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FACULTY OF SCIENCE EDUCATION

DEPARTMENT OF SCIENCE EDUCATION

AN INVESTIGATION INTO FACTORS THAT MILITATE AGAINST TEACHING AND
LEARNING OF INTEGRATED SCIENCE AT THE JUNIOR HIGH SCHOOL LEVEL.

A SURVEY OF TEN (10) SELECTED SCHOOLS IN THE JUABOSO DISTRICT OF THE
WESTERN REGION OF GHANA.



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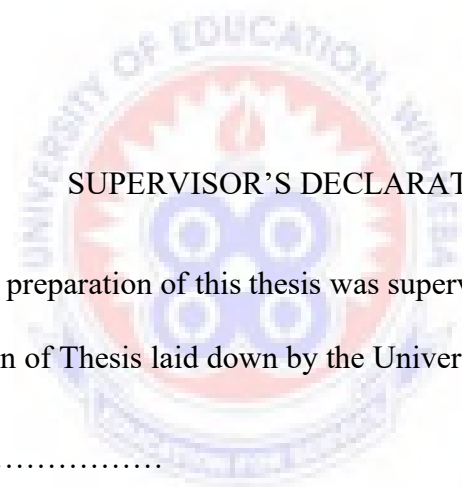
CANDIDATE'S DECLARATION

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

Signature.....

GEORGE BAIDOO

Date.....



SUPERVISOR'S DECLARATION

I hereby declare that the preparation of this thesis was supervised in accordance with the guidelines on supervision of Thesis laid down by the University of Education, Winneba.

Signature.....

DR K.D. TAALE

Date.....

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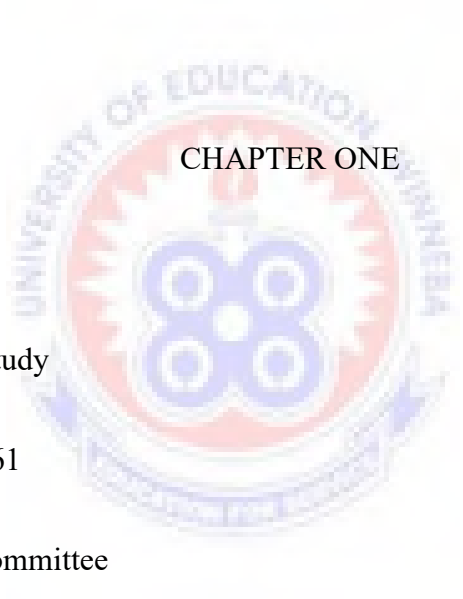
Additionally, I would like to thank the typists who worked delightedly towards the success of this research work. Many thanks to each of them for a job well done.

DEDICATION

This thesis is dedicated first of all to the Lord Jesus Christ and then to my beloved family; Mrs Kate Aduhene, Kofi Andam Baidoo, Nana Addae Baidoo and Yaw Addae Baidoo.



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ABSTRACT

The study was conducted to investigate the factors that affect the effective teaching and learning of integrated science at the Junior High School level in Juaboso district. The study stemmed from the Researcher's involvement in teaching integrated science, conduct, supervision and marking of district mock examination in integrated science organized by Juaboso district education directorate.

A total of 240 out of 987 students from 10 selected junior high schools in the district were randomly selected for the study. In addition, 10 integrated science teachers were purposely selected, one from each of the 10 schools selected for the study.

A descriptive survey research design was used. This design was chosen because it follows various means of obtaining the perceptions of both students and teachers which have to be compared and contrasted.

The main instrument used for the collection of data was questionnaire. This was followed by interviews with some of the students and the science teachers selected from each school which strengthened the validity of the results of the study. In order to validate the instrument and ensure that the results that would be obtained are reliable, the instrument was pilot tested and Cronback Alpha reliability co-efficient of 0.81 was obtained from the pilot tested results.

The following were the major findings of the study;

Most of the science teachers in Juaboso district are untrained with majority of them having their education up to the SHS level.

Most of the science teachers in the selected schools did not specialise in science during their education.

Due to the lack of teaching and learning materials in the schools, most of the science teachers resort to the use of lecture method in teaching at the expense of child-centred approach method. Hence, they fail to involve students in practical activities.

Majority of parents and students in the selected schools show negative attitude towards education in general and science education in particular.

The implications of the findings are that the future of science education in Juaboso district is very bleak and that measures should be taken immediately to curb the situation. The Ghana Government, Ghana Education Service, Juaboso district directorate of education, parents and students should all come together and find lasting solutions to all the problems that make teaching and learning of science difficult in Juaboso district.

CHAPTER ONE

INTRODUCTION

Overview

This chapter deals with the background information relevant to the study, statement of the problem and the purpose of the study. The research questions which this study addressed are also presented as well as the educational significance of the study. The chapter also includes limitations and delimitations of the study. This chapter ends with definition of terms or abbreviations.

1.0 BACKGROUND OF THE STUDY

Education, according to Bishop (1985), is the process which entails an awakening of curiosity, the development of proper interests, attitudes and values, and the building up of such essential skills as independent study and the capacity to think and judge for oneself.

For Aristotle (384-322BC), education is the process by which a sound mind is created in a sound body. By this is meant that, education aims at equipping the individual mentally, physically and morally. It is also implied that through education, a person is gifted with a healthy mindset which contributes tremendously to building a sane personality. This assertion by Aristotle was supported by Confucius (478BC) when he stated that, education was

essentially the development of the whole man. Confucius' perspective was that education should or does have the capacity to equip the individual mentally, physically and socially. It is the means by which society equips each person to make contributions that improve both the individual and the society in which he/she lives. Thus, education is what each generation purposefully passes on to those who are to be its successors in order to prepare them to deal with another and their surroundings purposely. This aspect of education places more emphasis on the preservation and transmission of culture. This means that, education plays a significant role in the development of every country by providing the desired manpower needs for economic and socio-cultural development. Before any country could develop, there is the need to develop her human resources through purposeful and relevant education to enable her utilize all other resources fully. This is why it is very important to have quality education in our country, Ghana.

Ever since Ghana became independent, its educational system had undergone series of changes to reflect the needs and demands of the society. It has been argued that the type of education bequeathed to Ghanaians by the colonial masters had many loop holes which hindered development. As a result, several attempts have been made to make education relevant to the needs of the society. It was realised that, the type of education inherited was too bookish, with parallel programmes which were too long to complete, limited to only few Ghanaians and also made school leavers too dependent. Scholars have recorded that, those few

who had access to formal education, many could not continue from the first cycle to second cycle; partly due to the selective mechanism put in place and partly because only few secondary schools were available.

Antwi (1992), stated that between 1970 and 1973, only 14% of the 64 cohort who benefited from primary and middle school education could proceed further to second cycle and for those in secondary institutions, only 0.8% entered tertiary institutions annually. The initial attempt to make formal education more accessible to many children of school going age led to the implementation of Education Act of 1961, but unfortunately it did not see the light of the day.

1.1 EDUCATION ACT OF 1961

The Act declared education to be compulsory. It divided the public system into stages, namely Primary and Middle education, followed by Secondary education. According to section 2 of the Act, “Every Child who has attained the School going age as determined by the Minister shall attend a course of instruction as laid down by the Minister in a School recognised for the purpose by the Minister”. In defiance of the Law, a parent was expected to be fined up to £ 10. However, this Education Act did not see the light of the day as said earlier.

The Dzobo Review committee of 1974 was brought into being to remedy the situation. The review committee of 1974 introduced the concept of “comprehensive” Junior secondary schools to teach academic and practical skills to all pupils. This system of education operated in the country until 1981 when a new system of education was put in place. The aim of this new system of education was to diversify the structure and content of elementary and secondary school education to make it more cost effective and also combine practical and academic work; as a way of making school graduates productive. The system brought into

being the Experimental Junior secondary schools which was three years after primary school and then three years in Senior Secondary School. With this system, the duration of formal education of the pre – university level was cut down from 17 to 14 years. Many Junior Secondary Schools were opened in the districts but unfortunately the programme did not gain much root. Among the reasons for the failure were that, there was lack of co-ordination of government support and also parental anxiety about the future prospects of the programme. The failure necessitated a change in the system. Thus in September 1987, the New Educational Reforms was initiated by the Provisional National Defence Council (P.N.D.C) government. One of the objectives of the 1987 New Educational Reforms was to make formal education at the basic and secondary level more accessible, that is making every child of school going age get basic education and at least 50% of the Junior Secondary School leavers enter Senior Secondary Schools (SSS), and 25% to Tertiary Institutions. The system was also to improve the quality, efficiency and relevance of pre – university education by expanding the curriculum of both primary and J.S.S to provide for academic, cultural, technical, vocational and commercial subjects. The 1987 New Education Reforms, like the previous educational systems could not solve the educational needs of Ghanaians and this led to the formation of the education review committee in 2002.

1.2 THE 2002 REVIEW COMMITTEE

Studying the government White Paper on the report of the Education Reform review Committee (October, 2004), it was seen that, the then President of the Republic of Ghana, inaugurated a Committee on Review of Education Reforms in Ghana on 17th January 2002. The 29 – member committee comprised of knowledgeable Ghanaians drawn from a cross – section of stakeholders in the education sector. The then Vice Chancellor of the University of

Education, Winneba, chaired the committee. The committee was tasked to review the entire educational system in the Country with the view to making it more responsive to current challenges. Specifically, the committee was required to examine the structure of education and to discuss issues affecting the development and delivery of education, the constrained access to different levels of the educational ladder, Information and Communication Technology (ICT) and Distance Education, Professional development and the management and financing of education, in addition to other cross – cutting issues concerning the sector. The committee also examined the content to be given to the implementation of the constitutionally mandated principle of free Compulsory and Universal Basic Education (fCUBE). The findings and recommendations of this committee also led to the implementation of 2007 Educational Reforms.

However, none of the Reforms put in place has helped to improve the standard of education in the Juaboso District of the Western Region of Ghana. The standard of education in the District under study keeps on falling and falling and as at 2009, the situation became worse. This is because statistics from the District Education Directorate show that four Junior High Schools scored 0% in the Basic Education Certificate Examination (B.E.C. E). Over 1,387 students could not gain access to Senior High Schools which defeat the objectives of the 1987 and 2007 New Educational Reforms respectively. Hence the need to carry out a research to find out the factors affecting standard of education in general and as well as the study of science in particular in the Juaboso District.

Education wise, Juaboso district has ten (10) educational circuits managing 162 pre – schools, 121 primary schools, 63 Junior High Schools and a Senior High School which is situated at Juaboso the district capital as at September 2009. Apart from the Senior High School, all the

Basic schools are scattered all over the district with many of them inaccessible during most parts of the year. Indications from the district educational directorate are that, most of the communities prefer to put up cocoa sheds instead of classrooms. School fees are mostly not paid and pupils do not have the requisite basic school needs. There are many Basic schools in the district that need repairs but have been left unattended to. The furniture situation in the schools is very poor with at least 50% of the entire basic school children having no furniture. Information from the District Education Directorate shows that, as at December 2007, 3,041 seating places were needed for students at the J.H.S, 8,959 seating places for Primary School Pupils and 9,357 seating places for kindergarten pupils. These figures clearly show that some of the pupils do not have places to sit during class hours hence the poor performance and falling standard of education in the District. Statistics from the district education directorate also show that, trained teacher to untrained teacher ratio is 1: 3 respectively. As at December 2007, trained teachers in JHS were 122 whilst untrained teachers were 135, 161 trained teachers for Primary Schools and 484 untrained teachers for Primary Schools, and finally 2 trained teachers and 277 untrained teachers for the kindergarten division. Table 1 below gives the details;

Table 1: Trained teachers compared to untrained teachers as at December 2007.

School	No. of Trained Teachers	Untrained teachers
Junior High School	122	135
Primary Schools	161	484
Kindergarten	2	277
Total	285	896

Source: GES Directorate, Juaboso

There is inadequate posting of trained teachers in the district under study. Table 2 below shows data from the district education office about trained teachers who were posted to the district as well as those who went on transfer, study leave or took release from the district under study in the years specified;

Table 2: Trained teachers posted compared to train teachers on release/study leave.

Year	Number of trained teachers posted	Number of trained teachers released/study leave
2005	35	28
2006	35	30
2007	10	15
2008	13	18
2009	13	22

Source: GES Directorate Juaboso

As a result of the poor support by the local communities to their teachers, most of the trained teachers take releases to other districts after serving for a maximum of three years. Data at the District Education office also indicate that, in 1998, 1999 and 2000, the following number of teachers took releases to other districts respectively 85, 77 and 62. Comparing the number of teachers posted into the district as well as the number of teachers released from the district from 2005 to 2009 shows that, 106 teachers were posted within the period whilst 113 teachers were released within the same period. This statistics show that the retention rate of teachers in the district is very low. Data from the district education directorate reveals that, about 20% of

the basic schools are headed by untrained teachers. The District Assembly has also failed to sponsor students to go to Colleges of Education to come and serve in the district after their study. This situation forced both the District Assembly and the District Education Directorate to employ 200 teachers in October 2006 under the National Youth Employment Programme. Information from the National Youth Employment Co-ordinator of Juaboso District shows that, all the 200 teachers employed were SSS graduates who could not pass all their subjects in the West African Senior Secondary Certificate Examination (WASSCE) and hence could not further their education. So the question to ask is: can these teachers teach effectively?

The above – mentioned problems coupled with others to be mentioned later in this research work had consistently led to very poor performance of candidates at the Basic Education Certificate Examination from 2000 to 2009 academic years. BECE performances especially by girls in the District have not been encouraging over the years. Information from the District Education Office indicates that, out of the 110 Districts that participated in BECE in the country, Juaboso District placed 99th and 86th in 2003 and 2004 respectively. In addition, the district placed 11th in 2003 and 2004 out of the 11 districts in the Western Region. The statistics are presented in table 3 below;

Table 3: Results of BECE of Juaboso District from the year 2000 - 2009

YEAR	NO. PRESENT AT EXAMS			NO. OBTAINED 6-30			NO. FAILED
	BOYS	GIRLS	TOTAL	BOYS	GIRLS	TOTAL	
2000	1,115	733	1,888	299	75	374	1514
2001	1,108	744	1,852	281	105	384	1468
2002	1,360	947	2,307	413	142	555	1752
2003	1,345	877	2,222	550	271	821	1401
2004	1,496	918	2,414	746	333	1,079	1335
2005	1,613	926	2,539	667	230	897	1642
2006	880	606	1,486	413	190	603	883
2007	918	592	1510	315	127	442	1068
2008	1149	749	1898	374	137	511	1387
2009	1173	824	1997	405	169	574	1423

Source: GES District Directorate, Juaboso.

With reference to the table, from the year 2000 to 2009 as many as 9995 candidates could not go beyond the Basic Education level in the district.

Ever since the computerised school selection and placement system (CSSPS) was introduced by the Ghana Education Service (GES) in the year 2005, most of the candidates who have been writing the BECE in the district understudy could not gain access to SHS of their choice because they either failed one, two, three, or all the four core subjects which a candidate has to pass before he/she could be placed in a SHS of his or her choice. The core subjects are English Language, Mathematics, Science and Social Studies. Table 4 below gives the details:

Table 4: Number of candidates placed compared to number of candidates not placed under the CSSPS in Juaboso District from 2005 - 2009

YEAR	NO. OF CANDIDATES PLACED	NO. OF CANDIDATES NOT PLACED
2005	824	1715
2006	684	802
2007	290	1220
2008	365	1533
2009	442	1555

Source: GES District Directorate, Juaboso

The gloomy picture of basic education in the Juaboso District could be reversed if valuable contributions could be provided by the various stakeholders in the form of school

infrastructure, support for teachers, provision of teaching and learning materials and textbooks. Many of the problems of the basic schools are left in the hands of the teachers and the district assembly to handle. Most of the communities still feel that it is the duty of the central government alone to provide the needed inputs to their schools. This idea should be discarded and all stakeholders should get involved. There is therefore the urgent need to revive all the stakeholders and support them to take ownership and responsibility for their schools. This will help to improve the standard of education in the district.

1.3 STATEMENT OF THE PROBLEM

The government and the Ghana Education Service have put in place a number of measures to improve the quality of education in the country. Millions of cedis have been pumped into the education sector to provide infrastructure, logistics such as teaching and learning materials, etc, to provide conducive environment for effective teaching and learning in order to promote good education in the country.

However, the quality of education in the Juaboso District leaves much to be desired. Most candidates at the Junior High School level graduate with limited knowledge in education as was portrayed in the results of the Basic Education Certificate Examinations (BECE) from the year 2000 up to 2009. Over 80% of the candidates who sat for the B. E.C.E within those years failed and therefore could not gain access to secondary education. These defeat the purpose of the New Educational Reforms put in place in 1987 as well as that of the year 2007. There is therefore the need to find solution to this problem. Hence, the need for this research.

1.4 PURPOSE OF THE STUDY

The broad purpose of the study was to bring to light the factors which militate against the teaching and learning of integrated science at the Junior High school level in the Juaboso District. Specifically, the study looked at the factors which affect the performance of students in science at the JHS level. Also the findings of this study were used to prescribe measures that could be taken by stakeholders in education in Juaboso district so as to find solutions to the falling standard of education in the district under study.

1.5 RESEARCH QUESTIONS

The following questions guided the conduct of the research.

- (1) What proportion of science teachers in Juaboso district is professionally trained?
- (2) What are the science teachers' areas of specialization?
- (3) What teaching methods are used by the teachers during science lessons?
- (4) How far have the selected schools been supplied with the necessary teaching and learning materials from the appropriate authorities?
- (5) What proportion of teachers take students through practical activities during lessons?
- (6) What is the attitude of parents in Juaboso district towards their children's education?
- (7) What is the attitude of students towards education in Juaboso District?
- (8) What proportion of science teachers in Juaboso district receives support from the communities in which they are teaching?

1.6 SIGNIFICANCE OF THE STUDY

The importance of this study cannot be over looked. The findings, recommendations and suggestions could be an important source of information to teachers in the schools in Juaboso District. The findings will also bring into light the role of stakeholders in education in Juaboso District so that whatever party is falling short will improve upon its performance.

1.7 LIMITATIONS TO THE STUDY

This research should have covered all the sixty three (63) JHS in the Juaboso District. However, financial constraints, time factor, proximity and accessibility, limited the study to only ten (10) JHS out of sixty three (63) JHS in the district. Also, for convenience sake the science teacher for each school selected was interviewed. Attention was not given to other teachers in the schools selected.

1.8 DELIMITATIONS OF THE STUDY

There are many factors that contribute to the fallen standard of Basic Education in the Juaboso District. However, the Researcher limited himself to the following major factors;

1. Inadequate supply of teachers, as well as the attitude of the few teachers available.
2. The attitude of students/pupils towards education.
3. The role of parents towards their wards' education, and
4. The role of District Assembly and the Ghana Education Service towards education in the Juaboso District.

1.9 DEFINITION OF TERMS/ABBREVIATIONS

B.E.C.E. - Basic Education Certificate Examination

C.S.S.P.S. - Computerised School Selection and Placement System

fCUBE. - free compulsory universal basic education.

G.E.S. - Ghana Education Service.

J.H.S. - Junior High School.

N.H.I.S.-National Health Insurance Scheme

P.N.D.C. - Provisional National Defence Council.

S.H.S. - Senior High School.

W.A.S.S.C.E. - West African Senior Secondary Certificate Examination.



CHAPTER TWO

LITERATURE REVIEW

OVERVIEW:

This chapter is devoted to the review of literature related to the study. The review of literature was done under the following headings:

- (1) The nature of science
- (2) Human Resource and classroom dynamics
- (3) Methods and strategies of teaching science
- (4) Presence of teaching and learning materials
- (5) The role of parents towards science education
- (6) The attitude of students towards science education
- (7) Profile of Juaboso District.

2.0 THE NATURE OF SCIENCE

Science covers the broad field of knowledge that deals with observed facts and the relationships among those facts. Marson (1998) sees science as a process of dynamic interaction of rational inquiry and active play. According to him, scientists probe, poke, handle, observe, question, think up theories, test ideas, jump to conclusions, make mistakes, revise, synthesize, communicate, disagree and discover.

The Junior High School science is geared towards the acquisition of scientific attitudes such as open-mindedness, being critical in thought and observation, respect for other view points, curiosity, objective, free from superstition, honesty, use of systematic problem solving procedures, willingness to change ones views in the face of new evidence, belief that all scientific knowledge is tentative, seeking facts and avoiding exaggeration, etc.

Science has two structures: the conceptual structure and the methodological structure. The conceptual structure is also known as the product of science and consists of ideas, facts, theories, and hypothesis which scientists generate as they work (Gega, 1990). The methodological structure of science which is also known as the process of science is the method scientists use to collect data. This comprises experimentation, classification, observation, reporting, communication, plotting, etc. Irrespective of the level at which science teaching and learning occurs it should reflect the procedures scientists adopt in order to make discoveries. Scientific knowledge is proven knowledge (Chalmers, 1994). He continues by saying that, scientific theories are derived in some rigorous way from the facts of experience acquired by observation and experiment. Thus science is based on what we can see and hear and touch. For example, personal opinion or preferences and speculative imaginations have no place in science. Science is objective. Scientific knowledge is reliable knowledge because it is objectively proven knowledge.

Chalmers (1994) said, apparently it is a widely held belief that there is something special about science and its methods. He continues by saying there is an abundance of evidence from everyday life that science is held in high regard, in spite of some disenchantment with science because of consequences for which some hold it responsible, such as hydrogen bombs and pollution.

There are so many importance of science to life. Among some of them are: Modern Science and Technology have changed our lives in many dramatic ways. Air-planes, automobiles, communications, satellites, computers, plastics, and television are, only a few of the scientific and technological inventions that have transformed human life.

Research by nuclear physicists has led to the development of nuclear energy as a source of power. Agricultural output has soared as scientists have developed better varieties of plants and highly effective fertilizers. The development of antibiotics and other new drugs has helped control many infective diseases. Studies in anatomy and physiology have led to amazing new surgical techniques and to the invention of life saving machines that can do the work of such organs as the lungs, kidneys and heart.

2.1 HUMAN RESOURCE AND CLASSROOM DYNAMICS

Studies have revealed that, there is generally inadequate supply of professionally trained teachers at the Basic education level in Ghana as a whole and Juaboso District in particular. In the year 2008, the Ministry of Education, Youth and Sports publicly declared that, twenty five thousand teachers are needed to fill vacancies in the classrooms in the Ghana Education Service. Juaboso District is of no exception. There are not enough in the teaching service because very few are produced by the Teacher Training Institutions and also the few trained for the purpose of teaching either seek greener pastures and leave the country or leave the education sector for other sectors in the country.

The researcher's own personal observation confirms this. In the year 2005, he and four (4) other trained teachers from the University of Education, Winneba were posted to Juaboso Senior High School. Unfortunately, all the four teachers left for the cocoa industry because to

them that is where better conditions of service exist. To add more salt to injury, some of the teachers in the school also left for the cocoa industry and elsewhere. For example, the then Assistant Headmaster of the school, left to be the scheme manager for the National Health Insurance Scheme (N.H.I.S).

Kyei Baffour (1991) said that “various professions do often succeed in attracting the best of our trained science teachers who are either Diplomats or Graduates” (p.43). This is what is happening in Juaboso District. Information from the Juaboso District Directorate of Education indicates that, some of the Head teachers have left their schools to become District Officers (D.O) or Co-coordinators for some of the cocoa firms. As a result, there are some basic schools in the District understudy without head teachers; some are headed by newly trained teachers who are inexperienced to solve pertinent academic problems. Surprisingly, there are few primary schools which are headed by untrained teachers who are S.S.S. graduates. To make things worse, with the exception of two (2) out of one hundred and sixty two (162) pre-schools in the district understudy which are managed/headed by trained teachers, the remaining one hundred and sixty (160) pre-schools are managed/headed by untrained teachers. One can therefore imagine the type of academic foundation which is being given to pupils in the Juaboso District as far as the pre-schools are concerned. Information from the District Education Directorate indicates that, there are some of the primary schools which have either one or two teachers teaching in such schools. Under such conditions, the teachers have no option than to combine some of the classes. The problem about the combination of classes is that which syllabus will be used in case Primary 1 and Primary 2 Pupils are combined? Statistics from the District Education Directorate shows that there are 121 primary schools in Juaboso District as at December 2008. To fill all these primary schools with teachers, a total

number of 841 teachers are needed. However, total number of teachers in the primary schools as at December 2008 was 655. Out of this number, 161 are trained whilst 484 are untrained. Subtracting this figure (655) from 841 gives 186. This implies that, as many as 186 teachers are needed to fill vacancies at the primary school level in the district understudy.

This situation is not different from the pre-schools as well as the JHS in the District understudy. In some of the Pre-schools visited by the researcher, it was observed that, some pre-schools have only one untrained teacher teaching over eighty (80) pupils. What effective teaching can such a teacher do? The true picture therefore is that, there is shortage of teachers at the basic education level in Juaboso district. This problem should be addressed.

In – service training is another aspect of human resource that must be looked at if learners are expected to perform creditably in the various subjects they are learning. Teachers need to update their knowledge in order to be abreast with current issues going on in the education sector.

Kyei Baffour (1991) stated that, since science is dynamic, there is the need to organize in – service training for science teachers from time to time to keep them abreast with changes in the knowledge of science. However, this is not the case in Juaboso District. In service training has completely eluded the teachers. In one of the researcher’s visit to some of the schools in the district understudy, he came across the head teacher of Seniagyakrom Primary school on the 14th of April 2009 and asked him; do you normally attend in – service training? “Ever since I was posted to this school, for the past two years, I have not heard anything of that sort”. The statement by this head teacher is not different from other schools visited by the researcher. If this situation will continue in Juaboso District, then the future of both teachers and learners

in the teaching and learning process will be in danger. The investigator's own personal experience as a teacher in Juaboso S. H. S confirms that, there has not been any in-service training organised for teachers in the Juaboso circuit of the Juaboso District for the past two years. Without in-service training for teachers, there would be no change in ineffective method of teaching styles; no new knowledge will be gained and this will affect the quality of education in Juaboso District.

2.2 METHODS AND STRATEGIES OF TEACHING SCIENCE

Nacino-Brown, Festus, and Desmond (1982) defined teaching as an attempt to help someone acquire, modify or change some skill, attitude, knowledge, ideal or appreciation. Teaching is an intentional act of offering valuable services that are believed to have the potential to bring about an improvement in the life situation of the taught. It is expected that such improvement would enable the taught become a more useful member of the community (Afful-Broni & Ziggah, 2007). The teachers' task is to create or influence desirable changes in behaviour or in tendencies towards behaviour in students or pupils.

As educators, we cannot speak of teaching having taken place if no adequate understanding also occurred. A major goal of the teacher, therefore, is to ensure that the students are to understand what is being taught. The importance of understanding in learning is that it arouses interest and facilitates retention. To ensure understanding of the learners, the topic of the lesson should be within the understanding of the learners and at the age level or psychological grasp of the students. Bruner (1973) contends that any subject matter can be taught to any child at any level. The key, though, is for the teacher to break down the contents into digestible portions for the students. Furthermore, the language level has to be appropriate to

the level of appreciation of the particular class, and questions should be asked in the course of the lesson to check the learners' understanding. Above all, the teacher should not accept chorus answers, but ask specific questions to illicit specific and appropriate answers from specific learners. Nothing should be taken for granted, since a good mark of good teaching is, among other things, the demonstration of interest in each student; the goal is that each one is able to understand what is taught.

For teaching to be effective, teachers ought to start from the:

Simple to the Complex

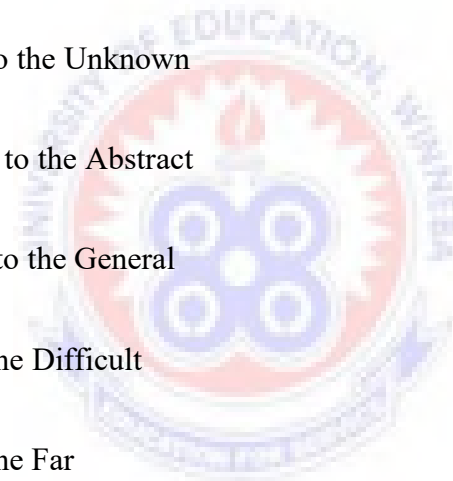
Known to the Unknown

Concrete to the Abstract

Specific to the General

Easy to the Difficult

Near to the Far



The above has been known by educators as a good principle of linking teaching to life. This principle clearly implies that the teacher must be one who is dedicated enough to love the students, and be passionate enough to follow the work up to ensure that during or by the end of a class or programme, learning would have taken place. Indeed, teaching is not simply about covering some laid down syllabus in a given time frame, but ensuring that learning which can be useful to one's present and future life has taken place.

At the basic level, it is recommended by experts that, the activity method of teaching should be used during instructional periods. The lecture method of teaching should not be encouraged at all and should be reduced to the barest minimum. Thus, the educators' function is not the pouring in from without or drilling some materials as into a hard and resistant rock. The educators' responsibility is to instigate learning. Therefore, the importance of the principle of self activity is to:

- a. Facilitate retention and mental growth
- b. Ensure better understanding
- c. Enable students to gain an added sense of achievement
- d. Arouse and sustain interest.

It is believed that in order to ensure the involvement of learners, there should be opportunities for discussions and of asking and answering questions. Notes writing instead of notes taking should be encouraged and practiced. Indeed, if self activity is enhanced by teachers, notes writing would be one of the obvious consequences, at least in the upper levels of the education ladder. Adequate written and expression of work must be enhanced and monitored. To ensure learners' involvement, the teacher should make use of activity methods, research in books, periodicals, debate, interviews, out-of-school visits and dramatisation/role playing. Observation and description of tangible features will also help to engage student attention in a lesson.

Marson (1998) has pointed out that science is a dynamic process, hence, learners are to be encouraged to think and act like scientists through approaches that cater for their individual differences. This implies that, science teachers should endeavour to adopt approaches that will

enable students to probe and question situations and be able to collect, classify and analyse simple scientific data. These activities in the long run, enable the students to discover facts and concepts for themselves.

However, for the students in the area under study, this appeared not to be the case. Due to lack of teaching and learning resources particularly science materials in the various Junior High Schools, the few science teachers available resort to the use of the lecture method of teaching during science lessons. Students are not taken through practical activities during science lessons. This situation the researcher found to be unfortunate.

Chayer (1975) points out that most often the way science is taught is misleading. Teachers lay emphasis on rote learning and acquisition of knowledge rather than developing a total child for the child to realise the relevance of what he/she learns in the immediate environment. If our students are to change their attitude towards the study of science, then teachers also need to change their way of teaching the science subject to make it attractive to students.

Bloom (1956) said that just as there is no single method through which new concepts are learnt, there is no single method of teaching which fits all learning situations. Science teachers should therefore use variety of ways during their lessons to enhance better understanding of the concepts they are teaching to students.

Yong (1986) emphasised that in science education the teacher should guide the students to find out information for themselves through activity rather than being fed with information. He went on to say when students are encouraged to do much of the talking and much of the activities during lessons they learn to be creative and inquisitive. Inquisitiveness leads to the

posing of problems and seeking solution to them. These processes help the students to use all their senses to learn.

2.3 PRESENCE OF TEACHING AND LEARNING MATERIALS

For us humans, the only significant means of reaching out to another human person or of receiving data from that other is through the senses. And our senses are best reached through the use of things that appeal to them most. It has been discovered that no human person has an endless stamina for receiving all that another may wish to convey without the assistance of some tools. Sometimes people tune off not too long after they start listening to others because the former may not be using the means that arouse their interest. Instructional materials have been known to help tremendously in effective teaching and learning. Yet, since it takes some amount of creativity (Titus, 1990) and expense to come up with the appropriate ones, some teachers avoid or limit their use. In place of appropriate instructional materials, some teachers engage in the production of endless amount of words to do what a simple picture or tool would have enabled them to accomplish more effectively. Teachers are more accused of “Over verbalisation”, that is, the excessive use of words to convey meanings in their teaching. There are great varieties of materials that can be used to make our meanings more vivid and more interesting. Cornelius (1852-1670), an advocate of this principle stated: “he who has seen a rhinoceros, even its picture can remember it more easily than if it had described to him about 600 times”. This principle is also in line with the Chinese proverb: I hear I forget, I see I remember, I do I understand.

Another major factor which affects the standard of education in Juaboso District is lack of facilities which include infrastructure and teaching and learning materials. Under this

category, consideration is given to physical structures like buildings, science workshops, store rooms, laboratory, essential equipment, furniture (tables, chairs, benches, cupboards etc), and other logistic such as textbooks, worksheets, charts, improvised materials apparatus (such as beakers, measuring cylinders, test tubes, pipettes, burettes) etc. Availability of these learning materials brings about effective teaching and learning. However, almost all of these facilities and teaching and learning materials are either in inadequate supply or completely lacking in most of the schools in the District under study.

Essah and Essampong (1996) noted that, after nine years of the implementation of the 1987 New Educational Reforms (NER), there are many schools without workshops and adequate apparatus as well as textbooks for pupils. There are some schools in the rural areas where pupils sit on the floor to write while others have classes under sheds and trees. Basic schools in Juaboso District are of no exception. Majority of the schools visited by the researcher showed that, almost all the Pre-schools did not have well constructed buildings for the children. Most of the classes for the pre-school pupils are held under trees, sheds and when it rains, they ran into the classrooms of the lower primary school pupils which stops teaching and learning in such cases. A lot of primary schools visited by the researcher had only three classrooms. In the whole of Juaboso District, there is not a single library for the pupils to visit. The researcher could not find a single community library in his visit to the schools, no science laboratory, and no workshop for the teaching of practical subjects like pre-technical and pre-vocational skills in the J. H. S. The only S. H. S. in Juaboso lacks library, science laboratory and even adequate classrooms. Statistics from the District Education Directorate indicates that, as at December 2007, the following seating places were needed from the pre –schools to the J.H.S. Pre-school- 9,357, primary levels – 8,959 J. H. S levels 3,041. These figures clearly

show that, most of the pupils do not have places to sit during classes' hours. All these factors have affected the standard of education in the District under study. Lack of teaching and learning materials in the various schools is of no exception. Some of the J. H. S. visited by the researcher could not boast of even a beaker let alone a measuring cylinder. The Head teacher of Benchema J. H. S when interviewed had this to say, "Ever since 1987 when some science equipment and materials as well as equipment for Technical Skills were brought we have not receive any teaching and learning materials of the sort. Hence we teach all the practical subjects in the classrooms without using any teaching learning materials. This saying by the Head teacher completely defeats the purpose of the 1987 and 2007 Educational Reforms which emphasise on teaching practical subjects using teaching and learning materials.

Woolnough (1991) underscored the importance of practical work in science and suggested that, science teaching and learning should be practical and must involve the use of scientific apparatus with learning ideally taking place in the science laboratory. In its real sense a room set aside solely for science teaching and learning could serve the purpose. If the view of Woolnough is anything to go by, then there is no effective teaching and learning of science and other practical subjects like pre technical and pre vocational skills in Juaboso District since almost all the schools lack laboratory or workshops. It was no wonder that in the year 2008, over one thousand J. H. S graduates could not get access into the S.H.S. of their choice or was not placed under the CSSPS because most of the students did not get a good grade in the General science subject.

Dinko (1998) observed that, to satisfy the demands of the JHS curriculum, it is evident that a lot of teaching materials will be needed. For example, teachers need recommended textbooks, reference materials, basic science equipment and chemicals to organize practical lessons

through which children are expected to develop process skills and scientific concepts. All these suggestions have eluded teachers and learners in Juaboso District. Provision of TLM is completely lacking and hence teachers find it very difficult to organise practical lessons for pupils.

2.4 THE ROLE OF PARENTS TOWARDS SCIENCE EDUCATION

Parents/guardians own it a responsibility to provide basic materials like (tables and chairs, exercise books, note books, school uniform, foot wear, etc.) and pay their wards school fees. They should also provide a conducive atmosphere in the home for pupils to learn after school and during vacations. However, the picture is quite different in some communities in the District under study. As of this 21st century, there are some pupils who walk barefooted to school simply because their parents have refused to purchase school footwear for them. Some of the pupils go to school without wearing school uniforms, no books etc. When some of these pupils were asked why they were not wearing footwear and school uniform, they answered by saying, their parents have refused to buy those items for them. Many of the parents in the District under study are simply not interested in the education of their children. Some of them claim that, they have seen many other children finish the JHS without getting any job or cannot continue. They possess no skills that can make them employable. They cannot even read or write, and are therefore of very little or no use to their illiterate parents, unlike the old times when a standard 7 school learner could read, write and interpret the parents letters and documents for them. The J.H.S graduates, the parent sometimes contend do not even want to join their parents to farm because they think they have some education, even though some of them cannot even write their names. They rather drift over to either Kumasi or Takoradi where they become street boys and sometimes get into trouble. So the parents feel that, if the children

do not go beyond the Primary School or drop out early, they are more likely to stay on in the village and get into some farming. They do not believe that education beyond Primary School can make their children better farmers. If you try to explain to them that the world is now more complex than during their times and that their children will need to have rudiments of reading and writing to be able to survive the complex world, they scoff at you. The frustration of the Head teacher of KAMA D/C J.H.S over the disinterestedness of both parents and children, was clearly evident when he told me (the researcher) that, 20 of the result slips of pupils from the 2008 examination (B.E.C.E.) up to date have not been collected by their parent or the pupils, an obvious indication that the results were not needed by them for any educational or other gainful purposes. A field survey conducted by Juaboso District Assembly in the year 2006 shows that, Agriculture employs 80.9% of the total labour force, Commerce is the second largest employer (9.3%), Industry (3.2%), Services (6.6%). The survey shows the importance of agriculture in the district economy. Cocoa farming dominates the farming activities. The survey shows that, most of the parents are farmers. As a result they give priority to farming activities at the expense of their children's education. Some of these parents instruct their wards to join them in the farm after school. When such pupils return from farm, they become so tired that they cannot study. During vacation the pupils are engaged in farming activities throughout without giving the opportunity to study at home. Some of the pupils are made to understand that farming brings a lot of income than anything else. This makes the pupils develop more interest in farming than going to school. Hence, the falling standard of education in Juaboso district.

2.5 THE ATTITUDE OF STUDENTS TOWARDS SCIENCE EDUCATION

The attitude of pupils and their socio-economic background has also affected the standard of Basic Education in Juaboso District. Most of the pupils do not have role models as far as education is concerned so as to emulate their life style. The 2000 National Population and Housing Census shows that, 43.4% of all Ghanaians of three years or above have never seen the inside of a classroom. 45.9% of the adult population of 15 years or more is totally illiterate. The figures for the Western Region are 40.0% and 45.6% respectfully. Even though these fall only slightly below the National Average, comparison with other regions per their population indicates that the Western Region, of which the Juaboso district forms part, has the sixth highest illiteracy rate in the country for both the 3 years and above and the adult population of 15 years and above. No matter how one looks at these figures, it gives a lot of cause for concern, and suggests that the region has a lot of work to do in general and Juaboso District in particular. The aim of any child at school is to make it to the highest possible level of their achievement or potential. In this country, there is clear evidence that the opportunity to make it to the highest level of attainment depends to a large considerable extent, not on the person's innate ability, but on the type of school that a person attends. The type of Primary/JHS that a child attends determines to a very large extent whether that child will make it to the Secondary School or any other second cycle institution, and the type of secondary school also, determines whether a child will make it to the tertiary level. The capacity of the children of the Western Region to make it all the way to the tertiary level will therefore depends upon the type of Basic and Senior High Schools that exist in the Region and other parts of the country. For graduation into Senior High Schools from the basic education level, the Ghana Education Service (GES) has indicated that the minimum qualification for entry is aggregate 30 at the

BECE and one must obtain at least grade five in all the four core subjects via English Language, Mathematics, Science and Social Studies. But with the limited number of Senior High Schools in the country compared with the number of candidates who take the BECE, it is a well known fact that only a fraction of the candidates actually make it to the SHS. Most of those who will make it to the SHS of any description will be those with aggregate 6 up to 15, with only those with aggregate 6 to 9 making it to the country's good SHS. Even though the official qualifying aggregate for the JHS to SHS is 30, including English Language, Mathematics, Science and Social Studies, with the limited number of schools countrywide, hardly anybody with an aggregate greater than 20 is likely to make it into any SHS of any description that will eventually enable the child progress any further up the educational ladder. No one makes it to the country's best 50 schools with an aggregate greater than 20. Over 80% of those entering these schools obtain aggregate 6.

Statistics from the Western Regional Educational Directorate shows that in 1999, of the 22,229 candidates presented by the region, only 624 obtained aggregate 6, constituting 2.8% of the total candidates. Of this number, as many as 568 or 90% of those with aggregate 6 came from Shama-Ahanta East and Wassa West Districts, indicating that Sekondi-Takoradi and Tarkwa, with a lion's share of good quality private and even public Junior High Schools, dominated in this category. In that year (1999), no candidate from the then Juaboso-Bia District obtained aggregate six. Another 1,958 obtained aggregate 7-15 constituting 8.8%. These two categories of candidates are those who were likely to make it into any reasonably good SHS from where they can eventually make it to the tertiary level. Even though the records of candidates who obtained aggregate 6-15 from Western Region in 1999 was not

encouraging that of Juaboso-Bia District was nothing to write home about. No candidate obtained aggregate 6. Only 13 candidates obtained aggregate 7-15.

The 2000 Population and Housing Census shows that, the Western Region is predominantly rural, with 668,836 (34.9%) urban and 1,247,912 (65.1%) classified as rural. Of the urban population, as many as 366,579 or 54.8% live in Shama-Ahanta East while 77,517 or 11.65% live in Wassa West, mostly Tarkwa, Aboso and Prestea. But these two Districts make up only 605,279 or 31.6% of the total population. Yet the two are producing over 90% of those BECE candidates who are likely to make it to the next level of the educational ladder. Juaboso District has the second largest population in the region, (245,035) with 231,184 being in rural areas. But this District has worst educational records in the region. None of its candidates for 1999, 2000 or 2001 obtained aggregate 6 in the BECE, and only 29%, 20%, 20.6% obtained the qualifying aggregate of 30 or better, with only 13, 4 and 20 candidates obtaining aggregate 15 or better in these years respectively. There is therefore certainly a gross rural-urban imbalance in educational opportunities in the region that need to be seriously addressed. I do not believe that all the pupils in Juaboso and the other rural areas are stupid while most of those in the urban areas are intelligent. Many researchers have demonstrated that ability and intelligence are evenly distributed in any society, and have nothing to do with achievement. What makes the difference is the opportunity to develop this ability and acquire a certain total body of knowledge to enable one to rise up the educational ladder. I believe that, merely giving children from the same background the chance to benefit from a better type of basic education significantly enhances their chances for educational and social advancement.

The attitude of pupils towards the learning of science in the district understudy is nothing to write home about. Pupils normally run away during science lessons.

Smith (1974) said that the pupil's attitude may be thought of as their consistent way of anticipating, evaluating and responding to people, events and objects. The pupil's attitude may be positive or negative. Pupils with positive attitudes proceed to study courses that are science based and pupils with wrong or negative attitudes detest anything that is science based.

The aforementioned problems coupled with some parents/guardians not showing interest in their children's education have demotivated most of the pupils. They therefore show lukewarm attitude towards education. Most of the pupils frequently absent themselves from classes. Others who even attend classes do not take their studies seriously. A lot of them have resorted to farming or engaged in petty trading for they know that after the BECE, one has to go back to the farm. All these factors have seriously affected the standard of Education in the District under study.

2.6 PROFILE OF JUABOSO DISTRICT

The Juaboso District, formerly called Juaboso Bia District was created out of the Sefwi Wiawso District in 1988. It is located at the North Western part of the Western Region of Ghana. The District shares boundaries with Bia, Asunafo North Districts in the North, Asunafo South and Sefwi Wiawso Districts to the East, Aowin Suaman District to the South and La Cote d'Ivoire to the West. The District capital is Juaboso and is located about 360km to the North West of Sekondi, the Regional Capital and a distance of 225km from Kumasi, the Ashanti Regional capital. The District has a surface area of 1,924 square kilometers and serves as entry / exit point between La Cote d'Ivoire and the Republic of Ghana. It forms part of Ghana's wet semi – equatorial climatic zone and it is characterized by two maxima rainfall regimes. The mean annual rainfall is between 1,250 mm and 2,000 mm and lasts for about

eight months in the year. This renders most roads in the district unmotorable in most part of the year.

The vegetation of the district is equatorial rain forest type with the semi – deciduous forest yielding various tree species including odum, wawa, mahogany, ofram, etc. About 27% of the total land surface in the district has been earmarked for forest reserves. There are two major reserves in the district namely: Bodi and Krokosue. The forest reserves enhance the district's ecosystem. Agriculture is the main stay of the economy employing about 80% of the population. The major cash and food crops grown are cocoa, coffee, oil palm, plantain, rice, maize, cassava, vegetables, etc. The availability of land, favourable climatic conditions, high soil fertility and flexible land tenure system places the district as an investment destination as far as agriculture is concerned. Economic activities reach its peak during the cocoa season. Massive inflows of cocoa funds bring a lot of economic activities. The population in the then Juaboso Bia District according to the 2,000 population and housing census is made up of 126,119 males and 118,916 females. The population in the district is multiethnic in character. They include the Sefwi's, the indigenous people (55.8%), the Brongs (12.2%), the Ashanti (11.4%), people of the Northern Ghanaian extraction (6.2%), Fanti's (2.4%) and others (12%). Apart from the Sefwi's, the other tribes are mainly settler farmers. The District also has very few social amenities and communication is very difficult. There are no telephone facilities and there is only one post office located at Juaboso. According to a survey conducted by the Juaboso Bia District Assembly in 1999, the literacy rate in the district was 63% with barely 20% going beyond basic education. As a result most of the School Management Committees and Parent Teacher Associations' executives do not have the requisite knowledge on educational issues and are therefore unable to contribute much to the development of their

schools. Education- wise, Juaboso district has ten (10) educational circuits managing 162 pre schools, 121 primary schools, 63 Junior High Schools and a Senior High School which is situated at Juaboso the district capital; Apart from the Senior High School, all the Basic schools are scattered all over the district with many of them inaccessible during most parts of the year.



CHAPTER THREE

METHODOLOGY

Overview

In this chapter, the research design of the study is described along with the details of procedures used to conduct the study. This requires participant selection, choice of instrument, and data collection and handling. The method of data analysis was also not left out.

3.1 Research Design

The objective of the research was to find out the factors affecting the standard of basic education as well as the factors that militate against teaching and learning of science in the Juaboso District. The research design for the study was based upon a survey method. This design was chosen because it allows various means of obtaining the perceptions of both pupils and teachers which have to be compared and contrasted. In addition, the choice of survey design was informed by the researcher's interest in determining commonalities or otherwise among the selected schools with respect to factors that militate against teaching and learning of science at the Basic Education level in the district under study.

Typically, surveys gather data at a particular point in time with the intention of describing the nature of existing conditions, or identifying standards against which existing conditions can be compared, or determining the relationships that exist between specific events (Louis & Lawrence, 1994). The survey is the only method through which the researcher can obtain the opinions, attitudes, and suggestions for improvement (Khan, 1990). As with other types of research; information obtained by a survey has limitations. Survey information reveals what

the situation is, and not what the situation should be. It cannot be used to secure all the information sometimes needed for decision making due to the use of limited sample and information obtained. Hence, it cannot be generalised.

3.2 POPULATION AND SAMPLING PROCEDURE

The target population of the study comprised all the 63 J.H.S. in the Juaboso District. These 63 schools are located within 10 educational circuits. All the 10 educational circuits were numbered. Five (5) of the 10 circuits were picked for the study using a table of random numbers. The selected circuits were Afere, Amoaya, Asempanaye, Proso and Juaboso. Within each circuit selected, all the names of the J.H.S were written on pieces of papers, folded and put into a container. Two schools were selected randomly from each of the five circuits selected. Hence, ten schools were selected from the 63 schools for the study. Furthermore, simple random method was used to select twenty four (24) students from each selected school, making a total of two hundred and forty (240) students for the study.

In addition, the science teacher for each school selected was purposely selected for the study. Hence, ten (10) science teachers were used, to bring the number of participants to two hundred and fifty (250) people to form the sample for the study.

3.3 INSTRUMENTATION

The main instrument employed for the collection of data was questionnaire. This was followed by some students' and teachers' interviews which strengthened the validity of the results of the study. In order to ensure content validity of the instrument, appropriate developmental processes were undertaken. The questionnaire items were given to the supervisor who

scrutinised them and made some corrections and additions to make them relevant to the research.

In order to validate the instrument and ensure that the results that would be obtained are reliable, the instrument was pilot tested. The questionnaire and interviews were conducted in two different Junior High Schools in the district which had characteristics similar to those in the sampled schools. Cronback's Alpha reliability coefficient of 0.92 was obtained from the pilot tested results. A typically reliability for a research designed instrument is approximately 0.7 or higher. For an instrument designed by a testing service one would expect a 0.90 or higher reliability coefficient (Sproul, 1998). Therefore, the questionnaire and interview items were considered to be reliable for the research purpose since the reliability coefficient was 0.92.

Steps taken to ensure content validity of the instrument itself started from the formulation of the research questions. This was done with the help of the supervisor of this study who examined the instrument vis-à-vis the research questions to make sure that it sampled the behaviours it was expected to measure. This was to help elicit the relevant facts from the respondents. Each item also had weight of the rating scale from one to five and the respondents were to tick the part that indicates their response to the corresponding question. If the respondent strongly agreed with the item statement, they were to make a tick under it, and if they agreed with a statement they were to make a tick under it. If they slightly agree to the statement they were to make a tick under it, if they disagree with a statement, they also tick under it and if they strongly disagree they were to tick under it.

3.4 DATA COLLECTION PROCEDURE

Before data was collected in the various schools selected, the researcher sought permission from the District Director of Education at Juaboso District. A letter was given by the Assistant Director in charge of supervision to be given to all Head teachers in the selected schools. The researcher personally visited these schools and informed the Head Teachers and his staff about the impending exercise. An agreeable date was fixed between the researcher and the school authorities. Data was then collected through the administration of the questionnaire to obtain information from the selected students in the school. An interview guide was also used to interview the science teacher of each school selected. In each school selected, the researcher distributed the questionnaire to the selected students. The instructions for a group of item in the questionnaire was read out and explained to students. All copies of the questionnaire were collected that same day. A face to face interview with the science teacher was also conducted after administering the questionnaire to students.

3.5 DATA ANALYSIS

The data collected through the administration of the questionnaire and interviews were first coded to enhance analysis. Frequency counts of the coded data were taken after which they were converted into percentages and used to answer the research questions. The rest of the data collected were subjected to narrative descriptions in answer to the various research questions.

CHAPTER FOUR

RESULTS / FINDINGS AND DISCUSSIONS

OVERVIEW

This chapter is devoted to the presentation and analyses of students' responses from the questionnaire followed by responses from the interviews granted to integrated science teachers from selected J.H.S in Juaboso district. The results from the analyses were used to answer the research questions. This was followed by thorough discussions on each of the results of the study one by one which enabled the researcher to obtain the major findings of the research.

4.1 ANALYSIS OF RESEARCH QUESTIONS

The following research questions were raised in the study:

Research question 1: What proportion of Integrated science teachers in Juaboso district are professionally trained?

This research question was answered using Table 4.1 below;

Table 4.1; Academic qualification of teachers

Responses	No of respondents	Percentage %
J.H.S.	—	0.00%
S.H.S.	7	70.0
TTC	3	30.0
Degree	—	0.0
Others	—	0.0
Total	10	100

Table 4.1 of the research has revealed that, not all the science teachers in the selected schools are professionally trained. Majority of them are untrained teachers. This could be deduced from the fact that, 7 respondents representing 70% have their educational level up to the SHS, whilst 3 of them representing 30% of respondents are from the Colleges of Education as shown in table 4.1 above. There was not any degree holder or its equivalent who happened to teach science among the teachers interviewed. This means that most of the science teachers in the selected schools have limited knowledge in the subject they teach. This has greatly affected the subject matter they deliver to students. This could probably explain why most of the BECE candidates who graduate could not gain access to Senior High Schools of their choice since they do not pass the science subject.

Major finding 1: About 70% of science teachers in the selected schools are not professionally trained, only 30% are professionally trained teachers.

Major finding 2; Most of the science teachers in the selected schools had their education up to the SHS level. This has affected the subject matter they teach students.

Research question 2: What are the science teachers' areas of specialization?

This research question was answered using Table 4.2 below;

Table 4.2: Teachers' area of specialization

Responses	No of respondents	Percentage %
Science	2	20
Agric Science	3	30
Home economics	1	10
General Arts	4	40
Total	10	100

From the analysis of the research, it is seen clearly that most of the teachers teaching science in the selected schools did not specialise in science or any of its main branches via Chemistry, Biology and Physics. This is because from Table 4.2 above, 2 respondents representing 20% said they specialised in science during their course of study. 3 respondents representing 30% of the science teachers said they specialised in Agric Science with the following combinations, General Agric, crop husbandry, Animal husbandry with Elective mathematics, 4 of the respondents representing 40% of the science teachers said they did General Arts with the following combinations, Geography, Economics, Government and English literature with

others doing Christian religious studies, 1 of the respondents representing 10% also said she specialised in Home Economics with the followings subjects, Food and nutrition, management in living, Economics and General knowledge in Art. Hence, from Table 4.2 it could be concluded that, 80% of the science teachers in the selected schools did not specialised in science. Only 20% of the teachers specialise in science. One can now understand why majority of BECE candidates from Juaboso district do not get placement under the computerised system of placement into S H S introduced by the Ghana Education service in the year 2006. This analyses show that, most of the teachers teaching science in the selected schools are not real science teachers but are teaching the subject because the real science teachers are not available in these schools.

Major finding 3: A vast amount of teachers teaching science in the selected schools did not specialised in science and therefore has limited knowledge in the subject.

Major finding 4: Teachers who specialised in science during their training are lacking in the selected schools for this study.

Research question 3: What teaching methods are most frequently used by the science teachers during science lessons?

This research question is answered by Tables 4.3 and 4.4 below;

Table 4.3: Teaching strategies used by science teachers.

Responses	No of respondents	Percentage %
Lecture method		70.0
Learner centred approach	1	10.0
Demonstration method	2	20
Others.	—	0.0
Total	N=10	100

From the analyses of the results, majority of the science teachers use the lecture method frequently in teaching science as shown in Table 4.3 above, thus, 7 of the respondents representing 70% of the teachers said they use the lecture method frequently, 2 of the respondents representing 20% said they use the demonstration method frequently whilst only 1 respondent representing 10% of the respondents said he uses the learner centred method frequently. No respondent said he uses any other method of teaching science apart from the three methods mentioned above. The learner-centred approach which is recommended for teaching science at the basic level has not been given the priority by most of these science teachers. This, the researcher sees to be very unfortunate on the part of the teachers. Science teaching at the Basic level should be made practical. Students should be involved in many activities in order to discover concepts for themselves with the teacher serving as a facilitator. Hence the learner centred method should be used frequently during science lessons. Table 4.4

below answers whether science teachers in the selected schools allow students to ask questions during lessons to clarify issues they do not understand during lessons or not.

Table 4.4; Students ask questions during science lessons

Responses	No of respondents	Percentage %
Strongly agree	09	3.8
Agree	12	5.0
Slightly agree	20	8.3
Disagree	96	40.0
Strongly disagree	103	42.9
Total	N=240	100

As shown in Table 4.4, only 9 of the respondents representing 3.8% strongly agreed to the statement that their science teacher allows them to ask questions during science lessons, 12 of the respondents representing 5.0% also agreed to the statement and 20 of the respondents representing 8.3% slightly agreed to the same statement. On the other hand, 96 of the respondents representing 40.0% totally disagreed to the statement whilst 103 of the respondents representing 42.9% strongly disagreed to the statement. From the analysis it could be deduced that majority of the science teachers in the selected schools do not allow students to ask questions during lessons. This has really affected the student's way of understanding

concepts taught in the subject. In addition, some of the teachers even go to the extend of using canes on students during science lessons. Table 4.5 below confirms this statement.

Table 4.5; Science teacher uses cane during lessons.

Responses	No of respondents	Percentage %
Strongly agree	104	43.3
Agree	76	31.7
Slightly agree	48	20.0
Disagree	10	4.2
Strongly disagree	02	0.8
Total	N=240	100

As indicated in Table 4.5, 104 of the respondents representing 43.3% strongly agreed that their science teacher uses cane regularly during science lessons, 76 of the respondents representing 31.7% also agreed to the same statement, 48 of the respondents representing 20.0% slightly agreed to the statement. However, 10 of the respondents representing 4.2% disagreed to the statement and 2 of the respondents representing 0.8% strongly disagreed to the statement. This indicates that, teachers in the selected schools cane students during lessons contrary to the rules laid down by the Ghana Education Service. If this situation is not checked, students in the selected schools will develop negative attitude towards the science lesson. Using canes during lessons case fear and panic in students and must be avoided during lessons.

Major finding 5: Majority of science teachers in the selected schools use the lecture method in teaching science with few teachers using the demonstration method.

Major finding 6: Only few of the science teachers use the child-centred method which is recommended to be used in teaching science at the basic level during their lessons.

Major finding 7: A large number of science teachers in the selected schools do not allow the students to ask questions during science lessons to clarify issues bordering their mind for better understanding of scientific concepts.

Major finding 8: Science teachers in the selected schools use canes on students during science lessons and this has affected the students' attitude towards the science subject.

Research question 4: How far have the selected schools been supplied with the necessary teaching and learning materials from the appropriate authorities?

This research question was answered using Tables 4.6 and 4.7 respectively.

Table 4.6: School has teaching and learning materials

Responses	No of respondents	Percentage %
Yes	1	10.0
No	9	90.0
Total	10	100

Statistics from Table 4.6 shows that, 1 respondent representing 10% indicated that the schools have enough materials for teaching and learning of science, 9 respondents representing 90% showed that there is lack of teaching and learning materials in the selected schools. These percentages indicate that, there is generally lack of teaching and learning materials in the selected schools. Lack of teaching and learning materials in the schools has affected the proper way of teaching science. One could now understand why most of the teachers in the selected schools use the lecture method for teaching the subject.

Table 4.7; School has enough materials for practical activities

Responses	No of respondents	Percentage %
Strongly agree	00	0%
Agree	00	0%
Slightly agree	15	6.3%
Disagree	100	41.7
Strongly disagree	125	52.0
Total	N=240	100

The results from Table 4.7 clearly shows that, there is lack of equipment and materials for teaching science in the selected schools. The schools do not have basic materials like beakers, test tubes, litmus papers, magnets, vacuum flasks, Fehling’s solutions, glucose, sucrose, droppers, basins, and benches for carrying out practical activities. This is because figures from Table 4.7 shows that, 100 of the respondents representing 41.7% disagreed that their schools

have enough materials and 125 respondents representing 52.0% strongly disagreed to the same statement, while 15 of the respondents representing 6.3% slightly agreed to the statement. However, none of the students either strongly agreed or agreed to the same statement.

Major finding 9: There is lack of teaching and learning materials for conducting practical activities during science lessons in the selected schools.

Major finding 10: Science teachers in the selected schools have failed to improvise materials to support the teaching and learning of science in the selected schools.

.Research question 5: What proportion of science teachers in the selected schools take students through practical activities during science lessons?

This research question was answered using Tables 4.8 and 4.9 respectively.

Table 4.8; Teacher involves students in practical activities.

Responses	No of respondents	Percentage %
Strongly agree	00	0.0
Agree	00	0.0
Slightly agree	12	5.0
Disagree	106	44.2
Strongly disagree	122	50.8
Total	N=240	100

Statistics from Table 4.8 indicates that, 122 of the respondents representing 50.8% strongly disagreed to the statement that their science teachers involve them in practical activities during science lessons, 106 respondents representing 44.2% also disagreed to the same statement, while 12 respondents representing 5.2% slightly agreed to the same statement. However, it was surprise to note that none of the respondents either agreed or strongly agreed to the same statement. This implies that, science teachers in the selected schools teach only the theory aspect of the science subject but neglect the practical aspects as spelt out in the JHS science syllabus

Table 4.9; Teachers conduct practical activities

Responses	No of respondents	Percentage %
Yes	1	10.0
No	9	90.0
Total	10	100

The findings of the research have revealed that, the teachers do not have teaching and learning materials and hence do not conduct practical activities during science lessons. As indicated in Table 4.9, 9 of the respondents representing 90% said they have not been taking students through practical activities during science lessons, 1 respondent representing 10% said he takes students through practical activities during science lessons. All these points go to support the fact that science teachers in the selected schools have not been taking students through practical activities during science lessons.

Major finding 11: Science teachers in the selected schools do not take students through practical activities during science lessons.

Major finding 12: Science is taught theoretically in the schools selected for the study contrary to what is spelt out in the JHS science syllabus.

Research question 6: What is the attitude of parents in Juaboso district towards their children's education?

Tables 4.10, 4.11 and 4.12 below answer this research question respectfully.

Table 4.10: Provision of educational materials

Responses	No. of respondents	Percentage (%)
Strongly agree	09	3.8
Agree	16	6.6
Slightly agree	42	17.5
Disagree	80	33.3
Strongly disagree	93	38.8
Total	N=240	100

As indicated in Table 4.10, 93 respondents representing 38.8% strongly disagreed to the statement that their parents provide them with basic educational materials, 80 respondents representing 33.3% disagreed to the same statement, 42 of the respondents representing 17.5%

also slightly agreed to the statement. On the contrary, 16 respondents representing 6.6% disagreed to the statement whilst 9 of the respondents representing 3.8% strongly disagreed to the same statement.

Table 4.11 below also presents teachers' view on the issue of whether parents provide educational materials for their children or not.

Table 4.11 Provision of educational materials for students

Responses	No of respondents	Percentage %
Yes	1	10.0
No	9	90.0
Total	10	100

Statistics from Table 4.11 shows that, 1 of the respondents representing 10% said that parents provide their children with basic educational materials. However, as many as 9 respondents representing 90% of the teachers who were interviewed said that parents do not provide basic educational materials for their children in school. All these factors put together show that most of the parents in Juaboso district show lukewarm attitude towards their children's education.

Table 4.12 below also presents issues on parents' attitude towards their children's education in Juaboso district. Some parents sometimes send their children to the farm without allowing them to go to school. They give priority to farming activities at the expense of their children's education. Table 4.12 gives the details;

Table 4.12; Students are sent to farm during school hours

Responses	No of respondents	Percentage %
Strongly agree	110	45.8
Agree	98	40.8
Slightly agree	15	6.3
Disagree	10	4.2
Strongly disagree	07	2.9
Total	N=240	100

Statistics from Table 4.12 indicates that, 110 respondents representing 45.8% of the participants strongly agreed to the statement that parents send their children to the farm during school hours, 98 respondents representing 40.8% also agreed to the same statement, 15 respondents representing 6.3% slightly agreed to the statement. However, 10 respondents representing 4.2% disagreed to the statement and 7 respondents representing 2.9% strongly disagreed to the same statement.

The findings of the research have revealed that, parents have not been giving the needed attention about education to their wards. Parents in Juaboso district gives priority to farming activities which is the main occupation of the people at the expense of their wards' education. They fail to provide basic educational materials which can help their wards to learn hard to achieve their aims.

Major findings 13: Majority of parents in Juaboso district are not serious about their children's education. They do not provide basic educational materials for their children.

Major finding 14: Most parents in Juaboso district send their children to the farm during classes' hours and this has affected the teaching and learning of science in the schools.

Research 7: What is the attitude of students towards education in Juaboso district?

This research question was answered using Tables 4.13 and 4.14 respectively.

Table 4.13; Students study on their own.

Responses	No of respondents	Percentage %
Strongly agree	10	4.2
Agree	06	2.5
Slightly agreed	20	8.3
Disagree	99	41.3
Strongly disagree	105	43.7
Total	N=240	100

Statistics from Table 4.13 show that, as many as 105 respondents representing 43.7% disagreed to the statement that those students study on their own. 99 respondents representing 41.3% disagreed to the same statement and 20 respondents representing 8.3% slightly agreed

to the statement. On the contrary, 6 respondents representing 2.5% agreed to the statement, whilst 10 respondents representing 4.2% strongly agreed to the same statement. From the analysis above, it is clearly seen that the students do not have the desire to study on their own and hence this could affect their way of learning science. Table 4.13 below presents teachers' view on the seriousness or otherwise of students towards their studies.

Table 4.14: Seriousness of students about their studies

Responses	No of respondents	Percentage %
Yes	1	10
No	9	90
Total	10	100

Results from Table 4.14 show that, 10% of the respondents believe that students are serious about their studies. However, 90% of the respondents said that students are not serious at all about their studies. This group of respondents went on further to say that most of the students absent themselves regularly from classes, fail to do assignment and class exercises, leave the classroom for farming activities and this has affected their performance in the science subject and other subjects they are studying.

Table 4.15 below also presents views of students on their intention to further their education after completion of their Junior High School level. Most of the respondents expressed their desire not to continue their education after the JHS level.

Table 4.15; Students' desire to further their education.

Responses	No of respondents	Percentage %
Strongly agree	18	7.5
Agree	30	12.5
Slightly agree	50	20.8
Disagree	70	29.2
Strongly disagree	72	30.0
Total	N=240	100

As indicated in Table 4.15, 7.5% and 12.5% of respondents strongly agreed and agreed respectively to the statement that they have the desire to further their education after the Junior High School level, with 20.8% slightly agreeing to the statement. However, 29.2% of the respondents disagreed with the same statement and 30.0% also strongly disagreed to the statement and hence, such students do not have the desire to further their education after the JHS level. If these percentages of students do not have the desire to further their education after the JHS level, they will definitely not be serious with their academic work.

Major finding 15: Most of the students in the selected schools do not take their studies serious.

Major finding 16: They give priority to farming activities at the expense of their education.

Major finding 17: Majority of students in the selected schools do not have the desire to further their education after the JHS level.

Research question 8: What proportion of science teachers in Juaboso district receive support from the communities in which they are teaching?

Table 4.16 below answers this research question.

Table 4.16: Support for teachers from communities

Responses	No of respondents	Percentage %
Yes	1	10.0
No	9	90.0
Total	10	100

The findings revealed that, teachers do not in any way get support from their communities. This is evidenced in Table 4.16 where 90% of the respondents said they do not get any support from the communities in which they are teaching. Only 10% of the respondents said that they get support from the communities in which they are teaching and is in the form of free accommodation only. Some of the teachers said that, some members of the community even involve them in some conflicts of which they are innocent. This makes some of their colleagues go on transfer to different schools.

Major findings 18: Teachers in the selected schools for this study do not get any support from the communities in which they are teaching apart from free accommodation few of them enjoy.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Overview

This chapter is devoted to summary of the research findings. This is followed by the conclusions that were drawn from the study based on the findings. The chapter ends with recommendations to the Ghana Education Service, parents, students and stakeholders in education particularly those in Juaboso district.

5.1 SUMMARY OF THE STUDY

This research was carryout to find out the factors that militate against teaching and learning of science at the Junior High School level in Juaboso district. This is because most of the Basic Education Certificate Examination (BECE) Candidates who graduate from the various JHS in the district could not gain access to secondary education because they do not pass the four core subjects particular integrated science. Questionnaire and interviews were the main instruments which were used to collect data for this research.

The data was collected from students of ten (10) Junior High Schools selected at random and questionnaire was given to them to test their level or ideas about what is happening in the teaching and learning of science in the various schools. In all twenty four students were randomly selected from each of the ten schools to answer the questionnaire, hence the questionnaire was administered to two hundred and forty (240) students.

An interview was conducted using seven students selected at random from each school. This was followed by an interview granted to only the science teacher of each selected school. The

selected schools were: Afere JHS A, Kotosa JHS, Kwasikrom JHS, Bokabo JHS, Mafia JHS, Breman JHS, Agyingo Preparatory JHS, Proso JHS, KEN'S School Complex, Juaboso JHS.

5.2 SUMMARY OF MAJOR FINDINGS

Major finding 1: About 70% of science teachers in the selected schools are not professionally trained; only 30% are professionally trained teachers.

Major finding 2: Most of the science teachers in the selected schools had their education up to the SHS level. This has affected the subject matter they teach to students.

Major finding 3: A vast amount of teachers teaching science in the selected schools did not specialise in science and therefore has limited knowledge in the subject.

Major finding 4: Teachers who specialised in science during their training are lacking in the schools selected for this study.

Major finding 5: Majority of science teachers in the selected schools use the lecture method in teaching science with few teachers using the demonstration method.

Major finding 6: Only few of the science teachers use the child-centred method which is recommended to be used in teaching science at the basic level during their lessons.

Major finding 7: A large number of science teachers in the selected schools do not allow the students to ask questions during science lessons to clarify issues bordering their minds.

Major finding 8: Science teachers in the selected schools use canes on students during science lessons and this has affected the students' attitude towards the science subject.

Major finding 9: There is lack of teaching and learning materials for conducting practical activities during science lessons in the selected schools.

Major finding 10: Science teachers in the selected schools have failed to improvise materials to support the teaching and learning of science in the selected schools.

Major finding 11: Science teachers in the selected schools do not take students through practical activities during science lessons.

Major finding 12: Science is taught theoretically in the schools selected for the study contrary to what is spelt out in the JHS science syllabus.

Major findings 13: Majority of parents in Juaboso district are not serious about their children's education. They do not provide basic educational materials for their children.

Major finding 14: Most parents in Juaboso district send their children to the farm during classes' hours and this has affected the teaching and learning of science in the schools.

Major finding 15: Most of the students in the selected schools do not take their studies serious.

Major finding 16: Students give priority to farming activities at the expense of their education.

Major finding 17: Majority of students in the selected schools do not have the desire to further their education after the JHS level.

Major findings 18: Teachers in the selected schools for this study do not get any support from the communities in which they are teaching apart from free accommodation few of them enjoy.

5.3 CONCLUSION

The items in the questionnaire and the interview guide were analysed using simple frequency tables and percentages. The following shows the conclusions drawn from the research.

The research has revealed that, majority of parents/guardians of Juaboso district are cocoa farmers and therefore give priority to farming activities at the expense of their children's education. This is true because most of them have failed to provide basic educational needs to their wards in school. It was also revealed that most of the science teachers are professionally untrained, a great deal of them also did not specialise in science and a lot of them have their education up to the Senior High School Level. In addition, most of the teachers use lecture method in teaching science at the basic level. Caning which is outlawed by the Ghana Education Service is also being used by teachers of Juaboso district. Students have negative attitudes towards education because they practice what their parents are doing (farming). Hence, they do not take their studies serious.

The findings of the research also revealed that teachers available in the district do not get any support from the communities in which they are teaching. Some community members even harass some of these teachers forcing them to take releases or go on transfer.

Finally, the district education directorate and the Western Regional Education directorate have both failed to organise in-service training for the teachers. Hence, the teachers are not able to update their knowledge.

5.4 RECOMMENDATIONS

In this twenty first century where Science and Technology is ruling the world, it will be prudent to give priority to science education more than any other business one is doing. Parents should therefore be encouraged to take education of their wards seriously for education is the only means through which they can have a successful life. This can be done by regular sensitisation of parents about the importance of education in the various communities in the Juaboso district.

Regular or periodic in-service training should be organised by the district education directorate of Juaboso for teachers to help them upgrade their methods of teaching particularly how to teach science using the learner-centred approach. Teachers should also be educated to desist from the use of canes during lessons. Circuit supervisors should also intensify their supervisory role in order to check teachers who regularly absent themselves from school and give them the necessary sanctions.

Juaboso District Assembly in collaboration with the District Education Directorate should help sponsor students who complete Senior High School successfully into the Colleges of Education so that they can come back to the district and serve their own people. This will help to solve the problem of inadequate supply of teachers in the district.

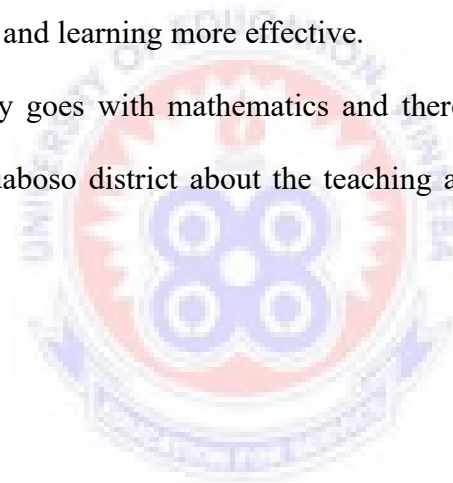
The Government and the Ghana Education Service should take it upon themselves to supply the schools with the necessary teaching and learning materials, particularly basic science materials so as to help the science teachers' carryout practical activities during science lessons.

Finally, there should be intensive education about the importance of education to students at the JHS level. All graduates from Juaboso district should take it upon themselves to form a

union with the sole reason of promoting education in Juaboso district. These people should visit the schools, talk to the students, compare the benefits of the subsistence farming their parents are doing to some lucrative jobs some of the graduates are doing. All these will go a long way to encourage the students to take their studies serious.

5.5 SUGGESTIONS FOR FURTHER RESEARCH

- 1) This study could be replicated in other districts in the country in order to find out the factors that militate against teaching and learning of science in the country as a whole.
- 2) Another study could be conducted to determine strategies teachers can adopt to make science teaching and learning more effective.
- 3) Science normally goes with mathematics and therefore a further research should be carried in the Juaboso district about the teaching and learning of mathematics at the JHS level.



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APPENDIX A

QUESTIONNAIRE FOR STUDENTS

Dear student, the researcher is conducting a study on the factors affecting students' performance in science at the Junior High School level in Juaboso district. The purpose of the questionnaire is strictly for research to find out your views on the factors affecting effective teaching and learning of science in the district. It would be greatly appreciated if you could respond to the statements below as friendly as possible. Your responses will be kept confidential. Thank you for being part of this research.

PART A: Background information of students

Please tick (✓) as is applicable to you.

1. Sex: Male Female
2. Age range: 11-12 13-14 15-16 Above 16
3. Are you a native of Juaboso district? Yes or No
4. Occupation of Guardian/Parent:
- Farming Teaching Trading Others

PART B

The following statements represent opinion on factors affecting effective teaching and learning of Science in Juaboso district. Your agreement or disagreement will be determined on

the basis of your particular convictions. Kindly tick (√) below the statement according to your level of agreement or disagreement with the statement.

STATEMENT	STRONGLY AGREE	AGREE	SLIGHTLY AGREE	DISAGREE	STRONGLY DISAGREE
1. My parents provide me with notebooks, exercise books and school uniform etc for my education					
2. My school has given me science textbook(s) to study					
3. I always understand what I am taught in science lessons					
4. My Science teacher uses came regularly during science lessons.					
5. My Science teacher allows me to ask questions during science lessons					
6. My school has teachers to teach all subjects.					
7. My school has enough materials for science practical activities.					

STATEMENT	STRONGLY AGREE	AGREE	SLIGHTLY AGREE	DISAGREE	STRONGLY DISAGREE
8. My science teacher involves us in practical activities during science lessons.					
9. My parents sometimes ask me to help them in the farm without going to school					
10. I have enough time to study after school and during weekends.					
11. I do study on my own after school and during vacation					
12. I have the desire to further my education after the JHS level					
13. Science as a subject is difficult for me to study					

APPENDIX B

STRUCTURED INTERVIEW GUIDE FOR SCIENCE TEACHERS.

1. Sex:
2. Academic qualification; J.H.S. S.H.S, TTC, Degree, Others, specify.
3. What is your area of specialization?
4. What teaching strategies/methods do you employ during your teaching?
(a) Lecture method b) Learner centred approach c) demonstration method, others,
5. Do you use teaching learning materials for your teaching?
YES OR NO If No, give reasons
6. Do you take students through practical activities as spelt out in the JHS science syllabus? If YES how often? If NO why?
7. Do you use local materials from the environment to supplement your teaching?
YES OR NO, If Yes how often?
8. Are your students serious about their studies?
YES OR NO, If YES OR NO, state how?
9. Do parents provide educational materials such as school uniform, school bags, exercise books, etc, for their wards? YES or NO, If NO, why?
10. Do you get any support from community in which are teaching?
YES OR NO, If YES specify
11. How often are in-service training organized for science teachers in your district or region? a) Once a term b) Once a year c) None