benefit(s) of the project to the research participants in particular and development of education in Ghana in general were explained to the research participants. The consents of teacher participants and of student

participants were sought. Administration of the instruments in schools then followed. The instruments were self-administered by a research team made up of the researchers and some trained research assistants. This provided the research participants the opportunity to clarify issues that were not clear to them. Since the study employed a concurrent mixed methods approach (Creswell, 2009), both quantitative and qualitative data were collected at the same time, implying that the instruments were administered at the same time within the same period of data collection. In each school, the research team observed a lesson in English Language, Mathematics or Science, used the document analysis guide to collect data on the EMS curriculum and administered a test. In some schools, this was followed by group interviews with students. In all, eleven focus group interviews were carried with students from eleven schools across the three districts. The team spent on the average three days in each of the participating schools. While all 45 English Language, 46 Mathematics and 48 Science teachers participated in the questionnaire survey, not all of them participated in the rest of the study. Some left after the questionnaire survey by avoiding further meetings with the research team. The results of aspects of the study involving documentary analysis and lesson observations were carried out with 28 (out of the 45) English Language, 25 (out of the 46) Mathematics and 27 (out of the 48) Science teachers. As this report focuses on the alignment between the planned and implemented curriculum, the analysis of results on students' achievement in test in EMS will not be presented.

The data obtained from the study were analysed using both quantitative and qualitative approaches. The quantitative data from other sources except the achievement test were analysed using frequency counts and descriptive statistics, while the qualitative data were analysed qualitatively and presented as narrative description with some illustrative examples. For the purposes of analysis, the responses from the teachers were coded as T1, T2, T3, … and T124, where T1 represents the response from Teacher number one, T2 represents the response from Teacher number 2 and so on. The data collection was done in July and August, 2017.

Results

Status of the planned curricula in EMS in JHS 2

The literature suggests that the planned curriculum relates to the official documents which spell out what students are expected to acquire from school/education such as the syllabus/curriculum and related curriculum materials such as textbooks (van den Akker, 2003; 2010). In this study, therefore, three documents namely, syllabus, textbooks and other supplementary resources, were examined to provide information on the planned curriculum in EMS. The results on the analysis of the planned curriculum in EMS from the three districts have been presented together to provide a global picture of the situation.

The analysis of the data on the availability of syllabus is presented in Table 1. The results in Table 1 show that the majority of the English Language (92.9%), Mathematics (88%) and Science teachers (85.2%) had syllabus in their respective subject areas. The majority of the English Language (88.5%), Mathematics (95.5%) and Science (87.0%) syllabi inspected contained all preliminary and content pages. The majority of the syllabi were published in 2012 (English Language 84.6%, Mathematics 81.8% and Science 87.0%). The remaining (15.4%) of the English Language syllabus were published in 2007. The remaining Mathematics (18.1%) and Science (13.0%) syllabi were either published in 2007 or 2001. The majority of the syllabi examined were in good condition (English Language, 69.2%, Mathematics, 60% and Science, 78.3%). However, a significant minority of the English Language (30.8%), Mathematics (40%) and Science (21.7%) syllabi inspected were in bad condition.

Table 1: Results on the Planned English Language, Mathematics and Science Curriculum - Syllabus

Item	Subject	Response/(N)[%]
Is the syllabus available to the class teacher?	English (28)	Yes (26) [92.9] No (2) [7.1]
	Mathematics (25)	Yes (22) [88.0] No (3) [12.0]
	Science (27)	Yes (23) [85.2] No (4) [14.8]
If the syllabus is available, does it contain all the preliminary pages and outline of topics to be covered?	English (26)	Yes (23) [88.5] No (3) [11.5]
	Mathematics (22)	Yes (21) [95.5] No (1) [4.5]
	Science (23)	Yes (20) [87.0] No (3) [13.0]
What is the year of publication?	English (26)	2012 (22) [84.6] 2007 (4) [15.4]
	Mathematics (22)	2012 (18) [81.8] 2007 (1) [4.5] 2001 (3) [13.6]
	Science (23)	2012 (20) [87.0] 2007 (3) [13.0]
Briefly comment on the state of the syllabus	English (26)	Good condition (18) [69.2] Bad condition (8) [30.8]
	Mathematics (22)	Good condition (15) [60.0] Bad condition (7) [40.0]
	Science (23)	Good condition (18) [78.3] Bad condition (5) [21.7]

Table 2 presents the results on textbooks situation in each of the three subject areas. The results in Table 2 show that all the 27 Science teachers had a textbook, which they use for their teaching, while the majority of the English Language (92.9%) and Mathematics (92%) teachers also had textbooks for teaching their respective subject areas. All the English Language and majority of Mathematics (87%) and Science (96.3%) textbooks inspected were Government-approved. It is evident from the results that although the majority of the teachers' textbooks inspected in each of the three subject areas were Government-approved, some of the teachers were found using unapproved books such as the Aki-OLA series. All the Mathematics and majority of Science (96.3%) textbooks were, generally, in good

physical condition, with all the pages being intact. The remaining were in bad physical condition with some pages torn. Only a little more than half of the English Language textbooks (53.6%) were in good physical condition. A few of the teachers (7.1%) had photocopies of the whole textbook but in good condition. The rest of the English Language textbooks inspected were in very bad condition (39.3%), indicating that a significant minority of the teachers' English Language textbooks inspected were in bad physical condition and needed replacement.

Unlike the teachers, the results on the availability of textbooks to students in each of the subject areas revealed that very few of the students had textbooks to themselves alone. Only 12 (50.0%) of the English Language teachers, 7 (28%) of the Mathematics teachers and 9 (33.3%) of the Science teachers indicated they had pupil-textbook ratio of one-to-one in their class. This shows that many of the students have very limited opportunity to use textbooks after school. A significant minority of the mathematics teachers (44%), for example, indicated that none of their students had access to a mathematics textbook. The teachers write all assignments and exercises on the chalkboard/marker board for students to copy. A significant percentage of students' textbooks, especially in Mathematics and Science were in bad condition.

Table 2: Results on the Planned English Language, Mathematics and Science Curriculum - Textbooks

Data source	Item	Subject	Response/(N)[%]
Textbooks	Does the teacher have a textbook?	English (28)	Yes (26) [92.9] No (2) [9.1]
		Mathematics (25)	Yes (23)[92.0] No (2) [8.0]
		Science (27)	Yes (27)[100.0] No (0) [0.0]
	Is the textbook approved by the Government of Ghana?	English (26)	Yes (26) [100]
		Mathematics (23)	Yes (20) [87.0] No (3) [13.0]
		Science (27)	Yes (26) [96.3] No (1) [3.7]
	Briefly comment on the state of the	English (28)	Good condition (original) (15) [53.6] Good condition (photocopy) (2) [7.1]

teachers' textbook		Bad condition (11) [39.3]
	Mathematics (23)	Good condition (23) [100.0]
	Science (27)	Good condition (26) [96.3] Bad condition (1) [3.7]
What is the pupil-textbook ratio?	English (24)	Ratio of 1:1 (12) [50.0] Ratio of 2:1 (5) [20.8] Ratio of 3:1 (2) [8.3] Ratio of 4:1 (1) [4.2] Ratio of 6 or more:1 (4) [16.7]
	Mathematics (25)	Ratio of 1:1 (7) [28.0] Ratio of 2:1 (9) [36.0] Ratio of 3:1 (5) [20.0] Ratio of 4:1 (4) [16.0]
	Science (27)	Ratio of 1:1 (9) [33.3] Ratio of 2:1 (6) [22.2] Ratio of 3:1 (4) [14.8] Ratio of 4:1 (4) [14.8] Ratio of 5+ :1 (4) [14.8]
Briefly comment on the state of pupils' textbook	English (24)	Good condition (17) [70.8] Bad condition (7) [29.2]
	Mathematics (25)	Good condition (13) [52.0] Bad condition (12) [48.0]
	Science (27)	Good condition (15) [55.6] Bad condition (12) [44.4]

Table 3 presents the results on the use of supplementary materials. The results in Table 3 show that the majority of the Mathematics (80%) and Science (96.3%) teachers had supplementary reading materials. A little more than half (53.6%) of the English Language teachers had supplementary reading materials. This is an indication that a significant minority of the English Language (46.4%) and Mathematics (20%) teachers did not have any supplementary materials apart from their textbooks. The majority of the English Language (60.7%) and Science (63.0%) teachers and a little more than half of the Mathematics teachers (52.0%) indicated that their students did not have any supplementary reading materials.

Table 3: Results on the Planned English Language, Mathematics and Science Curriculum – Supplementary Materials

Data source	Item	Subject	Response/(N)[%]
Other resources	Does the teacher have other supplementary reading material(s)?	English (28)	Yes (15) [53.6] No (13) [46.4]
		Mathematics (25)	Yes (20) [80.0] No (5) [20.0]
		Science (27)	Yes (26) [96.3] No (1) [3.7]
	Do pupils have other supplementary reading material(s)?	English (28)	Yes (11) [39.3] No (17) [60.7]
		Mathematics (25)	Yes (12) [48.0] No (13) [52.0]
		Science (27)	Yes (10) [37.0] No (17) [63.0]

Status of the implemented curricula in EMS at JHS 2

Scheme of work and lesson notes/plan are often classified as part of the implemented curriculum in the literature (van den Akker, 2003). In this study, these documents were therefore included in the data sources that were used to ascertain the status of the implementation of the planned curriculum in EMS. The other sources of documents were students' notes/exercise/work/homework books. Teacher questionnaire, lesson observation and interviews with students also constituted part of the data source for the analysis of the status of the implemented curriculum. The results of the analysis of the implemented curriculum in each of the three subject areas from the three districts in the Central Region are presented in this section.

Implementation of the planned curriculum in Ghana begins with preparation of scheme of work and lesson plan/notes. Table 4 presents the results of document analysis in English Language, Mathematics and Science - Scheme of work and lesson notes. Results in Table 4 show that majority of the teachers (English Language, 89.3%, Mathematics 72.0% and Science, 88.9%) had up to date scheme of work which spelt out topics that would be covered in each term in each of the three subject areas. The results of the inspection of lesson notes revealed that 85.7% of the English Language teachers, 80% of the Mathematics teachers and 66.7% of the Science teachers had up to date lesson notes. This shows that quite a number of the Science teachers (33.3%) did not

prepare up to date lesson notes, their lesson notes did not cover all the topics in the syllabus.

Although majority of the teachers (English Language 75.0%, Mathematics 76% and Science 59.3%) were able to implement all their lesson plans, a significant minority (English Language 25.0%, Mathematics 24% and Science 40.7%) were not able to implement all their lesson plans. In other words, they prepared the lesson plans alright but were unable to implement some of the plans.

Twenty-nine topics covering five areas namely grammar, writing, literature, reading and listening and speaking in the JHS 2 English Language syllabus, 14 topics in the JHS 2 Mathematics syllabus and 19 topics covering Biology, Chemistry and Physics in the JHS 2 Integrated Science syllabus are expected to be studied by the JHS 2 students (see Appendix A). However, the document analysis revealed that in addition to the JHS 2 topics, JHS 1 topics that were not covered such as Processes and Directions in English Language, Bearings in Mathematics and Respiratory System in Science were also covered in some cases.

Table 4: Results of document analysis in English, Mathematics and Science - Scheme of work and lesson notes

Item	Subject	Response/(N)[%]	
Does the teacher have up to date scheme of work?	English (28)	Yes (25) [89.3]	No (3) [10.7]
	Mathematics (25)	Yes (18) [72.0]	No (7) [28.0]
	Science (27)	Yes (24) [88.9]	No (3) [11.1]
Does the teacher have up to date lesson notes?	English (28)	Yes (24) [85.7]	No (4) [14.3]
	Mathematics (25)	Yes (20) [80.0]	No (5) [20.0]
	Science (27)	Yes (18) [66.7]	No (9) [33.3]
Was the teacher able to implement all the lesson notes?	English (28)	Yes (21) [75.0]	No (7) [25.0]
	Mathematics (25)	Yes (19) [76.0]	No (6) [24.0]
	Science (27)	Yes (16) [59.3]	No (11) [40.7]

In addition to the documentary review, a survey of the implementation of the planned curriculum was carried out with all the 45 English Language, 46 Mathematics and 48 Science teachers using questionnaire to elicit information on the topics teachers are unable to cover and those they found challenging to teach. In this section the results will be presented separately for each of the three subject areas.

Table 5 presents the topics teachers were not able to cover in their lesson notes in English Language. The results in Table 5 show that a number of areas in the English syllabus, especially in grammar and writing were not covered in the lesson notes of teachers who were unable to cover all topics. The results of the analysis of English Language data from the questionnaire revealed less than half (21 out 45) of the English teachers saying they are able to teach all the topics they are expected to teach in the JHS 2 curriculum. The remaining 24 English teachers said they are unable to teach all the topics. This is an indication that more than half (53.3%) of the teachers said they are unable to cover the topics they are supposed to cover in JHS 2 English syllabus. The majority (35 out of 45) indicated they have difficulty teaching some of the topics in the English Language curriculum. Only 22% of the teachers indicated that they did not have difficulty teaching some of the topics in English Language curriculum.

Table 5: Aspect/Topics teachers were unable to cover in lesson notes/actual delivery and those they found challenging to teach in English Language

Aspect	Topic	Lesson notes (N=15)	Actual delivery (N=24)	Challenging Topics (N=35)
		Total/(N) [%]	Total/(N) [%]	Total/(N) [%]
Grammar	Nouns	(0) [0.0]	(1) [4.2]	(2) [5.7]
	Tenses	(0) [0.0]	(2) [8.3]	(1) [2.9]
	Clauses	(13) [86.7]	(9) [37.5]	(4) [11.4]
	Adverbs	(3) [20.0]	(1) [4.2]	(0) [0.0]
	Verb tense forms	(5) [33.3]	(0) [0.0]	(0) [0.0]
	Phrases	(6) [40.0]	(0) [0.0]	(1) [2.9]
	Preposition	(0) [0.0]	(1) [4.2]	(1) [2.9]
	Sentences	(12) [80.0]	(10) [41.7]	(3) [8.6]

	Complex prepositions	(4) [26.7]	(0) [0.0]	(1) [2.9]
	Auxiliary verbs	(4) [26.7]	(0) [0.0]	(0) [0.0]
	All Grammar topics	(0) [0.0]	(6) [25.0]	(0) [0.0]
Composition	Letter writing	(0) [0.0]	(5) [20.8]	(7) [20.0]
	*Writing description	(0) [0.0]	(2) [8.3]	(1) [2.9]
	Argumentative essay	(0) [0.0]	(5) [20.8]	(2) [5.7]
	***Formal letter	(0) [0.0]	(3) [12.5]	(0) [0.0]
Literature	Short stories	(3) [20.0]	(0) [0.0]	(0) [0.0]
	Simple Poems	(10) [66.7]	(0) [0.0]	(1) [2.9]
	Simple plays	(15)[100.0]	(0) [0.0]	(0) [0.0]
	All literature topics	(0) [0.0]	(7) [29.2]	(6) [17.1]
Comprehension	Comprehension	(4) [26.7]	(7) [29.2]	(5) [14.3]
	Literary devices	(0) [0.0]	(4) [16.7]	(0) [0.0]
	Sounds	(0) [0.0]	(0) [0.0]	(4) [11.4]
Reading	All Reading topics	(0) [0.0]	(7) [29.2]	(5) [14.3]
	Summary writing	(5) [33.3]	(0) [0.0]	(0) [0.0]
	Parts of speech	(0) [0.0]	(3) [12.5]	(2) [5.7]
Writing	Consolidation work	(3) [20.0]	(0) [0.0]	(0) [0.0]
	Writing dialogue	(5) [33.3]	(0) [0.0]	(0) [0.0]
	Writing simple arguments	(4) [26.7]	(0) [0.0]	(0) [0.0]
	Writing speeches/talks	(4) [26.7]	(0) [0.0]	(0) [0.0]
	Writing reports	(6) [40.0]	(0) [0.0]	(0) [0.0]
	Articles for publication	(4) [26.7]	(0) [0.0]	(0) [0.0]
	Filling forms	(10) [66.7]	(0) [0.0]	(0) [0.0]

Note: *JHS1 topic and ***JHS 3 topic

The English language teachers gave four main reasons for their inability to cover all the topics in the syllabus namely, (1) limited/lack of teaching and learning materials; “Limited Reference materials,

teaching and learning aids." (T78) and "Lack of reading materials." (T52), (2) Readiness of students; "Pupils' low ability to assimilate what is taught..." (T105) and "… few vocabularies at their [pupils] disposal, hence struggle to express themselves." (T14), (3) Extracurricular activities; "Due to the school's unplanned curriculum which normally eats into the instructional hours." (T74) and "Extra/co-curricular activities. For example, sports, culture, Independence Day and other national holidays". (T100) and (4) Attitudes of students; "My students do not like reading. They always want to be fed with information for instance ... If you give try work to do they won't do it." (T18) and "Pupils' disinterestedness." (T52).

A number of the Mathematics topics were also not covered in lesson notes and actual lesson delivery by teachers who indicated that they were unable to cover certain topics, while a number of teachers also indicated that they found a number of topics challenging to teach (see Table 6). A little more than half (25, which represents 56.6%) of the Mathematics teachers said they were able to teach all the topics they are expected to teach in the JHS 2 curriculum. The remaining (20, 44.4%) Mathematics teachers said they are unable to teach all the topics. This is an indication that a significant minority of the teachers said they are unable to cover the topics they are supposed to cover in JHS 2 Mathematics syllabus. The results in Table 6 also show that almost two-thirds (62.2%) of the teachers said they did not have challenge teaching any of the JHS 2 topics. This is an indication that almost a third said they had challenge teaching certain topics in the JHS 2 syllabus. The results show that several of the topics teachers said they either skipped in their lesson notes and actual lesson delivery also formed part of the topics they said they found challenging to teach. For example, *Vectors, Area and Volume* and *Rationale Numbers.*

Table 6: Topics teachers were unable to cover in lesson notes/actual delivery and those they found challenging to teach in Mathematics

Topic	Lesson notes (N = 25)	Actual delivery (N = 20)	Challenging Topics (N=17)
	Total/(N) [%]	Total/(N) [%]	Total/(N) [%]
Area and volume	(3) [12.0]	4 [20.0]	(7) [41.2]
Rational numbers	(3) [12.0]	2 [10.0]	(2) [11.8]
Shapes and space	(2) [8.0]	5 [25.0]	(0) [0.0]
Statistics	(0) [0.0]	4 [20.0]	(4) [23.5]
Mapping	(0) [0.0]	1 [5.0]	(3) [17.6]
Linear equation and inequalities	(0) [0.0]	2 [10.0]	(0) [0.0]
Angles	(0) [0.0]	1 [5.0]	(2) [11.8]
Factorization	(0) [0.0]	1 [5.0]	(0) [0.0]
Ratio and proportion	(0) [0.0]	3 [15.0]	(2) [11.8]
*Algebraic expression	(3) [12.0]	1 [5.0]	(0) [0.0]
Properties of quadrilaterals	(3) [12.0]	2 [10.0]	(0) [0.0]
Geometric construction	(0) [0.0]	1 [5.0]	(2) [11.8]
Vectors	(6) [30.0]	6 [30.0]	(5) [29.4]
Bearings	(5) [20.0]	1 [5.0]	(1) [5.9]
Probability	(0) [0.0]	4 [20.0]	(1) [5.9]
Rates	(0) [0.0]	1 [5.0]	(2) [11.8]

Note: *JHS1 topic

The Mathematics teachers gave three main reasons for their inability to cover all the topics in the syllabus namely, (1) Extracurricular activities; "...other co-curricular activities take some time, so I'm not able to complete all topics" (T55) and "Extra co-curricular [sic] activities like sports and games organized during the term" (T59), (2) Curriculum overload; "The topics were many" (T58) and "The topics were broad and time consuming ..." (T48) and (3) Difficult topics; "Area and Volume is a bit challenging to the pupils. They find it difficult to apply the formula involve in the second year through to the final year." (T63) and "I [Teacher 70] find them [such topics] challenging..." (T70)

The situation in Science was not different; a number of Science topics were skipped in the lesson notes of teachers who were not able to cover all topics, with the majority of teachers skipping Basic Electronics (6 out of 9). Just a little more than half of the Science (26, which represents 54.2%) teachers said they are able to teach all the topics they are expected to teach in the JHS2 Science syllabus. The remaining (22, 45.8%) Science teachers said they are unable to teach all the topics, an indication that a significant minority said they are unable to cover the topics they are supposed to cover in JHS 2 Science syllabus. The mean number of topics these teachers said they were able to teach was 14 (out of the 19 topics) with standard deviation of 4. This shows that on the average they skip five topics. The high standard deviation shows high level of variability in the number of topics these teachers said they were able to teach. The majority (39, 81.3%) indicated they had challenge teaching some of the topics in Science. Only a few (9, 18.7%) said they do not have challenge teaching any of the JHS 2 topics in Science. Group interviews with students also revealed them saying they had difficulty understanding a number of topics in Science.

Table 7 provides a summary of the topics teachers said they are unable to cover in their lesson notes and actual lesson delivery and those they found challenging to teach in Science. The results from Table 7 show that *Basic Electronics* was the topic which was most frequently skipped by teachers, in their lesson notes, followed by *Pest and Parasites, Circulatory System*, *Photosynthesis*, *Machines*, *Force and Pressure* and *Metals and Non-Metals*. The remaining topics were skipped by very few of the teachers in their lesson plan. *Electronic energy/Electrical Energy* was the topic which was most frequently skipped by teachers, in their lesson delivery, followed by *Basic Electronics*, *Circulatory System*, *Infectious Disease of Humans and Plants, Force and Pressure*. The results in Table 7 also show that *Basic Electronics, Chemical Compounds and Electric Energy* were the main topics several of the teachers indicated that they found challenging to teach. Several of the topics teachers said they either skipped in their lesson notes and actual lesson delivery also formed part of the topics they said they found challenging to teach. For example, *Basic Electronics, Infectious disease of humans and plants* and *Force and Pressure.*

Table 7: Topics teachers were unable to cover in lesson notes/actual delivery and those they found challenging to teach in Science

Topic	Lesson notes (N=27)	Actual delivery *(N=22)*	Challenging Topics (N=39)
	(N) [%]	(N) [%]	(N) [%]
Basic Electronics	(6) [22.2]	7 [31.8]	(17) [43.6]
Pests and parasites	(5) [18.5]	5 [22.7]	(0) [0.0]
Weather, Season and Climate	(1) [11.1]	1 [4.5]	(0) [0.0]
Chemical compounds and mixtures	(0) [0.0]	4 [18.1]	(6) [15.4]
Circulatory System	(4) [14.8]	4 [18.2]	(0) [0.0]
Photosynthesis	(4) [14.8]	2 [9.1]	(0) [0.0]
Carbon cycle	(2) [11.1]	1 [4.5]	(0) [0.0]
Infectious disease of humans and plants	(3) [11.1]	4 [18.2]	(1) [2.6]
Machines	(4) [14.8]	3 [13.6]	(1) [2.6]
*****Respiratory System	(0) [0.0]	3 [13.6]	(1) [2.6]
Force and Pressure	(4) [14.8]	4 [18.2]	(1) [2.6]
*******Acids and Bases	(0) [0.0]	1 [4.5]	(2) [5.1]
*Ecosystem	(0) [0.0]	2 [9.1]	(0) [0.0]
Electrical energy	(0) [0.0]	2 [9.1]	(0) [0.0]
Food and nutrition	(0) [0.0]	2 [9.1]	(0) [0.0]
Metals and non-metals	(4) [14.8]	1 [4.5]	(0) [0.0]
*Light energy	(0) [0.0]	1 [4.5]	(1) [2.6]
Mechanics	(0) [0.0]	(4) [18.2]	(0) [0.0]
Electronic energy/Electrical Energy	(0) [0.0]	(9) [40.9]	(3) [7.7]

Note: *JHS1 topic and ***JHS 3 topic

The Science teachers gave five main reasons for their inability to cover all the topics in the syllabus namely, (1) Extracurricular activities; "I could not teach all the topics because of co-curricular activities and other unforeseeable events like sports, catholic education week, workshops..."(T11) and "Time for ...and co-curriculum programs in the school." (T18), (2) Curriculum overload; "JHS 2 topics for integrated Science are too many. More periods are needed for the

integrated science topic especially JHS 2 class." (T15) and "The topics were broad..." (T8), (3) Loss of instructional time through holidays; "Due to the holidays..." (T4) and "... Public holidays" (T39) and (4) Lack of Teaching and Learning materials; "Lack of teaching and learning materials such as: (i)Transistors (ii) LED (iii) Resistors (iv) Capacitor etc" (T12) and " Those topics are mostly practical and my school lack such practical equipment" (T32)

Analysis of the results of inspection of students note books, exercise books, workbooks and homework books showed that 10 (35.7%) English Language teachers, 7(28%) Mathematics teachers and 11(64.7%) Science teachers gave exercises to cover all the topics in their lesson plan. The remaining 18 (64.3%) English Language, 18 (72%) Mathematics and 6 (35.3%) Science, teachers did not give exercises/homework/assignment to cover all topics in their lesson plan. This indicates that a significant number of teachers appear not to give exercise or homework on some of the topics for the students to practice. Majority of the English Language teachers (67.9%), a little more than half of the Science teachers who participated in this aspect of the study and a significant number of Mathematics teachers did not mark all exercises that were given to students in each of the three subject areas. Quite a number of the teachers who marked class exercises did not mark corrections (English Language 33.3%, Mathematics 33.3%, and Science 33.3%).

Table 8: Results of content analysis of pupils' exercise/work and homework books

Item	Description	Subject		
		English (N)[%]	Mathematics (N)[%]	Science (N)[%]
Are topics covered in the exercise books reflective of all the topics in the lesson plan?	Yes	10 [35.7]	7 [28]	11 [64.7]
	No	18 [64.3]	18 [72]	6 [35.3]
Exercise/work and homework	Not all marked	19 [67.9].	10 [40]	8 [47.1]
	All Marked	9 [32.1]	15[60]	9 [52.9]
Corrections	Not all corrections marked	3 [33.3]	5 [33.3]	3 [33.3]
	All corrections marked	6 [66.7]	10 [66.7]	6 [66.7]

Results on Topics Students Identified as being difficult for them to learn in EMS

Eleven groups of students were also requested to provide information on the topics they found challenging to understand in each of the three subject areas through the group interviews. The results showed that topics under Grammar such as *Dialogue*, *Adverb*, *Compound Sentences* and *Tenses* dominated the topics students indicated in the interview they found difficult in understanding in English Language, followed by topics under Composition (topics such as *Letter Writing* and *Articles for Publication*) and *Literature*. Topics students indicated as being difficult in Mathematics generally covered almost all the areas in the JHS 2 syllabus and some areas in the JHS 1 syllabus. The main areas where a number of the groups indicated they had difficulty were *Algebra, Relations (Mapping), Geometry, Measurement (Volume and Area), Fractions and applications (Ratio and Proportion)* and *Statistics*. The results in Science revealed that

Force, *Elements and Compounds*, *Circulatory System*, *Infectious Diseases*, *Machines* and *Measurement* were some of the main topics students from several of the focus groups identified as being difficult for them to learn.

Gaps in the planned and implemented EMS curricula

The findings on the planned and implemented curriculum brought to light two major levels of gaps. The first had to do with the implementation of the wrong planned curriculum. Some of the English Language, Mathematics and Science teachers were found using the 2007 curriculum instead of 2012 curriculum (the current curriculum) in their respective subject areas, while some of the Mathematics teachers were found using the 2001 curriculum, which is even older than the 2007 in teaching. Eighteen point-one percent (18.1%) of the Mathematics, 15.4% of the English teachers, and 13.0% of the Science teachers were found using old curriculum. This finding suggests although most of the teachers implemented the correct planned curriculum in the three subject areas, a few of them implemented the wrong plan.

The second level of gaps had to do with non-implementation of all the topics teachers are expected to cover in the curriculum in the three subject areas. Analysis of the results from documents (lesson notes, and students' notes/exercise/ homework books) and teacher questionnaire brought to light that several topics are skipped in lesson notes. A significant number of Mathematics (44.4%) and Science (45.8%) teachers said they are not able to cover all topics in the syllabus. While more than half of the English Language (53.0%) teachers said they were also unable to cover all topics in the curriculum. In English, 20 (out of 29) topics in the JHS 2 curriculum formed part of some of the topics that were not covered in teachers lesson notes and those teachers said they were unable to cover. *Simple Play*, *Simple Poem*, and *Writing Reports* were examples. In Mathematics, 10 (out of the 14) topics in the JHS 2 curriculum formed part of some of the topics that were not covered in teachers' lesson notes and those teachers said they were unable to cover. *Vectors, Shape and Space, Area and Volume and Probability* were examples. While in Science, 12 (out of the 19) topics in the JHS 2 curriculum formed part of some of the topics that were not covered in teachers' lesson notes and those teachers said they

were unable to cover. *Basic Electronics*, *Electrical Energy*, *Circulatory System in Humans and Machines* were examples.

Discussion

The analysis of the status of planned curriculum in English Language, Mathematics and Science among the research participants showed that most of the teachers had the current approved planned curriculum/syllabus (English Language 84.6%, Mathematics 81.8% and Science 87.0%), a significant minority of these curricula were in bad condition with pages torn (English 30.8%, Mathematics 40% and Science 21.7%). This raises questions about the supply of these materials. Although these materials are available online, teachers are expected to download them and print them or store them in their electronic devices. It is a known fact that Ghanaian Junior High School teachers' salaries are among the worst in the world. The monthly gross salary of a beginning JHS 2 teacher who has completed College of Education in Ghana, for example, is about GHS 1,922.00 (US$360.50). It is therefore possible that the cost of downloading and printing the curriculum or buying electronic devices such as computers or iPads to store the curriculum electronically prevents some teachers from using the current curriculum. The second reason could also be the availability of internet and cost associated with the use of internet facilities. Many Primary and Junior High schools in Ghana do not have internet facilities; the internet cannot be accessed in a number of rural communities in Ghana. Uploading the curriculum on the internet and asking teachers to access them appears not to be adequate in ensuring that all teachers have access to the right planned curriculum they are expected to implement. For the teachers who did not have either the curriculum or textbooks of their own, the question is how do they teach? It will be difficult for teachers who do not have any of these curriculum materials to implement the national curriculum in order to attain the aims and objectives of the curriculum in such a situation.

Textbooks and other supplementary reading materials are important in quality curriculum delivery (Ensor, Dunne, Galant, Gumedze, Jaffers, Revees & Tawodzera, 2002; Knight, 2015). They are important for self-study, because they serve as reference material. The worked examples also enable students to prepare ahead of class. However, the results from this show that the majority of the students

might not be enjoying the benefits associated with the use of textbooks and other supplementary materials. While the science teachers and almost all teachers from the other two subject areas had textbook to themselves (English 92.9%, and Mathematics 92%), half of the English Language teachers and few the teachers in the other two subject areas indicated that each of their students had access to textbooks to themselves alone (English 50.0%, Mathematics 28.0% and Science 33.3%). This is an indication that the majority of the Mathematics (72%) and Science (66.7) teachers had students who did not have textbooks to themselves alone but had to share textbooks with their colleagues, while half of the English Language teachers had students in similar situation. This implies many of these students would have very little opportunity to learn outside what teachers teach in class. Instructional time will also be wasted by teachers copying assignments on the chalkboard.

Supplementary reading materials supplement the information in the textbooks. If well utilised, supplementary materials help students to develop in-depth understanding of concepts. However, the results from this study showed that a number of students have limited opportunity to acquire knowledge outside textbooks as more than half (52%) of the Mathematics teachers and majority of English Language (60.7%) and Science (63.0%) teachers said their students do not have access to supplementary materials. The literature suggests that even though teacher quality is key in the implementation of planned curriculum, resources condition has the tendency to affect the quality of the implementation of the plan (Jorgensen & Perso, 2012).

The results showed that most of the teachers from the three subject areas had a scheme of work and lesson plans to guide their teaching. However, a few of the English Language (10.7%) and Science (11.1%) did not have scheme of work, while more than a quarter of the Mathematics (28.0%) teachers also did not have. Again, a few of the English Language (14.3%) teachers and quite a number of mathematics (20.0%) and Science teachers did not have up to date lesson plan. This could be due to lack of supervision at the school level because school heads are expected to inspect the scheme of work of teachers at the beginning of every term and lesson notes of teachers at the beginning every week in Ghana. The fact that some teachers are teaching without lesson plan also suggests that supervision in the schools concerned

could be weak. Lesson notes provide the opportunity for the teachers to reflect on their teaching actions before they enact those actions. If some teachers are teaching without lesson plan, then it implies the quality of lessons will be affected. Those teachers are likely to present a wrong fact before they realise that they have presented it. For example, a Mathematics teacher who fails to go through all questions that would be used to develop a lesson might end up detecting an unsuitable question in the middle of the lesson.

Analysis of the scheme of work and lesson plans also revealed that quite a number of the teachers who prepared their lesson plans skipped a number of topics in each of the three subject areas. A number of the teachers also indicated that they are unable to cover a number of the topics in each of these subject areas (see Tables 5, 6 and 7). This could be due to curriculum overload. In Mathematics, teachers are expected to cover 14 broad topics with their sub-topics in the JHS 2 mathematics curriculum, in English Language, they are expected to cover 29 topics and in Science 19 broad topics (see Appendix A). All these topics, together with topics in six other subject areas would have to be covered within 40 to 41 weeks. In some cases, the scheme of work also covered Form 1 topics such as *Respiratory System* in Science, *Algebraic Expression* in Mathematics and *Writing Description* in English Language. This is an indication that curriculum overload may exist even at the JHS1 level, since JHS1 topics had to be covered in JHS2 in some cases. Identification of curriculum overload as one of the main reasons why teachers said they were unable to cover certain topics in each of the three subject areas supports our observation about the effect of curriculum overload on the alignment between the planned and implemented curriculum in EMS in Ghana. Teacher (T15)'s statement summarises that situation; "JHS 2 topics for integrated Science are too many. More periods are needed for the integrated science topic especially JHS 2 class" (T15). It is evident from T15's statement that it appears unrealistic to cover 19 main topics within the time frame they are given.

It was also evident that in the delivery of the planned curriculum, some teachers did not consider the grade appropriateness of the topic. For example, in Science, some of the teachers were found teaching *Acids and Bases*, which is a JHS 3 topic (see Table 7), while in English Language some were found teaching *Formal Letters*, which

is also a JHS 3 topic (see Table 5). Teaching topics which are meant for a lower grade level at a higher grade level is not a problem. However, teaching topics that are supposed to be covered at a higher grade level in a lower grade level may pose problems for students who might not be cognitively prepared for such high level contents. This might negatively affect learning outcomes.

Teachers inability to cover some of the topics could also be due to the difficulty they have teaching those topics. In English Language, topics such as *Clauses and Sentences* were skipped in teachers lesson plan, these topics also formed part of the topics teachers said they were unable to cover in the actual lesson delivery. They also formed part of the topics teachers said they had difficulty teaching (see Table 5). In Mathematics, *Vectors* and *Area and Volume*, were some of the topics teachers skipped in their lesson plan. These topics also formed part of the topics teachers said they were unable to cover in their actual lesson delivery. They also reflect the topics teachers said they found challenging to teach (Table 6). In Science, Basic Electronics was skipped by teachers in the lesson plan, this topic was also one of the topics many teachers were unable to cover in their lesson delivery and it is also one of the topics many of the teachers who indicated that they had difficulty teaching some Science topics indicated that they found it difficult to teach (see Table 7). We therefore argue that some teachers skip some of these topics also because of the difficulty they have teaching them.

A number of teachers indicated that they had difficulty in teaching certain topics in the three subject areas. This could be due to limited professional development opportunities aimed at addressing the immediate professional needs of teachers in Ghana. Presently, all professional development programmes available to teachers are mainly long-term upgrading programmes that culminate in the award of degrees or certificate. An English Language teacher who is experiencing challenges in teaching Grammar, for example, has very little opportunity to benefit from professional development programme, unless the teacher decides to obtain help from a colleague teacher. Teacher number 63, for example, who is unable to teach Area and Volume because “Area and Volume is a bit challenging to the pupils. They find it difficult …”, will continue to skip this topic until this teacher is fortunate to obtain help from a colleague teacher or

nominated by the head to attend one of the occasional workshops for teachers in the district by the District Education Office.

Some of the areas identified as being difficult for students in Chief Examiners' reports such as *Sentences* and *Grammar* in English (West African Examinations Council, 2015) and *Vectors* in Mathematics (West African Examinations Council, 2013) and *Chemical Equations* in Science (West African Examinations Council, 2014) formed part of the topics teachers either skipped or had difficulty teaching from this study. For example, in Mathematics, *Vectors* was one of the topics many teachers who were unable to cover some topics skipped. This indicates that their students would have no opportunity to learn the topic. It was also one of the topics quite a number of teachers who had difficulty teaching some topics in Mathematics identified as being difficult. This is an indication that their students will have very limited opportunity to learn this topic with understanding because their teachers find the topic difficult to teach. The question, therefore, is; are students exposed to the topics that are often projected as being difficult in English Language, Mathematics and Science in national examinations in Ghana, and large scale international assessment in Mathematics and Science, in which Ghanaian students' performance has always been among the poorest in the world? Although this study involved English Language, Mathematics and Science, the finding is similar to that of Trevers (1988) whose study found that students' poor achievement in Mathematics was mainly due to lack of opportunity to learn Mathematics.

Alignment between the planned, implemented and the attained curriculum has consequences for learning outcomes in any subject area (Phaeton & Stears, 2017). Implementation of 2001 and 2007 curricula instead of 2012 curriculum, which is the curriculum currently approved to be used by Ghanaian schools and skipping of a number of topics by a number of teachers constitutes a major misalignment between the planned and the implemented curriculum. This misalignment between the planned and implemented curriculum in the curriculum delivery in English Language, Mathematics and Science in the research locale has the tendency to affect not only students' learning outcomes but also the attainment of the general aims and objectives of English Language, Mathematics and Science education at the Junior High School level in the country. It also has the tendency to affect students' opportunity to

further their studies at higher level and their job opportunities, especially in the Science related areas. The misalignment between the general plan teachers are expected to implement and what they actually implement, and the topics they are expected to teach and what they are able to teach point to some of the major challenges associated with curriculum delivery in English Language, Mathematics and Science that affect students learning outcomes.

Conclusion and Implications

Some level of misalignment existed between the planned and the implementation of the English Language, Mathematics and Science curricula in a number of schools that participated in the study. Gaps were found between the planned curriculum teachers were expected to implement and what they implemented. Gaps also existed in the topics a number of teachers are expected to teach and what they were actually able to teach. These misalignments could have arisen mainly from curriculum overload and the difficulty teachers have teaching certain topics, since the topics students found difficult to learn reflected either the topics teachers were unable to cover or topics teachers had difficulty in teaching, in most cases. We, therefore, conclude that many of the topics that are often reported as being difficult for students in national examinations such as the BECE might be topics students might have very little or no opportunity to learn.

Although this study was conducted in only three out of nineteen districts in the Central Region of Ghana, with only JHS 2 students, the findings may reflect what might be happening in other districts. There is therefore the need for further studies to give a broader picture on the implementation of the planned curriculum in Ghanaian Primary and Junior High Schools. Also, while attempts were made in this study to document topics teachers said they had difficulty teaching, the study did not look at the sources of difficulty, that is, whether the teachers lacked the subject matter knowledge or the teaching of the subject matter or both. Further research is also needed to unearth the sources of difficulty of teachers. The findings from this study also have implications for policy on supervision and professional programmes in Ghana and developing countries that share similar situations as Ghana.

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