UNIVERSITY FOR DEVELOPMENT STUDIES, TAMALE

EXAMINING THE INFLUENCE OF INTERACTIVE METHOD OF TEACHING ON THE PERFORMANCE OF INTEGRATED SCIENCE TEACHERS AT THE EVANGELICAL PRESBYTERIAN BASIC SCHOOL AT SOGAKOFE

GOKA MANA AUGUSTINA

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TOPIC

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TERM PAPER SUBMITTED TO THE DEPARTMENT OF EDUCATIONAL FOUNDATIONS, FACULTY OF EDUCATION, UNIVERSITY FOR DEVELOPMENT STUDIES, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF EDUCATION DEGREE IN TRAINING AND DEVELOPMENT.

March, 2019

DECLARATION

Candidate's Declaration:

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

Candidates Name: Goka Mana Augustina

Signature: ……

Date: ……

SUPERVISOR'S DECLARATION

I declare that this Term Paper was supervised in accordance with the guidelines and supervision of Term Paper laid down by the University for Development Studies.

Supervisor's Name: REV. FR. DR. THOMAS ASANTE

Signature: ……..

Date: ……..

DEDICATION

This Term Paper is dedicated to my creator for how far he has brought me, and also to my family and friends for their love and support.

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This work has been possible due to the support from some prominent personalities that needs to be appreciated. The researcher wish to express her sincerest gratitude to her supervisor Rev. Fr. Dr. Thomas Asante of the Faculty of Education University for Development Studies whose guidance, advice and support made this term paper successful. The researcher wish to thank her family and friends especially Mr. John Amemakalor and Mr. and Mrs. Ametefe for their support. To the head teacher and staff of Evangelical Presbyterian Basic School Sogakofe, God bless you for your support.

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

This study is aimed at examining the influence of Interactive method of teaching on the performance of Science teachers at the Evangelical Presbyterian Basic School, Sogakofe. Fifty pupils were purposively sampled for the study. The nature of the study was conventional research. Nine Integrated Science teachers were selected for the research. Questionnaires were administered to respondents and data was collected. Descriptive statistics were used to analyze the data in terms of frequencies and charts. The findings of this research indicated that interactive methods of teaching positively influence the performance of teachers and also improves the performance of pupils in Integrated Science. Observation of pupils revealed that they were highly excited when lessons are made very interactive. It is recommended that teachers make their lessons more interactive rather than the usual lecture methods employed in teaching to help learners get the real concepts taught and also enhance quality teaching and learning outcomes

CHAPTER ONE

INTRODUCTION

Overview

This chapter of the research work deals with issues concerned with the Background of the study, Statement of the problem, Research aims and objectives, Research objectives, Research questions, Significance of the study and Organization of the study

1.0 BACKGROUND TO THE STUDY

The teaching and learning of science is to adequately equip students with the requisite knowledge and skills in order to understand science concepts. By definition, science is the knowledge acquired through observation, inquiry, experiment and evaluation of information gained. The knowledge of science is gained by continuous process of investigation and experimentation of problems and to project the understanding of the natural world. The influence and the impact that science has on the environment as well as life in general, lives a great task on the educational system of the country. It is in view of this that science was enshrined in the school curriculum right from the basic level up to the tertiary level of education to help expose all students to the basic facts and knowledge of science. The application of science ideas to practical situation in the areas of technology have grown significantly, hence the teaching of science at all levels of the educational ladders helps students acquire; scientific concepts and principles to solve problems on their own, skills in the manipulation of scientific apparatus equipment and materials, ability to interpret scientific information and findings in order to make inference, skills in handling and interacting with things in the environment and curious minds investigative attitudes towards the study of science as a whole (Blough & Schwartz, 1990). Ultimately, students understand and learn well by performing

activities in and out of the classroom, science students learn differently when they are exposed to different methods of teaching and learning such as observing what is being demonstrated, working in groups interacting with teaching aids and listening attentively to the teacher, thus, the teacher needs to design and look for appropriate practical works for students to exhibit their talents. Teachers often use teaching methods which cater for different learning styles to help students to retain information, or knowledge and also to strengthen their understanding. It is in the light of poor performance of pupils in science that Anderson and Helms (2001) and Hebert and Moore (2001) suggested that pupils at the basic level should be provided with experience to "learn science by doing". For effective teaching to take place good methods must be adopted by teachers to help students to see, touch and understand what is being taught. Both teachers and students need to work in collaboration to make teaching and learning very interesting and sustaining. This implies that students interaction and involvement in lessons are vital items in the transfer of knowledge from teacher to students these activities incorporated in lessons proved to be effective tools in an educational environment.

Science as a product in the use of scientific knowledge acquired through activities to produce something beneficial to life. Science as attitudes deals with certain basic characters and habits. All these are coined out of the fact that science is seen as a process product, and attitude. Science teaching follows a process approach which deals with observation, analysis, classification and drawing conclusion. All these and many more can be achieved by allowing students to perform more practical activities.

Promoting the learning of science in the country, various workshops and programs are organized to enhance effective teaching and learning of science such as the Unilever Ghana Limited Program, Science Technology and Mathematics Education (STME). The program is used to educate both boys and girls to undertake science projects and achievable goals in science.

The teacher facilitates students, helps them in the complicated process of knowledge acquisition and skills training, which requires a constructive teacher-student interaction and communication at empathy level. He is a mediator giving the educational content through the link between students and between students and the world around them, he must be both sympathetic and objective at the same time (Todorina, 2011).

Referring to human relations of life, the physics teacher must show humor, not only because it promotes friendly relations between teachers and students, but it creates a comfort and a positive mood for both current participants and constitute an attractive introduction to a difficult course on a complicated topic (Damodharan and Rengarajan, 2011).

The use of varying teaching methods in the teaching and learning process has being emphasized most especially in the sciences. Despite this noble course, some teachers still teach without using methods which will arouse the interest of learners. In view of this, the researcher seeks to examine the influence of interactive method of teaching on the performance of Integrated Science teachers. UNESCO (1995) defines science as an approach to the teaching of science in which concepts and principles are presented so as to express the fundamental unity of scientific thought stress on the distinction

between the various scientific fields. Science education is key in the development and technological advancement of every nation.

According to Onasanya and Omesewo (2011:68), The role of science in today's world, especially, with increasing rate of modernization and technological, Science is vital for the development of any country and so, it has become a fundamental tool for any economy which desires improvement in socio-economic spheres and general wellbeing of its people (Jegede, Awodun & Olusola, 2013). Jegede et al. (2013) described science and technology as a dominant culture factor in recent generation. The teaching and learning of science should be made very interactive so that the learner will be able to grasp the concept being delivered. The students gain teamwork skills, the teamwork is considered a standard in education (Todorina, 2011). In view of this assertion, the teaching and learning of Science at all levels must be interactive enough to arouse the interest of learners. This will set a firm foundation for the learners who wish to pursue the science subject further. After a critical look at the students notebooks and exercise books and through interaction with some of them, definition of formulas, concepts and calculations were some complaints they put across, the researcher also observed lack of interest in the subject when it is time for science period, some students dodge the class, and some pretend to fall sick but the same students become active after the period is over. Students' negative attitude towards homework, tests, class assignments and date of submitting homework for marking were also observed. In this regard, the study seeks to examine the influence of Interactive method of teaching on the performance of Integrated Science Teacher's in E. P Basic School Sogakofe.

1.1 STATEMENT OF THE PROBLEM

Over the years, personal interactions with some teachers and pupils have shown that pupil's performance in science at the B E C E has fallen with most learners getting grade five and below in the Sciences. Considering the Ghana Education System, the contact hours for integrated science is quite inadequate, so most teachers mostly use the lecture method in impacting knowledge, hence most pupils have shown little competency in mastering the application of concepts taught in the classroom. It is in the light of poor performance of pupils in science that Anderson and Helms (2001) and Huber and Moore (2001) suggested that pupils at the basic level should be provided with experience to "learn science by doing". The underlying question is can the use of interactive approach in science instruction influence pupil's performance positively in integrated science at the basic level? Not much effort is been made to avert the challenges being faced by these young and vibrant learners. In view of this, the study seeks to examine the influence of interactive method of teaching on the performance of Integrated Science teachers in Sogakofe Evangelical Presbyterian Basic School.

1.2 RESEARCH AIMS AND OBJECTIVES

The main aim of this study is to examine the influence of Interactive method on teaching and learning of Integrated Science in Schools.

1.2.1 OBJECTIVES OF THE STUDY

Main objectives

The main objective of the study is:

To investigate the effect of using inappropriate methods of teaching and learning Integrated Science.

Specific Objectives

Specific objectives of the study were to:

1. Identify the methods teachers use to teach Integrated Science at the Basic School level.
2. Find out the factors that affect the use of appropriate teaching and learning methods in Basic schools.
3. Assess the impact of using Interactive method of teaching and learning Integrated Science.

1.3 RESEARCH QUESTION

The following research questions guided the study:

Main research question

What are the effects of using inappropriate methods in teaching and learning integrated science?

Specific Research Questions

1. What teaching methods do teachers use in teaching and learning Integrated Science in Schools?
2. What are the factors that affect the use of appropriate teaching and learning methods?
3. What is the impact of using Interactive method in teaching and learning Integrated Science?

1.4 SIGNIFICANCE OF THE STUDY

Teachers: This study will help to create awareness to the teacher on the importance of using Interactive Method of teaching in the teaching and learning process.

Pupils: The study will improve upon the understanding of content and concepts in the study of Integrated Science.

District: With regards to the District Education Directorate, the results of the study will give them the exposure in the relevance of the subject teacher using Interactive method in the teaching and learning of Integrated Science.

Future researchers: The results of the study will serve as a guide for other researchers who would wish to research in this field.

1.5 ORGANIZATION OF THE STUDY

The study is organized in five chapters.

Chapter 1 consist of background, problem statement, research question, research objectives, significance of the study, scope and organization of the study. Chapter 2 deals with literature review. Chapter 3 deals with methodology. Chapter 4 deals with presentation, analysis and interpretation of findings. Chapter 5 deals with summary, conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

Overview

This section reviews some of the contributions, ideas and studies that have been undertaken by some earlier researchers and authors. The literature related to this study is reviewed under the following sub headings: Nature of science, Importance of Science, Theoretical and conceptual framework, Constructivist perspective of teaching and learning.

2.0 CONCEPTUAL ANALYSIS:

The researcher will review literature on the concept of Interactive method of teaching. Irrespective of the level at which science teaching and learning occurs, it should reflect the procedures scientists adopt in order to make discoveries. Apart from using approved approaches in their work scientists are also required to adopt certain dispositions in their work. The problem based learning is an interactive learning method widely used in mathematics and Science curriculum area (Sarivan et al., 2005). Conferring interactive nature of this method, the teacher teaches students to logically and analytically think. This can be done for example by summative questions, brainstorming or graphic organizer. The discussions between students and between students and teachers focused on students' questions about the phenomenon dealt with and the consultation of materials (lecture notes, publications, audio-video) or even the Internet, normally lead to a much broader problem understanding and much better results (Chen, 2003). Basic principles of total quality management (TQM) require that every action must be customer oriented (Paladini and De Carvalho, 2008).

2.2 ASPECTS OF THE PROBLEM UNDER INVESTIGATION:

Literature will be reviewed in the following areas: the nature of science, importance of Science, methods of teaching and learning, Interactive method of teaching and the impact of using Interactive method of teaching.

2.2.1 **Nature of Science**

The methodological structure of science which is also known as the process of science is the method scientists use to collect data. This method 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 apart from using approved approaches in their work scientists are also required to adopt certain dispositions in their work. These dispositions according to Eminah (2004) are known collectively as the scientific attitude and include the following attributes: open-mindedness, being critical in thought and observations, respect for other viewpoints, curiosity, objectives, freedom from superstition, belief in cause and effect relationship, honesty, use of systematic problem solving procedures, willingness to change one's views in the face of new evidence, suspended judgment, belief that all scientific knowledge is tentative, utilization of different instead of fixed problem-solving techniques, selection and use of recent and accurate material related to problems, seeking facts and avoiding exaggerations. (pp. 383-385)

Scientists who possess the above dispositions are expected to attack problems, even in unfamiliar areas, in the same way. The development of those

understandings, however, takes place within an individual's frame of reference. The value judgments, beliefs, perceptions and experiences that they bring to that process play an important role and, ultimately, science curriculum needs to consider students' worldviews (Liu & Lederman, 2007). This domain, from the six domains model, as emphasized in this paper illustrates the culmination of five areas of emphasis: concepts, processes, creativity, attitudes and applications and connections in a worldview context that examines the history, philosophy and sociology of science as a whole.

The development of the scientifically literate students and populations sought by the many present reform efforts necessitate curricular and pedagogical attention to this domain and therefore to the subset of epistemological understandings, Nature Of Science and Scientific inquiry. Existing research illustrates the critical importance of explicit, reflective instruction in the development of understanding about these constructs (Lederman, 2007). Until reforms and classrooms consistently reflect what we know to be needed, our ability as educators to influence the development of informed conceptions of nature of science and scientific inquiry and therefore scientific literacy will remain hampered.

Bell, R. (2008) assets that all scientific knowledge is subject to change in light of new evidence and new ways of thinking. That does not mean that we shouldn't have confidence in scientific knowledge rather that it may change in the future.

A handful of studies have examined science majors' NOS views in particular. Parker et al. (2008) blue right-pointing triangle explored the views of atmospheric science students and found evidence suggesting that students view;

1). Science as empirically based (with emphasis on proving, finding facts, or arriving at right or wrong answers),

2). Experiments as serving the role of testing or confirming scientific ideas,

3). A hierarchical relationship between laws and theories/

4). Creativity as an important aspect of science. Other studies of undergraduates within specific disciplines have revealed subtle differences in undergraduates' views of NOS that vary between disciplines.

Wong and Hodson (2009), reveals that inconsistencies between the views held by scientists and those articulated in the science studies literature. Most notably, they cite evidence that scientists, similar to high school and college students, also articulate a hierarchical relationship between laws and theories and in some contexts describe science as universal. Given that scientists' views impact the context into which undergraduate science majors are acculturated, it may not be surprising, after all, that science majors often hold naïve views of Nature of Science. Some have gone further to argue that because these “naïve” views have little impact on the day-to-day practices of scientists, perhaps the characterization of Nature of Science views as naïve and sophisticated deserves a re-examination altogether.

2.2.2 The Importance of Science

Science as described by Blough and Schwartz (1990) is essential to understand the world that we live in and it is about learning how to take care and protect the things in it. They also described science as the method of gathering knowledge through observation and recording the knowledge gathered by using them to find answers to questions that humans ask every day. It has been recognized globally that development and application of science and technology are vital for a country's economic development strategy and policy aimed at improving the living conditions of its people (Avoka, 2000). In general, science helps man to understand the natural environment by interacting with living organisms and also to help eradicate ignorance in the areas of superstition and other progress and development (Blough & Schwartz, 1990). Another aspect of science is that it helps people to develop the ability to operate simple appliances and gadgets that are commercially used in our everyday lives. It also helps people to acquire the spirit of science attitude and to promote our agriculture by developing early and high yielding varieties of crops (Quarm, 2001).

2.2.3 Methods of Teaching Science at the Basic Schools

There are many different ways teachers employ in presenting instructions to their pupils. Even though teachers adopt different styles in their presentation, they all strive to achieve the same results. Teaching methods thus refers to the manner in which a teacher effectively and efficiently interacts within the classroom environment to bring about quality learning of a subject matter among pupils. Woods (1995) identified two teaching styles such as: discipline -

centered or teacher - centered and pupil - centered which is also referred to the activity method.

2.2.3.1 **Teacher – Centered Approach**

This teaching method emphasizes more on the subject matter. The intention is just to teach the content base prescribed in the syllabus or textbook irrespective of whether it meets the needs of pupils or not. Erinosho (2008), proposed that the focus of this teaching style is the teacher, who acts as "the power house of knowledge" by passing on information to the passive pupils who merely regurgitate the content. The methods include lectures, demonstrations and illustrations. The discipline-centered style which is sometimes referred to as the Lecture Method is a theoretical approach and traditional technique which involves verbal delivering of a body of knowledge according to pre–planned scheme (Brown, Oke & Brown, 1982). It is again referred to as "textbook controlled lesson", because the teacher prepares and gives out information verbally to pupils without pupils' participation in the lesson. The pupils therefore listen, take down notes and memorize facts and concepts (Birke & Foster, 1993). This approach to science teaching makes pupils get bored during science lessons. Students also see scientific concepts as abstract and difficult (Reisman & Payne, 1987). According to Reisman and Payne (1987), most of the teachers who use lecture method are able to finish a lot of topics within the shortest possible time, but at the disadvantage of the learner. However, Brown *et al,* (1982), see lecture method as only preparing the learner to be a good listener, memorize facts and concepts. Wadsworth (1989) was with the view that people followed the theoretical approach due to limited knowledge of

science that the pupils possessed. In modern times, Wadsworth (1989) implied that science is seen more to be practically oriented or activity based. Students enjoy science lessons when they are involved in activities concerning the topic. There is therefore the need to adopt the activity–based and inquiry methods in the teaching of science especially at the basic and secondary levels (Reisman & Payne, 1987). This method according to Reisman and Payne (1987) is against the principle of learning by doing. Lecture method reduces teacher-pupils' interaction. However, this method of teaching is economical because no laboratory and expensive apparatus are required. It also encourages efficiency in time management since a single teacher can teach any number of students at a time (Brown *et al*, 1982).

2.2.3.2 **Activity – Method or Pupil Centered Approach in the Teaching and Learning of Science at the Basic Level**

According to Woodworth (1974), activities are ideal means to getting students acquire facts, ideas and understanding of a concept. He explained that most students enjoy child centered activities because it arouse their interest and delight especially when the scientific phenomenon involved is not familiar to them. The Junior High school science teaching syllabus suggests that science should be students-centered and activity oriented. The teacher should therefore act as a facilitator. Activity methods of teaching according to Petty (2001) are methods of teaching in which the teacher involves the learners in a series of tasks. Brown (1985) gave some examples of activity methods of teaching as discussions, demonstrations, enquiry, questions and answers, role play etc. Demonstration as explained by Balogun (1984) is mainly used when a teacher

wants learner to learn a skill such as using a living semi-permeable membranes to demonstrate osmosis or using disserted animals to demonstrate the various parts of the alimentary canal. Balogun continues that students who do not perform activities in the field of study ever attained a high degree of mastery in that field. Farrant (1990), see demonstration as a valuable tool in explaining the 'how' and why' of a process, as well as in motivating students to develop certain skills such as dissection. Farrant continues that when the teacher uses the same material, equipment and processes that student will employ in the laboratory; it helps to enhance students' potential for success. Displaying the steps in the process and explaining each step accurately, clearly and definitively while demonstrating expedites learning and encourages the students to compare and evaluate their own products. Another researcher Farrant (1986) asserts that demonstration can be done for a whole class, but in groups when the class is large. After the teachers demonstration he / she can let some of the students also demonstrate to get them involved. The teacher then supervises as learners practice the skills learnt. Demonstrate to me is the act of using equipment or arrangement of equipment to show how it works or how it explains a process. Farrent (1986), suggested that the best method of teaching science is the enquiry method. Here the students are involved in activities to find solutions to problems themselves. These enable students to find out facts, and establish relationship and infer from these facts and relationships. He who sees science as a method of enquiry would not presents his or her students with facts as a body of knowledge, but will provide the opportunity for them to find out by doing. Thus in teaching science, it is better the concepts at stake, for the understanding principles of the concepts to be seen and understood. Students must therefore

be actively involved in the lessons as they learn best through their involvement, remember easily and apply the knowledge gained in other situations. For effective science lessons, teachers should make use of a lot of activities. TLMs and also ensure that all students are actively involved in the lessons Reasoning is definitely of importance in the study or learning of scientific concepts and reasoning is generated as a result of doing. Carvin (1985) also argued that science as a special discipline cannot be taught or studied verbally or theoretically for the learners to grasp the various scientific concepts effectively. Utilizing the appropriate methods of teaching would allow for a better understanding thereby improving student's performance. Science as a discipline is taught using varied teaching methods which makes use of relevant and appropriate TLMs to appeal to learner's senses so as to improve their performance and to achieve aims and objective of the subject. Balogun (1984) is of opinion that science teaching should therefore be backed by intensive practical activities to expose learners to acquired varied experiences. "Science is experiment and experiment is science' He conducted. In practical, students are made to put into practice the theory learnt practical activity according to Tillery (1991), makes the students acquire skills and mastery in his field of study. He continued that practical lessons are efficient and beneficial to students when the class is under supervision of their teacher with specific instructions. Tillery continued that research has shown that students are enthusiastic about practical work as it provides opportunities for the decision making discovery. Practical activities serve two main purposes in teaching and learning of science. These are: they allow the observation of new facts and they determine whether a working hypothesis fits the world of observed facts. The connotation about

the above statement is that students should be made to handle and use science apparatus and equipment during science lessons which will help equip them with the requisite skills needed to discover new scientific facts taught or learnt. The activity–based method is a teaching strategy that attempts to assist pupils to discover their own knowledge through an activity (Mensah, 1992). According to Mensah (1992), in addition to acquisition of knowledge, the approach also leads to acquisition of process skills such as measuring, recording, analyzing and interpretation of data. Activity–based method is more of a child-centered approach, as such; pupils may learn better and faster when they are taught through activities (Reisman & Payne, 1987). When a pupil performs an activity as an individual, the learner easily understands and never forgets (Jenkins,1998).

The activity method is used to teach science in which the pupil is placed at the centre of the learning process and made to manipulate materials and experience things for him or herself (Mensah, 1992). In this method, the pupil discovers concepts and facts either unaided or with minimum teacher interference. The teacher is less active, a facilitator, co-learner and a guide. The activity method takes full advantage of the learner's natural tendency to explore the familiar environment. The advantage of this method is that pupils learn to use their hands and minds. Again pupils learn to organize, observe and become more curious to manipulate and carefully handle equipment during activity-based method. The activity–based method of learning science is also related to the doing of experiments or practical exercises with scientific apparatus (Reisman & Payne, 1987). This method according to Reisman and Payne (1987) takes full

advantage of the pupils' individual differences and abilities. However, the method is time consuming. It is also very expensive, since it involves the use of more materials. Erinosho (2008) identified other suitable methods that can be used for the activities in teaching science at the basic school to include: discussion Method, demonstration Method, questioning and Answer Method, concept Maps, field Trip, cooperative Learning and simulation method. It is clear 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 which will help the child realize the relevance of what he/she learns to his/her environment. If our children are to change their attitude towards the study of science, then, teachers also need to change their way of teaching the subject to make it fun especially for young children. There are several methods of teaching science, for example the inquiry method, observation method, discussion laboratory method, discovery and activity methods. The inquiry approach is one of the many ways through which ideas and concepts are transmitted to children Mechel and Oliver (1983). Inquiry is what scientist to do when they observe, predict, hypothesis, collect, data, analyze and draw conclusions. If children are to behave like scientist then, it is important that teachers ensure that all the children are involved in hands-on investigations during science lessons. Inquiry promotes doing science by children. During inquiring learning, children are involved in observing, classifying, communicating and using other science process skills which help to prepare them towards thinking objectively. Primary science lays emphasis on children doing their own learning rather teachers demonstrating or children reading only about science. Inquiry approach encourages children to identify a problem, form

their own opinion on how to collect relevant data with a view to finding solutions to their problems, Jacobson (1981) explains that inquiry method helps children to identify content-related problems, formulate their hypotheses, gather information from different sources, analyze this information, evaluate and draw conclusions Children also acquire a model to follow in solving problems in their environment and this serves as intrinsic motivation and increases the memory of the children. A child's attitude towards the teacher and the subject matter as promoted pointed out by Elser and Esler (1988), is closely related to the type of learning activities organized. The child will help the teacher to collect science materials and help set up the science room, if he/she is involve by the teacher this whip up the child's interest. A teacher who does all the talking and also does all other tasks related to the learning is likely to alienate the children. In view of the opportunities inquiry methods offers to young children to develop scientifically, science educators recommend the use of inquiry approach to teaching at primary school level. Agboola (1984) has indicated the roles of practical or interactive based method in science as follows: to encourage accurate observation and careful recording, to promote simple, common-sense, scientific method of thought, to develop manipulative skills, to give training in problem solving, to verify facts and principles already taught, to educate on theoretical work as an aid comprehension, to be an integral part of the process of finding facts by investigation and arriving at principles, to arouse and maintain interest in the subject.

According to Bloom (1995), just as there is no single method through which fits all learnt, there is no single method of teaching which fits all learning situations.

The teacher must accept his/her procedure to the situations as she finds it and modify her procedures in accordance with changing demands of the situation. The teacher method should be a combination of almost all the method of teaching. Each teacher should be an inventor of method suitable for the circumstances in which she finds him/her. Whatever method a teacher uses in teaching science should evoke the use the scientific methods; or processes e.g. observations, classification, measurement, inference experimenting, manipulating skills etc. at appropriate stages in the teaching/learning process. Sharma (1995) noted that achievement of modern science is due to the application of the experimental method. Practical work must therefore be made a prominent feature in any science lessons. It has been reported that during major science curriculum reform, some science educators felt that considerable amount of practical/laboratory work should lead rather than lag behind.

2.2.3.3 **Discussion Method**

Discussion as a teaching strategy is one of the best ways of helping pupils to understand and learn ideas. The method involves pupils- pupils or teacher-pupils interactive dialogue, where they talk together or share ideas about a topic(s) in order to find supporting evidence to a claim or solution to a problem. Discussion could involve a whole class or in organized smaller groups to enable both the teacher and pupils exchange opinions based on valid reasoning. In order that learners see clearly how an idea applies to everyday life, they must be given the opportunity to use the discussion approach, and that the teacher only acts as a catalyst during the interaction among the students (Akpan, 1992). The focus of a discussion can be on either content-specific issues or general

science-society-related topics just to provoke pupils' thought and stimulate them to fully participate in the lesson and also boost their confidence to express their opinions (Erinosho, 2008). According to Graves (1985), in situations where class discussions are frequent, each student develops self-confidence since he realizes that he is contributing something. This method provides an excellent opportunity for pupils to practice their oral communication skills. It also encourages critical and evaluative thinking (Graves, 1985).

2.2.3.4 **Demonstration Method**

The demonstration method as another type of pupil-centred lesson, involves the teacher doing or presenting something (a lesson) to the entire class or pupils in order to illustrate a principle to them or show pupils a procedure of accomplishing a task. The goal of this strategy is to help pupils acquire skills. In some cases, the teacher does it first and later asks pupils to try their hands on or perform another task. Some science educationists like Smith (1990) agreed to it that demonstration method is an essential aspect of science teaching.

2.2.3.5 **Question and Answer Method**

Question and Answer method of teaching science is also an important teaching strategy used to develop in pupils the essential attributes of scientific inquiry. Research finding by Walsh and Satters (2005), point to the positive effect of pupils-teacher classroom interaction through questioning. This means that questioning is the entry point to problem formulation in inquiry, promote participatory learning, good communication skills, and confidence building in pupils' learning process. One good strategy of engaging pupils in science lesson

is by prompting them to answer questions or ask questions. This would then help the teacher to resolve misconceptions and check understanding. Questioning could arise as a spontaneous activity during instruction, or could be pre-planned. Although questioning technique is a valuable instructional strategy, badly formed or faulty questions can impede learning. A faulty question is vague (difficult to pin down the answer); not logical (not asked to follow a sequence that helps to build up knowledge); unconnected with instructional materials (asked without reflection); confusing (unclear wording or one that entails multiple tasks); and not adequately challenging to provoke thinking (focus on recall).

2.2.3.6 **Concept Mappings**

The idea of concept mapping as a learning tool was developed by Novak (1991) when he was exploring the changes in children's knowledge of Science. This idea was derived from Ausubel's (1968) cognitive theory which places central emphasis on the connection of pupils' existing knowledge as the anchor for subsequent meaningful learning. Concept map is a useful tool for organizing and visually representing interrelated structure of concepts within a domain of knowledge.

Concept mappings are very useful tools for helping pupils learn about the structure of knowledge, and tie new knowledge to current experience. They are valuable tools for stimulating pupils' thinking process and representing knowledge in meaningful learning patterns. Concept maps are also useful for cooperative learning, to make pupils support each other and strengthen their

understanding of a subject matter, and as members of a group, to bring their thought processes to bear on the interpretation of concepts and relationships. In the learning of new ideas in science, concept mapping enhances pupils' achievement and improves their attitude. Danmole and Femi-Adeote (2004) found out that when concept mapping approach is employed in the teaching and learning of science at the basic level, it helps to reduce rote learning, and again help the teacher to negotiate meaning with pupils.

2.2.3.7 **Field Trip**

Another strategy which is rarely used in science education is the field trip or excursion (Akpan, 1992). It involves organizing a group of pupils to visit companies or industries where things taught in theory can be seen practically. According to Akpan (1992), field trip or excursion can be likened to a visit to another laboratory away from the school's premises, which is equipped with instruments and materials that the school's laboratory does not and cannot contain.

Those places they visit can serve as science resource centres, to allow the students to acquaint themselves with principles and phenomena which had been hitherto abstract to them. Field trip enables learners to see those things they have learnt theoretical and makes learning real (Reisman & Payne, 1987). According to Reisman and Payne (1987), it becomes very difficult for learners to forget what had been learnt and seen in field trip. This method is therefore recommended for students at the basic level since they easily remember things they have been taught and seen (Akpan, 1992).

2.2.3.8 **Cooperative Learning**

This is another form of collaborative learning technique that permits pupils to benefit from one another's abilities and knowledge as they interact in a small group within a non-imposing, non-threatening and non-competitive environment. Cooperative learning places emphasis on getting pupils to work together on a problem or task in small heterogeneous groups in order to achieve a common goal and support one another. Hartman and Glasgow (2002), working on cooperative learning among pupils observed that, pupils can work together to review a test or do a quiz, carry out a laboratory activity, solve a problem, or work on a project. The positive impact of cooperative learning as a pedagogical strategy on academic achievement have been confirmed by Driver et al (1985), who argued that the method develops in pupils the affective outcomes like inter-group relations, self-esteem, and a good classroom climate. In addition to promoting group work among pupils, Erinosho (2008) identified that cooperative strategies are useful in science teaching because it promotes positive interdependence spirit, face-to-face interaction, individual accountability, social skills, and group learning process.

The benefits of Cooperative Learning for science students are well documented (National Institute for Science Education-College Level One, 1997; Springer & Stanne, 1999; Lord, (2001). Cooperative learning improves student achievement and enhances student enjoyment of and attitudes towards learning science (Springer & Stanne, 1999; Lord, (2001). Cooperative learning works, because it is active, student centered and social (Johnson & Johnson, 1998). A cooperative learning activity might involve reading, writing, planning

experiments, designing questions, or solving problems. This multi-layered approach toward student interaction with the content improves understanding and retention. Since, cooperative learning shifts emphasis from the instructor to the students, the latter have opportunities to build social support networks and to learn and practice many social skills, such as leadership, communication, inquiry, and respect for diversity (Lord, 2001). The development of social relationships and skills helps students to build confidence as learners and to build trust in their teammates. This leads to improved attitudes toward the subject and often to the retention of underrepresented populations in science programmes. Peer tutoring is a type of cooperative learning/instructional strategy. It is a personalized system of instruction which is learner rather than teacher-oriented. Studies have shown that this instructional strategy benefits both the students being tutored and the tutor, although the tutor is associated with greater cognitive gains than the student being taught (Annis, 1982; Bargh & Schul, 1980; Lambiotte et al., 1987). It has also been observed that when biology lessons are done in groups, students are allowed to make valuable decisions which together lead to a satisfactory accomplishment. Mary (1996) explained that group work during practical is a pervasive and an influential feature of the classroom ecosystem, which must be encouraged in the teaching and learning of biology in the senior high schools.

2.2.3.9 **Simulation**

Simulation technique involves initiating activity that resembles real life situations in teaching certain science concepts and ideas. Simulation technique can take the form of a role-play, games, and models (Yardley-Matwiejczuc,

1997). According to Erinosho (2008), pupils could act as scientists in a situation that requires a decision or planning to solve problem through role-play and develop basic /generic skills in pupils. Yardley Matwiejczuc (1997), has observed that games and role-play helps pupils to develop analytical, communication, and decision-making skills, as well as to build confidence in discussions on science issues.

According to Wadsworth (1989) people followed the theoretical approach due to limited knowledge of science that the pupils possessed. In modern times Wadsworth (1989) stated that science is seen more to be practically oriented or activity based. Students enjoy science lessons when they are involved in activities concerning the topic. There is therefore the need to adopt the activity–based and inquiry methods in the teaching of science especially at the basic and secondary levels (Reisman & Payne, 1987).

2.2.4 Importance of Science Practical Work in Teaching and Learning of Science

Theories describe a well-verified body of abstract knowledge that has a large number of practical applications. Practical work can help students develop a better understanding of and principles as a result of concrete experiences. Science practical work leaves a lasting impression on students. Practical work enhances concepts development and promotes scientific attitudes. It also breaks up the instructional period, which limit the amount of lecturing and adds a variety to the course (Chiapperra and Koballa, 2002). Sometimes, it is to link theory with practice, or to cultivate a scientific spirit in the students. If properly put to good use, it could lead to the acquisition of practical skills like planning, performing, observing and reasoning. Hence the major

purposes of science practical work include the cultivation of science methods and the development of scientific attitudes. Shulman and Tamir (as cited in Ossei-Anto, 1999) observed that practical work has been the most distinctive feature of science instruction. Practical work motivates students to appreciate the distinction between science practical activities and the application of science and technology to real life cases. Practical work helps students to develop the ability to use one or more science process skills. It can also be used to improve students' awareness and competence in using skills that are related to scientific reasoning. Science practical/laboratory work engages students in 'finding out' and' learning how' through first-hand experience. It is an integral part of good science teaching, which involves students in the scientific enterprise-questioning, observing, classifying, gathering data, explaining, experimenting etc. This type of work permits students to plan and to participate in investigation or to take part in activities that will help them improve their manipulative skills Practical work would help improve students' manipulative skills. Practical work including hands-on activities, scientific inquiries, or experiments, always cited as the most powerful approach to helping students understand scientific knowledge. At the same time, Hodson (1992) argued that the skills-based approach of practical work was philosophically unsound, educationally worthless, and pedagogically dangerous. A holistic view of assessment to promote valid process learning, especially emphasizing the role of creativity in the data analysis process is necessary Torance (as cited in Penick, 1996) describe creativity as a process of becoming sensitive to problems, deficiencies, gabs in knowledge, missing elements, and disharmonies. Creativity identification of the problematic, the research solutions, the generation of guesses, or the formulation of hypotheses about the deficiencies; testing and retesting the hypothesis and the potential modification and retesting; and last the communication

of the result. The role of guessing as the basic element of creativity is stressed by Science Technology and Society of the United States of America. When students are viewing natural phenomena, to stimulate their creativity and interpretation of results, they should be encouraged to present wild guesses to generate diverse perspectives (Yager & MaCormack, 1989).

2.2.5 Using Teaching and Learning Materials (TLMs)

Teaching materials are described as aids materials used in teaching for illustrative purposes. Its ultimate goal is to facilitate and demonstrate an understanding of a lesson (Amoatey, 2000) Teaching and learning materials may be defined to include materials which can be seen or heard and contribute to the teaching and learning process. Learning is done through the use of five senses. Any medium which gives learners the opportunity to use many senses as possible is the best medium in learning (Atiku, 2004).The use of teaching and learning materials arouse the interest of students in what is being taught and make understanding and remembering concepts easily. Teaching and learning materials also serve the teacher the trouble of explaining at length hence the teacher talks less and also encourages students to find more on their own and thereby stimulating self- learning. Teaching and learning materials are divided into three groups; these are audio materials, those that appeal to the sense of learning. Examples are radio, cassette recorders, drum etc. Visual materials are those that appeals to the sense of sight, examples are real objects (relia), chalks, textbooks, charts. The last group is the audio-visual materials which appeal to both the sense of sight and hearing; examples films, video, television etc. (Amoatey, 2000). The use of teaching and learning materials in science lesson delivery brings variety, curiosity and interest among students to assist retention and recall. Students tend to forget what they hear

easier than what they see. Confucius gave a practical statement on how the human mind approaches the learning process: I hear and I forget, see and remember, I do and I understand (ITE Teachers Conference Report, 2005). One of the best ways to understand something is to get ones hands on it and actually experiment with it. Therefore, the use of teaching and learning materials must be encouraged in the teaching and learning process during science lessons in the Junior High Schools.

Ossei-Anto (1995) again asserted that, science teaching and learning will definitely be better done if the issue of inadequate supply of science equipment and materials is tackled with zeal. He further explained that, learning by doing is one of the cardinal principles of teaching science. Experimentation has put many theories on a sound footing and has also resulted in the rejection of many. History reveals that many beliefs and superstitions were trashed out from the minds of people as a result of experimentation.

2.2.6 Effects of Activity Methods on Students Understanding of Science Lessons

Blough and Schwartz (1990) analyzed the role of practical work in teaching and learning science. In their study, they pointed out that practical work and demonstration help to improve students understanding and performance in science lessons. Practical work is necessary for acquisition of skills and that students enjoy science lessons through practical work. In practical lessons, students handle apparatus and carry out experiments themselves and when this happens the experience is impressed more firmly in their minds than if they listen to or see from distance. Students are usually found doing things themselves so the use of practical activities in teaching science is psychologically sound as it satisfies their natural edge for activity. The young are

curious to know about how events occur in the laboratory and it helps to improve their understanding of science lessons if they observe or perform experiments. Activities carried out during science lessons, broaden student's knowledge and boost their interest. It also helps to consolidate theoretical knowledge. Activity based lessons help students to develop independent ability to work and interpret scientific problems and solution.

Activity-based methods proved to be more superior to content based traditional approaches in terms of students understanding of scientific method and creativity. So practical work or activity-based method, when well organized has an immense influence on students' retention and performance. The activity oriented teaching of science is an important skill, technique and methods of science such as handling of apparatus, demonstration and investigative type of learning. The development of the useful scientific process skills can only be achieved through activity- based methods. According to Talabi (2007), students tend to remember more what they see, hear and touch. Instructional materials create interest which helps reinforce students' interaction with learning experience as the Chinese proverbs says what I see, I remember.

CHAPTER THREE

METHODOLOGY

Overview

This chapter provides a description of the different research methods used in conducting the study. It explains research design, population, sampling techniques, instrumentation, data collection procedure, administration of research instrument and how data was analyzed.

3.1 RESEARCH APPROACH

The study uses the quantitative research approach. Quantitative involves the use of frequency distribution tables, bar and pie charts.

3.2 RESEARCH DESIGN

Research design is a scheme, outline or plan that is used to generate answers to research problems (Kombo & Delno, 2006). It is also a detailed documentation of plan for the collection, measurement, and analysis of data. Research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose. It constitutes the blue print for the collection, measurement, and analysis of data (Saunders, Lewis & Thornhill 2007). This is used to structure the research, show how all the major parts of the research project, the samples or groups, measures, treatments, and methods of assignment work together to address the central research questions.

This study used descriptive survey designed to collect information. Survey research is one of the most important areas of measurement in applied social research. The broad area of survey research has to do with asking questions of respondents. By this,

questionnaire will be the main instrument for data collection and this will be supplemented with interview. This is going to be used because it will be able to gather more information from the respondents and also give the opportunity of face to face interactions.

3.3 POPULATION OF THE STUDY.

The population of the study was one head teacher, nine teachers and two hundred and fifty pupils in Sogakofe Evangelical Presbyterian Basic School in the South Tongu District of the Volta Region. Hence the population of the study was 8+1+250= 260. But the target population of the study was one head teacher, nine teachers and fifty pupils, making a total population of eighty (60).

3.4 SETTING

The research was carried out in Sogakofe Evangelical Presbyterian Basic School in the South Tongu District of the Volta Region.

3.5 SAMPLE AND SAMPLING TECHNIQUE

According to Johnson and Christensen (2008), sampling is the process of drawing a sample from a population. Sampling is the process of selecting units from a population of interest so that by studying the sample we may fairly generalize our results back to the population from which they were chosen (Trochim, 2006), this means that sampling is concerned with selection of a group of individuals from within a statistical population to estimate characteristics of the whole population. Sampling is therefore used in place of a larger population for a study. Random sampling and purposive sampling techniques was used in this study. Purposive sampling is a non-probability sampling procedure

where the researcher selects a target sample based on pre-determined set of reasons. This includes personal experience, availability of information, among others. Numbers were assigned to pupils in the school from which the required numbers were selected for the study and were picked without replacement using random numbers. This was to ensure that as much as possible biasness is removed or is minimized and a fair representation is obtained. Kusi (2012) opines that one of the factors that influence the selection of a reasonable sample size for studies located within the interpretive research framework is manageability. He posited that the aim of such studies is to explore a phenomenon for a better understanding and therefore it is necessary to select a sample size to achieve this purpose. Kumar (2011) defined sampling as a process of selecting some individuals from a larger group in order to form the basis for estimating or predicting the existence and extent of unknown information or outcome on the bigger population. Sampling is a trade-off between some benefits and disadvantages since although it saves costs and time, the information on the population is not known but only through an estimate (Kumar, 2011). Sampling techniques, on the other hand, are the strategies applied by researcher during the sampling procedure.

3.6 DATA COLLECTION INSTRUMENTS

The study adopt interview and questionnaire as instruments for data collection for the research work. An interview can be described as an interaction between two persons with one being a researcher who employs his or her competence by guiding, directing and controlling to some extent the focus of the conversation.

3.6.1 Questionnaire:

A questionnaire according to Patton (2002) is a self-report data collection instrument that each research participant fills out as part of a research study. In this study, questionnaire was used to gather the bio- data of the participants. This data included the name of the school, age, form and sex. Questionnaire was used for the bio-data collection because of its convenience of enabling respondents" consistency and uniformity to questions they answer. Again, with questionnaire, less time is required to collect data and confidentiality is also assured.

3.6.2 Observation

According to Elliot (2007), observation is a research instrument which data are collected by observing the subject of the study and recording the information that is being observed. Observation is also referred to as taken a critical or close look at something or someone for possible changes or behavioral attitudes Reasons for using observation as a means of collecting information on the students are, it helps to easily notice the students' reaction and intention behind their behavior, which may be positive or negative. Osuala, (2001) contends that direct observation of techniques is specific and also arms the skilful observer with a high level of factors under study. This method is suitable for gathering information on a given situation for a specific period of time, and therefore describes the behaviour, qualities or changes that may be observed. Also, the effect of behavior on the outcome and subsequent events can be discerned. The researcher employed unscheduled methods of observing the students which closely monitoring of students during class activities, inspecting students

exercises, assignments and contribution and participation in class during lesson delivery to find out how far their progress in science subject in order to know the appropriate intervention measures to be put in place.

3.7 DATA COLLECTION PROCEDURE

The type of data that will be collected will be primary and secondary data. Primary data is the new information the researcher will collect for the first time. Secondary data will be gathered from journals, articles, books and online portals that are directly related to methods of teaching Integrated Science.

3.8 DATA ANALYSIS AND PRESENTATION

Data analysis is the process of simplifying data in order to make it comprehensible (Cohen *et al*, 1996).In this research, descriptive analysis was the method for the analysis of the data collected. All the answers to the questions were edited and statistical tables and frequencies were prepared to arrive at percentages corresponding to absolute figures. The responses from the questionnaires were all stated in the text to support the discussion of the results.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Overview

This chapter presents the empirical results and detailed discussion of the findings. The first section of the chapter looks at the demographic information of the respondents and the other section discuss on the research questions into detail.

4.1 BIODATA OF PARTICIPANTS

4.1.1 Frequency distribution of age of pupils

The ages of the pupils ranged from 14 years to 16 years. Out of the pupils who took part in the study, 23 were14 years old, 18 were 15 years old and 9 were 16 years old. The distribution of the ages of the pupils is shown in Table 4.1, Figure 4.1.

Table 4.1: Frequency distribution of age of pupils

Age of participants (years)	Frequency	Percentage
14	23	46.0
15	18	36.0
16	9	18.0
Total	50	100.0

Source: Fieldwork data (2018)

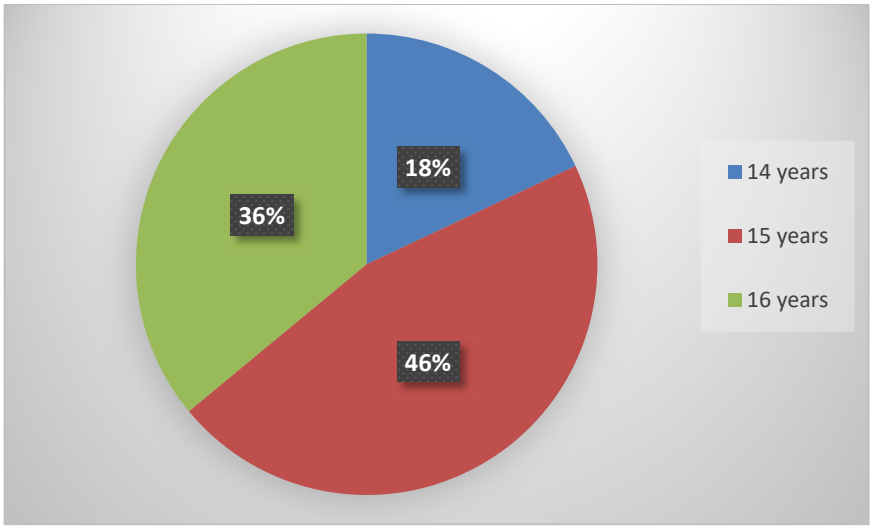

Figure 4.1 Frequency Distribution of age of pupils

4.1.2 Frequency distribution of sex of pupils

The questionnaire to the pupils sought to find out the gender distribution of the respondents used for the study. The sample for the study covered both males and females' respondents as shown in Table 4.2 and Figure 4.2 below.

Table 4.2: Frequency distribution of sex of pupils

Sex of participants	Frequency	Percentage
Males	31	62.0
Females	19	38.0
Total	50	100

Source: Fieldwork data (2018).

The results as presented in Table 4.2 and Figure 4.2 show that majority of the pupils who participated in the study were males (62.0%) whilst minority were females (38.0%). This is because there were more males in the population as compared to females.

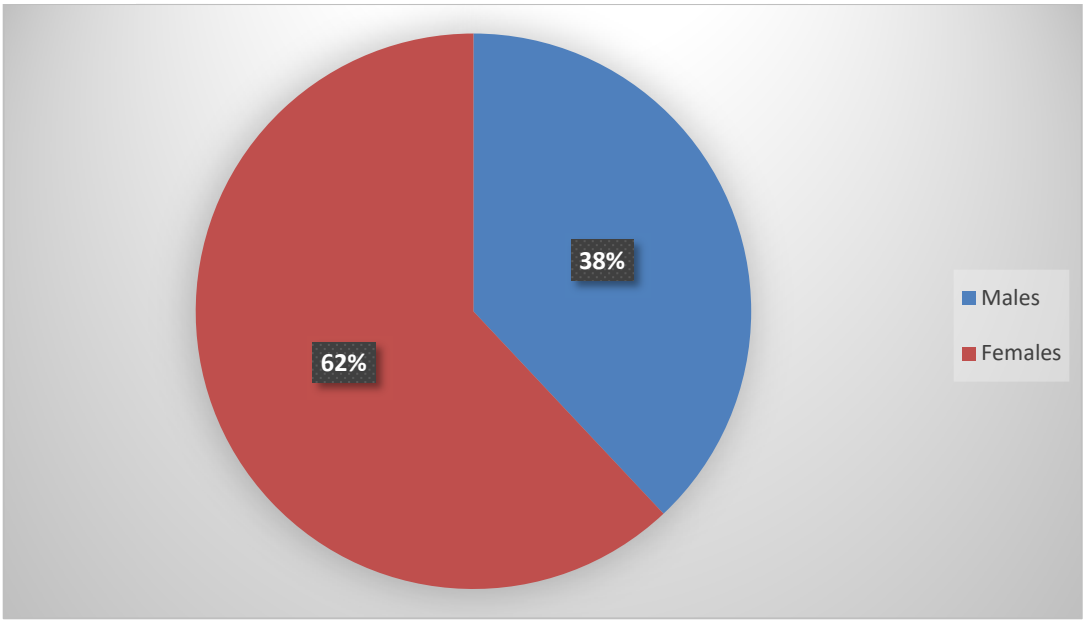

Figure 4.2 Frequency Distribution of sex of pupils

4.1.3 Frequency distribution of sex of teachers

The sample for the study covered both males and females' teachers as represented in Table 4.3 and Figure 4.3 below.

Table 4.3: Frequency distribution of sex of teachers

Sex of Teachers	Frequency	Percentage
Males	3	60.0
Females	2	40.0
Total	5	100

Source: Fieldwork data (2018).

Table 4.3 and Figure 4.3 shows that nine teachers participated in the study out of which five were males and four being females.

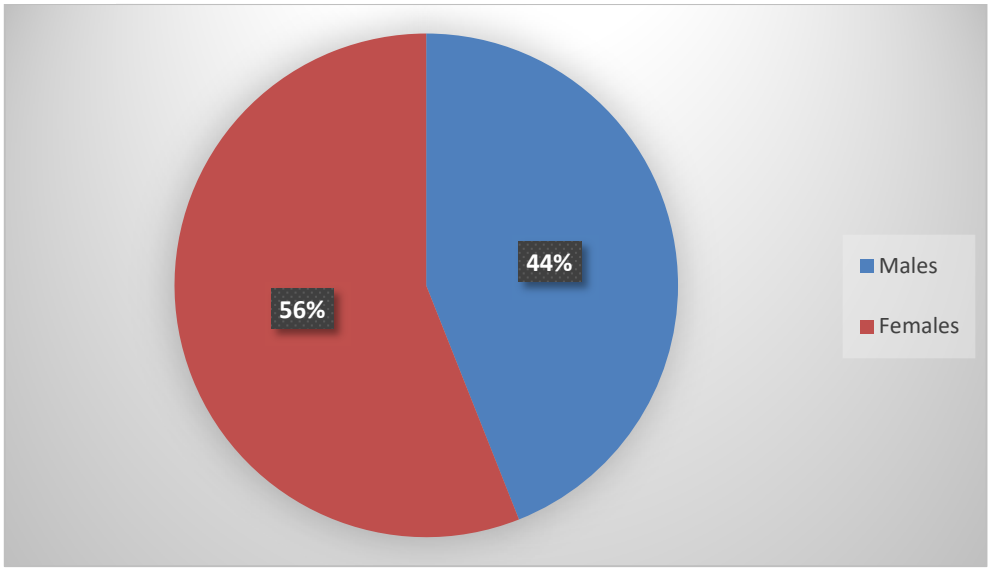

Figure 4.3 Frequency Distribution of sex of teachers

4.1.4 Frequency distribution of professional qualification of teachers

Table 4.4: Frequency distribution of professional qualification of teachers

Professional qualification of Teachers	Frequency	Percentage
Degree	3	33
Diploma	4	45
3-year certificate 'A'	2	22
Total	9	100.0

Source: Fieldwork data (2018).

Table 4.4 shows the frequency distribution of the professional qualification of the teachers who participated in the study. Three were qualified Bachelor's Degree holders whilst four were Diploma and two were 3-year certificates 'A' holders.

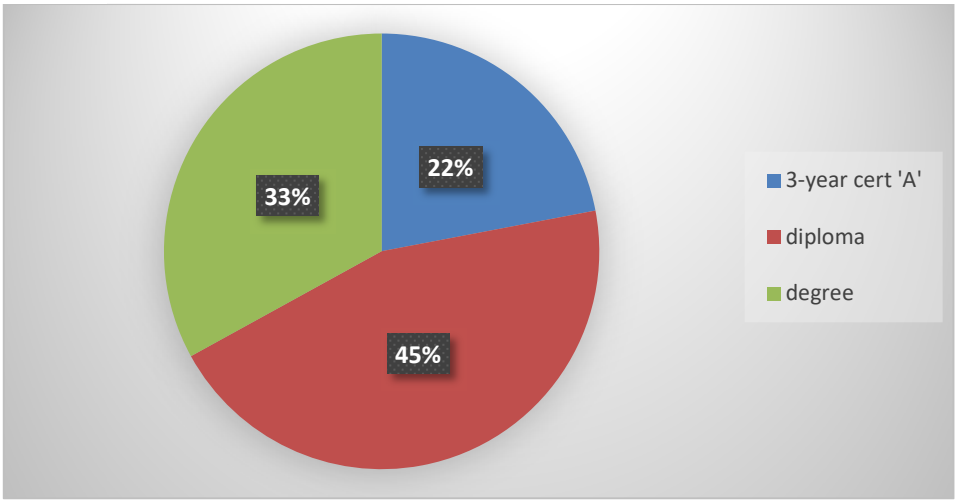

Figure 4.4 Frequency distribution of education levels of teachers

4.1.5 Frequency distribution of teaching experience of selected teachers

Table 4.5: Frequency Distribution of Teaching Experience of Selected Teachers

Years of teaching experience	Frequency	Percentage
Less than 5 years	2	22.0
5 – 10 years	3	33.0
Above 10 years	4	45.0
Total	9	100.0

Source: Fieldwork data (2018).

The result as presented in Table 4.5 shows that the selected teachers have varied years of teaching experience ranging from 2 years to 11 years. Two teachers, representing Twenty-Two percent (22%) had taught for less than five years. Three teachers representing (33%) had also taught for five years. Forty-five percent (45%) had teaching experience of between 11 and 13 years.

4.2 Analysis and Interpretation of Research Questions

Research question one: What are the effects of using inappropriate methods in teaching and learning integrated science?

The research question seeks to find out the effects of using inappropriate teaching methods in the teaching and learning of Integrated Science. The teacher who is the agent of change in the classroom seeks to impact positively on the learner hence needs to vary their methods. Data gathered shows that most of the learners do not really understand the concepts since the lessons are mainly lecture and discussions. Pupil's responses were grouped into 'positive feedback' and 'negative feedback'. The result is shown in table 4.6 below

Table 4.6: Pupils' understanding of the concept in Integrated Science based on teaching methods

Response	Frequency	Percentage
Positive feedback	31	62.0
Negative feedback	19	38.0
Total	50	100

Source: Fieldwork data (2018).

It can be seen from Table 4.6 and Figure 4.5 that 38% of the total pupil's responded negative feedback. These pupils lacked the understanding of the concept and they were in the minority as compared to the 62% who were able to give positive feedback.

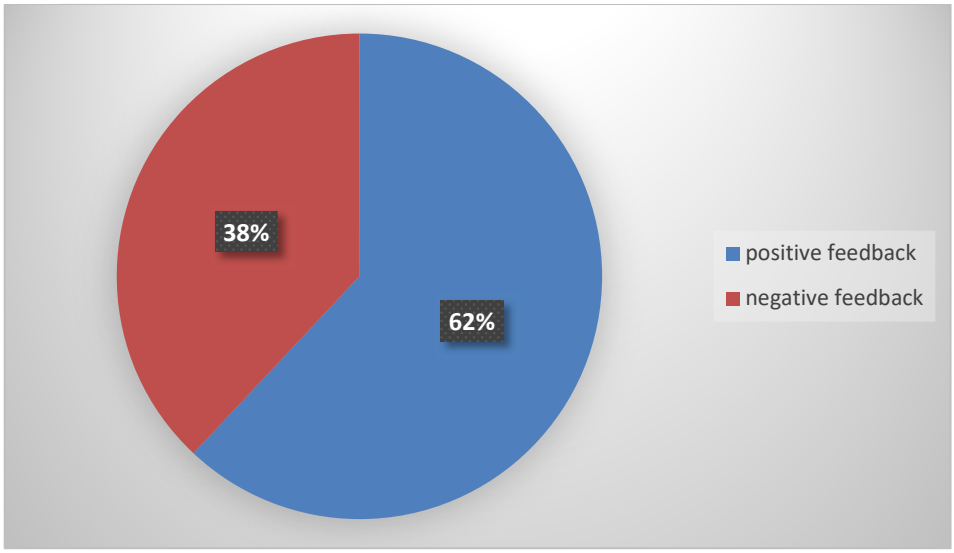

Figure 4.5: Pupil's understanding of concepts in Integrated Science.

Research question two: What teaching methods do teachers use in teaching and learning Integrated Science in Schools?

The research question attempts to find out the teaching methods employed by teachers in the teaching and learning of Integrated Science in the classroom setting. From the responses of learners few teachers use varying methods hence the learners are able to grasp the concepts. Some of this teachers use practical and interactive methods in lesson delivery which is beneficial to the learners whereas others also depend solely on the lecture methods for lesson delivery making the learner to struggle so much to understand the concepts. When practical activities are introduced it will be observed that pupils will be actively involved in the lesson. This observation is in support of McKeachie (1994) who found out that activity method of teaching science assists learners to discover their own knowledge and also leads to the acquisition of process skills such as measuring, recording, analyzing and interpretation of data which the learners may need in the course of their schooling and working in future.

Research Question Three: What are the factors that affect the use of appropriate teaching and learning methods? This research question sought to find out the factors that affect the use of appropriate teaching and learning methods in the study of Integrated Science. The responses gathered from the teacher's shows that there are no resources to gather adequate teaching and learning materials that would make lessons more practical for learners. Again responses show that there is too little time allocated for Science lessons hence the failure of teachers to make lessons more practical and interactive for learners hence the constant use of the lecture and discussion methods. Despite this fact, some dedicated teachers still make their lessons very practical and interactive for their learners.

Research Question Four: What is the impact of using Interactive method in teaching and learning Integrated Science?

This research question seeks to find out the impact of using interactive methods in teaching and learning Integrated Science. Science is a practical subject which is to be taught as such. In other for learners to grasp the real concept of what is taught the lesson should be made practical and Interactive. Learners must be made to explore and handle teaching and learning material in their quest to get a better understanding of what is been taught. From the responses gathered from learners the use of Interactive teaching methods have a positive impact on their ability to grasp the concepts they are introduced to during lesson delivery. The interactive methods give them the chance to really understand the subject matter teachers relay to them. Again the interactive methods give them the opportunity to see and handle teaching and learning materials that are provided by the teachers. In effect the use of interactive methods to the students is very beneficial to them than the other methods that do not allow them the chance to explore.

4.3 SUMMARY

From the responses gathered from the questionnaires collected from pupils as well as teachers it is very clear that when teachers use the interactive methods where learners are made to explore, handle and interact with the various teaching and learning material there is better assimilation of concepts compared to the regular use of the lecture methods which are commonly used by Science teachers all over due to inadequate preparation before lessons are delivered.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Overview

This chapter deals with the summary of the findings and conclusions derived from the study as well as recommendations and suggestions for further studies.

5.1 SUMMARY OF FINDINGS

The main findings were summarized below:

1. The study revealed that Pupils of Evangelical Presbyterian Basic School Sogakofe have better understanding of Integrated Science concepts after the introduction of Interactive teaching methods by teachers.
2. Also the pupils have developed much interest in the Integrated Science lessons due to the use of Interactive teaching methods.
3. It has also come to light that teachers of Integrated Science now conduct thorough research before teaching.
4. It has been observed that most teachers do not use adequate teaching and learning materials to teach Science lessons. This has resulted in the loss of interest in the teaching and learning of Science since no major practical works are done in addition to the theory.
5. The research also revealed that respondents shared similar ideas that Interactive lessons leads to more understanding and better assimilation. This is to say that when learners see, hear and touch whatever they are learning, they tend to understand it better.

5.2 CONCLUSION

Based on the findings, the following conclusions were made. The introduction of Interactive teaching methods by teachers has greatly influenced learners positively. Teaching Science by the integration of theory and practical as well as the involvement of the students makes learning both meaningful and interesting. Moreover it also motivated pupils to learn and retain what they have learnt. The Science teacher is therefore encouraged to expose the learners to many situations to reinforce pupils learning.

5.3 RECOMMENDATIONS

The following recommendations were made based on the conclusions:

1. Teachers should provide pupils of Evangelical Presbyterian Basic School Sogakofe the appropriate teaching and learning materials that will make them see, handle and manipulate real objects and materials rather than giving them lengthy notes to copy and read.

2. Pupils should be empowered to become responsible for their own learning by creating opportunities that will actively involve them in the learning process. This can be done by helping them construct their knowledge and organizing it in a way that can help them apply the needed information correctly and improve upon their performance in Science.

3. Integrated Science teachers in all Basic Schools should devote about 70% of their teaching methods to be Interactive enough for learners.

4. Regular workshops, seminars and conferences on the importance of Interactive method of teaching should be organized for Science teachers to enable then impact well on the learners.

5. Head teachers should do regular supervision of the teaching and learning process rather than placing so much value on the writing of lengthy lesson notes by teachers.

6. Further research should be conducted over a longer period to ascertain the validity of Interactive teaching methods on pupils.

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APPENDIX 1: Questionnaire for the collection of primary data

EXAMINING THE INFLUENCE OF INTERACTIVE METHOD OF TEACHING ON THE PERFORMANCE OF INTEGRATED SCIENCE TEACHERS AT THE EVANGELICAL PRESBYTERIAN BASIC SCHOOL SOGAKOFE

This questionnaire is to be completed by E.P Basic School Pupils.

Biodata

1. Age of pupil ……..
2. Sex of student. i. male ii. female
3. How regular do you go to school? i. very regular ii. Regular iii. Not regular

Questionnaire on student's attitudes towards Integrated Science and its effect on their performance. Student group membership

4. Do you have a study group? i. Yes ii. No
5. If yes how many are you in the group? .....
6. Do you have a study partner? i. Yes ii. No

Other factors

7. Is integrated science your favorite subject? i. Yes ii. No
8. What do you like about Integrated Science? .....
9. How would you describe your motivation towards the study of Integrated Science?

   i. highly motivated ii. Motivated iii. Not motivated
10. Do you think your Integrated Science teacher delivers on the well?

    i. Yes ii. No

11. How many hours do you spend learning Integrated Science in a day? .....
12. Is the teaching and learning of Integrated Science interactive enough. i. Yes ii. No
13. Do you think your Integrated Science teacher is experienced enough in teaching the subject? i. Yes ii. No
14. Does your Integrated Science teacher introduce hands-on activities in the teaching and learning of Integrated Science? i. Yes ii. No
15. Does your teacher use enough teaching learning materials in the delivery of lessons? i. Yes ii. No

APPENDIX 2: **Questionnaire to be completed by head teacher.**

1. Sex of head teacher. i. Male ii. Female
2. For how long have you served as a head teacher? .....
3. What is your highest level of education? i. Diploma ii. First Degree iii. Master's Degree iv. Others
4. What criteria do you use in vetting teachers Integrated Science lesson notes? .....
5. Do you observe teachers during their lesson delivery? i. Yes ii. No
6. Do you ensure your teachers make Science lessons Interactive enough for learners? i. Yes ii. No
7. Does your teachers use adequate teaching and learning materials in lesson delivery? i. Yes ii. No
8. Do you have qualified teachers who teach the subject? i. Yes ii. No
9. Do your teachers revise their notes thoroughly before lesson delivery? i. Yes ii. No
10. How do you ensure that your teachers do not recopy old notes for submission on weekly bases? .....
11. In vetting lesson notes, do you take note of the teacher and learner activities for each lesson? i. Yes ii. No
12. How often do you supervise teacher's lessons during delivery? i. Very often ii. Often iii. Not often
13. Do you regularly check on the exercise books of learners? i. Yes ii. No
14. How often do you make teaching and learning materials available for teachers to use in teaching Integrated Science? i. Very often ii. Often iii. Not often

15. If often, how do you finance the purchase of the teaching and learning materials?

.....

16. If not often, how do teachers provide the teaching and learning materials for their lesson delivery? .....

17. How would you rate the importance of using interactive methods to teach integrated science? i. Excellent ii. Very good iii. Good iv. Average.

APPENDIX 3: Questionnaire to be completed by teachers

1. Sex of teacher. i. Male ii. Female

2. For how long have you served as a teacher? .....

3. What is your highest level of education? i. Diploma ii. First Degree

   iii. 3 year post sec.

4. What teaching methods do you use in delivering Integrated Science lessons?

   .....

5. Do you use interactive methods in teaching and learning of Science?

   i. Yes ii. No

6. How do you make Science lessons Interactive enough for learners?

   ……

7. Do you use adequate teaching and learning materials in lesson delivery?

   i. Yes ii. No

8. Are you trained professionally to teach the subject? i. Yes ii. No

9. Do you revise your notes thoroughly before lesson delivery?

   i. Yes ii. No

10. What factors affect the use of appropriate teaching methods in your school?

    .....

11. Do you regularly check on the exercise books of learners? i. Yes ii. No

12. How would you rate the importance of using interactive methods to teach integrated science? i. Excellent ii. Very good iii. Good iv. Average.