

# BECAS

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## **OPPORTUNITY TO LEARN**

### **English and Mathematics in Ghanaian Primary Schools**

**[A study conducted on behalf of Ghana Education Service, Curriculum Research and Development Division (CRDD) to facilitate the Basic Education Comprehensive Assessment System (BECAS)]**

*[The study was carried out by the following team of experts from UEW, UCC, GES and AED - an American NGO: Mereku, K. D., Amedahe, F. K., Etsey, K., Adu, J., Acquaye, E., Synder, W., Moore A. and Long, B. Details of the report can be obtained at Assessment Service Unit of the CRDD, Accra]*

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# **OPPORTUNITY TO LEARN**

## **ENGLISH AND MATHEMATICS IN GHANAIAN**

### **PRIMARY SCHOOLS**

[Report of a Study Conducted on Behalf of Ghana Education Service, Curriculum Research and Development Division (CRDD) to Facilitate the Basic Education Comprehensive Assessment System (BECAS)]

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## **I Abstract**

The Ghana Basic Education Comprehensive Assessment System (BECAS) is a new assessment system developed to replace national tests that were implemented from the 1992-1999 to better monitor instructional effectiveness in primary schools in English and Mathematics.

To ensure that the new system closely assesses what teachers actually teach, the BECAS Team carried out a survey of the contexts of teaching and learning in primary schools to better inform the development of a new comprehensive assessment system. The study examined whether or not the opportunities provided in primary schools for learning are good enough to promote learning for all pupils and to assure high levels of outcomes for all pupils.

The study involved 1,063 teachers and sampled schools from the ten regions of the country in July 2004. The research team used a questionnaire to gather data on teachers and schools, such as classes taught, location of schools, class size, gender of teachers, professional qualifications, instructional resources for teaching English and Mathematics, instructional time, and coverage of content of English and Mathematics in teachers' instruction over the year.

A major finding of the study was that *Opportunity To Learn* (OTL) standards for most schools were very low and that the majority of teachers completed only 60% of the content of the Mathematics and English syllabuses. The analysis also indicated that there were grave inequalities between schools, as well as districts, in the following areas.

- availability and adequacy of instructional materials like textbooks
- instructional practices and management of instructional time
- teacher preparedness to implement the content standards

These inefficiencies could be attributed to the fact that while the curriculum content standards are clearly defined by the syllabuses of the various subjects taught at the basic level, no OTL standards have been set to guide their implementation.

## 2 Introduction

Five years after the Educational Reform Programme was initiated in 1987, a national test, Criterion Referenced Test (CRT), was instituted to assess Primary 6 pupils' achievement in English and Mathematics. Despite the fact that the CRT was a quality assurance measure, it was instituted principally to ensure whether or not the processes and inputs<sup>1</sup> introduced during the educational reforms were helping to improve the quality of education (CRDD, 2001). United States Agency for International Development (USAID) assisted the Ministry of Education and Sports (MOES) in the development and administration of the CRT from 1992 to 1999. The CRT indicated that less than 10% of the pupils reached mastery. Scores in both English and Mathematics rose slowly and steadily beginning from the base year of 1992. However, it could not provide enough information to assess the effectiveness of the processes and inputs introduced during the educational reforms.

Pupils perform best on tests that assess subject matter content which pupils have had the *opportunity to learn* (Gamoran, Porter, Smithson, and White, 1997; Robitaille, et al,

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<sup>1</sup> Such as revision of textbooks, teacher training reforms, intensification of decentralization of the education system and revision of the curriculum

1994). Though supported time and again by research, this observation is little more than common sense. In connection with assessment, Winfield (1987:438) notes that *opportunity to learn* relates to "the provision of adequate and timely instruction of specific content and skills prior to taking a test". She adds that *opportunity to learn* may be measured by "time spent in reviewing, practicing, or applying a particular concept or by the amount and depth of content covered with particular groups of students" (p. 439).

One of the major limitations of the CRT was that the test coverage exceeded the realities of the classroom. Test items covered the **entire** curriculum (syllabus) for Primary 6. Outcomes pupils attained were compared with the entire intended curriculum, even though a substantial proportion of the content prescribed in the syllabus could not be implemented under the conditions that prevailed in schools. Though curriculum standards in the various Ghanaian primary school subjects are clearly defined by syllabuses designed by CRDD, little is said about the processes and inputs required for their attainment. That is, the curriculum standards currently used in Ghana do not address the *opportunities to learn* necessary to promote a high level of achievement for all pupils.

## **2.1 Rationale**

Planners of the Ghana Basic Education Comprehensive Assessment System (GhanaBECAS) included an *Opportunity to Learn* study in order to provide essential information that would enhance the quality of the assessments. Articulation between curriculum, instruction, and assessment is critical to successful learning and instruction. To ensure this articulation, clear OTL standards must be set. It was the hope of the team that the OTL study would guide the BECAS Senior Advisory Group (SAG) in framing its policy directives about OTL standards in addressing the following areas.<sup>2</sup>

- Curricula, instructional materials, and technologies
- Teacher capability and continuous professional development
- Curriculum delivery process (instructional practices)

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<sup>2</sup> At printing, the SAG has not yet been formed and inaugurated.

- Non-discriminatory policies (curricula, and instructional practices for special needs)

Finally, information from the OTL study will guide the development of the new National Education Assessment (NEA) to better assess, through pupil achievement, the quality and quantity of instruction, by documenting what aspects of the curriculum go unlearned and/or untaught.

## **2.2 Purpose of Study**

In order to develop a comprehensive assessment system that ensures all primary school pupils perform reasonably well, thereby reflecting full coverage of the curriculum in the primary schools, OTL must be considered. It is necessary to know whether or not the opportunities provided in primary schools for learning are good enough to promote learning for all pupils and assure high levels of outcomes for all pupils.

The purpose of the study was to ascertain:

- teacher preparedness to implement the content of the national curriculum in English and Mathematics
- the adequacy and availability of resources for the delivery of the national curriculum content in English and Mathematics
- how well the instructional times for teaching English and Mathematics were managed
- extent of teachers' coverage of the national curriculum content in English and Mathematics
- extent of teachers' emphasis on content in English and Mathematics in the national curriculum
- teachers' content emphasis for individual students or groups of students (i.e. whether or not the instruction is differentiated to ensure each student achieves his/her highest potential)<sup>3</sup>

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<sup>3</sup> The study only addresses the above-mentioned aspects of OTL.

### **2.3 National Curriculum in Ghana**

No study in Ghana has looked closely at the curriculum delivery standards. Only two studies have examined aspects of the standards. One was commissioned by the Ghana Ministry of Education in 1993 to examine and analyze the official primary school curriculum materials – syllabuses, pupils’ textbooks and teachers’ guides. The study reported that Mathematics teaching in basic schools focuses on computation skills, learning of formulas, rote practice and teaching as telling. The study also reported that the vast majority of Ghanaian children are growing up functionally illiterate in both their native language and in English. The principal investigator in this study, Kraft (1994), attributed these unfortunate developments to the poor nature of the curriculum, including syllabi, textbooks and teachers’ handbooks, used in the nation’s schools. He argued that “the current syllabi, textbooks and teachers’ handbooks do not meet the highest international standards, nor the current best thinking on sequence, learning and pedagogy and will not prepare Ghanaian students for the needs of the next century” (Kraft:2).

The second study was TIMSS-2003, which was the third in a series of studies undertaken once every four years by the International Association for the Evaluation of Educational Achievement (IEA). The performance of the Junior Secondary School Form 2 (JSS2) students in the TIMSS was unsurprisingly very poor, because of the nature of Mathematics which students experience at school in this country (Anamuah-Mensah, et al, 2004). Analyses of the students’ performance on the TIMSS Mathematics test items show that the few (about 15%) items for which most students were able to make correct responses were those that were testing knowledge of facts and procedures. They performed poorly on items that tested their ability to use concepts, solve non-routine problems and reason mathematically.

Analysis of the TIMSS data on the context for learning Mathematics in Ghanaian schools indicate that students have little opportunity to engage in activities that will enable them to use concepts, solve non-routine problems and reason mathematically (Mullis, et. al., 2004). Anamuah-Mensah, et. Al. (2004) observed that only 42% of Ghanaian JSS Mathematics teachers used the Mathematics textbooks as the main basis for lessons

while 54% used it as a supplementary resource. Thus, the textbooks were used mainly by Ghanaian teachers as a supplement to other materials that teachers may have in their possession. This was not the case in most of the high performing countries, such as Singapore, Korea and Japan, where the textbooks were the primary materials used in teaching the subject. Ghanaian teachers use the textbooks mainly as a supplementary resource, because they are obsolete and do not align with the current syllabuses in school.

### **3 Opportunity to Learn (OTL) Standards**

*Opportunity to learn* refers to equitable conditions or circumstances within a school or classroom that promotes learning for all students (Porter, 1993). It includes provision of curricula, teaching/learning material, facilities, teachers, and instructional experiences that enable students to achieve high standards. The term also refers to the absence of barriers that prevent learning.

Delivery of educational opportunities, defined by the national curriculum and high expectations of student outcomes, includes a number of inputs and processes. OTL standards are in fact indicators that assure a fair and appropriate provision of these inputs and processes. Since views about the specifics of standards, and their use, differ from one educational system to another, it can be difficult to state a universal definition of OTL standards. However, in this report OTL is defined as the criteria for, and the basis of, assessing the sufficiency and quality of resources, practices, and conditions necessary at each level of the education system. A system which closely follows OTL standards can then provide all students with the *opportunity to learn* the material in national curriculum (Ysseldyke, Thurlow, and Shin, 1995).

OTL standards differ from country to country and depend on a particular nation's economic and educational policies. Indices of OTL in different schools, districts, or regions within the same nation cannot be compared when those OTL standards are defined differently. Therefore, there exists a need for consensus on 'what should constitute *opportunity to learn*' for the primary school pupil across districts and regions in Ghana.

OTL standards are usually set around the following areas.

- **Resource Standards** - to assure that all schools have sufficient resources to deliver high level of curriculum content and to therefore achieve higher levels of outcomes for all students
- **Curriculum Delivery Standards** - to assure high levels of curriculum delivery to all students
- **Outcome and Capacity Building Standards** - to assure that all schools have improved capacity to deliver quality education and are evaluated by their delivery of quality educational opportunities to all students

### **3.1 Curriculum Delivery Standards and Pupil Achievement**

In the first International Association for the Evaluation of Educational Achievement (IEA) study of Mathematics achievement (Husen, 1967), teachers from 12 participating nations were asked to judge whether they had promoted the learning of (that is, whether their students had had the *opportunity to learn*) the content exemplified by each test item. IEA studies have found a substantial relationship between teachers' reported content coverage (i.e. *opportunity to learn*) and students' Mathematics achievement (TIMSS, 2004; Mullis, *et. al.*, 2000).

Studies have shown that strong correlations exist between student OTL scores and mean student achievement scores in Mathematics (Husen, 1967; Schmidt). Baratz-Snowden (1993) asserts that if students are held accountable for their learning, schools must be held accountable simultaneously for providing students with the *opportunity to learn* to meet the standards. Winters, *et. al.*, (1994) stated further that *opportunity to learn* (OTL) often serves as part of the evidence for alternative interpretation of student performance.

International summaries of research on relationship between content coverage and achievement demonstrate that students learn the content of the curriculum they are taught; the more they are taught, the more they learn (Oxenham, 1992). Lockheed and Verspoor (1990) reported that most nations have closer to 40 per cent of their teaching time devoted to the national language and only 20 per cent to Mathematics. In this vein, Oakes (1989), and Porter (1991) recommended that school administrators, teachers, and policy makers should not judge test results without considering and analyzing students' *opportunity to learn* (OTL).

### **3.2 Content Coverage**

According to Porter et al. (1979), 'content coverage' can be differentiated into 'content covered' and 'content emphasised'. The first - *content covered* - refers to actual counts made of concepts introduced or the range of content (or skills) actually taught (McDonald, 1976). Measures of content emphasised identified in the literature includes such proxies for content coverage as time allocated to content, textbook length or number of pages in textbook devoted to concept or topic (Good et al. 1978; Barr, 1987; Freeman and Porter 1989).

Many investigators of content coverage have been concerned with "the influence of the curriculum on learners' opportunities to learn concepts measured by achievement tests" (Barr, 1987). Most of the studies in content coverage have treated coverage as a condition that acts upon learning autonomously. In these studies, the researchers were concerned with the influence of content coverage (which is analogous to '*opportunity to learn*') on learners' achievement. Other researchers have considered coverage as a reflection of a complex set of instructional components that jointly affect learning. The empirical literature on content coverage can be separated into two main strands. One explored the influence of content coverage on learners' achievement and the other outlined studies which have been concerned themselves with content coverage as part of a complex instructional component influencing the whole curriculum. In both strands similar methods have been used to estimate the extent of coverage.

## **4 Methodology**

### **4.1 Population and Sample**

The population for the study consisted of primary school teachers, all trained and untrained, in towns and villages where students from the University of Education, Winneba, could undertake the study during their long vacation holidays. The use of "opportunity" sample of schools, instead of a "random" selection, enabled the provision of contextual data that could later shed light on student performance on the National Education Assessment, administered throughout Ghana in July 2005.

## **4.2 Instrument**

A questionnaire was designed by a team of consultants who themselves were teacher-educators. The instrument was pre-tested to ensure suitability of language, flow and length. A copy of the questionnaire can be seen in Appendix A. The questionnaire was designed to provide information about teachers, specifically their schools, classes taught, class size, and gender. Through the questionnaire, researchers also gathered information about professional qualifications, instructional resources and time for teaching English and Mathematics and coverage of content of English and Mathematics over the school year. The questionnaire included items structured to elicit dichotomous responses along a two-point scale – taught or not taught - to indicate whether the teacher had done more or less than a week's teaching of units in the English and Mathematics syllabuses. These items were intended to provide information on teacher coverage of topic/units and emphasis on content domains in the official primary Mathematics and English curricula. The questionnaire took each teacher about 30 minutes to complete.

## **4.3 Data collection and analyses**

Prior to commencement of the data collection, all the students who volunteered to administer the instruments were briefed on the project requirements and were thoroughly trained in the use of the questionnaire. In all, 110 students at the University of Education, Winneba, volunteered to administer the questionnaire. Each student visited two primary schools. Each volunteer student was able to interview 12 teachers and complete a questionnaire for each teacher. About 80% of the questionnaires were returned. The data obtained were keyed onto the computer, and the SPSS application package was used to do the analysis.

## **5 Findings**

The study involved 1,063 teachers, of whom 44.1% were male and 55.9 were female. The teachers who participated in the study were taken from the six primary classes in schools spread throughout the ten regions. Table 1 - Distribution of Teachers by Region and by Gender - shows that the study covered the whole country and the

number of male and female teachers was balanced. The representation of regions was also evenly balanced.

**Table 1**      ***Distribution of teachers by region and by gender***

<b>Region</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>	<b>%</b>
<b>Ashanti</b>	42	86	128	12.1
<b>Brong Ahafo</b>	71	49	120	11.3
<b>Central</b>	47	63	110	10.3
<b>Eastern</b>	50	67	117	11.0
<b>Greater Accra</b>	26	106	132	12.4
<b>Northern</b>	82	26	108	10.2
<b>Upper East</b>	16	32	48	4.5
<b>Upper West</b>	43	41	84	7.9
<b>Volta</b>	45	76	121	11.5
<b>Western</b>	46	47	93	8.7
<b>Total</b>	<b>468</b>	<b>593</b>	<b>1063</b>	<b>100.0</b>

The following table shows the distribution of teachers by region and by the class they taught. Each primary class (Primary 1 to 6) was fairly represented in the study. The number of each primary school class in the study ranged between 161 and 190.

**Table 2**      **Distribution of teachers by region and by classes taught**

Region	Number of teachers						Total*
	Primary 1	Primary 2	Primary 3	Primary 4	Primary 5	Primary 6	
Ashanti	23	22	22	18	21	21	127
Brong Ahafo	24	24	24	24	24	24	144
Central	29	17	11	21	12	12	102
Eastern	24	25	25	21	25	20	140
Greater Accra	28	28	28	16	28	25	153
Northern	17	17	17	17	16	17	101
Upper East	6	6	6	6	6	6	36
Upper West	14	14	14	14	13	13	82
Volta	25	23	23	24	23	24	142
<b>Total</b>	<b>190</b>	<b>176</b>	<b>170</b>	<b>161</b>	<b>168</b>	<b>162</b>	<b>1027</b>

*\*Note: The classes of 36 teachers were not indicated due to incomplete questionnaires.*

### **5.1 Teacher Preparedness**

One of the indicators of OTL standards is teachers' preparedness to implement the curriculum content. This standard can be measured through the teachers' knowledge of subject matter content and pedagogy, which often varies according to the teachers' subject, credentials, certification and professional experiences. In this study, the teachers' preparedness to implement the curriculum content was measured by their teaching qualifications.

Teachers with four categories of teaching qualification – untrained, certificate A, diploma and Bachelor of Education (B. Ed.) degree - participated in the study. Table 3 shows the number and proportion of teachers with each teaching qualification.

**Table 3**      **Distribution of teachers by qualification**

<b>Qualification</b>	<b>Untrained</b>	<b>Certificate A</b>	<b>Diploma</b>	<b>B. Ed degree</b>
Number of teachers	130	892	27	11
Percentage	12.3	84.2	2.5	1.0

The majority of teachers trained to teach at the primary level in Ghana had taken some pre-service education programmes that led to ‘*Certificate A*’ qualifications. The initial training of primary school teachers in Ghana was done at two levels - the post-middle (or junior-secondary) level; and the post senior-secondary level. Even though programmes offered at both levels led to equivalent qualifications (i.e. Teacher’s Certificate ‘A’), the first was a four-year programme while the other was, and still is, a three-year programme. The four-year college programme was phased out in 1991, and all colleges now offer the 3-year post-secondary programme. Since the expectation of the designers of these Teachers’ Certificate ‘A’ programmes was to educate teachers whose academic attainment would be equivalent to that of O-level General Certificate of Education (GCE), the programmes placed more emphasis on subject content at the expense of pedagogy. Thus, the academic qualification of most Ghanaian primary school teachers is poor to nonexistent.

The study showed that 84% of the primary school teachers involved in the study had low teaching qualifications and a substantial proportion (12.3%) had no formal training at all. It can be argued in this regard that the preparedness of the majority of teachers to implement the content of the curriculum in English and Mathematics is inadequate.

The study also examined teachers’ preparedness to implement the content of the curriculum by identifying the difficulties they encountered when teaching the topic areas in English and Mathematics. In teaching English language, 21% of the teachers indicated that they found teaching certain topics or aspects of the syllabus difficult. Below are some of the areas teachers reported difficulties in teaching English and reasons why.

**Table 4      Difficult Units in English**

<p><b>All sections, but specifically:</b></p> <p><u>Grammar</u></p> <ul style="list-style-type: none"> <li>• Adjectives</li> <li>• Anomalous finites (modals)</li> <li>• Determiners</li> </ul> <p><u>Reading</u></p> <ul style="list-style-type: none"> <li>• Comprehension</li> <li>• Library</li> </ul> <p><u>Listening</u></p> <ul style="list-style-type: none"> <li>• Directions/instructions</li> <li>• Drama</li> <li>• Poetry</li> <li>• Library</li> <li>• Conversation</li> <li>• Storytelling</li> <li>• Speaking</li> <li>• Rhyme/verse</li> <li>• Speech work (sounds of letters)</li> <li>• Songs</li> </ul> <p><u>Writing</u></p> <ul style="list-style-type: none"> <li>• Argumentative essay</li> <li>• Mechanical writing</li> </ul>	<p><b>Reasons included:</b></p> <ul style="list-style-type: none"> <li>• Lack of resource books</li> <li>• No resources for the teaching communication skills</li> <li>• (Grammar) pupils find it very difficult to grasp the concepts</li> <li>• No teacher's handbook</li> <li>• Textbooks not available</li> <li>• Lack of TLMs<sup>4</sup> portraying scenes for teaching rhyme/verse</li> <li>• Lack of readers</li> <li>• (Grammar) not well explained in syllabus</li> </ul>
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<sup>4</sup> *Teaching and Learning Materials*

In teaching Mathematics, 34% of the teachers indicated that they experienced difficulties in teaching certain topics of the syllabus. That is, more teachers had difficulties in teaching Mathematics than English. Below are some of the areas in which teachers reported difficulties in teaching Mathematics.

**Table 5 Difficult Units in Mathematics**

<b>All sections, but specifically:</b>	<b>Reasons included:</b>
<p><u>Number</u></p> <ul style="list-style-type: none"> <li>• Integers, the number plane</li> <li>• Investigation with numbers</li> <li>• Numbers + numerals 0 - 10,000</li> </ul> <p><u>Basic Operations</u></p> <ul style="list-style-type: none"> <li>• Decimal fractions</li> <li>• Percentages</li> <li>• Ratios</li> <li>• Proportions</li> <li>• Fractions</li> <li>• Operations on fractions, decimal fractions and percentages</li> <li>• Rational numbers</li> <li>• Long division</li> </ul> <p><u>Measurement</u></p> <ul style="list-style-type: none"> <li>• Area and length</li> <li>• Capacity and volume measurement of weight</li> <li>• Measurement of weight time and money</li> </ul> <p><u>Shape and Space</u></p> <ul style="list-style-type: none"> <li>• Geometric figures in space</li> </ul> <p><u>Collecting and Handling Data</u></p> <ul style="list-style-type: none"> <li>• Chance</li> <li>• Graphs</li> </ul>	<ul style="list-style-type: none"> <li>• Story problems - forms of questions are difficult for children to read and interpret.</li> <li>• Syllabus is different from textbook</li> <li>• Concepts hard to understand for both teachers and students</li> </ul>

In spite of the fact that most teachers have little or no teaching qualifications and know little about the pedagogy for teaching many of the topics, units or aspects of the syllabuses, it was obvious from their comments that their difficulties had been worsened by the lack of textbooks that match the contents of the syllabuses.

## 5.2 Adequacy and Availability of Resources

As noted above, the delivery of educational opportunities defined by the national curriculum includes a number of inputs and processes. The study also sought to determine the current resource standards; that is, whether or not schools have sufficient resources to deliver a high level of curriculum content and to therefore achieve higher levels of outcomes for all students.

To do this, the primary school teachers indicated whether or not the following inputs, which affect the teaching and learning of Mathematics and English, were *available and adequate*, *available but inadequate* or *not available at all* in the classes they taught during the academic year. Table 4 shows the proportion of teachers indicating the availability of these basic inputs.

**Table 6**                      **Availability of the basic inputs**

Resources needed to deliver curriculum content	Percentage of teachers indicating availability inputs		
	Not available	Available but inadequate	Available and adequate
Classroom space	4	20	75
Classroom furniture	4	31	65
Pupils exercise books	4	45	51
Teacher's stationery (chalk, notebook, cardboard, etc.)	2	41	57
English textbooks	25	53	21

Mathematics textbooks	14	41	43
Audio-Visual aids for teaching language (i.e. radio, TV/Video or computer)	94	4	2
Mathematical drawing instruments (ruler, compasses and protractor)	71	20	6
Resources for teaching measurement and geometry (metre-ruler, tape measure, litre containers, weighing scale, etc.)	68	27	4

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Interestingly, Table 6 shows that 4% of the teachers instruct pupils in structures that were not originally constructed as classrooms. It can also be observed from the table that 24% of pupils have inadequate classroom space, and 35% are without adequate classroom furniture. The volunteer student researchers observed that some children sat on stools brought from home and some even sat on boards resting on blocks. More than 40% of pupils do not have enough exercise books in which to do their class exercises and roughly 50% of the teachers do not have enough stationery (chalk, notebook, manila card, cardboard, etc.) for teaching their daily lessons.

It was found that while 80% of the teachers had copies of the Mathematics and English syllabuses, only half of the 20% which did not have copies had access to them only at weekends when preparing their lesson notes. The other half had them whenever they wanted them in the week.

It was also observed that the textbooks<sup>5</sup> currently in use in the nation's primary schools for teaching English and Mathematics were published over a decade ago. Over half of the schools involved in the study reported inadequate or few supplies of these books. Only 21% of the teachers indicated that pupils' English textbooks were available and

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<sup>5</sup> Ghana Mathematics Series: Primary Schools Pupil's Books 1 – 6, published in 1987 by CRDD.  
An English course for Ghana: Pupil's Books 1 – 6, published in 1988 by CRDD.

adequate, while 43% indicated that pupils' Mathematics textbooks were available and adequate.

A majority of the teachers (70%) indicated that measurement and mathematical drawing instruments such as tapes, litre-containers, weighing scales, rulers, compasses and protractors were not available in their schools for teaching topics in measurement and geometry. Audio-Visual aids for teaching language (i.e. radios, TV/Videos or computers) were found in the schools of only 2% of the teachers' classrooms and 94% of surveyed teachers did not have these in their schools at all.

### **5.3 Management of Instructional Time**

Instruction in primary schools in Ghana is scheduled to begin at 08.00 hrs and finish at 13.30 hrs. The amount of time that pupils spend in school each school day is 5 hours, since there are two breaks that last 30 minutes each. The total time expected to be spent in school over the 40 weeks in an academic year is 1,000 hours. However, this expectation is not achieved, because lessons in many schools do not start on time and teachers report frequent interruptions. Some of the reasons for not starting lessons on time include:

- Pupils, teachers and administrators live far away from school and arrived late
- Transition from morning to afternoon is difficult in schools with shifts
- Transport to many areas is lacking or infrequent
- On market days some pupils must take food stuffs to the market before coming to school
- Pupils are made to tidy up the compound which uses up instructional time

Additionally, the instructional time was often interrupted by co-curricular (or planned non-instructional) activities, like school worship, cleaning compound and classrooms, gardening, practising sports for athletics meetings, practising marching and cultural activities, among others.

The teaching syllabuses state that the amount of time allocated to teaching Mathematics and English is ten 30-minute periods a week for each subject. The two subjects together

take 40% of each day's instructional time. A considerable amount of the time pupils are expected to be learning these subjects is instead spent on some of the non-instructional activities mentioned above.

To ascertain if pupils were fully engaged during the time allocated to teaching Mathematics and English, the teachers were asked to indicate whether or not they followed the suggested timetable when teaching all subjects on the timetable each day. More than half of the teachers (53%) indicated they followed the timetable, but as many as 47% did not rigidly follow it.

Some reasons given for not following the timetable are as follows.

- We usually miss the first periods.
- Activities like sports, culture, and grounds works, disrupt the timetable.
- As non-detached head teacher, I combine classroom work with administrative work.
- Children are slow learners and slow in writing.
- Class size too large to be able to teach all subjects.
- Contact hours are not enough.
- It is difficult to plan/teach all the subjects.
- Activities, such as morning worship and visits by educational heads, delay the beginning of instruction and/or interrupt lessons
- Ghanaian language cannot be taught, because I do not speak it. (i.e. Fante)
- Lack of textbooks on subjects like music prevents adequate instruction.
- Pupils are unable to finish exercises on time.
- Marking of pupils' exercises and corrections takes away from teaching time
- Teachers sometimes teach multiple classes, i.e. P4, P5 and p6.
- The children are slow in understanding concepts.
- The time table is overloaded.
- It is sometimes necessary to use physical education periods to teach other subjects, like Mathematics.

#### 5.4 Coverage Of English And Mathematics Content

To determine the extent to which teachers cover the content of the English and Mathematics curricula, they were asked to indicate the proportion of the syllabuses they were likely to complete by the end of the academic year during which this OTL study was undertaken. They indicated whether or not they taught topics, units or sections in the syllabuses. Teachers reflected on their preparedness indicating the topics, units or sections in the syllabuses that were taught in the year. They also gave reasons why topics, units or sections in the syllabuses were not taught during the year. The figure below illustrates the coverage of both the English and Mathematics curriculum.

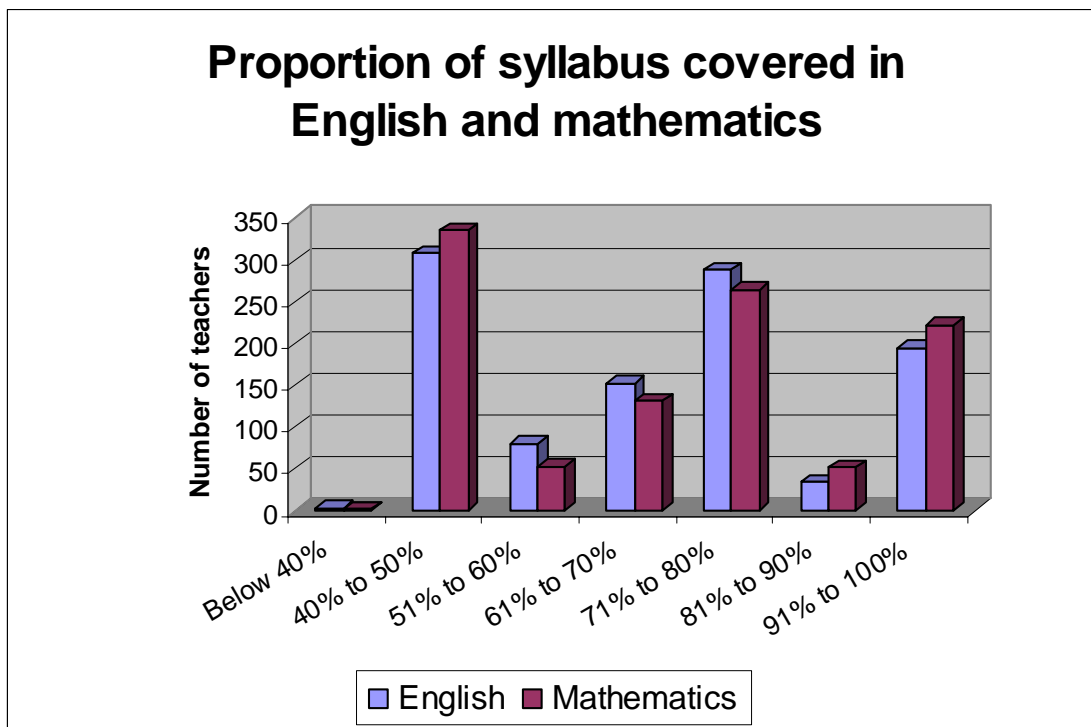
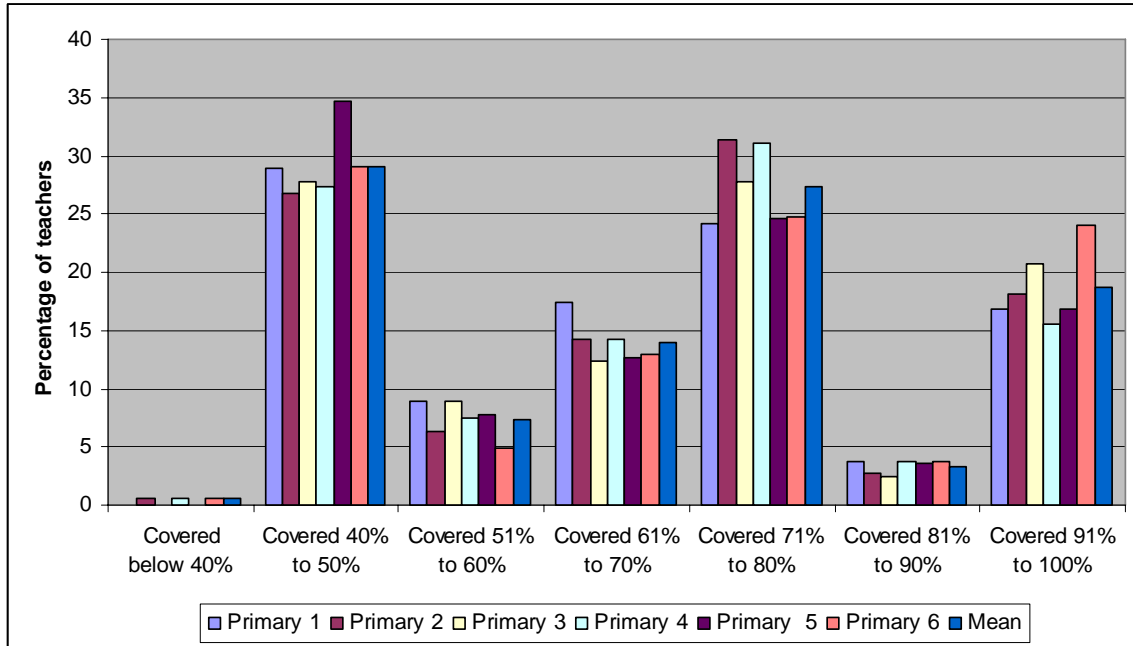


Figure 1 Coverage of English and Mathematics syllabuses

#### 5.5 Content Coverage of the English Curriculum

Figure 2 shows the proportions of the teachers indicating their content coverage in English. About 30% of the teachers indicated that they were able to cover half of the English syllabus content. About only 19% indicated that they were able to cover all the content, leaving the majority to cover only 80% of the content of the English syllabus.



**Figure 2 Teachers' content coverage in English.**

The information the teachers provided on topics in the English syllabus was further examined to expose content areas that were not taught at all by many teachers. Table 7 shows the proportion of teachers indicating topics that were not taught at all.

The table shows the following topics were not taught by many of the teachers in the study:

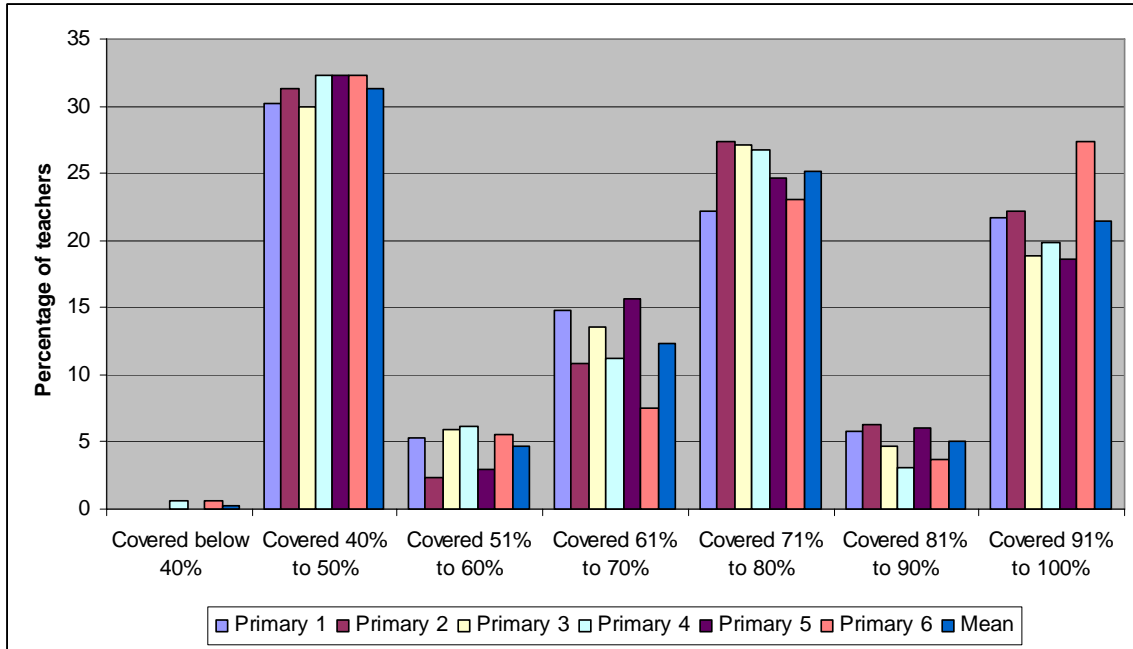
- library
- story telling
- drama
- songs
- mechanical writing
- poem
- directions and instructions

**Table 7**      **Proportion of teachers indicating English topics not taught**

Sections/units of English	Percentage* of teachers indicating section/unit was not taught					
	Primary 1	Primary 2	Primary 3	Primary 4	Primary 5	Primary 6
<i>English Content Domain 1: Comprehension/Reading</i>						
Library	35.2	28.9	23.3	20.9	12.1	14.4
<i>English Content Domain 2: Writing/Composition</i>						
Mechanical writing	-	-	-	9.5	11.6	15.6
Dictation	-	-	-	-	6	6
<i>English Content Domain 3: Oral Language (listening and speaking)</i>						
Story telling	4.8	5.8	7.7	8.3	6.1	6.4
Drama	16	26	20.5	29.4	22.1	23.1
Poem	-	-	-	11.4	14	8.8
Verse, directions, instructions	-	-	7.1	13.3	12.7	10.1
Song	-	8.0	14.4	15.2	19.5	20.8
<i>English Content Domain 4: Language Item (grammar and structure)</i>						
Conversation	-	-	-	6.4	4.3	4.0

### **5.6 Teachers' coverage of the curriculum content of Mathematics**

Figure 3 shows the proportions of the teachers indicating their content coverage in Mathematics.



**Figure 3 Teachers' content coverage in Mathematics**

In Mathematics the coverage was very similar to that of English. About 31% of the teachers indicated that they were able to cover only half of the Mathematics syllabus content and 21% indicated that they were able to cover all the content. That is, only about 20% of teachers taught the entire Mathematics syllabus, with the majority only covering up to 80% of the syllabus.

The information teachers provided on topics in the Mathematics syllabus was further examined to expose content areas that were not taught by many teachers. Table 8 shows the proportion of teachers indicating topics that were not taught.

**Table 8**      **Proportion of teachers indicating topic was not taught in Mathematics lessons**

Topics in Mathematics	%age of teachers indicating topic was not taught					
	Primary 1	Primary 2	Primary 3	Primary 4	Primary 5	Primary 6
<i>Mathematics Content Domain 2: Number operations and algebra</i>						
Division	-	20.6	-	-	-	-
Decimals and Percentages	-	-	-	11.1	-	-
Operations on fractions	-	-	14.8	-	12.6	-
Ratio and proportion	-	-	-	-	17.6	-
Investigations with numbers	-	-	-	28.7	33.6	23.0
<i>Mathematics Content Domain 3: Measurement</i>						
Length, capacity and mass	24.2	19.6	-	-	-	-
Time and money	17.4	-	-	-	30.4	-
Capacity and mass	-	-	23.1	-	-	-
Length and area	-	-	-	13.2	-	-
Area and volume	-	-	-	34.5	12.6	35.8
<i>Mathematics Content Domain 4: Shape and space (Geometry)</i>						
Shape and space	-	32.2	9.9	17.1	21.3	14.8
Number plane	-	-	-	-	18.2	-
<i>Mathematics Content Domain 5: Handling data</i>						
Collecting and handling data	38.6	33.5	14.9	26.5	-	-
Chance	-	-	-	-	-	21.9

### **5.7 Emphasis<sup>6</sup> in the national curriculum content in English and Mathematics**

The amount of emphases placed on content domains in the two subjects was examined in terms of the number of teachers indicating they taught topics in these domains. For English the content domains comprised:

- Comprehension/Reading
- Writing/Composition
- Oral Language (listening and speaking)
- Language Items (grammar and structure)

For Mathematics, the domains were:

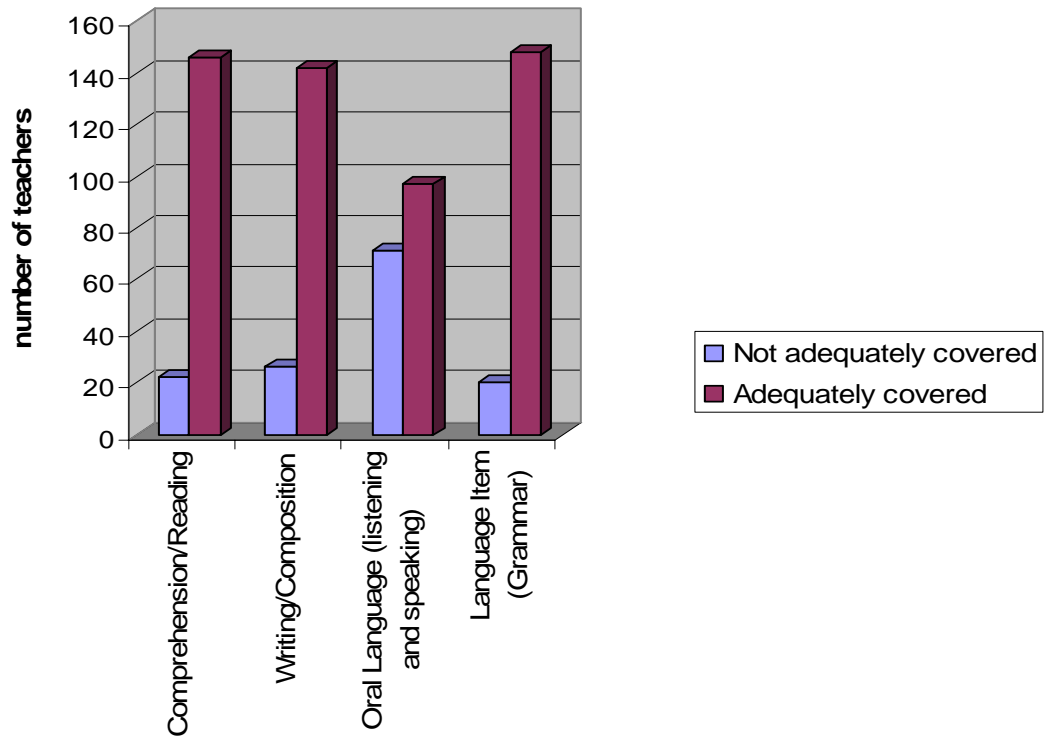
- Number and Numerals
- Number Operations and Algebra
- Measurement
- Shape and Space (Geometry)
- Handling Data

Only the results from the Primary 6 data on the amount of emphases placed on content domains are presented in this report, since the trend was the same for all the other classes.

Figures 4 and 5 show the amount of emphases given to topics in the various content domains of the two subjects. Figure 4 clearly shows that teachers and classroom resources gave equal attention to comprehension/reading, writing/composition and language item (grammar and structure). However, nearly half of them did not give adequate attention to oral language (listening and speaking) units.

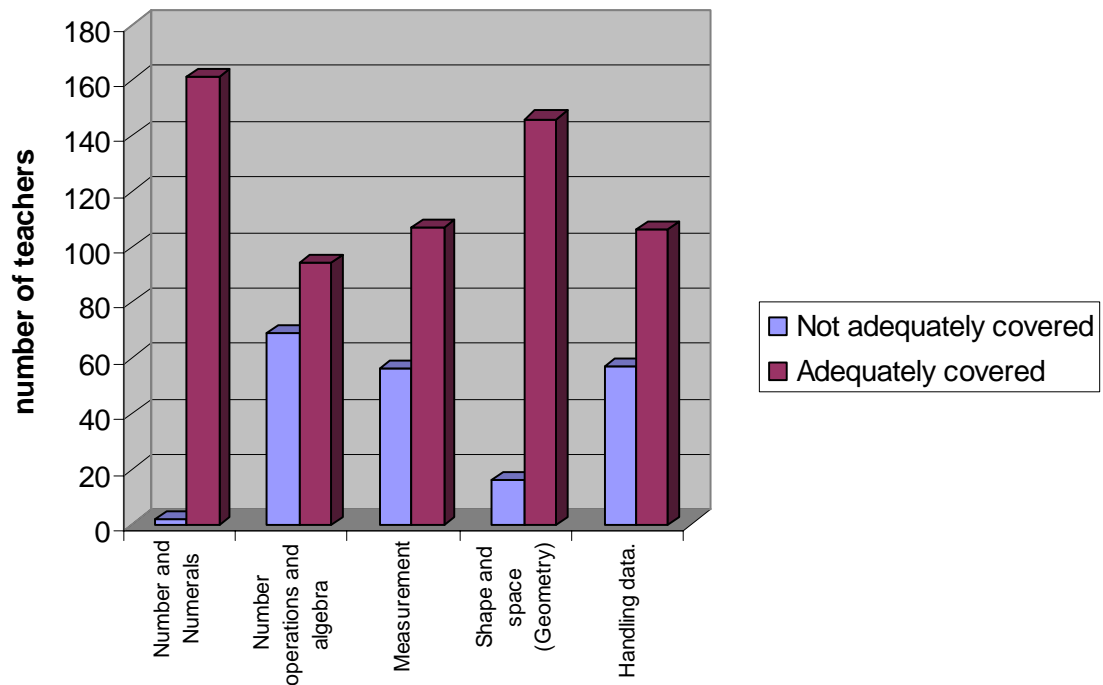
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<sup>6</sup> As stated earlier, *emphasis* refers to time allocated to content, textbook length or number of pages in textbook devoted to particular concept or topic.



**Figure 4** *Emphasis of the English content domains*

In Mathematics, almost all teachers teach topics in number and numerals, as well as shape and space. However, as Figure 5 shows, a substantial proportion of teachers gave little attention to the other content domains – operations/algebra, measurement and handling data.

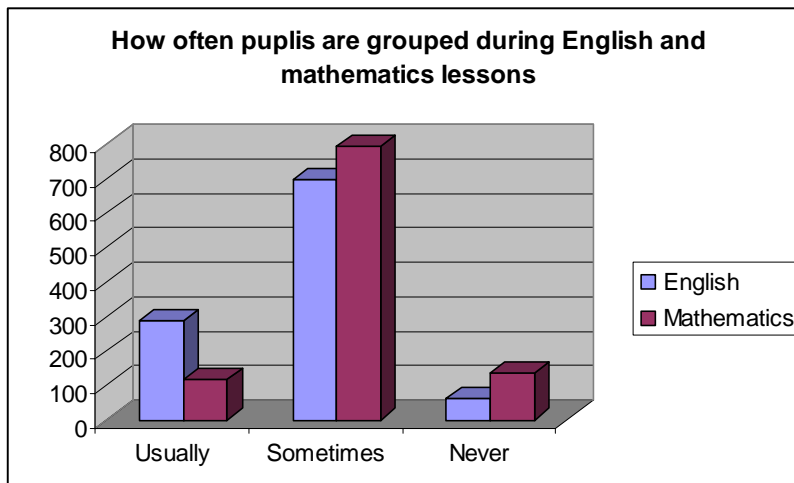


**Figure 5** *Emphasis of the Mathematics content domains*

### **5.8 Content emphasis for individual students or groups of students**

As pointed out earlier, content emphasis for students or groups of students is one of the indicators of *opportunity to learn*. In this study, data was obtained on a number of factors that facilitate content emphasis for students or groups of students. These factors help students receive a fair opportunity to achieve the knowledge and skills in the content standards set in English and Mathematics. The factors considered in this area of the study were class size, availability of teaching inputs/materials and frequency of ability-grouping by teachers.

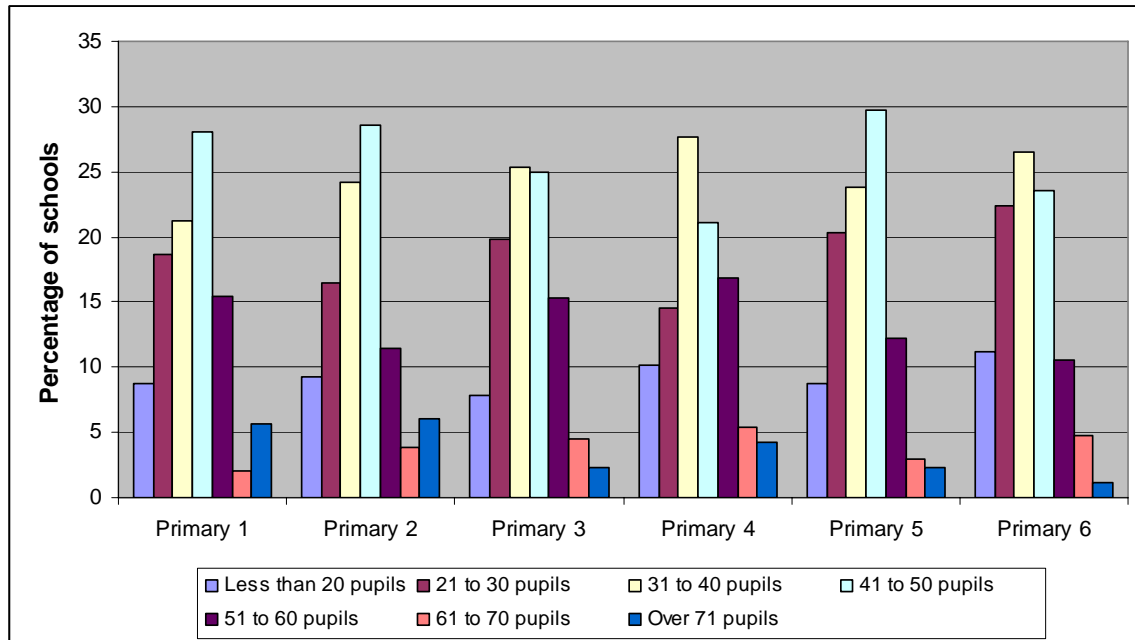
As noted above, inputs for teaching English and Mathematics are not sufficient in most classes. Only 21% of teachers indicated that pupils' English textbooks were available and adequate, while 43% indicated that Mathematics textbooks were available and adequate. As can be seen in Figure 6, many of the teachers indicated that they did, in fact, often or sometimes group their pupils by ability during Mathematics and English lessons.



**Figure 6** Frequency of grouping pupils by ability during lessons

The proportions of teachers who grouped pupils by ability *usually* or *sometimes* during English lessons were 27% and 65% respectively, while those who did so in Mathematics lessons were 11% and 74% respectively.

Figure 7 shows the size of classes at the various grade levels in the primary school. Class sizes are large in Ghana. On the average, in about 25% of the classes in this study, the class sizes ranged from 31 to 40. But in more than 40% of the schools involved in the study, class-sizes were larger than 40 pupils. Large classes provide a perfect opportunity for ability-grouping, as it allows all children to work and learn with limited human resources. But as indicated below, very little use is made of ability group work by the teachers.



**Figure 7** Proportion of schools with class-size categories

## 6 Summary, Conclusions and Recommendations

### 6.1 Summary

In this study, researchers hoped to ascertain whether or not the *opportunities to learn* provided in primary schools are good enough to promote learning for all pupils and assure high levels of outcomes for them. The study focused specifically on:

- i. teachers' preparedness to teach the content of the national curriculum in English and Mathematics
- ii. the adequacy and availability of resources provided for the delivery of the national curriculum content in English and Mathematics
- iii. the management of instructional time for teaching English and Mathematics
- iv. extent of coverage of the national curriculum content in English and Mathematics
- v. extent of emphasis in the national curriculum content in English and Mathematics

- vi. teachers' content emphasis for individual students or groups of students (i.e. whether or not the content is differentiated to ensure each student achieves his/her highest potential).

The study involved 1,063 teachers in primary schools in Ghana, both trained and untrained, of which 44.1% were male and 55.9% were female. A questionnaire was used to gather data on teachers, schools, classes taught, location of schools, class size, professional teaching qualifications, instructional resources for teaching English and Mathematics, instructional time, and coverage of content over the year.

The main findings of the study are outlined here.

- i. A majority of the primary school teachers have low teaching qualifications and a substantial proportion is not at all trained. Therefore, one could argue that the preparedness of the majority of teachers to implement the content of the curriculum in English and Mathematics is low.
- ii. Teachers experience difficulties in teaching certain topics in both English and Mathematics.
- iii. Schools do not have sufficient resources to deliver the necessary amount of curriculum content to achieve high levels of outcomes for all students. Teachers cannot deliver their best instruction and help pupils achieve their highest potentials without basic resources like textbooks.
- iv. Lessons in many schools do not start on time, and instructional time is often interrupted.
- v. More than half of teachers in the study indicated they did not follow the timetable.
- vi. The majority of teachers are only able to cover up to 80% of the content of the English syllabus, and one-third teaches only half of the curriculum for English.
- vii. As in English, the majority of teachers are only able to cover up to 80% of the content of the Mathematics syllabus, while as many as one-third cover only half of the syllabus.

- viii. Certain topics/units were not taught by many of the teachers in the two subjects. Some of the more difficult Mathematics topics are shape and space, length, capacity and mass, decimals and percentage, investigations with numbers, time and money, collecting and handling data, chance, and area and volume. Topics in English which teachers find difficult to cover are library, story telling, drama, song, mechanical writing, poem and verse, and directions/instructions.
- ix. In teaching English, teachers gave equal attention to comprehension/reading, writing/composition and language item (grammar and structure). But nearly half of them did not give adequate attention to units in oral language (listening and speaking). In teaching Mathematics, while almost all teachers taught topics in number and numeral, as well as shape and space, a substantial proportion of teachers gave little attention to the other content domains – operations/algebra, measurement and handling data.
- x. Many teachers indicated they grouped (*often* or *sometimes*) their pupils by ability during Mathematics and English lessons.

## **6.2 Conclusion**

The majority of teachers examined in the OTL study are not prepared to implement the content of the curriculum in English and Mathematics, and a substantial number of them experience difficulties when teaching certain topics in both subjects. The schools lack sufficient resources to deliver high level of curriculum content and thereby achieve levels of outcomes for all students. Supplies of textbooks, classroom furniture and teaching/learning materials were inadequate. Finally, instructional time is poorly managed.

Curriculum content standards are clearly defined by the syllabuses of the various subjects at the basic level. The study has shown, however, that no OTL standards have been set to guide the implementation of these content standards. Hence, there are grave inequalities between schools in the availability and adequacy of instructional materials and textbooks, instructional practices, management of instructional time and teacher preparedness to implement the content standards.

### 6.3 Recommendations

- i. It is recommended that the Curriculum and Research Development Division should set OTL standards that will assure a high level of achievement for all pupils, that is, state the indicators that will assure a fair and appropriate provision of inputs and processes in basic schools. Also, teacher education programmes should ensure that teachers are not only exposed sufficiently to OTL standards, but also to the strategies that can be adopted to ensure such standards are maintained and improved.
- ii. Test items for National Educational Assessment (NEA) and School Education Assessment (SEA) developed for the GhanaBECAS project and CRDD should cover largely the critical or “core”<sup>7</sup> objectives in the primary Mathematics and English syllabuses, being that these are the objectives most commonly taught by most teachers. This will also ensure there is match in content emphasis, as well as coverage in the official curricula.
- iii. In order to promote a high level of achievement for all pupils, the Curriculum Research and Development Division (CRDD) should set *opportunities to learn* (OTL) standards. It should indicate who would provide the resources that will be required to meet the OTL standards for teaching in basic schools. In doing so, CRDD should provide a list of additional resources that schools can use to supplement those necessarily supplied by the government.
- iv. The CRDD should also advise the Ministry of Education and Sports (MOES) on issues relating to policy on class sizes, use of instructional time, in-service training and increased professional education of teachers.
- v. Textbooks that match the revised syllabuses for Mathematics and English should be purchased for pupils.
- vi. Teachers should plan lessons to allow their pupils to work often in groups in order to share the few resources that are available.

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<sup>7</sup> “Core” applies to those objectives that a child at a particular grade level must achieve in order to be ready for the next level of schooling.

- vii. A quality assurance mechanism should be put in place to ensure that schools meet these standards in the implementation of the content standards.
- viii. Information on teachers' coverage of the curriculum - Interviews and/or daily logs can be used to gather information on how well the curriculum is covered. For example, content coverage is indicated by topics covered in each class period and by the amount of emphasis placed on each topic. This information also will indicate the modes of instruction, the types of student activities, and the types of instructional materials that were used.
- ix. There is an urgent need to increase school-based in-service education activities to support these teachers.
- x. Ghanaian schools clearly lack sufficient resources to deliver a high level of curriculum content. It can be argued in this light that the environment for learning Mathematics and English for many Ghanaian pupils is not conducive for teachers to deliver their best instruction and help pupils to achieve their highest potentials. Better provision of teaching and learning resources is necessary for achieving higher levels of outcomes for all students

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**APPENDIX A Questionnaire**

**GHANA EDUCATION SERVICE  
CURRICULUM RESEARCH AND DEVELOPMENT DIVISION (CRDD)**

**Survey of Basic School Contexts and Curriculum Implementation for the  
Basic Education Comprehensive Assessment System (BECAS)**

**PRIMARY I TEACHERS' QUESTIONNAIRE**

Dear Teacher,

As you are aware, assessment is an integral part of teaching. The teacher must be supported to assess his or her pupils well. This questionnaire is surveying the contexts of basic schools and their curriculum implementation to inform the development of a new comprehensive assessment system for basic schools.

We will be pleased if you will complete this questionnaire to provide information for the process. Your responses will be treated with utmost confidentiality. Thank you for your cooperation.

.....

**Mr. E. ACQUAYE**

(DIRECTOR, CRDD)



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## INSTRUCTION

In each case, COMPLETE THE STATEMENT(S) and/or TICK (✓) THE APPROPRIATE OPTION.

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1. SCHOOL: .....
2. TOWN: .....
3. DISTRICT: .....
4. REGION: .....
- 5a. SEX: MALE [ ] FEMALE [ ]
- 5b. PROFESSIONAL'S QUALIFICATION: UNTRAINED [ ]  
CERTIFICATE 'A' [ ] DIPLOMA [ ] DEGREE (B.Ed) [ ]
6. CLASS(ES) YOU TEACH PRESENTLY .....
7. NUMBER OF PUPILS IN YOUR CLASS .....
  
8. Do you usually start teaching on time? YES [ ] NO [ ]
9. If NO, why do you usually start late?  
.....  
.....  
.....
  
10. Tick (✓) to show whether the following inputs, which affect the teaching and learning of Mathematics and English, were **not available, available but inadequate, or available and adequate** in your class in the academic year.

<b>CLASS INPUTS</b>	<b>SCALE</b>		
	<b>Not Available</b>	<b>Available But Inadequate</b>	<b>Available And Adequate</b>
a) Pupils exercise books			
b) Teacher's stationery (chalk, notebook, cardboard, etc.)			
c) Pupils' Mathematics textbook(s)			
d) Pupils' English textbook(s)			
e) Pieces of pupils' mathematical drawing instruments (ruler, compasses and protractor)			
f) Classroom space			
g) Classroom furniture			
h) Resources for teaching measurement and models for work in number and shape (metre-ruler, tape measure, litter containers, weighing scale, etc.			
i) Audio-Visual aids for teaching language (i.e. radio, TV/Video or computer)			

11. Do you have your own copy of the Mathematics syllabus? YES [ ] NO [ ]

12. If NO, how often do you have access to the Mathematics syllabus?

A. At the beginning of term when writing my scheme of work

B. Only at weekends when preparing my lesson notes

C. Any day during the week that I need it

D. Other, Please specify.....

13. Do you have your own copy of the English syllabus? YES [ ] NO [ ]

14. If NO, how often do you have access to the English syllabus?

A. At the beginning of term when writing my scheme of work

B. Only at weekends when preparing my lesson notes

C. Any day during the week that I need it

D. Other, Please specify.....

15. Do you usually follow the time table when you teach (or do you teach all subjects on the time table each day)? YES [ ] NO [ ]

16. If NO, how many subjects are you able to teach each day? .....

17. What prevents you from teaching all subjects on the time table each day?

.....  
.....  
.....  
.....

18. How many Mathematics periods do you teach each week?

.....

19. What proportion of the Mathematics syllabus are you likely to complete by the end of the academic year? (Please tick only one)

A. Below 40% [ ]

B. 40% to 50% [ ]

C. 51% to 60% [ ]

D. 61% to 70% [ ]

E. 71% to 80% [ ]

F. 81% to 90% [ ]

G. 91% to 100% [ ]

20. How many English periods do you teach each week? .....

21. What proportion of the English syllabus are you likely to complete by the end of the academic year? (Please tick only one)

A. Below 40% [ ]

B. 40% to 50% [ ]

C. 51% to 60% [ ]

D. 61% to 70% [ ]

E. 71% to 80% [ ]

F. 81% to 90% [ ]

G. 91% to 100% [ ]

22. Do you have any difficulties in teaching any of the topics in Mathematics?

YES [ ] NO [ ]

23. If yes, which topics in Mathematics?

.....  
.....  
.....

24. How often do you group your pupils by ability during your Mathematics lessons?

USUALLY [ ] SOMETIMES [ ] NEVER [ ]

25. Do you have any difficulties in teaching any of the Sections/Units in English?

YES [ ] NO [ ]

26. If yes, which Sections/Units in English?

.....

.....  
 .....

27. How often do you group your pupils by ability during your English lessons?

USUALLY [ ]                      SOMETIMES [ ]                      NEVER [ ]

28. Below are the Sections/Units that are to be taught in Primary I according to the new English syllabus. Reflecting on your scheme of work and what you actually taught in the year

- i. TICK (✓) whether or not you taught the Sections/Units in the year; and
- ii. Give brief reasons why Section/Unit was not taught in the year.

SECTIONS/UNITS OF ENGLISH		TAUGHT	NOT TAUGHT	REASON SECTION/UNIT WAS NOT TAUGHT
1.	Pre-reading/reading			
2.	Conversation			
3.	Grammar			
4.	Rhyme			
5.	Mechanical Writing			
6.	Story Telling			
7.	Drama			
8.	Library			

29. Below are the Units that are to be taught in Primary I according to the new Mathematics syllabus. Reflecting on your scheme of work and what you actually taught in the year

- i. TICK (✓) whether or not you taught the Units in the year; and
- ii. Give brief reasons why the Unit was not taught in the year.

<b>MATHEMATICS</b>			<b>NOT</b>	<b>REASON TOPIC WAS</b>
	<b>UNIT OR TOPIC</b>	<b>TAUGHT</b>	<b>TAUGHT</b>	<b>NOT TAUGHT</b>
1.	Pre-Number Work			
2.	Groups of Objects			
3.	Counting Objects			
4.	Numbers and Numerals I			
5.	Addition (Up to 5)			
6.	Solid Shapes			
7.	Number and Numerals II			
8.	Addition 6 - 9			
9.	Subtraction 0 - 9			
10.	Ten and Ones			
11.	Addition and Subtraction			
12.	Measurement of Length, Capacity and Mass			
13.	Measurement of Time and			

	Money			
14.	Collecting and Handling Data			
15.	Addition and Subtraction of Number (0 - 99)			

**THANK YOU**

**APPENDIX B Coverage of Syllabus**

	<b>Proportion of Mathematics syllabus covered</b>	<b>Proportion of English syllabus covered</b>
ASHANTI	51-60%	51-60%
BRONG AHAFO	61-70%	61-70%
CENTRAL	61-70%	61-70%
EASTERN	61-70%	61-70%
GREATER ACCRA	61-70%	71-80%
NORTHERN	61-70%	61-70%
UPPER EAST	51-60%	51-60%
UPPER WEST	61-70%	51-60%
VOLTA	61-70%	61-70%

**Note:** With the exception of Greater Accra, where the coverage was 71-80%, the maximum coverage of the Mathematics and English syllabuses in the other regions reached only 70%.

**APPENDIX C Class Size**

<b>REGION</b>	<b>CLASS SIZE MEAN</b>
ASHANTI	42.46
BRONG AHAFO	34.91
CENTRAL	43.24
EASTERN	35.97
GREATER ACCRA	42.67
NORTHERN	51.06
UPPER EAST	54.23
UPPER WEST	42.50
VOLTA	30.72

**CLASS SIZE CATEGORIES**

<b>Class</b>	<b>Less than 20 pupils</b>	<b>21 to 30 pupils</b>	<b>31 to 40 pupils</b>	<b>41 to 50 pupils</b>	<b>51 to 60 pupils</b>	<b>61 to 70 pupils</b>	<b>Over 71 pupils</b>	<b>Total</b>
Primary 1	8.8%	18.7%	21.2%	28.0%	15.5%	2.1%	5.7%	100.0%
Primary 2	9.3%	16.5%	24.2%	28.6%	11.5%	3.8%	6.0%	100.0%
Primary 3	7.9%	19.8%	25.4%	24.9%	15.3%	4.5%	2.3%	100.0%
Primary 4	10.2%	14.5%	27.7%	21.1%	16.9%	5.4%	4.2%	100.0%
Primary 5	8.7%	20.3%	23.8%	29.7%	12.2%	2.9%	2.3%	100.0%
Primary 6	11.2%	22.4%	26.5%	23.5%	10.6%	4.7%	1.2%	100.0%
TOTAL	9.3%	18.7%	24.7%	26.0%	13.7%	3.9%	3.7%	100.0%