UNIVERSITY OF CAPE COAST

BASIC SCHOOL TEACHERS' UTILIZATION OF INSTRUCTIONAL TIME IN THE TEACHING AND LEARNING OF SCIENCE

ERIC APPIAH

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BY

ERIC APPIAH

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DECLARATION

Candidate's Declaration

I hereby declare that this dissertation is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:……. Date:……

Name: Eric Appiah

Supervisor's Declaration

I hereby declare that the preparation and presentation of the dissertation were supervised in accordance with the guidelines on supervision of dissertation laid down by the University of Cape Coast.

Supervisor's Signature:…….

Date:……

Name: Prof. Joseph Ghartey Ampiah

ABSTRACT

This study investigated upper primary school teachers 'utilization of instructional time during the teaching and learning of integrated science. Teachers' expectations of science lesson delivery and their actual practices in the classroom and their difficulties in teaching integrated science were also investigated. A multi-site case study approach was adopted for this study and the participants were purposively selected. Data were collected from primary four, five and six classrooms in two basic schools in Cape Coast in the Central Region of Ghana using a classroom observation checklist and teachers' interview schedule. Six teachers were interviewed and 18 classroom lesson observations were made.

The results indicated that teachers apportioned instructional time for reading, discussion, brainstorming, practical activities and demonstration. However, teachers' expectations of their lessons were contrary to their actual classroom practices. Out of the 18 lessons observed, it was only in four lessons that teachers' were seen using the right teaching and learning materials. Also, factors such as interruptions within and outside the classrooms, unavailability of learning materials, large class sizes, extra-curricular activities and the nature of classrooms for science lessons were some of the difficulties integrated science teachers' had in managing classroom instructional time. It was recommended that the Inspectorate Division of the Ghana Education Service should be adequately resourced to provide effective monitoring and supervision of instruction in schools to ensure effective teaching and learning of integrated science.

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DEDICATION

Dedicated to my lovely wife, Mrs. Berlinda A. Appiah, and my fathers, Prof. J. G. Ampiah and Mr V. K. Eghan for their sacrifices and encouragements.

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CHAPTER ONE

INTRODUCTION

Background to the Study

One of the most consistent educational finding is that the amount of time that children are actively engaged in tasks they can perform successfully contributes significantly to achievement (Berliner, 1990; Marzano, 2000). More than four decades ago, Carroll (1963) proposed a model of school learning to guide the solution of educational problems grounded in the economics of instruction. Carroll's model was based on the idea that only a few critical variables influence students' learning. Central to this model was the role of time or opportunity to learn.

Instructional time is the actual contact hours when teachers and pupils interact. Thus, instructional time is defined as time scheduled for purposes of instruction, examinations, and other student activities where direct student-teacher interaction and supervision are maintained (McLeod, Fisher & Hoover (2003). Kraft (1994) stated that the number of hours given to children for the study of any subject is determined by three factors. These are the length of the official school year in hours, the number of hours given to the subject and the amount of time lost as a result of school closure, teachers' absence and other interruptions. Thus for this reasons, it is important for teachers to use the allocated instructional time as much as they can. This calls for teachers' consciousness of how he/she uses the given instructional time for the

promotion of teaching and learning. Furthermore, instructional time is the time block set aside for that instruction – 90 minutes a day, or 7.5 hours a week or 300 hours a school year. Sometimes, this is called scheduled time, to distinguish it from the time actually allocated by teachers (Rentner, 2006). Instructional time is also the amount of time school authorities' schedules for a subject. For example, 30 minute a day for mathematics (Miller, Murnane & Willett, 2007).

According to Slavin (2003), providing an effective learning environment includes strategies that teachers use to create a positive productive classroom experience. This is often called classroom management strategies which include preventing and responding to students' misbehaviour, important usage of instruction of time, creating an atmosphere that is conducive to interest and inquiry and permitting activities that engage students' mind and imaginations. All these contribute to a successful teaching and learning process. Educational theorists and researchers have long considered time to be a key component of individual learning. Thus, there is the need for proper and effective utilization of instructional time in the teaching and learning process in all subjects, since effective time spent in learning is frequently found to contribute to learning (Adelman, Haslam, & Pringle, 1996).

The importance of instructional time in education has been demonstrated repeatedly through empirical investigations (Brown & Sachs, 1985; Fisher, Berliner, Filby, Marliave, Cahen, Dishaw, 1980; Gettinger, 1984). The results consistently indicate that higher rates of learning are related to the amount of time students spend actively engaged in their academic tasks.

Special education researchers have also documented how the efficient use of instructional time increases the achievement of students with mild educational disabilities (Greenwood, 1991; Sindelar, Smith, Harriman, Hale, & Wilson, 1986). In fact, Sindelar, Smith, Harriman, Hale, & Wilson, 1986 and Greenwood (1991) conclude that time actively engaged in the learning activity is the single best indicator of achievement among students with educational disabilities. This assertion has also been supported by Karweit (1989), whose research on engaged time reveals positive relationships between the time students spend on academic task and their achievements. Furthermore, other research works suggest that the relationship between students' achievement and instructional time is more closely linked to student's' academic engagement and quality of instructional activities than to the specific amount of time allocated to the school day or year (Aronson, Zimmerman, & Carlos, 1998; Cohen & Ball, 1999). In a meta-analysis of an educational research conducted by Scheerens and Bosker (1997), the effect of time on students 'achievements was shown to have increased students' achievements by 15 percentage points, the strongest single factor identified. Again the search for more effective strategies to raise learning achievement with limited resources, educational planners and educational economists came out with the following as the main inputs that have had statistically significant positive effects on improving learning achievement are class instructional time, availability of textbooks, presence of school library (Vegas & Petrow, 2007; WöBmann, 2000). In the World Bank's support for Primary School Development Project Report (Barrera-Osorio, Fasih, Patrinos, & Santibáñez, 2009), the study reached the conclusion that the management and use of instructional time was

a fundamental problem which undermined quality of education in public schools. In addition, Konover (2003) believes that good use of instructional time reduces stress, increases productivity and makes teaching in the classroom a lot easier on the whole. This means that, when a teacher makes good use of time on the time table, he/she prevents the situation whereby he/she has to teach extra time to cover up for lost time.

A study in Pakistan reveals that, while instructional time in itself is a poor predictor of student achievement, the effective use of instructional time is a more accurate predictor (Reimers, 1993). Research in the Philippines (Tan, Lane, & Coustere, 1997) and Ethiopia (Verwimp, 1999) also shows that the quality of classroom time, especially when accompanied by more pupil oriented teacher behaviour, has a significant impact on learning process and resulted in higher achievement levels. Also, a study examining the influence of active learning methods shows that instructional time significantly affects pupil performance (Armitage, Batista, Harbison, Holsinger, & Helio, 1986). The evidence from a sample of 15 year olds from over 50 countries that participated in the Programme for International Student Assessment (PISA) in 2006 (Lavy, 2009) consistently shows that instructional time has a positive and significant effect on test scores (Lavy, 2001).

There are however, large differences across countries in instructional time in public schooling institutions (Lavy, 2009). For example, among European countries such as Belgium, France, and Greece, pupils aged 15 have an average of over 1000 hours per year of total compulsory classroom instruction. However, in England, Luxembourg and Sweden the average is only 750 hours per year. For children aged 7-8 in England, Greece, France and

Portugal the average instructional time is over 800 hours per year while in Finland and Norway it is less than 600 hours (Organization for Economic Co-operation and Development (OECD), 2006). These differences are also reflected in differences in the number of classroom lessons per week in different subjects. For example, the PISA 2006 data (Lavy, 2009) reveals very large differences among OECD Countries. Whiles pupils aged 15 in Denmark benefit from instructional time of four hours per week in mathematics and 4.7 hours in reading, pupils of the same age in Austria have only 2.7 hours of weekly classroom lessons in mathematics and 2.4 hours in reading. Overall, total weekly hours of instruction in math, reading and science is 55 percent higher in Denmark (11.5 hours) than in Austria (7.4 hours). Similar magnitudes of disparities in instructional time are observed among the Eastern European and developing countries that are included in PISA 2006. Can these differences explain some of the differences across countries in pupil's achievements in different subjects? This question is of policy relevance in many countries, and it became very concrete recently as president Barrack Obama argued that American Children should go to school longer, either stay later in the day or into the summer. He announced the objective of extending the school week and year as a central element in his proposed education reform for the United State of America (Patall, Cooper, & Allen, 2010; Quaid, 2009). According to Abadzi (2007), worldwide, governments define the number of days or hours that schools should teach specific material, usually 850-1,000 instructional hours or 180-220 days per school year, aside breaks and extra-curricular activities.

The 2005 The *United Nations Educational, Scientific and Cultural Organization- Education for all* Global Monitoring Report recommend 850-1,000 hours annually (aside from breaks and lunch periods). Moreover, the Education for All Indicative Framework expects at least 850 (or about 200 days at 5 days per week). In terms of days, the length of the school year varies. In the early grades of primary Education (grades 1-4), median instructional hours tends to be higher in the education system of sub-Saharan Africa, Latin America, the Caribbean, Western Europe and North America. They tend to be lower in Central Europe and the former Soviet Union and, to a less extent, in East Asia and the Pacific and the Arab States (Benavot & Massimo, 2004). In Pakistan and Nepal, the primary school year lasts for 180 days, rising to 190 days in Zambia, 200 days in Bangladesh, and 220 days in India. In terms of actual rather than instructional hours, the global mean may range from 705 hours in grade 1 to about 830 hours in grade six (Benavot, 2002).

In the teaching and learning process in Ghana, instructional time is also called contact hours, since it is time the teachers interact with pupils for knowledge acquisition and behavioural changes. In Ghana, the number of hours allocated to teaching in the primary school is six hours per day. The six hours are further divided into minutes for every subject on the time table. This means that we have lessons that can last for forty minutes, thirty minutes and so on depending on the class, whether upper primary, a lower primary or a junior high school level. Within six hours allocated for teaching and learning, instructors (teachers) are expected to give exercises for lesson evaluation, whiles some portion of the six hour instructional time is used for other

activities like morning assembly, marking of registers and lunch periods. Consequently, the six hour instructional time is rendered inadequate for teaching and learning process.

The Curriculum and Research Development Division (CRDD) of Ghana (Ministry of Education, Science and Sports (MOESS), 2007), suggests the following instructional times for the teaching of natural and integrated sciences at the lower primary, upper primary and junior high school levels of education. The CRDD allocated the same instructional time of six periods comprising 30 minutes for a lesson period as far as teaching and learning of natural science and integrated science in the lower(1-4 levels) and upper (4-6 levels) primaries are concerned. It must hereby be made clear that the weekly sum of the instructional time of six lesson periods for the teaching and learning of natural and integrated sciences is 180 minutes. For junior high schools, MOESS (2007) teaching syllabus suggests a total of six periods a week each period of six periods consists of 40 minutes allocated to the teaching of science at this level. This means that the teaching of science takes six periods each being a 40 minutes lesson period. Thus 240 minutes is used in the teaching of science weekly. The same MOESS (2007) teaching syllabus also suggests that at the lower primary level (1-3 and upper primary level (4-6) mathematics is allocated eight periods in a week, each period consisting of 30 minutes, thus making a sum of 240 minutes in each week whiles at these same levels, Information and Communication Technology (ICT) is allocated four periods of 35 minutes, thus making a total of 140 minutes each period per a week. Moreover, English Language is allocated 10 periods weekly, with

each period consisting of 30minutes, thus making a sum of 300 minutes per a week.

According to the 2005 report of the Basic Education Comprehensive Assessment system (Mereku, Amedahe, Etsey, Adu, Acquaye, Synder, Moore & Long, 2005) the total time expected to be spent in school in Ghana over the 40 weeks with respect to academic year is 1000 hours. According to the report, however, the above target is not met due to late commencement of lessons coupled with frequent interruptions both teachers and students during teaching and learning periods. This buttresses a recent study on the real instruction time in Senior Secondary Schools (Abadzi, 2007), which reveals that the average percentage of actual contact hours to the prescribed hours is only about 65%. This is due to time lost mainly as a result of teachers' absenteeism, un-programmed school activities and "clashes" on the timetable. The above fact which pinpoints that nearly one-third of instructional time is lost must give a cause for concern, since the basic components of academic learning time include time allocated for instruction, engaged time and academic productivity (Gettinger & Seibert, 2002).

The result from Trends in International Mathematics and Science Study (TIMSS) held in 2007 during which Ghana participated at the eighth grade level (JHS 2), which is the most recent in a very ambitious series of international assessments, by the International Association for the Evaluation of Educational Achievement (IEA) which seeks to continue to monitor trends in mathematics and science at two levels; the fourth grade (primary four) and eight grade (JHS 2) to provide comparative information about educational achievement across countries to improve teaching and learning in mathematics

and science (Mullis, Martin, Foy Olson, Preuschoff, Erberber, Arora, & Galia, 2008). In this TIMSS 2007 report, Ghana's performance in mathematics and science at JHS 2 though improved significantly since TIMSS 2003, remains among the lowest in Africa and the world. In these two subjects (mathematics and science), that Ghana's scores of 309 and 303 in mathematics and science respectively were among the lowest and were statistically significantly lower than the TIMSS scale average of 500. This shows that Ghana's performance on the international benchmarks, though improved significantly remains among the lowest in Africa and the world. Ghana moved two countries up the table when ranked by the international benchmarks in both 2003 and 2007 test results (Anamuah-Mensah, Mereku & Ampiah, 2007). This even goes to suggest that teachers in the upper primary should make good use of the instructional time in the classroom since learning achievement and instructional time go together (Konover, 2003).

Looking at TIMSS 2007 report (Anamuah-Mensah, Mereku, & Ampiah, 2007); one of the key findings was that achievement of learners was higher among students who attended schools that reported few attendance problems, few shortages or inadequacies in resources. Whiles schools that recorded lateness as far as starting lessons is concerned, interruptions in the instructional time and lack of timetable saw their students performing poorly in the test conducted. This means that the more teachers make effective use of instructional time, the higher the learning achievement of students. Making reference again to the TIMSS 2007 report, it was recommended that the Curriculum and Research Development Division should set opportunities to learning standards which will ensure a higher level of achievement for all

pupils. That is to say that there is the need to do away with irrelevant topics as well as broad topics which do not go with the stipulated instructional time on the timetable. TIMSS 2007 also recommended that teachers must be educated on how to write lesson plans using the appropriate format which is simple and teacher-friendly. The report further emphasizes that these lesson plans should reflect students' learning activities including practical work, observations, solving, investigations group work and discussion. Hence, instructional time spent on lecturing and writing down notes for students to copy into their notebooks should be discouraged (Anamuah-Mensah, Mereku, & Ampiah, 2007). Additionally, the report also states that the poor performance of the students was partly due to the teaching of the subjects and thus recommended that Ministry of Education Science and Sport (MOESS) should review the time teachers' work in schools to ensure they have adequate time to improve upon their teaching skills. The report also made it clear that academic achievement of students were high among students in schools with high index of teacher attendance. That is to say that where there were no problems like absenteeism, skipping of classes and arriving late to class by teachers, students performed well in their academics. Thus, heads of schools were tasked to ensure that the various teachers were held responsible for the usage of their own instructional time. This fact has also been buttressed by the Educational Reforms Review Committee of 1999 report on pre-tertiary education (Ministry of Education, 1999*),* which stated that the poor learning achievement at the JHS level as witnessed in the Basic Education Certificate Examination (BECE) results could be traced to many factors among which excessive loss of instructional time stands as a strong factor.

More time in school could indeed have a positive impact on how much students learn. In order for most students to excel and reach higher academic standards, they will likely need to be engaged in more time for learning (Aronson, Zimmerman, & Carlos, 1998). But research indicates that the solution is not as simple as merely lengthening the school day or year (Abadzi, 2007). To improve students' learning outcomes, the critical factor for policymakers to consider is the effective utilization of instructional time in the classroom. Thus, finding ways to increase the effective utilization of academic learning time is the path to bolstering students' success. To state it clearly for quality improvement in primary education, especially in integrated science education, there is the need for teachers to maximize the effective utilization of instructional time in schools. Also, since teachers are expected to give pupils solid basic foundation upon which their future academic performance will be built, there is the need for proper utilization of the apportioned instructional time. Furthermore, since teachers are the sole implementers of any government policy concerning education in the classroom, there is the need for effective utilizations of apportioned classroom instructional time. Lastly, when pupils' basic education in the primary level is not firmly established, it can lead easily to academic failure. Thus, there is the need for proper utilization of instructional time apportioned to prevent academic failure.

Statement of the Problem

The Ministry of Education, Science and Sports (2005), outlines a portfolio of several educational reforms such as the expansion of Free Compulsory Universal Basic Education (FCUBE) to include two year of

kindergarten and three year Senior High School (SHS) with some, advocating for the four year system with the aim of ensuring that young Ghanaians achieve better and quality education. The question bothering the minds of Ghanaians is whether the extension of schooling years could improve the quality of education of young Ghanaians if the use of instructional time in the classroom is not considered.

Teachers' use of classroom instructional time can significantly impact student learning in natural and integrated science classrooms. Among their many responsibilities, teachers plan and manage what takes place in their classrooms and thus make daily decisions about how class time is used.

Previous studies have characterized this use in classrooms (Doyle, 1986; Fischer, Berliner, Filby, Marliave, Cahen, & Dishaw, 1980), and the way classroom time is used has been shown to be important in terms of what students learn (Good, Grouws, & Ebmeier, 1983). Teachers' allocations of instructional time to things such as introducing scientific concepts, conducting activities, demonstrating concepts, reviewing previously taught natural or integrated science topics, developing new scientific theories and ideas, assessing and evaluating students learning outcomes of natural or integrated science have potential implications for student achievement in science. Although previous studies of teachers' use of time have been conducted, there have been few recent studies of effective utilization instructional time, despite many calls in the last decade for reforming what takes place in science classrooms (Teachers Development Group, 2007).

Furthermore, there have been important changes in natural and integrated science textbooks in recent years with regard to how the science

content of the syllabuses and textbooks are organized. Considering that science is a core subject in Ghanaian schools, it is imperative that researcher's study how time is used in today's natural and integrated science classrooms. Therefore, this research seeks to provide a perspective on how effectively basic school teachers utilize instructional time in the teaching and learning of science in some selected upper primary schools in Ghana.

Time for learning is an essential precondition for learning. Random checks on the school attendance of both teachers and students in developing countries reveal significant short-comings. One of the shortcomings is teachers' absence which lowers students learning achievement (Chaudhury, Hammer, Kremer, Muralidharan, & Rogers. 2004; Miller, Murnane, & Willett, 2007). Though time has been allocated for the various subjects on the timetable, no proper attention is given to its effective use. At times teachers make their own drafted timetable aside the official timetable made for the school, thus, not properly following the timetable. There are instances whereby teachers teach only two lessons for the day, or 30 minutes out of 60 minutes to teach. As a university student all the above were observed during my observation of teaching in some selected schools in Cape Coast, Central Region.

The report of the President's Committee on Review of Education Reforms in Ghana (Ministry of Education, 2002) in certain schools has revealed that a major problem related to dropouts was teachers' attitudes to lessons and the use of instructional time. The use of instructional time was found again to be a major problem in the schools. It must hereby be stated that am not the first to have identified the problem with the use of instructional

time. Other researchers (Pryor & Ampiah, 2003; Fobih, Akyeampong, & Koomson, 1999) have conducted researches in this area. During their research in one of the schools, they observed that lesson taught during the previous week was still found on the writing board. Upon chatting with the pupils it was explained that that was the only lesson which was taught on that thursday of the previous week. The pupils had not been taught any other lesson from friday and monday thus losing considerable number of instructional time expected to be used effectively. It was also observed that in each school where they conducted a study, there was at least a class without a teacher on each day of the visit of the study. This clearly helps us to know why the pupils in the above schools would not find school interesting since they are often left to use the apportioned instructional time mostly to play instead of learning. Also, Ahadzie's (2007) recent study on contact hours across four developing countries including Ghana stated that students were engaged in learning only 38.7% of the time allocated for teaching. Ahadzie's (2007) also stated that, out of the 197 official days available to Ghanaian students for learning tasks only 76.3 days were used for learning tasks with the other days either closed or engaged in other extra-curricular (sports days, culture activities etc). Again, Ahadzie's study indicated that in Ghana 28% of class time was taken up by teachers when they engaged in non-instructional time like management classroom activities, text book distribution, socialising and being out of the classroom.

Studies have shown that learning outcomes are related to the amount of time students engage in learning tasks (Rockoff, 2008). However, visits to schools (Abadzi, 2007; Benavot & Massimo, 2004), have reveals that students

again are often taught for only a fraction of the stipulated time, particularly in lower-income countries. Losses are due to informal school closures, teachers' absenteeism, delays, early departures and sub-optimal use of time in the classroom. A study undertaken by Abadzi (2007) with World Bank backing to develop an efficient methodology for measuring instructional time loss in schools sampled in Tunisia, Morocco, Ghana and Brazil gave the following percentage of time that students were engaged in learning vis-à-vis government expectations 39 percent in Ghana, 63 percent in Brazil, 71 percent in Morocco and 78 percent in Tunisia. To achieve the Millennium Development Goals, students must get more of the time that governments, donors, and parents pay for.

A few other studies have also estimated the link between absence (measured through direct observation) and student attendance and achievement. In the case of India, (Kremer, Muralidharan, Chaudhury, Hammer, & Rogers, 2005) found that higher teacher absence leads to lower predicted student achievement of 4th‐graders – about 0.02 standard deviations lower for each 10‐percentage‐point increase in absence – and also to lower student attendance. For Indonesia (Suryadarma, Suryahadi, Sumarto, & Rogers, 2006), found that an additional ten percentage points in the average absence rate of teachers at a school is associated with a 0.09‐standard‐deviation decrease in math scores of 4th‐graders (with no effect on verbal test scores). These studies do not track student learning over time, however, they are not able to correlate an individual student's achievement with the absence of his or her own teacher, so these estimates of the effects of absence are less reliable than those discussed above.

How children spend their time in classrooms continues to be a topic of importance for teachers, school administrators and educational researchers. Researchers concluded that as little as half of each school day may be devoted to instruction in some classrooms, and engagement rates among students may range from as low as 50% up to 90% depending on teachers managerial competencies, type of instruction, grouping practices, or individual student characteristics (Hollowood, Salisbury, Rainforth, & Palombaro, 1995).

Although 1000 effective hours of schooling per year is broadly agreed as a benchmark, few countries reach it. Also, as a result of poor performance of students and pupils especially from Ghana in science and other subjects with reports of misuse of time by teachers through absenteeism, lateness and improper use of instructional plan (lesson note) in teaching, lack of learning materials and lack of mastery over subject. These factors render instructional time underutilized (Abadzi, 2007; Rogers & Vegas, 2009; Alhassan & Adzahlie-Mensah, 2010).

The study "basic school teachers' utilization of instructional time in the teaching and learning of science" is to find out the continual low academic output by Ghanaian pupils in the upper primary schools levels (empirical evidence) (Anamuah-Mensah, Mereku & Ampiah, 2007) as it relates to the length and effective utilization of instructional time by science teachers at the upper primary levels. Specifically the study will enable us to detect how effective the periods in the upper primary level of school timetable are being used as well as to detect any interference that comes about as a result of loss of instructional time. In short, this report examines whether teachers at the

upper primary school level utilize effectively or not the instructional time in the teaching of science.

Purpose of the Study

1. Are there ways by which teachers apportion instructional time for teaching integrated science at the upper primary school level?
2. To what extent does teachers' expectation of lesson delivery reflect their actual practices?
3. What are the possible difficulties teachers have in managing instructional time during integrated science teaching at the upper primary school level?

Research Questions

The study was geared towards finding answers to the following questions:

1. How do teachers apportion instructional time for teaching integrated science at the upper primary school level?
2. To what extent does teachers' expectation of lesson delivery reflect their actual practices?
3. What difficulties do teachers have in managing instructional time during teaching of integrated science at the upper primary school level?

Significance of the Study

It is hoped that this study will prove to be invaluable by helping teachers to use instructional time profitably and hence help to improve the quality of teaching and learning in basic schools. Moreover, it's will serve as a guideline to educational planners, policy makers in education, curriculum

developers, teachers, students and learners in their quest to make sound and valuable policies concerning instructional time usage.

Furthermore, it will help in informing teachers and learners on the good use of instructional time to improve the quality of teaching and learning in the basic schools. It is also hoped that it will help in serving as useful information for both head teachers and Circuit Supervisors to aid them in delivering in-service training for teachers on proper utilization of instructional time.

Again, it is believed that this report will help in improving the pedagogical climate of classrooms to produce significant gains in pupils learning and achievement through well-designed framework aimed at maximizing instructional time in the basic schools and beyond.

Finally, it is hoped that this will help educational policy makers by sensitizing them to restructure the time table and syllabus to help students acquire and develop basic knowledge, desirable attitudes and physical skills through the proper utilization of instructional time in the classroom in particular.

Delimitation

The study is limited to two Basic Primary Schools which are all in Cape Coast municipality in the Central Region of Ghana. The schools are Akotokyir Anglican School and Ola Presbyterian Primary school. Upper Primary level classes were used in this study and it is hoped that the information will be relevant to only these schools and also the study is restricted to only upper primary science teachers in the two selected primary schools named above.

Limitations

This data collected looked into how upper primary basic school teachers effectively utilize instructional time in the teaching and learning of science. It did not, however, address the quality of instructional time used at the lower primary school level and thus the knowledge generated is limited to the upper primary school level and specifically to the schools where this study was conducted.

Secondly, the study did not, address the quality of instruction provided. As such, the conclusions are limited to the quality of instructional time with little regard for quality of delivery or breadth and depth of content.

This research was intended in part to determine whether teachers at the upper basic primary schools really utilize time effectively in the teaching and learning process as far as integrated science is concerned. Thus, this research is restricted to the usage of instructional time by integrated science teachers and not to be generalized to cover all subject areas.

Although the sample was not all that large, the research conducted cannot be concluded to be a representative sample for all science teachers at the upper primary level. Teachers volunteered to complete the interview questionnaire, and the researcher had no means for selecting a sample systematically from a list of other teachers to survey. Therefore, I cannot make claims about the prevalence of particular effective or ineffective usage of classroom teaching practices, and instructional procedures used in other classrooms to ascertain how instructional time is used. However, as I have done here, the study attempts to show the teachers who participated in the survey, make use of instructional time allocated for science teaching.

This study also does not allow me to determine what the effects effective utilization of instructional time has on teaching and learning in the classroom, or whether it rather enhances learning in any of the classrooms from which teachers were surveyed. In this study, there was no independent measure of teaching practice or student learning; nor did I attempt to design an impact study with random assignment to evaluate teachers' lesson. Both independent measures and a more rigorous design would be necessary to make claims about the impact of using the instructional time on student learning and engagement.

In traditional instances of qualitative data collection and analysis the research "shifts between cycles of inductive data collection and analysis to deductive cycles of testing and verification" (Huberman & Miles, 1998). In this study, sources of data were already in place prior to conceptualizing a conceptual study framework. However, in this study the details of the conceptual framework and the subsequent data analysis cycled back and forth to realize more appropriate matches of methodology and method to existing data sources and research objectives. The analytic cycle for this study could be better described as one which moved between conceptual frameworks, case analysis, and being clear as to the purpose of the study.

Finally, the findings from this study are likely to be generalized to lower primary integrated science teachers with similar functionality to upper primary science teachers. However, the findings may or may not generalize to instructional time usage with different kinds of teachers. The study chose the upper primary science teachers because it is a true representative of a class

where natural and integrated sciences are taught, in terms of its syllabuses design and functionality.

Organization of the Rest of the Study

The dissertation is organized into five chapters, with a list of references and appendices at the end of the last chapter. Chapter one serves as an introduction to the study. It has sub-sections that contain background to the study, a statement of the problem, purpose, research questions and significance of the study. Delimitations and limitations are also presented in this chapter. Chapter two is a review of literatures that are relevant to the study. It provides the theoretical framework for the study. Also, the chapter contains a discussion and summary of other early empirical studies that are related to the issue under research. Chapter three is an outline of the methodology including a description of the research design, the population, the sample and sampling procedure, the research instruments, validity and reliability of the research instruments as well as data collection procedure of the study. The analysis of the data collected is also presented in this chapter. Chapter four presents the results and discussions. The chapter consists of the discussion of the preliminary results as well as the major findings that emerged with regard to the research questions. Finally, chapter five focuses on the summary, conclusions and recommendations of the study. Suggested areas for further research are also captured in this chapter.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Educational theorists and researchers have long considered time to be a key component of individual's learning. Carroll (1963), in his classic model of school-based learning conceptualized achievement as an outcome of two time variables; first, the amount of time a learner is engaged in learning and second an individual's learning rate. Many studies later reported positive correlations between measures of time and student achievement (Bloom, 1971; Wiley & Harnischfeger, 1974). Heyneman & Loxley (1983) found out that more instructional time spent on general science is associated with higher academic achievement. This chapter is divided into the following sections, namely;

a. Value of Instructional Time
b. Instructional Time and Science Teaching
c. Teaching Syllabus for Upper Primary School Integrated Science
d. The Difficulties Teachers Face in the Teaching and Learning of Science
e. How to make the most of Instructional Time
f. The Concept of Instructional Time allocation in the School System
g. Summary of Major findings of the Literature Review

Value of Instructional Time

Time and the way it is used are at the centre of the challenge to improve student learning and achievement. Research clearly state that time

spent on learning is an important determiner of student success in school. It has also been proven that increasing and effectively utilizing the quality of instructional time is a key to improving student learning and achievement in all programme areas at all grade levels of education (Walberg, 1988; Good & Beckerman, 1978).

Konover (2003) believes that good use of instructional time reduces stress, increase productivity and makes life a lot easier on the whole. This means that when a teacher or an instructor makes good use of time on the time table he/she prevents the situation whereby he/she has to teach extra time to cover up for lost time. Aside this, it is also helps in achieving good results on the part of the students. Again using time wisely and effectively in the classroom leads to more meaningful experience for both teacher and students.

Many studies report correlations between measures of time and student achievement (Bloom, 1971; Rosenshine, 1979; Gettinger, 1984). Research assessing the relationship between pupil exposures to curricular content and test scores reports similar results (Fredrick & Walberg, 1988; Wang, 1998). Overall, these findings support arguments that increased instructional time enhances pupils' exposure to knowledge and results in corresponding significant learning gains. A study in Pakistan found that, while instructional time in itself was a poor predictor of student achievement, the effective use of time was a more accurate predictor (Reimers, 1993). Research in the Philippines (Tan, Lane & Coustere, 1997) and Ethiopia (Verwimp, 1999) also found that the quality of classroom time, especially when accompanied by more pupil-oriented teacher behaviour, had a significant impact on learning processes and resulted in higher achievement levels. A study examining the

influence of active learning methods found that instructional time significantly affects pupil performance (Armitage, Batista, Harbison, Holsinger, & Helio, 1986).

Instructional Time and Science Teaching

According to the National Assessment Educational Progress (NAEP, 2005) data, less than one-quarter of high school seniors scored proficient or above and less than one-fifth of 12th grade students with disabilities scored at the basic level of the 2005 mathematics and science assessment. Concerns over students' performance in schools have initiated several accountability initiatives whereby schools are required to report performance on end of year assessments. Principals and teachers are under unprecedented demands to improve the academic performance of all children, especially in the area of mathematics and science. Proficiency in mathematics and science depends on a continuous development and blending of various intricate combinations of various critical component skills especially in the area of proper utilization of instructional time in the classroom (Jones, 2001). With limited instructional time in the school day due to many subjects and other extra-curricular activities, teachers must use their time efficiently and effectively to make every minute count since the increased effective use of instructional time, use of evidenced-based instructional strategies and approaches are critical to the overall success of science (Coalition for Evidence-Based Policy, 2002).

According to the Committee on High School Science Teaching for National Science Teachers Association (NSTA, 2002) position statement on learning condition for high school science recommended that students spend minimum of 300 minutes per work in the high school science classroom. This

calls for effective utilization of instructional time. Again they also stressed that at the high school level, “a minimum of 40 percent” of the science instructional time should be spent on laboratory related activities. This time, according to them should include pre-laboratory instruction in concepts relevant to the laboratory, hands-on activities by the students and a post-laboratory period involving communication and analysis. They also recommended a change on the said of teachers who place emphasis on getting answers from learners while these teachers do few research in order to develop understanding ability values of inquiry and knowledge of science content.

Few studies have examined the impact of instructional time on pupil achievement in least-developed countries. These studies conclude that more instructional time spent on general science was associated with higher academic achievement in Iran, India and Thailand (Heyneman & Loxlye, 1983). Heyneman & Loxlye, also stated that increasing pupil reading time, teacher quality and textbook availability were the three major areas which consistently brought positive learning achievement. Their review of fourteen least-developed countries based on studies conducted on instructional time identified positive relationships with academic achievement in twelve of them. In short, the optimization of instructional time may be as important for pupils’ achievement in teaching and learning. Thus, this calls for proper and effective utilization of instructional time for the achievement of instructional objectives.

Teaching Syllabus for Upper Primary School Integrated Science

Science and technology form the basis for inventions, for manufacturing and for simple logical thinking and action. This means that scientific and technological literacy is necessary for all individuals, especially

in the developing countries which have to move faster in the attempt to raise the standard of living of their people. Natural Science is a fusion of the major branches of science which equip young people with the necessary process skills and attitudes that will provide a strong foundation for further study in science at the upper primary level and beyond. It provides the young person with the interest and inclination toward the pursuit of scientific work.

According to the integrated science teaching syllabus by Curriculum Research and Development Division (CRDD) in Ghana (Ministry of Education, Science and Sports (MOESS), 2007), there are generally two main goals for Science Education. First, it inculcates scientific literacy and culture for all, so that people can make informed choices in their personal lives and approach challenges in the workplace in a systematic and logical order. Second, it aims to produce competent professionals in the various scientific disciplines who can carry out research and development at the highest level. This means that according to the teaching syllabus it is important for pupils to be trained in the investigative process of seeking answers to problems. For this to happen, pupils are required physically to explore and discover knowledge in their environment, in the laboratory and in the classroom to be able to contribute new scientific principles and ideas to the already body of knowledge existing in their culture.

The MOESS (2007) teaching syllabus for integrated and natural science also suggested because a class may consist of pupils of different physical problems and mental abilities equal attention has to been given to all these children. Thus, it is the duty of the curriculum and syllabus implementers to ensure that equal attention is given to all pupils in a class.

This is to provide each of the students with the needed equal attention opportunities for learning since learners may have hidden talents that can only come to light if they are provided with the necessary encouragement and support in class. This therefore, calls for proper utilization of instructional time in the class for learning achievement to take place.

Again, the MOESS (2007) integrated science syllabus for JHS prepared by CRDD recommended that for effective teaching and learning schools should have science equipment and materials. The syllabus also recommended that schools should adopt a team teaching approach for this course since many science teachers currently in schools were trained as physicists, biologist, chemists agriculturalists etc. This deficiency will be remedied in the future if the teacher development universities start programmes in integrated science out of which new crop of integrated science teachers will be drawn.

Difficulties Teachers Face in the Teaching and Learning of Science

Research has identified a strong positive relationship between academic learning time, defined as the portion of time students spend actively and productively engaged in learning, and student achievement (Anderson, 1981; Fisher & Berliner, 1985). The basic components of academic learning time include time allocated to instruction, engaged time, and academic productivity (Gettinger & Seibert, 2002).

Although most school professionals are aware of this relationship, students spend up to one-half of instructional time engaged in tasks that are not related to learning, such as classroom procedural matters, transitions between activities, discipline situations, and off-task activities (Anderson,

1981; Fredrick, Walberg, & Rasher, 1979). Although efforts to address the individual needs of students is a critical component of service delivery in schools, focus on classroom-wide changes may offer a more potential means of preventing further academic difficulties (Kern & Clemens, 2007). Teacher behaviours and instructional management strategies impact all students in the classroom. Instructional time is lost in classrooms in which teachers have difficulty getting started on lessons, maintaining student attention, and making smooth transitions among activities (Gettinger & Seibert, 2002). Transition also pose a challenge to both teachers and students since students misbehaviour is more likely to cause a wastage of the instructional time as students are asked to halt their current routine, perform a set of tasks, and initiate a new activity without breaking established classroom procedures (McIntosh, Herman, Sanford, McGraw, & Florence, 2004).

A study conducted on behalf of Ghana Education Service, Curriculum Research and Development Division (CRDD) to facilitate the Basic Education Comprehensive Assessment System (BECAS) (Mereku, Amedahe, Etsey Adu, Acquaye Synder, Moore & Long, 2005) came out with findings that classroom teaching and instructions in primary schools in Ghana are scheduled to begin at 08.00 hours and finish at 13.30 hours. However, the amount of time that pupils spend in school each school day is five hours, since there are two breaks that last 30 minutes each. Thus, the total time expected to be spent in school over the 40 weeks in an academic year is 1,000 hours. However, according to the study, this expectation is not achieved because lessons in many schools do not start on time, teachers reporting late to school, and frequent interruptions in the classroom. It was found out that several factors

contribute to the delay in the commencement of lesson. Some of the factors are; difficulty in transportation, transitional difficulty in schools that make use of the shift system. Additionally, pupils, teachers as well as school administrators live far away from their respective schools. It was further revealed that pupils carry food stuffs to the market for sale before reporting to school. All the above factors contribute to lost time as far as the instructional time is concerned. Additionally, according to Mereku et al. (2005), the instructional time was often interrupted by co-curricular (or planned non instructional) activities like school worship, clean-up exercises, gardening, preparation for athletics competitions, school general meetings, cultural activities among others.

According to Abadzi (2007), visits to schools have revealed that students are often taught for only a fraction of the intended time, particularly in lower-income countries. Losses are due to informal school closures, teacher absenteeism, delays, early departures, and sub-optional use of time in the classroom. According to the World Bank Independent Evaluation Group Sector, Thematic and Global Evaluation Division Policy Research Working Paper on Absenteeism and Beyond-Instructional Time loss and Consequences (Abadzi; 2007), instructional time wastage is often due to impoverished environments. From this study (Abadzi; 2007), studies in the United State of America found that schools serving the poor often have lower time-on-task and time was l spend less effectively. For example, socio-economic differences corresponded to the amount of time students spent learning how to read. Classroom interruptions and disruptions were also found to be more frequent in low-income areas. From this study, poorer students other than

students from better-off areas were found to spend five percent less time per day engaged in academic tasks. Again, a 2003 United States Agency for International Development (USAID) study in Ghana found that on the day of school visit, 25 percent of the teachers were present in schools. However, these teachers were not found in the classroom teaching. They were either found engaged in their personal conversations, or making or receiving phone calls, or having meetings with school administrators or eating (Fobih, Akyeampong & Koomson, 1999). Based on the study they found out that primary schools were losing and wasting a lot of instructional time through lateness and absenteeism and other factors mentioned aboved. Furthermore, a recent study on the instructional time in senior secondary schools (JICA, 2006) in Ghana has revealed that the average percentage of the actual contact hours is only about 65%. The time lost is due mainly to teacher absenteeism, unprogrammed school activities and subject's collisions on the time table.

Benavot (2002) also points out how instructional time on tasks is related to other factors often identified as determinants of educational outcomes. The size of classes is related to time spent on tasks. That is to say that many educators believe that smaller classes allow for more time and more attention to be paid to each student. Adequately maintained school buildings can help avoid loss of time on tasks (Benavot, 2002). Poor infrastructure results in poor achievement. For example, according to researchers (Glewwe, 2002; and White, 2004), school buildings in Ghana which had leaking roofs during torrential rainfalls were consequently identified to be schools with poor achievement. Also insufficient textbooks for pupils can also reduce time on

task as the teacher is forced to write most of the important information on the chalk board for students to see and/or copy (White, 2004).

In some developing countries the colonial languages are the main languages used for instruction in schools. In other countries with diverse ethnic groups, the languages of the dominant ethnic groups are also to be used for instruction. According Abadzi (2003), the operation evaluation department under the sponsorship of World Bank reports that when the local languages of children are used as instructional languages to explain concepts in reading and arithmetic lessons, these children are able to master the lessons. Thus, it implies that teachers are going to face serious challenges once the mother tongue is not used for instruction. One of the challenges is that the teacher will be forced to use the colonial languages for instruction and then translate everything taught into the mother-tongue of the children. This practice is found to be time consuming taking into consideration the time stipulated for lessons. The United Nations Educational, Scientific, and Cultural Organization report by Fiske (2000) showed in the program for the Analysis of Education Systems of Francophone Countries in West Africa that children do better when they speak the language of instruction used at home.

How to Make the Most of Instructional Time

Studies of instructional time in schools consistently document that a limited portion of allocated time between 50% and 60% is used for instruction (Hollowood, Salisbury, Rainforth, & Palombaro 1995). A variety of events typically occur in classrooms that may reduce the number of scheduled minutes that are converted to instructional time. According to Anderson (1981) lost instructional time is the amount of time allocated to instructional

activities that for a number of different reasons, is not used toward the completion of those activities.

Based on direct observation conducted in eight elementary classrooms, Hollowood et al. (1995) identified six categories of sources of lost instructional time:

a. Student interruptions (e.g. disruptive behaviour, leaving the classroom, changing seats, peer conflicts);
b. Teacher interruptions (e.g. disciplinary actions, collecting or distributing materials, calling the office);
c. Visitors to the class;
d. Loudspeaker announcements;
e. Transitions, and
f. Other sources (e.g. late starts, early dismissals, fire drills)

To date, instructional time to learn initiative has centered on maximizing and optimizing the amount of time that teachers spend on delivering the prescribed curriculum. The introduction of learning outcome frameworks, in most subject areas has focused more on the importance of effective programme planning and delivery to ensure that all dimensions of the program and the full range of prescribed outcomes are addressed in the time allocated.

In view of the complexity of academic learning time, successful efforts to increase and make most of instructional time are multifaceted. Specifically, best practices according to Doyle (1986) require that:

a. Teachers maximize the use of instructional time while minimizing lost time.

b. Students maintain high engagement rates, both procedurally (observable behaviours such as paying attention in class and completing assignments) and substantively (a sustained personal commitment to and engagement in the content of instruction); and
c. Students experience a high level of success on meaningful academic tasks.
d. Teachers must know when their students tend to waste time often and try to find out more productive ways of helping them to make proper utilization of instructional time in the classroom.
e. The beginning and ending of class are times one can use to their students' advantage. Teachers and instructors must have routines they have planned in order to open and close class on a positive and productive note.
f. A teacher can also ask his/her colleagues to list the distractions they observe in one's classroom. Once these are spelt out he/she must then find out how these disruptions can be minimized in the classroom.
g. One way to use time wisely is to give students enough work to do. Thus, the instructor must know the steps which can be taken to make sure one provides enough work. According to Doyle, these activities should vary in different subject areas. That is to say that activities used for a mathematics class should be the same as that used for an English Language class and so on.

Opportunity for student learning can be increased by ensuring that teachers are employing effective classroom-management strategies, since undue time spent attending to behavioral disruptions or other disciplinary

issues reduces instructional time. Consistently providing curriculum and appropriate instruction according to the age and ability of students also contribute to student learning. Finally, student engagement and learning will tend to increase if teachers foster student motivation through a repertoire of interesting, innovative, and thought-provoking instructional endeavors rather than offering activities as repetitive seatwork (Aronson, Zimmerman & Carlos, 1998). Opinions vary on whether block scheduling enhances learning. A popular reform during the 1990s revealed that block schedules offer ninety-minute instead of forty-five-minute classes. While supporters assert that a longer class period result in better learning, a new study by Iowa State University suggests a link between block schedules and declining scores on the American College Test assessment test (Coeyman, 2002). One empirical study suggests that a shortened school year, with an added intercession period for low-achieving students, may enhance overall student achievement. Besides a general improvement, a positive impact was noted for students identified as economically disadvantaged on state assessment tests (Byrd, 2001).

Time to learn doesn't necessarily stop at the end of the academic day. Given the diversity of student learning abilities, policymakers must view achievement as a complex issue rather than as a problem to be addressed with narrowly focused solutions. Higher achieving students spend more time in structured learning activities outside school. After-school hours, weekends, and summer months all provide opportunities for additional learning to take place (Council of Chief State School Officers, 2001). In particular, the practice of learning outside school instructional hours has been found to

improve students' sense of competence and classroom engagement (Grossman, Price, Fellerath, Jucovy, Katloff, Raley, & Walker, 2002).

In Ghana, for example, a country in which implementation of the official curriculum is mandatory, a large portion of rural school teachers do not follow the prescribed weekly time table (Educational Assessment and Research Center (EARC), 2003). In Burkina-Faso, a minimum of 16% of the official allocated time was lost due to examination periods, lunch and rest hours, writing lessons and written problems on the boards because of lack of access to textbooks (Dia, 2003). Also, past studies note the following factors as significantly reducing instructional time in African and other least developed countries schools. The revealed factors includes teachers absenteeism, the school's physical condition, poor infrastructure (examples no roof or walls, high noise levels, lack of ventilation or heating), and the lack of teachers in general and in particular lack of female teacher for that matter (Attar, 2001; EARC, 2003). A related problem involves the introduction of double-shift policy- an arrangement often employed when parental demand for educational services exceeds the supply of public school spaces. The adoption of double-shift policy typically reduces the length of the school week and significantly diminishes overall instructional time. Evidence from Guinea and Burkina-Faso suggests that the negative impact of double-shift arrangement is more significant in the afternoon shift (Dia, 2003).

An additional factor which has also been noted in other literatures as a contributing factor misuse of instructional time is government's inability to monitor school implementation of official time standards, a feature common in many third World Education Systems. In Indonesia, for example, the school

year at the local level is shorter than that established in official national guidelines, reducing classroom hours (Lockheed & Verspoor, 1992).

Teachers' strikes, often due to low (government-mandated) salaries, also reduce actual instructional time. In 1988, several months of the school year were lost in Brazil due to teacher strikes, sit-in demonstrations etc. The scarcity of school resources, such as textbooks, can also reduce classroom instructional time (Attar, 2001). Activities such as announcements, lunch count, checking of attendance, permission slips, and exercises in class and school easily compete with instructional time. Thus, there is the need of eliminating things that waste time. Some of the ways teachers can adopt in eliminating things which can bring about wastage and lose of instructional time propounded by Froyen and Iverson (1999) are as follows;

1. Teachers must start class activities quickly and on time
2. Accommodating different roles of tasks completion by having relevant supplemental work ready for students who finish academic activities early. These academic activities should not be busy work but should be independent work related to the individual student's needs and skill levels.
3. Minimizing open ended discussions of student opinions and beliefs when this is not the direct objective of the lesson.
4. Not wasting time talking about the discipline problems. Discipline should be dealt with as quickly as possible in a manner which provides students the least attention possible.
5. Eliminating social interruptions. These include social interruptions for the students and for the teacher. Eliminate unscheduled discussion of

personal items such as sports and movies during academic time. When the goal for a student includes social skills or integration, an appropriate time should be included which does not interfere with priority academic areas.

6. The teacher must be systematic and consistent in how learning activities are delivered. Planning and organization of instructional lessons prior to meeting with students is a key ingredient in effective use of instructional time.
7. The teacher can also establish and practice procedures for handling out and picking up learning materials and students papers. For example, one student from each row in the class might be assigned to pick up materials, and other teaching and learning materials used for lessons. This can save quiet a lot of time.
8. The teacher can also develop supplementary materials. This can be done by making backup materials available for activities that finish up early or are ineffective. Supplementary materials might include alternative instructional activities, personalized activity sheets, extra worksheets and learning materials or relevant instructional games.

The Concept of Instructional Time Allocation in the School System

How children spend their time in classroom continues to be a topic of importance for teachers, school psychologists, administrators, and educational researchers. Recently, researchers concluded that as little as half of each school day may be devoted to instruction in some classrooms. It has been found that engagement rates among students may range from as low as 50% up to 90%, depending on teachers' managerial competencies, type of

instruction, grouping practices or individual student characteristics (Hollowood, Salisbury, Rainforth, & Palombaro, 1995).

There is strong evidence that teaching makes a difference in mathematics classrooms, however, identifying exactly how it makes a difference is difficult (Hiebert & Grouws, 2007). Researchers have examined a wide variety of potential influences, including teachers' content, pedagogical, and pedagogical content knowledge; professional development experiences; and teacher beliefs about teaching mathematics and learning. Recent research, however, has overlooked the role that teachers' time allocation may play.

In past decades, researchers have studied the choices mathematics teachers make with regard to their use of instructional time. For example, Good and Grouws (1979) in a classroom-based study examined the instructional behaviours of effective fourth grade teachers, including time for review, development of the lesson, seatwork, and homework. They found that students of teachers trained to follow a lesson structure similar to that of effective teachers tended to demonstrate higher achievement. More recently, investigations by the Horizon Research Incorporated (Weiss, Banilower, McMahon, & Smith, 2001; Weiss, Pasley, Smith, Banilower, & Heck, 2003) surveyed K-12 teachers' use of class time using a United State nationally representative sample. They found that teachers reported using 87% to 95% of class time for "instruction." In particular, they found that the most common instructional activities included answering textbook or worksheet questions, practicing computations, reviewing homework, and using mathematics concepts to interpret and solve problems. Similarly, results from the National

Assessment of Educational Progress have included reports of students' typical activities in class (Braswell, Lutkus, Grigg, Santapau, Tay-Lim, Johnson, 2001). For example, doing mathematics problems from their textbooks was more common than talking with other students about solving problems. With regard to technology, the use of calculators during class time increased with grade level. Results from the Trends in International Mathematics and Science Studies (Mullis, Martin, Foy Olson, Preuschoff, Erberber, Arora, & Galia, 2008) also provided information about how time was spent on various activities in eighth grade mathematics classes in several nations. Teacher self-report data from the TIMSS study suggested that in the United States, the most common elements of class time included homework review, lecture-style presentations by teachers, teacher-guided student practice and student independent practice. Collectively, these elements on average comprised 70% of class time (Mullis, Martin, Gonzalez, Gregory, Garden, & O'Connor, 2000).

Two trends in secondary schools raise additional questions about how teachers make use of instructional time. The first is the development of integrated mathematics curricular programs and their adoption for use in many schools. In integrated mathematics curricular, students study a variety of mathematics content strands each year and lessons are structured in a fundamentally different manner (Senk & Thompson, 2003). For example, the Core-Plus Mathematics Project (Schoen & Hirsch, 2003) calls for teachers to: (1) introduce students to a mathematical investigation, (2) allow students to explore questions in order to learn new content, (3) share and summarize ideas from the investigation, and (4) apply ideas from the investigation to new problems. This process can take several class periods, in contrast to traditional

mathematics lessons that are typically contained in a single class period. Researchers have begun to identify differences in how teachers use these curricular. For example, McNaught (2009) found that teachers often were not following textbook authors' recommendations, frequently omitted steps in the recommended instructional sequence. Certainly such an alternative arrangement of the mathematical content could lead teachers to use class time differently than teachers who teach more "traditional" (subject-specific) courses. A second trend is that many schools are implementing "block" schedules in which student often attend fewer classes per week but for longer time periods. Analysis of the impact of such schedule modifications on student achievement have provided mixed results (Veal & Schreiber, 1999). Research also suggests that block scheduling has had a varied impact on teachers' classroom practices. For example, Veal and Flinders (2001) found that some teachers whose schools switched to block schedules tended to use a greater variety of instructional techniques and experienced improved interactions with students, while other teachers reported feeling more pressed for time and thus, tended to lecture more and interact with students less. This study provides needed current information about how mathematics teachers are using their classroom time. It also makes special contributions to our understanding of the current state of instruction in mathematics classrooms where new types of curriculum are in place and provides information about non-standard class period organization.

Interest in learning time can be traced to Carroll's (1963) original model of school learning which hypothesized that learning is a function of time engaged relative to the time needed for learning. The earliest and most

extensive research programme to examine the relationship between learning time and achievement was the Beginning Teacher Evaluation Study (Denham & Lieberman, 1980). The purpose of this study was to identify teaching activities and classroom conditions that promote students learning. At the end of the study it was realized that academic learning time is a strong determinant of academic achievement.

In almost all educational systems, government authorities mandate a certain number of years and a set quantity of hours per year during which pupils are required to be in school and engaged in classroom learning. To be sure, not all school and classroom time is devoted to formal instruction or pupil learning. A widely held assumption in the research literature concerns the impact of instructional time on pupils learning (Anderson, 1994, Millot, 1995). Simply stated, the more time that educational authorities require that pupils be present in classrooms, the greater the chances of positive time effects on desired learning outcomes. Examples being knowledge acquired, skills mastered, values and attitudes internalized.

Teachers' use of classroom instructional time can significantly impact student learning in science and mathematics classrooms. Among their many responsibilities, teachers plan and manage what takes place in their classrooms and thus they make daily decisions about how class time is used. Previous studies have shown the way classroom time is important in terms of what students learn (Good, Grouws, & Ebmeier, 1983). Teachers' allocations of instructional time to such things as introducing science and mathematics concepts or methods, reviewing previously taught topics, developing new

ideas and assessing students' learning of science and mathematics have potential implications for students' achievement in science and mathematics.

Even though more complex models of allocated time take into account school and classroom contingencies such as teacher absence due to strikes, in-service training, conferences, and illnesses; and time allocated to non-instructional activities such as recreation, breaks, examinations, holiday celebrations or classroom management (Harnischfeger, & Wiely, 1985). Nevertheless, the core intuitively sound notion remains; pupils' achievement increases when students are given greater opportunities to learn, especially when engaged learning time is maximized. Although some studies raise doubts about the learning effects of more instructional time (Anderson, 1984; Demfer, 1987), the presumed positive benefits of instructional time have considerable currency among international and national policy makers.

In the United States, studies have shown that socio-economic status (SES) affects the amount of time students spent on learning how to read. Classroom interruptions and disruptions are salient problems in schools attended by low-income pupils (Stevens, 1993). Similarly, Yair (2000) found out that the gap between allocated and productive instructional time is significantly larger in minority pupil classes, mainly due to the preponderance of conventional teaching methods. Another study found that engagement in writing, reading and academic discussion was 5% lower per among low socio-economic status students than among high socio-economic status students (Greenwood, 1991). Since reduced instructional time accumulates over time, this places low-income students at higher risk of under achievement and dropout (Walberg, 1988). Hence, while the academically rich get richer, the

academically poor fall further behind. Such studies illustrate why Carroll's model attained greater validity in assessing the effects of increased time on task for low-achieving or disadvantaged children (Fusaro, 1997). Overall, the evidence suggests that there is a positive and fairly consistent association between instructional time and pupil achievement.

Among the many elements that impact student achievement, the allocation of instructional time is one fact directly under school control. More than a decade after the National Education Commission on time and learning (2005) recommended the school day to be redesigned, the commission continues to examine strategies aimed at ensuring adequate instructional time, as well as boosting its effectiveness. Literature on time and learning looks both at the total number of days or hours of instructional time and the arrangement of school time throughout the year, investigating the time students actually spend engaged in focused learning activities (Berliner, 1990; Aronson, Zimmerman & Carlos (1998). In addition to allocating adequate instructional time, prioritizing and protecting time for core content is a key element of research based practice. Many curricular programs, such as those used in the Federal Reading First Program (Education Commission of the States, 2002; Simmons & Kamme'ennui, 2003) are designed to help teachers protect time for addressing the core content. Thus, it is seen that using instructional time effectively is critical to improving student achievement studies of high poverty schools report and that those school's that are found "beating the odds" tend to spend more time on core subject areas (Taylor, Pearson, Clark & Walpole, 2000).

Aronson, Zimmerman and Carlos (1998), found three factors along with the use of instructional time, that appear to contribute to student learning;

a. Improving teachers classroom management techniques;
b. Ensuring appropriateness of curriculum and instruction and
c. Increasing students' motivation.

They saw that these provide teachers with longer subject-focused blocks of time to increase opportunities for active learning and student involvement in order to show some relationship to student outcomes (that is grades but not necessarily to test scores). To ensure that teachers use instructional time effectively, teachers should receive meaningful professional development on interactive instructional strategies and pedagogical knowledge (Marzano, 2003).

According to Fisher and Berliner (1985), an instructional time is a concept under academic learning time, which is briefly the amount of time during which students are actively, successfully and productively engaged in learning. According to Gettinger and Stoiber (1999), academic learning time is seen as a strong determinant of academic achievement and has the following constituent parts:

a. Allocated Time

This is the time teachers plan to use for instructional activities. This time represents the upper limit of in-class opportunities for students to be engaged in learning. Research has documented significant variation across schools and classrooms in the amount of time allocated for instruction (Anderson & Walberg, 1993). Also, according to Aronson, Zimmerman & Carlos (1998) in "Making Time Count" policy briefly stated that allocated

time is the amount of time assigned for instruction in a content area without reference to the quality of the activities being conducted during that time. This means that in allocating time to a specific curriculum area one must consider how the time is allocated as well as total time set aside for the class. And to the Education Sector (2007), allocated time is the total numbers of days or hours students are required to attend school. According to Gettinger and Grimes (1995) allocated time can be reduced by student interruptions, teacher interruptions, class visitors, announcements, transitions and other sources of lost time.

b. Engaged Time

This is the proportion of instructional time during which students are engaged in learning (Gettinger & Seibert, 2002). It is also defined as the time that students appear to be paying attention to materials or presentations that have instructional goals. According to Ellect (1989), engaged time is the amount of time the student is actively involved in such learning task as writing, listening and responding to a teacher's questions which does not include classroom tasks such as handling in a paper or waiting for a teacher to pass out materials, or inappropriate activities such as disruptive talking. Whiles Education Sector (2007), sees engaged time as that part of a day when students are participating in learning activities, as opposed to, say, roll call.

c. Transition Time

According to Berliner (1990), transition time is the non-instructional time before and after some instructional activity. This time is recorded within a block of allocated time when a teacher takes roll or gives back homework at the beginning of an instructional activity. This also describes the inevitable

decrease in time allocated for instruction that ordinarily accompanies mass education.

d. Instructional Time

This is the proportion of allocated time which is actually used for instruction. Instructional time can also be explained as the number of hours that teachers are expected to allocate to the needed subjects on the school's timetable as well as other activities planned by the school (Berliner, 1990; Aronson, Zimmerman & Carlos (1998). According to Konover (2003), instructional time spreads through almost all aspects of teaching and learning. That is organizing the day, organizing the classroom, deciding how long to teach various subjects and recording students' progress in the classroom. This means that the teacher should plan his or her time well in order to use the allocated time for instruction to the maximum. Also, from Benavot and Massimo (2004), instructional time refers to the number of annual hours that should be devoted to the teaching and learning process taking place at school in accordance with official policies and curricular guidelines. To them, the guidelines are usually summarized in curricular or lesson timetable which list the subject that are expected to be taught at each level. This goes a long with the prescribed amount of weekly periods or instructional hours that should be allocated to each subject.

From the above, it can be explained that the official perspective concerning instructional hour (time) do not necessarily tally with the actual amount of hours of instruction received by students in the classroom. Sometimes school activities such as staff meetings, administrative work, teacher and pupil absenteeism, strikes and demonstrations, in-service training

and many others can determine whether the instructional time can be used to its maximum or not.

Again, to Benavot and Massimo (2004), intended instructional time is defined as the number of hours during the school year that educational authorities expect local schools to allocate for the teaching of all required curricular subjects as well as other planned school activities. In practice, this quantity refers to the number of hours that schools should devote to formal school-based learning situations. According to Benavot and Massimo (2004), the three components of intended instructional time are as follows;

i. The duration of the 'working' school year, expressed as the number of days or weeks that schools are opened for classroom instruction to take place.

ii. The number of teaching periods (lessons, or instructional hours) allocated to each subject in each grade level as specified in the official curricular timetable or other curricular -related documents and

iii. The average duration of periods (lessons or hours) expressed in minutes.

Summary of Major Findings of the Literature Review

Instructional time is one of the most important ingredients of educational learning achievement, and its linkage with learning is one of the most consistent factors needed for learners' achievement and success in teaching and learning. For the past 25 years, much has been learned about maximizing the amount of instructional time that students experience. This continuing focus on learning time has important implications for schools,

teachers, learners and psychologists. First, it is incumbent on all these people to ensure that the classroom teachers, learners and administrators have an awareness of the importance of academic learning time and its relationship to students' achievement. Second, school teachers can facilitate classroom-based or school-wide assessment of time use, as well as the identification of areas to target improvement in order to maximize learning time.

Finally, through consultation, collaboration, or in-service training, school teachers can be helped to acquire and implement more effective classroom practices to increase students' academic learning time. Assisting teachers and schools to manage and effectively utilize instructional time is important in increasing academic learning time and improving academic performance for all learners and students.

CHAPTER THREE

METHODOLOGY

This chapter seeks to discuss the methodology and procedures that were used in the studies. This involves the research design, population, sample and sampling procedures. The rest are instruments, data collection procedure and data analysis.

Research Design

This study used multi-site case approach to study and conduct in-depth study of Basic School teachers' utilization of instructional time in the teaching and learning of science in two upper primary schools namely St. John's Anglican Primary School at Akotokyir and Ola Presbyterian Primary School at Ola both in Cape Coast, Central Region. This study involved observing and tracking classroom activities during science periods and interviewing of integrated science teachers after class periods. The major steps involved in the study were the gathering of data from teachers as well as from classroom observations during visits to schools and analysis and synthesis of the data. Even though pupils' participation in school learning is within and outside classroom contexts, this study focused only on classroom interactions involving pupils, teachers and input resources such as textbooks, teaching and learning materials etc.

Questionnaires were given to all teachers, whose lessons were observed in the two selected upper basic schools. The purpose was to collect

data that will provide case study insights within the context of the two schools on some key factors which influence the effective utilization of instructional time in the classroom. The study was not meant to generalize the findings to all basic schools in the districts where data were collected or even in Ghana. The study, however, gives information on the typology and trend of classroom teaching and learning in the two schools. The key issues raised in this study are therefore relevant for the vast majority of basic schools.

The multi-case study was used to conduct the study because this study is a qualitative research approach that is designed to gain an in-depth knowledge of an organizational phenomenon that had barely been researched: strategic planning (Audet, Hansen, Jaumard, & Savard, 2001). Furthermore, a case study is a type of qualitative research in which in-depth data are gathered relative to a single individual, program, or event, for the purpose of learning more about an unknown or poorly understood situation (Leedy & Ormrod, 2005). Again the multi- case site study was used since its combines several approaches of case-study research, borrowing from the positivist tradition, the interpretative approach and the qualitative research corpus. It involves the observation and analysis of several sites using namely cross-case comparisons and explanations building techniques to analyze data (Audet et al., 2001).

Apart from the theoretical benefits and challenges, multiple site case studies offer practical benefits as well. These practical benefits include the following:

a. The diversity of variables leading to a greater understanding of the degree of effectiveness of the curriculum. A curriculum that is effective in more schools with more classes would have more practical

benefits than one that is found to be effective in only one school or a few classes. The possibility of coming up with a lateral replication or a theoretical replication is higher. (Yin, 1994).

b. In multiple site case studies, there are also multiple conditions which reflect the naturalistic conditions found in the educational arena. By trying out curriculum in these different conditions, without manipulating any of the variables, any finding in relation to the effectiveness of the curriculum, the findings would be more reliable.

Again, Merriam (1998) and Bogdan & Biklen (1998) postulated that multi-site case study research seeks to understand specific issues and problems of practice through a detailed examination of specific group of people, a particular organization, or selected activity. Also, since it was important that the researcher actually see and understand the content, instructional practices and interactions that occurred between teacher and learner (pupils) in the class during science teaching and learning. Therefore, this approach of the study allowed the researcher, the teacher and the school in general to relate their individual perspectives toward the effective utilization of instructional time when conducting science activities.

The multi-site case study was used to conduct this study because it helps in gaining an in-depth knowledge of an organizational phenomenon that had barely been researched into. It is also suitable for learning more about poorly understood situation. Furthermore, the approach is useful for investigating how an individual or programme changes over time perhaps as the result of certain circumstances or intervention (Leedy & Ormrod, 2005). However, the major weakness of the multi-site case approach is that when

only a single case is involved, one cannot be sure that the findings are generalizable to other situations (Leedy & Ormrod, 2005).

Population

The target population for the study comprised all Public Upper Basic level and their Integrated Science Teachers' in the Cape Coast Metropolis in the Central Region of Ghana. The population was made up of all Upper Basic level because the schools had similar characteristics in terms of length of instructional time spent in school, school system, syllabus, textbooks, teaching and learning materials, suggested methodologies and language(s) spoken. Integrated science teachers were used as part of the population because they all use the same science syllabus, and the same instructional time suggested by the syllabus.

The population consisted of all public Upper Basic level in the Cape Coast Metropolis in the Central Region of Ghana 2010/2011 academic year with a numerical status of more than 200 primary schools and about 1200 integrated science teachers. The target population comprised all upper primary schools and their integrated science teachers in Ghana. However, the accessible populations were two upper primary schools and their six integrated science teachers in Cape Coast, Central Region, 2010/2011 academic year.

Sample and Sampling Procedure

The research was conducted in two Basic Primary Schools namely Ola Presbyterian Primary School and St. John's Anglican Primary School both in Cape Coast, Central Region. A total number of three teachers were drawn from the two Upper Primary levels (Basic Stage, 4-6) in each school for the

study and this was made up of five females and one male teacher respectively. In each school, lessons in primary four, five, and six were observed.

The reason for selecting two Upper Primary level in Central Region were to find out how teachers in the Basic Schools utilize effectively instructional time in the teaching and learning integrated science. The six integrated science teachers selected were observed during the teaching and learning process to ascertain how teachers apportion instructional time for teaching integrated science at the upper primary school level and also to find out the extent teachers' expectation of lesson delivery reflect their actual practices. Again the teachers were interviewed to ascertain the difficulties teachers have in managing instructional time in teaching integrated science at the upper primary level leading to an effective utilization of instructional time. For this study the purposive sampling was used to select participants for the study since its selects information cases for in-depth study.

Instruments

This exploratory case study data was primarily gathered using two instruments. The items on the instruments were chosen based on the principles of quality teaching and learning as well as acceptable classroom practices. The instruments were developed by myself and validated by the researchers' supervisor. The instruments used were teachers' interview schedule and classroom observation schedule.

Teachers' Interview Schedule

The teachers' interview schedule (see Appendix A) consisted of open-ended questions related to topics that were sequenced in advance in an effort to elicit more in-depth responses. The teachers' interview schedule focused on

eliciting information from upper primary integrated science teachers about their science teaching time. Teachers' interview schedule, therefore, consisted of questions which could provide descriptive data that would offer a better understanding of how time is allocated for the teaching of integrated science.

The Teachers' interview schedule had 46 items. The items were grouped into three major categories based firstly on how teachers apportion instructional time for the teaching of integrated science, secondly, teachers' expectations of lesson delivery and their actual practices and lastly, difficulties teachers had in managing instructional time in the teaching and learning of integrated science at upper primary school level.

The first part of teachers' interview schedule consisted of 17 open-ended items, which sought to find out how upper primary integrated science teachers apportioned their instructional time in the teaching of integrated science. The second part, which looked at teachers' expectations of lesson delivery and actual classroom practices, had 19 open-ended items and lastly, the third part had 10 open-ended items which sought to find out difficulties upper primary science teachers had in managing instructional time.

To establish content validity, teachers' interview schedule instrument was reviewed by the researchers supervisor, since one of the means of achieving content validity is by expert judgment (Gay, 1987). This was done to eliminate irrelevant interview schedule items. Data was collected from six interviewee one from each school and hence giving higher confidence in the measures of the constructs. In order to ensure internal validity, I used the pattern matching mode of analysis after having performed the cross-case search for patterns from data gathered from interviews and observations.

Furthermore, I iteratively compared and contrasted responses gathered in the schedule interview and classroom observations. Following such a replication logic both strengthens and broadens analytical generalizations (Paré, 2002).

Reliability refers to the consistency of results. It is concerned with whether the results are reproducible, either on a different day of the week or even in a different setting (Thorndike, Cunningham, Thorndike, & Hagen, 1991; Allen & Yen, 1979). Thus, to ensure reliability in this study, the interview schedule contained the same items and the teachers were given the same level of information and support prior to and during the completion of the interviews. Each teacher was made to respond to the same interview schedule items and the results were compared and correlated to give a measure of stability. Again, to ensure reliability of the interview schedule, the instrument was administered in a consistent manner by standardizing the use of the instruments from one teacher to the others. The development of thick, rich descriptions that clearly detail phenomena as experienced through the participants' perspectives did helped in addressing reliability in this study. The multiple methods used for the data collection and flexibility of procedures for data analyses have lent themselves to the development of the thick rich descriptions that were reflective of the participants.

To ensure standardizations, the teachers' interview schedule was developed with instructions which made clear what needs to be done. Also, the items on the interview schedule were presented in a series of logical reasoning problems. In addition, I made sure that the physical surroundings of the teachers involved were comfortable and conducive to diligent work before administering the interview. Since the responses were longer I developed clear

criteria for coding the responses. The respondents were exposed to the same items and the same system of an inductive analysis which involves discovering patterns, themes, and categories in one's data (Patton, 2002) coding responses. The aim here was to ensure that differences in responses to items can be interpreted, rather than differences in the processes that produced the responses (Siniscalco & Auriat, 2005)

Classroom Observation Schedule

Bogdan and Biklen (2007) suggested that a better understanding of participants' behaviour occurs when data are collected in the settings where the participants normally spend their time. Thus since this study deals with teaching practices, it was natural to collect data through classroom observation in an attempt to envision practice through the eyes of the subjects being studied (Angrosino, 2005).

The classroom observation schedule (see Appendix B) was made up of sections A, B and C. Section A looked at time lesson started, when lesson was to start, duration of lesson as stated in the lesson plan and the actual time of the lesson. The section B sought information introduction to lessons, the lessons development and lessons closure, whiles section C gathered information on my observations of lessons and how teachers structured their lessons. The classroom observation protocol was designed to monitor instructions during integrated science teaching and was used as one of the qualitative sources of data designed to address the research questions of this study. A major advantage of using direct observation in this study is that it provides in-depth information of the subjects in their normal environment, instead of depending on the reports of others (Lincoln & Guba, 1985).

To establish content validity, the instrument was reviewed by the researcher's supervisor, since one of the means of achieving content validity is by expert judgment (Gay, 1987). This resulted in the elimination of irrelevant classroom observation schedule items. The essence of reliability is consistency through repetition. In order to ensure reliability of the observation schedule instruments, the same items were used throughout the two schools involving the six teachers used to give information in the study.

Reliability is the extent to which the research findings can be replicated. Moreover, the connection between reliability and internal validity rests on the assumption that a study is more valid if "repeated observations in the same study or replications of the entire study have produced the same results" (Siniscalco & Auriat, 2005; Joppe, 2000; Shuttleworth, 2008). The multiple methods used for the data collection and flexibility of procedures for data analyses have lent themselves to the development of the thick rich descriptions that were reflective of the participants. The researcher's confidence in the study's ability to build a sense of understanding in regards to the phenomena in question has been supported by the results of the thorough coverage of the propositions that guide the study. Thus, to ensure reliability of the classroom observation schedule, individual items were highly correlated with each other which ensured confidence in the reliability of the instrument. To further ensure and demonstrate reliability of the classroom observation schedule in this research, I asked for clarification and following-up when uncertain of certain facts provided by the respondents as recommended by Shank (2006).

Data Collection Procedure

Data collection commenced in May 2011 and was completed in July, 2011 for the two schools namely Ola Presbyterian Primary School and St. John's Anglican Primary School both in the Cape Coast Metropolitan. The collection of the data took six weeks.

In the first place, the researcher met with the headteachers in each school and explained to them the purpose of the visit and the purpose of the observation and interview protocol. Before I conducted the interview, a separate meeting was held with the six teachers in the classroom. During the meeting, I discussed with them the purpose of the study and subsequently, my expectations from them. The teachers were assured that the purpose of the research was to understand how instructional time is used during teaching and learning activities in the classroom and that the researcher was not in the schools to monitor or supervise teachers' work.

In each class (Basic Stage 4 - 6), the researcher observed the teaching and learning of Integrated Science over a period of three days. A total of 18 observations were made in the two upper basic primary schools. That is, to say three observations each in basic stage four, five and six. In each school, teachers' interview schedules were administered to the teachers whose lessons were observed.

Data Analysis

This section profiles analytic methods employed to make sense of the mass of qualitative data that was collected over a period of time. I attempted to provide in-depth explanation of the analysis process in order to bring

meaning structure and order to the data. Data were collected through teachers' interview schedule and a classroom observation schedule.

For research question one, which sought to find out how teachers apportioned instructional time allocated for the teaching of integrated science at the primary school level, classroom observation was analyzed using frequencies and percentages of occurrence of instructional strategies employed by teachers in teaching. Data collected using teachers' interview schedule was put into themes which emerged.

Research question two sought to find out upper primary integrated science teachers' expectations of lesson delivery and their actual practices in the classroom. Data were collected using teachers' interview schedule and classroom observation schedule respectively. Data gathered were compared and useful informational issues relating to the research questions which emerged were analyzed using thematic analysis.

Finally, research question three sought to determine difficulties teachers had in the teaching of integrated science at the primary school level in terms of how they manage Classroom instructional time. Data collected using the two above mentioned instruments were compared and issues relating to the research question which emerged were categorized in terms of common themes.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter presents the findings and discussion on the utilization of instructional time in the teaching and learning of science in upper primary classrooms in basic schools using the following three broad headings:

a. How Teachers Apportion Instructional Time for Teaching
b. Teachers' expectation of lesson delivery and their actual classroom practices.
c. Difficulties teachers have in managing instruction time in the teaching of integrated science.

The results are presented and research questions are discussed using frequencies, percentages, and storyline.

How Teachers Apportion Instructional Time for Teaching Integrated Science

How teachers apportioned instructional time for teaching integrated science at the upper primary level is presented under two main headings based on classroom observations protocol and scheduled interview protocol.

How teachers apportion instructional time based on Classroom observations protocol

Science Research question one sought to find out how teachers at the upper primary school level apportion instructional time for the teaching of integrated science teaching in the two schools used for the study. Integrated

science lessons were observed to find out how time is distributed for the teaching and learning activities which go on during integrated science lesson.

Table 1, 2, 3, and 4 show the results of how six Basic Stages 4-6 teachers apportion instructional time for Integrated Science.

Table 1: How Primary Four Teachers Apportioned Instructional Time for Integrated Science

Instructional Strategy of Time	Time(Minutes)	%
Oral Reading (Teacher/Pupils)	87	24.2
Discussion	50	13.9
Brainstorming	77	21.3
Practical Activity	0	0
Explanation	32	8.9
Class Exercises (Pupils)	28	7.8
Non-Instructional activities	60	16.7
Copying notes	13	3.6
Demonstration	13	3.6
Total	**360**	**100**

From Table 1, the teachers spent 360 minutes for the six lessons observed. Each lesson took 60 minutes as far as the teaching of integrated science lesson is concerned. Out of the time spent, the teachers made use of 87 minutes representing 24.2% of the total instructional time for oral reading

which involves the teachers and pupils reading from the science textbooks. The teachers also used 50 minutes (13.9%) in conducting discussion with the pupils during science lessons. Another 77 minutes (21.3%) was apportioned for brainstorming. During this time, pupils are made to solicit for ideas and information. None of the six teachers in the two schools performed any practical activities with the pupils. From the table 1, it can be seen that explanation of concepts from pupils and teachers took 32 minutes (8.9%) whiles pupils doing class exercises in class within the instructional time took 28 minutes representing 7.8% of the instructional time apportioned for the six lessons observed. Also from the table 1, it can be seen that non-instructional activities like distribution of textbooks and class exercise books to pupils in class, roll call in class, morning assembly, and general meeting among others took 60 minutes representing 16.7% of the apportioned time. Copying of notes on the board by teachers and pupils copying the notes into their notebooks to be taken home took 13 minutes (3.6%) with demonstration of concepts, theories and principles by the teachers and pupils took also 13 minutes (3.6%).

The data in Table 2, show that the teachers and pupils spent 39 minutes representing 10.8% of the apportioned instructional time for oral reading from their science textbooks whiles 69 minutes (19.2%) of the instructional time was apportioned for discussions involving the teachers and pupils. From table 2 again, the teachers spent 14 minutes representing 3.9% of the instructional time brainstorming with pupils in gathering and collecting information about a science concept. In addition, the teachers and pupils spent 66 minutes representing 18.3% from the entire 360 minutes performing practical activities with pupils, whiles 47 minutes (13.3%) of the apportioned time was used by

the teacher in explanation of facts, concepts theories and principles to pupils. The teachers also apportioned 67 minutes (18.6%) of the integrated science instructional time for pupils to use in doing class exercises which were mostly written on the board, whiles non-instructional activities like distribution of textbooks, exercise books and teaching and learning materials (TLM's), roll call in class due to unplanned incidences, etc took 37 minutes (10.3%) of the 360 minutes of the six lessons observed.

Table 2: How Primary Five Teachers Apportioned Instructional Time for Integrated Science

Instructional Strategy of Time	Time (Minutes)	%
Oral Reading (Teacher/Pupils)	39	10.8
Discussion	69	19.2
Brainstorming	14	3.9
Practical Activity	66	18.3
Explanation	47	13.3
Pupils doing Class Exercises	67	10.3
Non-Instructional activities	37	10.3
Copying Notes	6	1.7
Demonstration	15	4.2
Total	**360**	**100**

Lastly from the Table 2, it could be seen that copying of notes on the writing board by the teachers whiles pupils copied them into their notebooks took six minutes (1.7%). It could further be seen that demonstration organized in class by the teachers and pupils in order to explain concepts, facts, ideas, theories and principles took fifteen minutes representing 4.2% of the entire 360 minutes apportioned for the six lessons observed in basic stage five classes during Integrated Science lessons.

Table 3 shows that the teachers observed in basic stage six classes spent 63 minutes representing 17.5% of the 360 minutes instructional time apportioned for the six lessons in conducting oral reading from the science integrated textbooks whiles discussion with pupils was apportioned 60 minutes representing 16.7% of the entire 360 minutes for the six lessons observed. Again from the Table 3, it could be observed that teachers set aside 25 minutes (6.9%) for brainstorming in order to solicit for information, definitions and explanations from pupils by during integrated science lessons, whiles explanation of laws, concepts and definitions took 42 minutes representing 11.7% from the entire 360 minutes apportioned for the six lessons observed. The teachers also apportioned 57 minutes (15.8%) of the instructional time for pupils to complete class exercises, whiles 40 minutes which represent 11.1% of the instructional time was apportioned for non-instructional activities like distribution of textbooks (integrated science), teaching and learning materials and exercise books. It was also observed that roll calls, meetings formed part of the crucial activities conducted during the non-instructional time of 40 minutes. And lastly from the table 3, it can be seen that the teachers involved in the study did not apportion time for writing

of copious notes on the board for pupils to copy into their note books throughout the six observations conducted whiles demonstration of concepts, principles, laws and theories in class during science lessons took 36 minutes representing 10% of the entire instructional time apportioned for the six lessons observed in the two schools.

Table 3: How Primary Six Teachers Apportioned Instructional Time for Integrated Science

Instructional Strategy of Time	Time (Minutes)	%
Oral Reading (Teacher/Pupils)	63	17.5
Discussion	60	16.7
Brainstorming	25	6.9
Practical Activity	37	10.3
Explanation	42	11.7
Pupils doing Class Exercises	57	15.8
Non-Instructional activities	40	11.1
Copying Notes	0	0
Demonstration	36	10
Total	**360**	**100**

Table 4 represents the combination of data discussed using Table 1, Table 2 and Table 3. Table 4 therefore gives an idea of how teachers apportioned instructional time for integrated science at the upper primary class levels. Table 4 shows that out of the total 1080 minutes apportioned for

classroom activities of the 18 lessons observed involving six teachers from two different schools, 189 minutes representing 17.5% was used for oral reading from the science textbooks, whiles 179 minutes which is 16.6% was apportioned for discussions involving the teachers and the pupils.

Table 4: How Upper Primary Teachers Apportioned Instructional Time for Integrated Science

Instructional Strategy of Time	Time (Minutes)	%
Oral Reading (Teacher/Pupils)	189	17.5
Discussion	179	16.6
Brainstorming	116	10.7
Practical Activity	103	9.5
Explanation	121	11.2
Pupils doing Class Exercises	152	14.1
Non-Instructional activities	137	12.7
Copying Notes	19	1.8
Demonstration	64	5.9
Total	**1080**	**100**

Again from Table 4, it can be seen that 116 minutes representing 10.7% which forms part of the 1080 minutes was set aside by teachers to brainstorm with their pupils in order to solicit for information, definitions, and laws, whiles 103 minutes which is 9.5% was apportioned for practical activities. These practical activities were done by both the teacher and pupils.

A critical observation from Table 4 also shows that the teachers apportioned 121 minutes which makes up 11.2% of the entire 1080 minutes for the provision of explanation to concepts, facts, laws and principles in class during the 18 lessons observed in integrated science whiles 152 minutes representing 14.1% was apportioned for pupils to do their class exercises after lessons. Again it could be seen from table 4 that non-instructional activities which involved distribution of science textbooks, teaching and learning materials and exercise books, conducting roll call exercises, ensuring discipline in class whiles teaching is going on, receiving a telephone call, attending impromptu meetings with heads of school and colleague teachers etc was apportioned 137 minutes representing 12.7% of the entire instructional time apportioned for the 18 lesson observed.

Lastly from Table 4, it could be seen that copying of notes by the teachers on the writing board for pupils to copy into their note books was apportioned 19 minutes which made up 1.8% of the instructional time apportioned, whiles practical demonstration of lessons in class involving teachers and pupils in order to get explanation for a concept, definitions, facts and laws for a clearer understanding of integrated science lessons was apportioned 64 minutes which also made up 5.9% of the entire 1080 minutes apportioned for the 18 lessons observed in the two schools.

How Teachers apportion Instructional Time based on Scheduled Interview Protocol

How teachers apportion instructional time for teaching and learning of integrated science at the upper primary school level is an area worth of discussing and studying. What time do teachers spend on various activities

including introduction, practical activities and duties especially in class time? Example of duties includes maintaining accurate, complete, and appropriate records and files reports promptly. Taking precautions to protect records, equipment, materials, and facilities and lastly, enforcing regulations concerning student conduct and discipline also formed part of the duties. What proportion of classroom time is allocated to certain activities like interactions with pupils, teaching of subject content and unplanned incidences that occur in a classroom? How does the time on particular tasks relate to pedagogy?

Many studies have investigated pupils and student engagement and time but rarely have the above questions been specifically addressed. This report examines how teachers apportion instructional time for the of teaching integrated science at the upper primary school level based on scheduled interview protocol conducted with six teachers in two schools. Specifically, this report addresses the following items: time apportioned for oral reading in class, time for explanation of concepts, facts and definitions in the classrooms, brainstorming in class, how practical activities are conducted in class, time apportioned for pupils to do class exercises, time apportioned for note taking in class and demonstration of activities in class. Lastly the report also addresses issues concerning non-instructional activities like unplanned incidences in classroom, distribution of textbooks, teaching and learning materials and exercise books, attending impromptu meeting and many more.

Ideally, pupils should be engaged in meaningful activities for them to derive concepts and facts themselves. However, interviews with the six teachers clearly show that the usage of oral reading method by teachers and pupils is not their making. Since most of the teaching and learning materials

needed for performing those activities suggested by the science teaching syllabus are not available, teachers and pupils resort to the oral reading method from their science textbooks during science lessons. In fact, four out of the six teachers agreed that they most often make of use of the oral reading method in class to save time so that they could finish the overloaded syllabuses. The remaining two teachers said that they would also resort to the oral reading method once teaching and learning materials become unavailable.

Furthermore, I asked the teachers for the reasons why they explain definitions, concepts and facts. I moved a step further to ask the teachers whether pupils were allowed to participate during the explanation of concepts. In response to these questions, all the six teachers first agreed that time has to be apportioned for explanation of concepts, definitions and principles in class since it went a long way to help pupils understand the lessons better. They also agreed that apportioning time for explanation by both teachers and pupils in class is beneficial since it afforded pupils the opportunity to share their views on certain concepts.

Research into how discussions between teachers and pupils during science class lesson are apportioned revealed from the interviews that five out of the six teachers agreed that specific amount of instructional time is apportioned for discussions in class in order for pupils to engage with themselves as well as with the teacher in order to share vital information about a topic or lesson. It is also as a means to solicit solutions for a problem. I also found out that discussions in class were mostly done to seek available evidence to support a claim. To achieve this particular reason, teachers usually selected familiar, interesting topics as well as ones which could positively

affect the lives of pupils. These topics are then given to the pupils to embark on research on them so that relevant information gathered concerning the topics could be discussed during class lessons. Five teachers out of six agreed to have been making use of this method though not frequently because of limited time. However, the remaining teacher disapproved the use of this method of teaching due its time consuming nature. This teacher further told me that the noisy nature accompanied by this method discouraged her fro using it.

Do teachers apportion time for brainstorming in class? What are the reasons for its usage in the classroom during science lesson? According to all the six teachers interviewed, brainstorming is an act and method which has to be part of the science lesson since most pupils come to class not wanting to share ideas, talk or contribute to lessons in class. Thus, brainstorming helps to motivate them to come out of their shells and make meaningful suggestions concerning topic being discussed. Also, brainstorming usage helps both teachers and pupils to get a wide range of ideas and information since brainstorming affords every learner the opportunity to propose a solution to a problem. Time apportioned according to the six teachers for brainstorming range between five to twenty minutes during a science lesson because of its importance.

Data collected from the six teachers on apportioning of instructional time for practical activities reveal that a variety of practical activities are performed which are related to science instruction in class. According to these teachers, instructional times for practical activities are apportioned based on suggestions made in the integrated science syllabus concerning a particular

topic. It revealed also that instructional time was apportioned based on the class size, teaching and learning materials available for practical work. Even though teachers are supposed to use practical activities to help pupils acquire basic skills needed to understand science concepts in order to make science interesting to be studied, large class size and unavailability of teaching and learning materials are factors which contribute to the lack of practical activities during science lessons. Thus, according to these teachers, the above mentioned factors have to be considered before apportioning time for practical activities which range between 25 minutes to 50 minutes during a science lesson.

To ascertain if pupils were fully engaged in exercises during science lesson, four teachers out of six interviewed confirmed that they do apportion time for pupils to do class exercises which range between ten minutes to thirty minutes after science lesson in order to evaluate and assess pupils understanding of lesson taught. Though giving more class exercises will help pupils in understanding the lesson according to the teachers, marking the exercises becomes a huge task. It is for this reason that pupils are giving class exercises to reduce the burden that teachers go through when marking. All the six teachers interviewed agreed that these exercises are either written on the writing board for pupils to refer to them or in a mentioned page in their textbooks. Additionally, it was realized from the interview that the instructional time was often interrupted by non-instructional activities like assembly meeting, unplanned incidences in classroom like a teacher been sick, sharing of textbooks, teaching and learning materials and class exercises books. Taking into consideration information gathered fro the six teachers

interviewed, these non-instructional activities require a considerable number of minutes raging from three to sixty minutes. It must hereby be stated that the time spent carrying out these non-instructional activities is part of the entire number of minutes apportioned for the teaching and learning of integrated science during class periods.

The scarcity of school resources such as textbooks for pupils to use at home after school sections necessitate copying of notes on the board by the teacher for pupils to copy into their notebooks. This usually takes five to thirty minutes depending on the seriousness on the part of the pupils. That is to say those pupils at times intentionally delay in copying notes with various excuses missing pens, full notebooks etc. All the six teachers again agreed that talking and usage of blackboard (Chalk and talk") at the same time while students (pupils) wrote note into their notebooks form major part of how they apportioned instructional time for science lessons.

According to Westwood (2004), cognitive research suggests that students and pupils are more likely to retain material and convert data from one form to another that they have had the chance to manipulate, looked at or view with continued attention, observe or study thoughtfully in multiple cognitive networks (that is involving visual, auditory, psychomotor skills etc). All the six teachers agreed that apportioning time for demonstration is good and beneficial. Thus time is sometimes apportioned for demonstrations in class based on the lesson topic and teaching and learning materials available. Based on the interview data collected, instructional time apportioned for demonstration of concepts, definitions, and principles for pupils to observe and practice ranges from fifteen minutes of the instructional

time to 30 minutes. Mostly, the demonstrations are conducted by the teachers with seldom chance given to pupils to also demonstrate in class due to lack of teaching and learning materials available.

Drawing upon extensive collections of data on how basic school teachers at the upper primary level apportion time in the teaching and learning of science, thus this report tried answering the above question by looking at how teachers apportioned time for oral explanation, practical activities, demonstration in class, non-instructional activities, and discussion. It also looked at how time is apportioned for brainstorming in science lessons, explanation of concepts, definitions etc and how time is apportioned for copying of notes and note taking in class during science lessons in the Upper Basic Primary Class level.

Teachers' Expectation of Lesson Delivery that Reflect their Actual practices

Research question two sought to find out how the two sampled upper primary schools teachers' expectations reflect their actual practices in the classroom when teaching integrated science. The findings of this study revealed that teachers' expectations and actual classroom practices towards implementing effective integrated science instructional time were found to be different. Even though teachers' response to the interview reveal positive and promising expectations they did not practice the very things they talked about and some of the information they gave during the interview did not match their practice. The details are presented and discussed in the sections which follow:

Use of Teaching and Learning Materials during Teaching

Even though, teachers talked about using teaching and learning materials in teaching during interviews, the 18 lessons observed revealed that teaching and learning materials were not often used in their teaching and learning of integrated science at the upper primary level. Out of the 18 lessons observed, it was only in four lessons (22.22%) that teachers were seen using the right teaching and learning materials in teaching. For example in the teaching of the topics heat, respiration and freezing primary six teachers were seen teaching without any teaching and learning materials apart from the pupils' textbooks even though when interviewed they made mention of using real, improvised and other materials in teaching. In primary five classes, the following are some of the lesson topics in which teaching and learning materials were not used: food preservation, matter, and uses of mixtures in our daily life. In primary four, the following are lessons in which teachers did not use teaching and learning materials: Luminous and non-luminous bodies, components of solar system and metals and non-metals. Out of the 18 lessons observed the following were the lessons in which teaching and learning materials were used: magnetic and non-magnetic materials, magnetism, methods for separating mixtures, mixtures, uses of man-made satellite, causes and effects of rusting, and electrical circuit.

Involvement of Pupils in Lessons

In all the 18 lessons observed, teachers' activities in class over-shadowed that of the students. This was contrary to what they said during the interviews. Teachers were seen performing virtually all the activities in class such as reading from textbooks, demonstrations, discussions and explanation

of facts, concepts and definitions even though during the interviews before the lessons they gave responses which indicated otherwise. An example is where a teacher teaching metals and non-metals was seen doing the reading whiles the pupils looked into their textbooks. And even after reading the teacher did not call any of the pupils to read from the textbook. Observations in class also revealed that teachers emphasized on factual information that encouraged memorization.

Pupils should not just be engaged in any learning activity but should spend their time in activities which have been spelt out in their science syllabus which will help them acquire the needed generic skills in integrated science. However, the degree to which this happened in the two schools observed was uncertain as the teachers did not spend time on activities which will enable pupils to develop these skills.

Again, instead of teachers guiding pupils to manipulate learning aids to develop their own ideas and making the subject more meaningful and relevant, teachers were seen manipulating these teaching aids themselves whiles pupils were only seen observing the teacher. An example is where a teacher was seen manipulating the learning aids by herself during a lesson on the uses of man-made satellite

Teachers talked about giving pupils the chance to demonstrate practical activities after teachers' demonstrations. However, classroom observations revealed that in all the 18 lessons, it was in only one lesson that a pupil was called to come and demonstrate after the teacher's demonstration to the whole class.

Dictation of Notes

When teachers were asked whether they dictated copious notes for pupils to write during the lesson, all the six teachers said they did not dictate notes in class as it consumed time. However, classroom observations reveal otherwise as some of the teachers observed were seen dictating notes for pupils to copy into their notebooks during lessons. Thus, what teachers said did not march their actual classroom practices. Dictation of notes took between five to ten minutes of the instructional time apportioned for the science lesson.

Again, on whether teachers write notes on the writing board for pupils to copy into their notebooks, all the six teachers indicated that, they wrote notes on the board for pupils to copy into their note books. According to them this normally took five to fifteen minutes of the instructional time after the lessons have been taught. However, it was observed that writing notes from the board was mixed done. This is to say that copying notes on the board do take place even during the teaching and learning process and not only after lessons as the teachers alleged. For example, it was observed that when the topics “metals and non-metals”, “methods for separating mixtures”, magnetic and non-magnetic materials lessons were going on, teachers were observed writing notes for pupils to copy into their notes books.

Use of Lesson Plans

Out of the 18 lessons observed, lesson plans were written as a matter of duty and not as a teaching guide even though in the interview teachers referred to lesson plans as a guide to teaching. Even though the six teachers observed and interviewed clearly stated they followed their lesson plans when

teaching, classroom observations showed that this was not the case. Lesson notes prepared by teachers were in teachers' bags or on their tables and they did not open them when teaching. In some of the lessons observed, no lesson plans were seen with the teachers.

For example, on the topic, "Electrical Circuit", where the teacher had stated in the lesson plan that he will use five minutes to introduce the lesson, in practice the teacher used only two minutes, whiles for lesson development instead of the lesson taking fifty minutes, it only lasted for thirty one minutes. Also, there was no lesson closure even though time was allocated to this stage of the lesson. In another lesson observed on "metals and non-metals" the teacher had indicated the performance of practical activities and the use of guided discovery in teaching in the lesson plan. However, when teaching this was not followed as the teacher made use of drill-oriented methods, reading from their science textbooks on the topic and barnstorming. A disturbing observation was where some teachers came to the classroom with teaching and learning materials stated in their lesson plans but did not use them in teaching.

Lesson Evaluation

According to two of the teachers, lesson evaluation was done through questions and exercises which were marked and discussed with pupils. The other four teachers indicated they used challenging projects, assignment and homework based on the lesson with little guidance from the teacher. Classroom observation revealed, however, that most of the exercises given to pupils were not marked contrary to teachers' claim that they marked and discussed all exercises with the pupils.

It was also observed that teachers used only oral questions and exercises to evaluate their lessons even though they made mention of using different strategies in evaluating the lesson such as project and challenging activities.

How teachers apportioned time to wrap-up and close science lessons was another question teachers were asked. Teachers indicated that between five to twenty minutes was usually set aside after lesson presentation but observation showed that three out of the six teachers did not set aside any time for lesson wrap-up as some of the lessons observed ended without any wrap-up.

Structuring of Lessons and Activities

The time between lesson activities is often full of disturbance and often instructional time lost is likely to occur (Buck, 1999; Allington, 2005; Fox, 2009)**.** During interview teachers claimed this problem is dealt with by not allowing pupils to wait before a new lesson or activity begins after the completion of one lesson or activity. Thus, according to the teachers, materials are organized ahead of time, so that time wasted before a new activity of class session began could be minimized. However, actual classroom observations revealed that three out of six teachers observed were not fully ready to introduce pupils to new activities.

During interviews, teachers claimed another step they took structuring lessons was by selecting tasks or activities which are at an appropriate level of difficulty for pupils. However, actual classroom practices revealed otherwise. In ten lessons, three teachers were seen using question-oriented strategies throughout the lessons without doing exactly what they said during the

interviews. In four lessons observed two teachers were seen not introducing the lesson as they straight away asked pupils to share and read from their science textbooks without any proper link between the new topic and their previous knowledge.

According to the teachers interviewed, lessons were also structured by putting time limit on some activities performed by pupils. According to the teachers, when pupils know that they have only a short amount of time to complete a task, they are more likely to get right to work and complete the task. However, classroom observations revealed that in three practical lessons, pupils were given activities with no time frame only to be told by the teacher that it was time for them to stop performing the activities. This attracted protests from the pupils.

Breaking lessons into smaller sections can help to maintain the pace of the lesson. This is to preventing the feeling of being bombarded with work which was another response teachers gave for pacing lessons. However, in ten lessons observed, lessons were not broken down into smaller sections as lessons were presented as a whole. This occurred when the topics “metals and non-metals”, components for solar system”, “luminous and non-luminous bodies” and “methods for separating mixtures” were taught.

Teachers Difficulties in Teaching Integrated Science

Research question three sought to find out teachers’ difficulties with teaching integrated science at the primary school level in terms of how they managed classroom instructional time. This was done through interviewing teachers and observations during classroom instruction in integrated science. The difficulties observed in the classroom and what teachers made mention of

during interviews were interruptions, discipline matters, lack of teaching and learning materials and large class size. Other difficulties were attendance to morning assembly and worship, pupils' slowness in understanding concepts, and lack of science textbooks for pupils to use at home.

Based on my observations of lessons in class and teachers' responses during the interview, one difficulty teachers had which affected effective utilization of instructional time in teaching integrated science lessons was interruptions. The interruptions were both external and internal. Some of the external interruptions observed and also mentioned by teachers were announcements by the school administration whiles lessons were in session, the need for the class teachers to sign forms or documents from the office, other teachers trying to ask questions, and impromptu meetings. Others were pupils from other classes coming into the classroom to collect items from their friends, teachers coming into the classroom to deliver messages, and unscheduled visits by outsiders namely parents and siblings of wards, circuit supervisors and people seeking for directions. Out of the eighteen lessons observed, seven started very late (about five to twenty five minutes late) with some ending abruptly as teachers were seen having discussions either with the head teachers or colleague teachers. Also, some teachers were seen going out of the classroom to attend to head-teachers summons, explaining and clarifying issues with other teachers and conducting roll calls. Whiles internal interruptions included arranging of desks, chairs and tables for practical lessons; pupils struggling over insufficient textbooks; and behavioural issues such as pupils distracting others with talking, pupils refusing to do their work,

pupils constantly fidgeting in their chairs, pupil's lack of focus, and the inability to sit or stand for an appropriate length of time to effectively learn.

Lack of teaching and learning materials for science lessons was another problem teachers raised during interviews and this problem was apparent during classroom observations as the teachers taught science practical activities theoretically. That is to say the teachers were talking about practical activities orally without the use of actual teaching and learning materials. Again, where teaching and learning materials were used, it was realized that they were in-sufficient. Some of the teaching and learning materials were in bad state (apparatus and equipment with parts missing, and some with faulty regulators etc.) making the teaching of integrated science very challenging. For a topic like "solar system" the science syllabus suggested the use of video so that children could watch the planets and other heavenly bodies. However, because the schools observed did not have television sets and video players the suggestion from the syllabus had to be ignored. Furthermore, taking into consideration a topic like "methods for separating mixtures", because teaching and learning materials were not brought to class, the teacher taught the lesson without any practical activities which were very essential in this lesson. The materials needed were very simple and easy to come by, yet he teacher did not come to class with any of them.

Other difficulty teachers mentioned and I observed was also the size of the class. According to the teachers interviewed, although the free education and compulsory programme had brought about an increase in the number of pupils in class, there is no corresponding increment of textbooks supplied to

schools for pupils to use during teaching and learning process, teaching and learning materials. During the classroom observations, some pupils were made to sit together to share a science textbook and in some cases teaching and learning materials were shared among students. Some teachers complained that some of the class size were too big, making it difficult to carry out activities with the pupils. Marking of class exercises and assignments was a problem since the teachers handled other subjects apart from the integrated science.

Additionally, teachers had difficulty managing instructional time due to extra-curricular activities like sports, cultural activities, grounds work, morning worship and visit by educational heads and officials. These activities disrupt the school time table, thus, affecting the time for teaching in all the subjects including integrated science. For example, during observations four days were used for sports and athletics activities. Morning assembly sometimes takes a lot of instructional time off the first lessons in school. For example in one situation the first lesson which was to start at 8:15am in the morning started at 8:32am. Hence, due to morning assembly a lesson which was to last for sixty minutes lasted only for thirty three minutes with other interruptions like roll call in class.

Another difficulty pointed out by teachers during interviews was the nature of classrooms for teaching integrated science. According to the teachers, because they did not have special classrooms like a science laboratory where activities like group work, individual practical activities and group demonstrations could be performed, the normal classrooms had to be rearranged for these activities and this took a considerable amount of the

instructional time. During classroom observations on the topic “food poisoning”, pupils were seen moving their desk from one position to the other because the teacher was using group work method. I observed pupils moving their desks for the activities and this really took a lot of time as some of the desks were quite heavy for them.

Pupils were slow in understanding science concepts due to language barrier. This was another difficulty which came to light during the classroom observations. This was confirmed by the teachers during the interviews. Since most of science teaching required the teachers to use the English language as a medium of communication, most pupils struggled to understand as the language seems too difficult for them to understand. Even though some of the pupils could be seen performing tasks given to them, explaining of concepts was a difficult task because of lack of English language articulation facility.

According to the teachers, since most of the pupils did not have integrated science textbooks at home, they tend to forget easily what they learned at school as they could not revise at home. I observed pupils during classroom observations hardly recollecting what they had learnt the previous day as they found it’s difficult responding to teacher’s questions during the introduction which clearly indicate that they either did not understand what they had learned or they did not revise what they had been taught at home as questions asked by the teacher were difficult for them to answer.

Another difficulty was the loaded and the technical nature of the integrated science syllabus. According to the teachers some of the science topics are quite loaded making it difficult for them to teach these topics within

the stipulated time on the time table. The teachers therefore resort to the lecture method of teaching at the expense of practical activities.

Drawing upon extensive collections of data on difficulties upper primary integrated science teachers face in managing instructional time, it can be said that there are a lot of difficulties upper primary school integrated science teachers come across in teaching integrated science. Some of these difficulties are interruptions, large class sizes, lack of textbooks for pupils to use at home and insufficient teaching and learning materials for practical activities. Others were discipline matters, extra-curricular activities and slowness in understanding science concepts.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The aim of the study was to investigate upper primary schools teachers' utilization of instructional time in the teaching and learning of science. The study had three research questions which were all tailored towards soliciting information on the research topic.

This study used multi-site case approach to study and conduct in-depth study of basic school teachers' utilization of instructional time in the teaching and learning of science in two upper primary schools in Cape Coast, Central Region. This study involved observing and tracking classroom activities during science periods as well as interviewing science teachers after class periods.

In all, six integrated science teachers in upper primary were interviewed with 18 observations of integrated science lessons. The instruments used for data collection were observation protocol and scheduled teacher interview questionnaire protocols. The outcome of the observations and the interviews were analyzed using tables, frequencies, percentages and story-line approach.

Key Findings

The key findings were as follows:

1. It was observed that when teaching teachers apportioned much instructional time to oral reading strategy and brainstorming strategy as compared to practical activities to engage the pupils in developing basic skills and attitudes needed in science teaching and learning.
2. The research also revealed that expectations of lesson delivery and the actual classroom practices of the six teachers involved in the study were contrary.
3. Furthermore, it was also observed that upper primary schools do not have sufficient teaching and learning materials to deliver the necessary amount of curriculum content in order to achieve high levels of outcomes for all pupils. This thus, prevented teachers from giving up their best during instructional periods. Also, teachers complained of not being able to help pupils achieve their highest potentials due to lack of basic teaching and learning materials like textbooks. Other challenges that compounded the problem of instructional time lost during integrated science teaching and learning were interruptions, discipline matters, large class size and pupils' slowness in understanding concepts.

Conclusions

The conclusions are drawn based on the findings of the research that most teachers did apportion instructional time for teaching integrated science at the upper primary school level. It was observed that the amount of time spent on each instructional strategy differs according to the topic, time at hand and teaching and learning materials available. Teachers, however apportioned

more time to oral reading with less time were apportioned to practical activities in class teaching.

Generally, it can also be concluded that upper primary science teachers' expectation before going to class and the actual classroom practices of teaching and learning of integrated science are totally different from what teachers profess to be doing in class.

Another conclusion drawn based on the findings of the research is that most teachers encounter difficulties in managing instructional time during the teaching and learning of integrated science as a result of both internal and external interruptions, discipline matters, teaching and learning materials unavailability and large class size. Others were extra-curricular activities, bad nature of classrooms, pupils' slowness in understanding concepts, over loaded science syllabus and finally, lack of science textbooks for pupils to use at home.

Recommendations

1. There is the need for headteachers to inspect and monitor integrated science teachers during teaching and learning process to ensure that they apportion instructional time for learning strategies at the upper primary school level. The headteachers can do this by sitting in a class during integrated science lesson or observing lesson through a class window. Integrated science teachers also need to apportion time for instructional strategies that might be needed for a particular topic and effectively adhere to each of these instructional strategies in order avoid bias.

2. There is the need for teacher training institutes and educational offices to include in their training programme how teachers can achieve their expectations in class during teaching and learning process. Again, headteachers should inspect teachers' expectations before going to class and monitor from time to time to check whether their actual classroom practices are in line with their expectations.
3. Since effective use of instructional time on task for teaching and learning is one of the most critical components of learning achievements, Ghana Education Service and school heads must ensure that challenges faced by integrated science teachers are addressed so that teachers can manage effectively the giving instructional time. They can do this by providing appropriate and adequate teaching and learning materials and providing well equipped resource classrooms and minimizing impromptu meetings.

Suggestions for Future Research

1. Conduct a study that seeks to find out why upper primary science teachers write and prepare lesson plans to be marked without using them in teaching. This has become necessary as during classroom observations of lesson, most teachers observed were seen coming to class with prepared lesson plans but kept them in their bags and on top of teachers' tables without using them in teaching.
2. Conduct follow-up study to find out whether headteachers really monitor the expectations of their teachers before going to the classroom and during teaching and learning process in the classroom to determine whether their expectations and actual classroom practices

are in agreement. This is necessary because during visits to the two schools to conduct interviews and lesson observations, I never came across the two headteachers going round to monitor teachers' actual classroom practices, even though they had checked their lesson notes which contained the teachers' expectations before going to class to teach.

3. Researchers should conduct a study to find out the difficulties lower primary level teachers face in managing instructional time during natural science teaching and learning process since this study concentrated on only upper primary schools.

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APPENDICES

APPENDIX A

UNIVERSITY OF CAPE COAST

TEACHERS' INTERVIEW SCHEDULE

This research is on basic school teachers' utilization of instructional time in the teaching and learning of science in some selected primary schools in Ghana. I would be grateful to you if you could be part of this research. The research seeks to answer the questions below:

1. How do teachers apportion instructional time for teaching integrated science at the upper primary school level?
2. To what extent does upper primary integrated science teachers' expectation of lesson delivery reflect their actual practices?
3. What difficulties do teachers have in managing instructional time in teaching integrated and natural science at the primary school level?

Your identity will not be disclosed in the write up and also all the information you give will be for research purposes' only. Thank you.

SECTION A

TEACHER'S BIO DATA

1. Name of School ……
2. District……....
3. Sex: Male [ ] Female [ ]
4. Class you teach ……
5. Number of years of teaching……
6. Full time [ ] Part-time [ ]
7. Professional Status: Trained [ ] Untrained [ ]
8. Educational Qualification: Dip Sc [ ] B. Ed Sc [ ]

B. Sc [ ] M. Ed [ ] M. Phil [ ] M. Sc [ ]

SECTION B

How do teachers apportion instructional time for teaching integrated and natural science at the upper primary school level?

Instruction: Please supply your own answers as may be required in the spaces provided.

1. How do you estimate the number of minutes needed for instructional strategy like demonstration, discussion etc?

……

……

2. How do you apportion time to relate the introduction and development of a lesson?

……

……

3. How do you estimate the number of minutes needed for activity set-up, passing out materials, setting up group work areas, and getting students moved into their workstations?

……

……

4. How do you employ effect classroom management strategies to prevent undue time spent attending to behavioural disruptions or other disciplinary issues to reduce loss of Instructional time?

……

……

5. As a teacher how do you apportion time for practical activities in class?

……

……

6. How do you decide on time needed to write notes on the writing boards?

……

……

7. Before you go to class how you do apportion time to dictate notes for learners to write into their notes books?

……

……

8. How do you encounter problems with transition of learner into new activities?

……

……

9. How do you pace instructional time for learners to complete learning activities?

……

……

10. How do you decide on the directions and the amount of time needed for learners to complete their class assignments?

……

……

11. How do you establish procedures for performing non-instructional tasks like handling materials and supplies, managing transitions and organizing and monitoring group work?

……

……

12. How do you set aside time to be used by pupils in writing core points on writing board (blackboard) into their notebooks as lesson progress?

……

……

13. Once you are teaching science how do you apportion time to be used by learners in sharing their textbooks and exercise books?

……

……

14. How do you establish a set rule that govern students' verbal participation and talking during different types of activities, whole class instruction, and small group instruction?

……

……

15. How do you establish a set of rules and procedures that govern pupils' movement in the classroom during different types of instructional activities?

……

……

16. How do you eliminate unscheduled discussion of personal items such as sports, movies, and politics during academic teaching and learning process?

……

……

17. How do you provide time for all pupils to reflect on the teaching and learning while's lesson is progress?

……

……

To what extent does teachers' expectation of lesson delivery reflect their actual practices?

Instruction: Please supply your own answers as may be required in the spaces provided.

1. How do you have materials, supplies and equipment ready at the start of a lesson?

   ……

   ……

2. Describe how you provide sustaining feedback after an incorrect response by probing, repeating the question, giving a clue, or allowing more time.

……

……

3. Do you use time budget stated in the lesson notes for each activity? Yes( ) No ( )

If yes, how do you decide on the time budget?

.....

.....

4. What do you do to prevent outside distractions from influencing science teaching and learning process?

   ……

   ……

5. What do you do to engage pupils in critical thinking activities with freedom from worksheets, redundancy and meaningless activities?

   ……

   ……

6. How do you minimize open ended discussions of students' opinions and beliefs when this is not the direct objective of the lesson?

   ……

   ……

7. What do you do to provide learners with evaluation information and feedback using a variety of methods in the teaching and learning process?

   ……

   ……

8. Do you write notes on blackboard for pupils to copy into their notes books?

   Yes ( ) No ( ) If yes, how do you do that?

   ……

   ……

9. Do you dictate copious notes for pupils to write during the lesson?

   Yes( ) No ( )

If yes, how do you do that?

……

……

10. How do you decide on the directions and the amount of time needed for learners to complete class assignments?

……

……

11. What do you do to make sure your lesson plan matches instructional objectives to students needs?

……

……

12. How do you pace your instructional activities for learners to complete class activities?

……

……

13. What do you do to prevent your lesson note characterize information giving and teachers use of ‘Chalk and talk’ method of delivering lesson?

.....

.....

14. How do you apportion time for inviting questions and answering them from pupils in class?

……

……

15. How do you apportion adequate time and structures for wrap-up and closure of science lesson during teaching and learning process?

    ……

    ……

What difficulties do teachers have in managing instructional time in teaching integrated and natural science at the upper primary school level?

Instruction: Please supply your own answers as may be required in the spaces provided.

1. Is the time on the time table for science instruction enough? Yes( ) No ( )

   If No, what are your suggestions?

   ……

   ……

2. Have you made changes to the instructional time for science teaching? Yes( ) No ( )

   If Yes, why?

   ……

   ……

3. What changes have you made concerning the science instructional time on the time table?

   ……

   ……

4. Do you have your own time table which is different from the school time table for science teaching and learning? Yes( ) No ( )

If Yes, why?

……

……

5. Outline some of the things that cause time lost during teaching and learning of science at the basic level.

……

6. Mention some of the things that contribute to the effective use of instructional time in the teaching and learning of science lesson.

……

……

7. Mention some aspects of science that waste a lot of instructional time during teaching and learning process.

……

……

8. What are the methods' do you use in the teaching and learning of science at the upper primary level?

……

9. How do you implement an effective classroom management plan?

……

10. List some of the importance of effectively utilizing science instructional time during teaching and learning process.

……

……

APPENDIX B

UNIVERSITY OF CAPE COAST

CLASSROOM OBSERVATION SCHEDULE

This research is on basic school teachers' utilization of instructional time in the teaching and learning of science in some selected primary schools in Ghana. The research seeks to answer the following questions;

1. How do teachers apportion instructional time allocated for teaching integrated and natural science at the primary school level?
2. To what extent does teachers' expectation of lesson delivery reflect their actual practices?
3. What difficulties do teachers have in teaching integrated and natural science at the primary school level?

Preamble

District:……

School:……

Class observed: BS 4 [ ] BS 5 [ ] BS 6 [ ]

Topic:……

Date:……

Section A

Time lesson started……

Time lesson was to start……

Duration of lesson as stated in lesson plan……

Actual time of the lesson……

Section B

1. Introduction of Lesson

2. Development of lesson

What the teacher did	Duration	What the Pupils did

3. Closure of lesson

4. Researchers Observations

APPENDIX C

CLASSROOM OBSVERVATIONS

BASIC STAGE FOUR CLASSROOM OBSVERVATIONS

Observation 1

Preamble

District:	Cape Coast
School:	OLA Presby Basic School
Class Observed:	Basic Stage Four (4)
Date:	2nd May, 2011
Topic:	Characteristics of Metals

Section A

1. Time lesson started: 10:45am
2. Time lesson was start: 10:45am
3. Duration of lesson as stated in lesson: 60 minutes
4. Actual time of the lesson: 10:45am - 11:45am.

Section B

Introduction of lesson

10:45am-10:50am (5 minutes)

The lesson started exactly 10:45am as stated in the lesson plan and on the time table with the teacher asking pupils to mentions some of the things they have at home especially in their mothers kitchen, which she used to introduced the lesson on metals and non-metals. The introduction took 5 minutes.

Lesson Development

10:50am – 11:40am (50 minutes)

What the teacher did	Duration	What the pupils did
Teacher asked one pupil to share the textbooks which were on her table and asked them to open to a mentioned page.	5 minutes	Pupils took their textbooks and referred to the mentioned page.
Teacher then read out aloud from the science textbook as pupils listened.	14 minutes	Pupils looked into their textbooks as the teacher read to them.
Teacher uses discussion for pupils to list things made from metals whiles she writes them on the board.	16 minutes	Pupils responded to teachers questions.
Teacher through brainstorming guided pupils to mention some of the various characteristics of metals which the book made mentioned off.	8 minutes	Pupils gave guessing responses to the teacher's questions.
Teacher then asked the pupils to write what she was writing on the board		Pupils write the information

which took of lot of time.	7 minutes	teacher wrote on the board into their note books.

Closure of Lesson (5minutes)

Teacher gave a summary of the lesson using oral questions and referred the pupils to a mentioned page in their textbooks to respond to number questions in the said page as their home work which brought the lesson to an end.

Researchers Observations

Even though Instructional time was not lost to non-instructional activities, writing on the board took much of the lesson presentation as the pupil were left passively doing nothing and waiting for the teacher to finish writing for them to copy into their notebooks.

The pupils were not engaged in any meaningful activities as they were made to read from the textbooks all the time even though the syllabus made a number of suggestions concerning methods to be used in the teaching of the above topic. The recommended methods are as follows; Guided Discovery, Discussion method, Demonstration, Project, Problem solving method whiles the teacher made use of the following; drill-oriented methods, Question and answer method, brainstorming, reading, lecturettes, and lecture method. Sharing of textbooks also took much of the instructional time and the lesson was teacher centered.

Observation two

Preamble

District: Cape Coast

School: OLA Presby Basic School

Class Observed: Basic Stage Four (4)

Topic: Metals and Non-metals

Date: 4th May, 2011

SECTION A

1. Time lesson started: 12:36pm
2. Time lesson was to start: 12:30pm
3. Duration of lesson as stated in lesson plan: 60 minutes
4. Actual time of the lesson: 12:36 - 1:26pm

SECTION B

Introduction of lesson

12:36 -12:42pm (6 minutes)

The teacher used questions to review the previous knowledge of the pupils on metals and non-metals which took 3 minutes. The lesson should have started at exactly 12.30pm but because the teacher was eating the lesson has to be delayed till 12:36pm.

Lesson Development

12:42pm-1:22pm (40 minutes)

What the teacher did	Duration	What the pupils did
Teacher displayed metals and non-metals materials on the table and	8	Pupils gladly responded to the teachers requests.

asked pupils to identify them as metals and non-metals.	minutes	
Teacher asked the class prefects and another pupil to share their science textbooks. Teacher read from the textbook mentioning some examples of metals and non-metals which has been grouped in the textbook.	15 minutes	Pupils waited to receive their textbook from their colleagues. Pupils listened as the teacher reads from the textbook.
Teacher through discussion asked pupils to come out with the various uses of metals and non-metals in their community, home and at school.	12 minutes	Pupils gave out responses to the teachers' questions.
Teacher then asked pupils to copy notes which she wrote on the board.	5 minutes	Pupils copy the notes on the board into their notebooks.

Closure of Lesson

1:22pm-1:26pm (4 minutes)

Teacher uses oral question to mention some examples of metals and non-metals and their uses to the pupils to bring the lesson to an end, which took 4 minutes of the instructional time allocated for the lesson.

Research Observations

The lesson should have started at 12.30pm but because the teaching was eating the lesson started at exactly 12:36pm losing 6 minutes of the instructional time for the lesson.

The lesson should have ended at 1.30pm but ended earlier than scheduled thus losing another 4 minutes of the instructional time. The lesson should have taken 60 minutes but it does take only 50 minutes losing 10minutes to non-instructional activities.

The pupils were not engaged in any meaningful activities as they were made to read from the textbooks all the time even though the syllabus made a number of suggestions concerning methods to be used in the teaching of the above topic. The recommended methods are as follows; Guided Discovery, Discussion method, Demonstration, Project, Problem solving method whiles the teacher made use of the following; drill-oriented methods, Question and answer method, brainstorming, reading, lecturettes, and lecture method

Observation three

Preamble

District: Cape Coast

School: OLA Presby Basic School

Class Observed: Basic Stage Four (4)

Topic: Causes and Effects of Rusting

Date: 1st June, 2011

SECTION A

1. Time lesson started: 12:40pm
2. Time lesson was to start: 12:30pm

3. Duration of lesson as stated in lesson plan: 60 minutes
4. Actual time of the lesson: 12:40pm - 1:20pm

SECTION B

Introduction of the lesson (3 minutes)

The lesson should have started at 12:30pm but because of PTA meeting they had early in the morning, the lesson to started 10 minutes late at 12:40pm. At 12:40pm the teacher reviewed the previous knowledge of the pupils using questions on what one will observe once you put a coin in the rain, in the soil for about a week to introduce the lesson which took 3 minutes (12.40pm - 12.43pm).

Lesson Development 12.43pm-1.17pm (34 minutes)

What the teacher did	Duration	What the pupils did
The teacher used lecture method to explain to the pupils the concept rusting and used some examples in the classroom doors, metals in the cardboard and flames to explain rusting.	12 minutes	Pupils passively listened and observed as the teacher explains and point out examples of rusting to them.
Teacher used discussion to guide pupils to come out with the various causes rusting after asking them to read from their textbooks The teacher then led the pupils outside to observe an old rusty car near the	22 minutes	Pupils responded to the teachers questions with some guessing.

school field for the pupils to have real experience of rusting.		They also want out with the teacher to observe the rusty car near the school field.

Closure

1:17pm - 1:20pm (3 minutes)

The teacher asked the pupils to pack their textbooks as she was tired due to the PTA meeting which she attended after asking them to copy out an assignment in their textbook to be taken home.

Researchers Observations

Lesson was to start on this day at 12.30pm but because of the PTA meeting classes started at 12.40pm thus 10 minutes of the instructional time lost.

Again, lesson was to end at 1.30pm, but because the teacher complained of tiredness, the lesson ended earlier than scheduled at 1.20pm instead of 1.30pm, thus losing another 10minutes of the instructional time. For this lesson 20 minutes of the 60 minutes allocated for the lesson was lost due to non-instructional activities.

Guided discovery, discussion method, Activity method, Demonstration method and Inquiry / design / solving method were the methods the science syllabus suggested to be used in the teaching and learning of this topic but I observed that the teacher made used of the following lecture method, question and reading method in delivering this topic which was not in line with the syllabus suggestions.

Observation Four

Preamble

District: Cape Coast

School: St. John's Anglican School

Class Observed: Basic Stage Four (4)

Topic: Components of Solar System

Date: 2nd May, 2011

SECTION A

1. Time lesson started: 12:47pm
2. Time lesson was to start: 12.30pm
3. Duration of lesson as stated in lesson plan: 60 minutes
4. Actual time of the lesson: 12:47pm-1:28pm

SECTION B

Introduction of lesson 12:47pm -12:50pm (3 minutes)

The teacher introduced the lesson at 12:47pm even though the lesson was to start at 12:30pm using questions on some of the items that appears at night and day time in the sky to review the pupils' previous knowledge using three minutes. The lessons started late because the class teacher was having a short meeting with the assistant headmaster. Thus the pupils have to wait a little till 12.47pm before the lesson started.

Lesson Development 12:50pm-1:25pm (35 minutes)

What the teacher did	Duration	What the pupils did
Teachers use lecture method to explain the term solar system and also talked about the	12	Pupils listened attentively to the

components of the solar system using the sky as the teaching and learning material.	minutes	teacher.
Teacher then asked pupils to open their textbooks to a mentioned page on the solar system and the nine planets.	2 minutes	Pupils opened their textbooks to the said page amid talking.
Textbook reading continues as the Teacher asked one pupil to read from their textbooks.	21 minutes	A Pupil read from the textbooks as the rest looked into theirs.

Closure of Lesson 1:25pm-1:28pm (3minutes)

Teacher asked one pupil question related to planets and then asked the pupils to go and read on the nine planets, their moons, and distance from the sun for the next science lesson which brought the lesson to an end at exactly 1.28pm.

Researchers Observations

Lesson was to start at 12.30pm but because of the short meeting the teacher had with the assistant head the lesson has to start at 12.47pm thus 17 minutes of the instructional time lost. Again the lesson was to end at 1.30pm but ended exactly 1.28pm thus reducing the instructional time by 2 minutes. In all the lesson was to be a 60 minutes lesson, but because some were lost (19 minutes), only 41 minutes was used for the lesson.

Guided Discovery, Discussion method, Activity method, Demonstration method, and watching a video clip on the Solar system were the methods listed by the science syllabus but the teacher made used of only

lecture, questions and brainstorming thus ignoring the syllabus suggestions on how the lesson should be taught.

Observation Five

Preamble:

District: Cape Coast

School: St. John's Anglican School

Class Observed: Basic Stage Four (4)

Topic: Luminous and Non-luminous Bodies

Date: 18th May, 2011

SECTION A

1. Time lesson started: 9:27am
2. Time lesson was to start: 9:25am
3. Duration of lesson as stated in lesson plan: 60 minutes
4. Actual time of the lesson: 9:27am -10:24am

SECTION B

Introduction of lesson

9:27am -9:30am (3 minutes)

The science class was to star exactly 9:25am according to their time table pasted on the wall in the classroom, but because the pupils were answering mathematics questions on the board at 9:27am the teacher instructed the class prefect to share the science textbooks and introduced the lesson.

Lesson Development

9:30am -9:59 (29 minutes)

What the teacher did	Duration	What the pupils did
Through brainstorming teachers asked pupils following questions ; 1. What do you understand by the term Luminous Bodies and 2. What is Non-luminous Bodies? The teacher then explains the two terms that is Luminous and Non-luminous Bodies.	8 minutes 6 minutes	Pupils responded by guessing answers to the teachers question. Pupils sat down passively whiles the teacher lecture them.
Teacher then asked the pupils to open their textbook to a mentioned page to read on Luminous and Non-luminous Bodies.	9 minutes	Pupils opened their textbooks while a pupil read from the page with the rest pupils looking into their books
Teacher again pointed to another page in the textbook and asked another pupil to read on the examples of Luminous and Non-	6 minutes	One pupil read from the page whiles the rest of the class sat down looking into

luminous Bodies.		their books.

Closure of Lesson 9:59am-10:25am (26 minutes)

Teacher used oral question to go over the lesson and then asked pupils to respond to questions which she wrote on the board which ended the lesson.

Researcher's Observations

The integrated science lesson for this day was to start at 9:25am but started late at 9:27am losing 2 minutes to Mathematics lesson. Instead of 60 minutes for the lesson the teacher used 58 minutes thus 2 minutes of the instructional time lost to non science lesson activities.

The teaching method mostly used in the teaching and learning process were reading, lecture, questions, and discussion whiles the syllabus made mention of Discussion, Activity, Experimentation and Demonstration method. Thus I observed that the teacher clearly ignored the major methods suggestion by the science syllabus

Observation Six

Preamble:

District: Cape Coast

School: St. John's Anglican School

Class Observed: Basic Stage Four (4)

Topic: Uses of man-made Satellite

Date: 1st June, 2011

SECTION A

1. Time lesson started: 9:25am
2. Time lesson was to start: 9:25am

3. Duration of lesson as stated in lesson plan: 60 minutes
4. Actual time of the lesson: 9:25am -10:18am

Introduction of lesson

9:25am -9:31am (6 minutes)

The lesson started on time at exactly 9:25am as stated on the time table and in the teachers lesson note as the teacher used television and radio poles and antennas to review pupils' previous knowledge.

Lesson Development

9:31am -10:19am (48 minutes)

What the teacher did	Duration	What the pupils did
Teacher asked pupils to open their science textbook and look through as she read from the textbooks to them.	10 minutes	Pupils looked into their books as the teacher read from the textbook on the uses of mixtures in everyday life.
Teacher continues reading from the textbooks and asking one/two questions based on what she was reading.	11 minutes	Pupils try to give responses to the teacher's questions as the reading continues.
Teacher brainstorm with pupils to respond to a question like What are some of the uses of man-made Satellite at home, health, telecommunication, weather etc. from	14 minutes	Pupils respond to the questions as their names were mentioned.

the textbooks? Teacher then used an improvised satellite dish to demonstrate how satellite work and function linking with television and radio receptions at home.	13 minutes	Pupils observed as the teacher conduct the demonstration.

Closure of Lesson

10:19am - 10:21am (3 minutes)

Teacher used oral questions to go over the lesson which brought the lesson to an end at 10:21am as the teacher received a message from a colleague's teacher that there was a visitor waiting for her at the Staff Common Room.

Researchers Observations

Lesson was started on time but ended earlier than scheduled thus losing 4 minutes of the instructional time assigned for science lesson. The teacher was doing everything in class leaving the pupils passively not involved in the lesson.

The syllabus suggestions on intended method again were not followed in addition to the lesson plan structured by the teacher for the topic. The teaching methods lay down by the syllabus for this topic which is Discussion, Activity, Demonstration, Problem solving, and Experimentation and also

video show on Satellites usage were not followed as the teacher made use of questions, reading and lecture method in delivering the lesson.

Basic stage 4 Teacher's Lesson Plan

This is how the teacher has structured the lesson on respiration

Introduction:	5 minutes
Development of lesson:	40 minutes
Closure:	15 minutes

BASIC STAGE 5 CLASSROOM OBSVERVATIONS

Observation One

Preamble:

District: Cape Coast

School: Ola Presby Basic School

Class Observed: Basic Stage Five

Topic: Mixtures

Date: 26th May, 2011.

SECTION A:

1. Time lesson started: 11:18am
2. Time lesson was to start: 11:15am
3. Duration of lesson as started in lesson Plan: 60 minutes
4. Actual time of the lesson: 11:18am-12.05pm

SECTION B:

Introduction of lesson 11:18am-11:20am (2 minutes)

Because the teacher had to gather the necessary needed materials for the lesson from the head teacher's office, the lesson started exactly 11:18am instead of 11:15am as stated on the time table. At exactly 11:18am, the teacher asked the pupils to open their textbook to a said page whiles she used questions to review their previous knowledge on mixtures which took roughly 2 minutes.

Development of lesson 11:20 am-11:48 am (25 minutes)

What the teacher did	Duration	What the pupils did
Teacher displayed the TLM's on the	16	Pupils identify the various

table whiles pupils were called to identify them as the teacher lift them up in the air and then demonstrated how to make a mixture using gari and sugar.	minutes	TLM's as the teacher raised them up. Pupils observed as the teacher put the two items together and stir to form a mixture
Teacher then mentioned the various types of mixtures and explained how those to make the mentioned mixtures one by one herself.	9 minutes	Pupils passively sat down and observed as the teacher uses lecture method and explanation to describe the various kinds of mixture
Teacher mentioned a page to the pupils and she read from the textbook as the pupils look into their textbooks.	3 minutes	Pupils only looked into their textbooks as the teacher reads on.

Closure of Lesson

11:48am-12:05 pm (27 minutes)

Teacher uses oral question to go over the lesson and again asked the pupils to take their class exercise books and responds to the questions she was writing on the board pupils responded to the questions as the lesson come to end.

Researcher's observations

The lesson was to start at 11:15am but instead it's started around 11:18am thus loss 3 minutes of the instructional time trying to gather. TLM's for the lesson which should have been ready even before the lesson start.

The teacher did everything herself without engaging the learners in the teaching and learning process. The learners should be have been given the opportunity of demonstrating some of the activities (like the various kinds of mixtures).

The teaching methods lay down by the syllabus for this topic which are Discussion, Activity, Demonstration, Problem solving, and Experimentation were not followed as the teacher made use of questions, reading and lecture method in delivering the lesson.

The class should have ended at 12:15pm but ended at 12.05pm thus another 10 minutes lost for unknown reason. In all, the lesson should have taken 60 minutes but because some were lost the lesson took only 47 minutes thus losing 13 minutes.

Observation Two

Preamble:

District: Cape Coast

School: Ola Presby Basic School

Class Observed: Basic Stage Five

Topic: Methods for separating mixtures

Date: 26th May, 2011.

SECTION A:

1. Time lesson started: 9:15am

2. Time lesson was to start: 9:15am
3. Duration of lesson as stated in lesson plan: 60 minutes
4. Actual time of the lesson: 9:15am-10:10am

SECTION B

Introduction of lesson (2 minutes)

At exactly 9:15am, the teacher introduced the lesson with questions to review the learners' previous knowledge on the definition and the various kinds of mixtures which the pupils gladly responded taking 5 minutes (9:15am-9:17am).

Development of lesson 9:17am-10.05am (48 minutes)

What the teacher did	Duration	What the pupils did
Teacher wrote down the various methods of mixtures on the board and asked pupils to copy into their notebooks.	6 minutes	Pupils copy the note into their note books.
Teacher use lecture method to explain the various kinds of methods for separating mixtures.	11 minutes	Pupils passively pay attention to the teacher as he lectures them.
Teacher then poured sand and iron fillings into a bowl and stir to form a mixture solid-solid mixture) and then used a magnet in picking out the iron filling from	10 minutes	Pupils looked on as the teacher demonstrate the separating of solid-solid mixture involving iron fillings and sand using a magnet with

the bowl leaving the sand. Teacher then gave out practical activities to be performed in groups on forms of mixtures.	21 minutes	amazement. Pupils in groups performed the practical activities assigned them.

Closure of Lesson

10.05am - 10:07am

The teacher used oral questions to go over the main lesson on various kinds of methods for separating mixtures and asked pupils to go and read on the other methods which were not discussed in class because of time factor taken 2 minutes (10:05am-10:07am).

Researchers Observations

The science class was to start at 9:15am which was perfectly executed thus no time was lost, but the lesson should have ended at 10:15am but ended exactly 10:07am thus losing 3 minutes of the instructional time because the teacher felt she has finished for the day. The teacher was not following the lesson plan she prepared for the lesson. The lay down methods in the syllabus for this topic was not used and thus the lesson becoming a teacher centre lesson.

The teaching methods lay down by the syllabus for this topic which are Discussion, Activity, Demonstration, Problem solving, and Experimentation

were not followed as the teacher made use of questions, reading and lecture method in delivering the lesson.

Observation Three

Preamble:

District: Cape Coast

School: Ola Presby Basic School

Class Observed: Basic Stage Five

Topic: Uses of mixtures and in everyday life

Date: 30th May, 2011.

SECTION A:

1. Time lesson started: 11:25am
2. Time lesson was to start: 11:25am
3. Duration of lesson as started in lesson plan: 60 minutes
4. Actual time of the lesson: 11:25am-12:00noon

SECTION B

Introduction of lesson (2 minutes)

The teacher introduced the lesson by using questions to review the pupils' previous knowledge, on the methods of mixtures, and the various kinds of methods for separating mixtures which took 2 minutes (11:25am-11:27am).

Lesson Development

11:27am-11:55am (28 minutes)

What the teacher did	Duration	What the pupils did

Teacher asked pupils to open their science textbook and look through as she read from the textbooks to them.	11 minutes	Pupils looked into their books as the teacher read from the textbook on the uses of mixtures in everyday life.
Teacher continues reading from the textbooks and asking one/two questions based on what she was reading.	12 minutes	Pupils try to give responses to the teacher's questions as the reading continues.
Teacher then held discussions with pupils to respond to items like the uses of mixtures in their homes and communities.	15 minutes	Pupils respond to the questions as their names were mentioned.

Closure 11:55am - 12noon

The Teacher had to attend natures call as her stomach was upsetting her, thus asking a colleague to take over and continue discussion with the pupils on what they were discussing earlier on.

Researchers Observations

Lesson was started on time but ended earlier than scheduled thus losing 25 minutes of the instructional time assigned for science lesson. The teacher was doing everything in class leaving the pupils passively not involved in the lesson.

The syllabus suggestions on intended method again were not followed in addition to the lesson plan structured by the teacher for the topic. The

teaching methods lay down by the syllabus for this topic which are Discussion, Activity, Demonstration, Problem solving, and Experimentation were not followed as the teacher made use of questions, reading and lecture method in delivering the lesson.

Observation Four

Preamble

District: Cape Coast

School: St. John Anglican School

Class Observed: Basic Stage Five

Topic: Magnetism

Date: 18th May, 2011

SECTION A

1. Time lesson started: 11:36am
2. Time lesson was to start: 11:30am
3. Duration of lesson as stated in lesson plan: 60 minutes
4. Actual time of the lesson: 11:30am-12:24pm

SECTION B

Introduction of lesson

Class was to start at 11:30am, but because the teacher was having a meeting with the headmistress at her office he came in at exactly 11:35am and asked the class prefect to share their exercise and textbooks. And at 11:36am, the teacher wrote the topic of the lesson on the board and used the doors of freezers, and what cobblers have been using to hold unto nails and pins to introduce the lesson which took 3 minutes (11:36am-11:39am).

Lesson Development

11:39am-12:29pm (50 minutes)

What the teacher did	Duration	What the pupils did
Teacher explained the concept magnetism to pupils using lecture methods and then passed round some magnet which were of the following shapes; a bar magnet, horse-she magnet and round bar magnet for pupils to observe.	12 minutes	Pupils listened as the teacher explain the concept of magnetism. Pupils observed the various magnet shaped bars as they moved round from desks to the other
Teacher then collected the magnets from the pupils and explained their characteristics using lecture method. Again teacher gave out some iron fillings, magnets and plain sheet of paper for pupils to use to perform a practical activity on magnetic field lines around a magnet.	15 minutes 9 minutes	Pupils listened to the teacher as he explains the various characteristics of a magnet. Pupils performed the practical activity as the teacher goes round to observe their activities.
Teacher then led the class to discuss the	13	Pupils responded by

various uses of magnets using their science textbooks.	minutes	sharing their views on the various uses of a magnet.

Closure

Teachers called out two pupils to give some of the characteristics and uses of magnets which ended the lesson with a promise of performing demonstration the following time they have science which took just a minutes (12:29pm -12:30pm).

Researchers Observations

The lesson started late at 11:36am instead of 11:30am thus losing 6 minutes to a minutes the teacher had with the head of the school. In all the lesson was to use 60 minutes but instead the teacher used 54 minutes since some of the instructional time for the lesson was lost.

The syllabus suggestions on intended method again were not followed in addition to the lesson plan structured by the teacher for the topic. The teaching methods lay down by the syllabus for this topic which are Discussion, Activity, Demonstration, Problem solving, and Experimentation were not followed as the teacher made use of questions, reading and lecture method in delivering the lesson.

Observation Five

Preamble

District: Cape Coast

School: St. John Anglican School

Class Observed: Basic Stage Five

Topic: Magnetic and Non-Magnetic Materials

Date: 23rd May, 2011

SECTION A:

1. Time lesson started: 8.29am
2. Time lesson was to start: 8.25am
3. Duration of lesson as stated in lesson plan: 60 minutes
4. Actual time of the lesson: 8:29am - 9:25am

SECTION B

Introduction of lesson

Teacher reviewed the previous knowledge of the pupils through questions on the uses of magnets at home and in their community which took 3 minutes. The lesson should have started at exactly 8.25am but because the teachers had a short meeting after the morning assembly the lesson started at exactly 8:29am after the teacher has taken the role.

Lesson Development

8.32am-9:00am (24 minutes)

What the teacher did	Duration	What the pupils did
The teacher through discussions asked pupils to mention items which can be attracted by magnets and items which cannot be attracted by magnets.	12 minutes	Pupils gave both correct and guessing responses to the teacher's questions.
Teacher displayed both magnetic and non-magnetic materials mixed together on a table and asked pupils to sought	12 minutes	Pupils tried grouping the various materials into magnetic and

them out into magnetic and non-magnetic materials as he raised them up in the air.		non-magnetic materials.
Teacher wrote notes on the board for pupils to copy into their notebooks.	8 minutes	Pupils' copy teacher's note on the board into their notebooks

Closure of Lesson

9:00am-9:25am (25 minutes)

Teacher asked the pupils to open their science textbooks to a mentioned page and respond to the questions in the side page on magnet in their exercise books using the time left.

Researchers Observations

The lesson was purely teacher centered as the teacher was doing everything whiles the pupils were passive.

The lesson was to start at 8.25am but because of the short emergency teacher meeting, the science lesson started at 8:29am thus taking away 4 minutes of the instructional time and again the instructional time. Thus a lesson that should have taken 60 minutes, took only 56 minutes reduced by 4 minutes.

The syllabus suggestions again were not followed as the teacher made use lecture, brainstorming and question in teaching neglecting demonstration and activity method.

Observation Six

Preamble

District: Cape Coast

School: St. John Anglican School

Class Observed: Basic Stage Five

Topic: Change of State of Matter

Date: 25th May, 2011

SECTION A

1. Time lesson started: 11:30am
2. Time lesson was to start: 11:30am
3. Duration of lesson as stated in lesson plan: 60 minutes
4. Actual time of the lesson: 11:30am - 12.30pm

SECTION B

Introduction of lesson

11:30am -11:32am (2 minutes)

At exactly 11.30am the teacher wrote the topic change of state of matter on the board and through questions guided pupils to mention some of the items that they see in the classroom and outside the outside the classroom to introduce the lesson which took 6 minutes (11.30am-11.32am) as each pupil in class wanted to be heard by the teacher.

Lesson Presentation

11:36am-12:25pm (39 minutes)

What the teacher did	Duration	What the pupils did
Teacher listed the state of matter and their definitions on	13 minutes	Pupils passively listened to the teacher as she explained and

the board and later asked them to copy into their notebooks.		contributed mentioning the various examples of the types of matter.
Teacher asked pupils to open their textbooks to a mentioned page as she read out loud to them on the state of matter. Teacher then lead a discussion with pupils on the examples of the various state of matter listed on the board.	13 minutes 18 minutes	Pupils looked into their textbooks as the teacher reads out. Pupils hold discussion with the teacher.

Closure

12:15pm -12.30pm (15 minutes)

The teacher summarized the lesson using oral questions and then led the pupils to pack the various TLM's used for the science lesson and gave them class exercise to be done in class.

Researchers Observations

There wasn't any time lost since the lesson started on exact time and ended as scheduled. The lesson was also teacher centered as the teacher was seen almost virtually doing everything in class

The lesson was too theoretical since there wasn't any practical activities even though the syllabus made mentioned of the teacher making use of Guided Discovery Method, Discussion method, Activity method,

Demonstration method, Experimentation, and Brainstorming. The teacher made use of reading from textbook, questions and discussion.

BASIC STAGE 6 CLASSROOM OBSVERVATIONS

Observation One

Preamble

District:	Cape Coast
School:	OLA Presby Basic School
Class Observed:	Basic Stage Six (6)
Date:	13th May, 2011
Topic:	Food Preservation

SECTION A

1. Time lesson started: 8:32am
2. Time lesson was to start: 8:15am
3. Duration of lesson as stated in lesson plan: 1 hour (60 minutes)
4. Actual time of the lesson: 8:32am-9:05am

SECTION B

Introduction of Lesson (2 minutes)

The science class was to star exactly 8:15am according to their time table pasted on the wall in the classroom, but because of morning devotion (assembly) the pupils come into class at 8:28am and got sited around 8:30am whiles the teacher was with other colleagues teachers given punishment to some of the pupils who come late to school. At 8:31am the teacher came in and instructed the class prefect to share the science textbooks.

At exactly 8:32am the teacher wrote the topic preservation of food on the board and used questions and brainstorming to reviews the pupils'

previous knowledge which took another 2 two minutes that is from 3:32am-8:34am.

Development of Lesson 8:34am-9:02am (28minutes)

What the teacher did	Duration	What the pupils did
Teacher use questions to brainstorm for pupils to come out with responds to questions like; 1. What do you understanding by term food preservation? 2. What are some of the foods that are processed for preservation in you community?	8 minutes	Pupils responded by guessing answers to the teacher's questions like, food preservation is when food is stored at home especially in the kitchen and also food preservation is the process f storing food. But for the second questions the pupils were able to list quiet a number of foods that are processed for preservation in their community as Cassava, maize, corn, pepper, etc.
Teacher used lecture to mention the various methods of food preservation as freezing, steaming, drying, refrigeration, vacuum packing, salting, smoking sugaring, pickling,	18 minutes	Pupil just sat quietly and passively listened to the information given by the teacher.

canning and bottling etc after explaining to them food preservation as the process of treating and handling food to stop and also to slow down spoilage and thus allow for longer storage at home especially.		
Teacher then asked pupils to open their integrated science textbook to a mentioned page which she also wrote on the board.	1 minute	Pupils opened their textbooks and observe the information in the said page for few seconds before mentioned named pupil started reading from the textbooks whiles the remaining pupils looked into their textbooks.
The teacher then asked one pupil by name to read out loud the page mentioned for the whole class to follow on food preservation	8 minutes	Pupils opened their textbooks and observe the information in the said page for few seconds before mentioned named pupil started reading from the textbooks whiles the remaining pupils looked into their textbooks.

Closure (3 Minutes) 9:02am-9:05am

Teacher asked few questions like what is the meaning of food preservation, and how many methods of food preservation do we have in and which of these methods are common in our community to summaries the lesson.

Researcher's Observations

The lesson was to start at 8:15am but the lesson started at 8:32am thus losing 17 minutes of the science instructional time to morning assembly and punishing of late comers.

Again, I realized that the lesson started very, very late and ended earlier than scheduled. Also the lesson was to end at 9:15am but ended earlier and thus 10 minutes lost. It can be concluded that the teacher used only 3minutes instead of 60 minutes which has been allocated for the science subject as scheduled thus 27 minutes lost on this particular day.

Again, I realized that the teacher was not following the lesson note she had prepared for this topic and on this day. Since the time budget and time allocated for the teaching was not in line with the lesson plan in the lesson notes.

The teaching method mostly used in the teaching and learning process were reading, lecture, questions, and discussion whiles the syllabus made mention of Discussion, Activity, Experimentation and Demonstration method.

Observation Two

Preamble:

District:	Cape Coast
School:	OLA Presby Basic School
Class Observed:	Basic Stage Six (6)

Date: 27th May, 2011

Topic: Food Preservation – Freezing Method

SECTION A

1. Time lesson started: 8:30am
2. Time lesson was to start: 8:15am
3. Duration of lesson as stated in lesson plan: 1hour
4. Actual time of the lesson: 8:30am-9:05am

SECTION B

Introduction of lesson (3 minutes)

Class was to start at 8:15am but because of morning assembly which ended at 8:23 am, pupils went to their classrooms at 8:26am and got sited whiles the class teacher was outside chatting with another colleague teacher. After 2 minutes that is 8:28am the teacher came in and took attendance and talked with some pupils.

At exactly 8:30am the teacher introduced the lesson topic freezing after reviewing the pupils' knowledge on definition of food preservation, methods of food preservation which took three minutes.

Development of lesson 8:33am – 8:50am (17 minutes)

What the teacher did	Duration	What the pupils did
Teacher used questions and discussion to guide pupils to respond to items like; a. What is freezing as a method of food preservation?	6 minutes	Pupils responded by giving guessing answers to the teachers question like freezing is when food is put in deep freezer to chill.

b. List foods that can be frozen at home.		
Teacher used lecture to mention and explain the kinds of frozen food.	10 minutes	Put sat quietly and passively listening to the teacher.
Teacher asked pupils to open their integrated science textbook to a mentioned page and observe food that can be preserved using freezing method. Teacher asked one pupil to read out loud from the mentioned page.	3 minutes	Pupils opened their textbooks and observe the various food items listed in the mentioned page Pupil read from the textbook whiles the rest looked into their textbooks.

Closure 8:50am – 9:15am (25 minutes)

Teacher asked the class prefect to distribute pupils' class exercise books for them to use to copy and respond to exercises on the lesson which was written on the board.

Researchers Observations

The lesson was to start at 8:15am but because of the morning assembly the lesson started at 8:30am thus losing 15 minutes of the science instructional

time to morning assembly. Again, It can be concluded based on the observation that the teacher used only 45 minutes instead of 60 minutes which has been allocated for the science subject as scheduled thus 15 minutes lost on this particular day.

Again, I realized that the teacher was not following the lesson note she had prepared for this topic and on this day since the time budget and time allocated for the teaching was not in line with the lesson plan in the lesson notes.

The teaching method mostly used in the teaching and learning process were reading, lecture, questions, and discussion whiles the syllabus made mention of Discussion, Activity, Experimentation and Demonstration method.

Observation Three

Preamble:

District:	Cape Coast
School:	OLA Presby Basic School
Class Observed:	Basic Stage Six (6)
Date:	9th June, 2011
Topic:	Food Poisoning

SECTION A

1. Time lesson started: 12noon
2. Time lesson was to started: 12noon
3. Duration of lesson as stated in lesson plan: 60 minutes
4. Actual time of the lesson: 12 noon -12:55pm
   (55 minutes)

SECTION B

Introduction of lesson

12 noon - 12:05pm (5 minutes)

At exactly 12 noon on Thursday, the teacher asked a pupil to share the integrated science textbook for basic stage 6 pupils which took minutes. After which the teacher ask the pupils questions why their parents normally heat left over stews, foods, soup etc and also at times put them in freezers to review their previous knowledge.

Lesson Presentation (Development of lesson)

12:05pm-12:50pm (45 minutes)

What the teacher did	Duration	What the pupils did
Through discussion the teacher engaged the learners on the meaning of food poisoning, and the various causes that can bring about food poisoning at home and school.	8 minutes	Pupils responded to the teachers items by giving responses like; Food poisoning is when food is poisoned, and also Food poisoning is when the food becomes a deadly food to be consumed. For the causes of Food poisoning pupil discussed extensively with the teacher and they came out with useful in formations.
Pupils were put into groups using the rows by the teachers to discuss the effects of food	25 minutes	Put sat in the groups and discussed to come out with the various effects of food poisoning whiles

poisoning on humans after given them thorough rules on discussion method. After the instructions and whiles the pupils were in their groups the teacher was seen moving from group to the other and at times making contributions.		one pupil in each group was made to write their discussion on a sheet of paper to be discussed after the discussion at the group level.
Teacher called each group to come and do group presentation and advising the other groups to pay attention whiles one group was doing presentation and ask questions later. After the presentation the teacher summaries the whole group work and ask pupils to move back to their seat.	5 minutes	Pupils come in groups to do the group presentation after which they were questioned and queried from the other groups.

Closure of Lesson 12:50pm-12:56pm (10 minutes)

Teacher through oral questions summarized the lesson and asked them go and write a story on food poisoning as their home work to be submitted the following day.

Researchers Observation

The lesson started on time but ended earlier than scheduled compare with the time table and also the teaching method mostly used in the teaching and learning process were reading, lecture, questions, and discussion whiles the syllabus made mention of Discussion, Activity, Experimentation and Demonstration method.

Out of the 60 minutes allocated for the lesson, 4 minutes was lost because the lesson needed earlier. Again the teacher was not following the lesson notes she prepared herself.

Again, I realized that the teacher was not following the lesson note she had prepared for this topic and on this day. Since the time budget and time allocated for the teaching was not in line with the lesson plan in the lesson notes. The teaching method mostly used in the teaching and learning process were reading, lecture, questions, and discussion whiles the syllabus made mention of Discussion, and Demonstration method.

Observation Four

Preamble:

District:	Cape Coast
School:	St. Johns Anglican School
Class Observed:	Basic Stage Six (6)
Date:	13th June, 2011
Topic:	Respiration

SECTION A

1. Time lesson started: 9:25am
2. Time lesson was to start: 9:25am

3. Duration of lesson as stated in lesson: 60 minutes
4. Actual time of the lesson: 9:25am-10:25am

SECTION B

Introduction of lesson (6 minutes)

The science lesson started at exactly 9:25am with the teacher asking the pupils to hold their noses gently for about 5 minutes without breathing which the pupils find it's difficult in fulfilling this task. The teacher lead them to discuss the reason man needs to breath from time to time to introduce the lesson which took 6 minutes (9:25am-9:30am).

Development of lesson 9:30am-10:09am (39minutes)

What the teacher did	Duration	What the pupils did
Through brainstorming teachers asked pupils following questions ; 1. What do you understand by the term respiration 2. What is breathing The teacher then explains the two terms that is respiration and breathing to the pupils.	17 minutes	Pupils responded by guessing answers to the teachers question like respiration is when you breath, or when you take in air. And to the term breathing some of the pupils' responded breathing is when the Chest move up and down once you takes in air or breath. Pupils sat down passively whiles the teacher lecture them.

Teacher then asked the pupils to open their textbook to a mentioned page to read on respiration for one pupil to read.	9 minutes	Pupils opened their textbooks while a pupil read from the page with the rest pupils looking into their books
Teacher again pointed to another page in the textbook and asked another pupils to read on the importance of respiration to humans	13 minutes	One pupil read from the page whiles the rest of the class sat down looking into their books.

Closure of Lesson

10:09am-10:25am (16 minutes)

Teacher used oral question to go over the lesson and then asked pupils to draw the respiratory system of human drawn in their textbooks into their exercise books to be marked which ended the lesson.

Researcher's Observations

The integrated science lesson for this day started on time as expected on the timetable at 9:25am and ended as scheduled on again on the time table.

The teaching method mostly used in the teaching and learning process were reading, lecture, questions, and discussion whiles the syllabus made mention of Discussion, Activity, Experimentation and Demonstration method.

Observation Five

Preamble:

District: Cape Coast

School: St. Johns Anglican School

Class Observed: Basic Stage Six (6)

Topic: Heat

Date: 14th June, 2011

SECTION A

1. Time lesson started: 10:30am
2. Time lesson was to start: 10:30
3. Duration of lesson as started in lesson Plan: 60 minutes
4. Actual time of the lesson: 10:30am - 11:40am

Introduction of Lesson

10:30am – 10:32am (2 minutes)

At exactly 10:30am the teacher wrote the topic "heat" on the board and asked the pupils to open their textbooks to a mentioned page to read on heat to get an idea of the heat concept. This took two minutes as the pupils were looking into their books and reading silently on heat. After few questions on heating of food, cooking of food and putting on of clothes by the teacher the new topic "heat" which was on the board was introduced as the topic to be considered.

Development of lesson 44 minutes (10:32 -11:16am)

What the teacher did	Duration	What the pupils did
Teacher asked the class prefect to give out their science textbook for the pupils to read on heat and	9 minutes	Pupil read from their science textbook on heat silently. Pupils responded by giving

through questions the, teacher asked pupils to explain heat as in book after given them time to read from their textbooks'.		exactly what is in the book.
Teacher this time lead pupils to discuss on some of the common sources of heat in their community. Teacher then demonstrated how heat can be generated using the various TLM'S which were brought into the class.	20 minutes	Pupils gladly responded with every body trying to shout out some of the sources of heart. Pupils observed as the teacher demonstrate.
Teacher again used discussion method for pupils to come out with the various effects of heat in their daily life. And afterward dictated small notes for them to copy into their notes books.	15 minutes	Pupils gladly again responded by giving out some of the effects heat has an object in our daily life lie changing the shape of objects, causing object to melt etc..

Closure of Lesson

11:16am - 11:30am

The teacher did not summarize the lesson but straight away asked the class prefect with two other pupils to share their class exercise books to

respond to questions using the 14 minutes left which she wrote on the board which took of the instructional time.

Researchers Observations

The science class for today started on time as scheduled on the time table and ended as on the time table. The teaching method mostly used in the teaching and learning process were reading, lecture, questions, and discussion whiles the syllabus made mention of Discussion, Activity, Experimentation and Demonstration method.

Observation Six

Preamble:

Topic: Electrical Circuit

Date: 20th June, 2011

District: Cape Coast

School: St. Johns Anglican School

Class Observed: Basic Stage Six (6)

SECTION A:

1. Time lesson started: 9:25am
2. Time lesson was to start: 9:25am
3. Duration of lesson as started in lesson plan: 60minutes
4. Actual time of the lesson: 9:25-10:04am

SECTION B

Introduction of lesson

9:25am - 9:27am (2 minutes)

Class started at exactly 9.25am as on the time table with the teacher using the wirings and bulb connections in addition to the switch in the classroom to link their previous knowledge with the new topic which took only 2 minutes of the instructional time.

Development of lesson 9:27am-10:04am (37 minutes)

What the teacher did	Duration	What the pupils did
Teacher displayed items for connecting electric circuit on a table and asked the pupils to come in rows to observe the displayed items.	9 minutes	Pupils moved in groups to observe the displayed items on the table.
Teacher then picked the items displayed on the table after each row has had the opportunity of observing them displayed and explained their functions to the pupils using lecture method.	12 minutes	Pupils sat passively and quietly listening to the teacher as she explained to them the various functions of the items displayed. That is the components of simple Electrical Circuit.
Teacher again using discussion guided pupils to mention some conductors and non-conductors. (Insulators) in their community after explaining what conductor and insulators are	6 minutes	Pupils responded with some guessing and some too giving correct examples of conductors and non-conductors (Insulators).

Teacher then asked one pupil to read from their science textbook on electric Circuit from a mentioned page.	10 minutes	The pupil whose name was mentioned stood up and read from their science textbook as the rest looked attentively into their books.

Closure of Lesson

There wasn't any closure as the lesson ended with another colleague teacher coming in to call the teacher whose was teaching outside only to come in after the period was over. The pupils were left looking into their textbooks as the teacher left without any explanation or exercise for the pupils to do.

Researcher's Observations

Even though the lesson started on time it's ended abruptly earlier than scheduled thus losing 20 minutes of the instructional time for the science lesson since the teacher left to have some conversation with a colleague teacher In all the lesson should have taken 60 minutes, but for going out to chats with a colleague teacher, the lesson lost 20 minutes thus only 40 minutes was used for the lesson.

The teaching method mostly used in the teaching and learning process were reading, lecture, questions, and discussion whiles the syllabus made mention of Discussion, Activity, Experimentation and Demonstration method.

Basic Stage Six Teachers' Lesson Plan

Introduction: 5 minutes

Development of lesson: 50 minutes

Closure: 5 minutes