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ATTITUDE OF SENIOR HIGH SCHOOL STUDENT TOWARDS THE LEARNING OF INTEGRATED SCIENCE: A CASE OF BIBIANI ANHWIASO BEKWAI MUNICIPALITY

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DECLARATION

Student's Declaration

I, Adjei Safoah Newman Esther, hereby declare that this thesis is the result of my original piece of research work except for references and quotation contained in published work which have been identified and duly acknowledged. I further declare that this research work has neither in whole nor in part been presents for another degree in this University or elsewhere.

SIGNATURE: ……..……..

DATE: …….……...

Supervisor's Declaration

I hereby declare that the preparation of this research project was in accordance with the guideline on supervision of Project Work laid down by University of Education, Winneba.

DR. PAUL KOBINA EFFRIM (SUPERVISOR)

SIGNATURE: ……..……..

DATE: …….……...

DEDICATION

This research work is dedicated to Dr. Paul Kobina Effrim

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ABSTRACT

The study investigated the attitude of Senior High schools (SHS) students toward learning of integrated science in Bibiani Ahwiaso Bekwai Municipality. Four objectives were given and to these objectives four research question were raised. The target population was all the students in Bibiani Ahwiaso Bekwai Municipality Senior High Schools. The population of the study comprises of 350 students. The study was a descriptive survey type which used stratified random sampling technique to select a sample of 60 form two (2) students. These students responded to valid and reliable instrument in a form of Questionnaire. Apart from personal information, the questionnaire contained ten (10) closed ended items on five point Likert scale and 1 open ended item. The collected data were analyzed by using percentages and frequencies. The results showed that SHS students in Bibiani Ahwiaso Bekwai municipality had a negative attitude towards integrated science subjects, it also showed that their attitude influenced the poor academic performance. The gender of the students also had a significant effect on their negative attitude. The results indicated that female students had more negative attitude toward integrated science subjects than their male counterparts. The results again rated in order of priority practical method or ways that could be employed to make integrated science more appealing to students as a core subject. Based on the results of this study, recommendations were made on how positive attitude of students can be incorporated and maintain particularly the attitude of female students in Bibiani-Anhwiaso-Bekwai Municipality.

KEYWORDS: Students Attitude, integrated Science, Academic performance

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Education in its general sense is a form of learning in which the knowledge, skills, and habits of a group of people are transferred from one generation to the next through teaching, training and research. Any experience that has a formative effect on the way one thinks, feels, or acts may be considered educational. Education from all perspective is viewed or aimed at preparing one for life and since it is supposed to prepare one for a better living, one must be certain on what he/she can achieve through it and from what discipline he/she can attain it. Education must draw some of its principles from psychology. This entails having good grasp of all theories that influence the teaching-learning process. Also, the quality of education that a teacher provides to students is highly dependent upon what teachers do in the classroom. Thus, preparing the students of today to become successful individuals of tomorrow, science teachers need to ensure that their teaching is effective. Understanding of student attitude is very important in supporting their achievement and interest toward a particular discipline Sofeme and Amos (2015).

Students attitude toward science have been extensively studied, but research was initially focused greatly on general science (Dawson, 2000; Osborne, Simon and Collins, 2003). This can partly camouflage students' attitudes because integrated science is not viewed as homogenous subjects. Students' attitudes toward science significantly alter their achievement in integrated science. Therefore, identification and influence of attitudes came to be an essential part of educational research. Attitudes associated with science appear to affect students' participation in integrated science as a subject and impact performance in integrated science (Linn, 1992). It is

generally believed that students' attitude towards a subject determines their success in that subject. In other words, favourable attitude result to good achievement in a subject.

A student's constant failure in a school subject can make him/her to believe that he/she can never do well on the subject thus accepting defeat. On the other hand, his/her successful experience can make him/her to develop a positive attitude towards learning the subject (Olowojaiye, 2000). According to educational psychologists, Negative attitude towards a certain subject makes learning difficult, while positive attitude stimulates students effort and leads to high achievement in that subject. (Veloo, Nor & Khalid, 2015).

The Attitude of students is a relatively more dispositional construct that changes slowly and influences the broad range of perceptions, views, and values regarding integrated science. Also a significant relationship exists between student's attitude and their corresponding academic performance. Determining students' attitude towards an integrated science subject is therefore a useful task if one wishes to improve the performance of students in that subject (Godwin & Okororonka 2015).

Integrated science can be defined as a combination of all the sciences with the fusion of technology, taught and learnt as a single subject to ensure that the individual acquires the basic scientific skills needed in solving problem of the society (Abbey, Alhassan, Ameyibor, Essiah, Fometu &Weredu, 2008). Learning Integrated science is encouraged because problems of the world is not from one source but from several sources, so issues and realities need to be addressed beyond one discipline, that is the gathering of knowledge, skills abilities and patterns required such interdisciplinary mental schemes and actions, which also goes beyond just the learning of one discipline (Draghicescu, Petrescu, Gorghiu & Gorghiu, 2014).

There are many significant successes of integrated science when learned could help solve Ghana's socio-economic and political problems such as inadequate electricity supply, poor sanitation; post-harvest loses in agriculture and electoral challenges that we recently faced (Ongowo, 2013). The teaching and learning of integrated science is to adequately equip students with the requisite knowledge and skills in order to understand science concepts.

Globally, there have been impressive successes of science to managed and bring under control epidemics and pandemics such as Ebola and recently covid-19 which nearly brought about human extinctions. Also genetically modified seeds are being introduced among farmers to enhance better yield during both dry and wet season. This reasons is why Roberts suggested that all students' needs scientific literacy to become fully- fledged citizens and to be able to work with science and it related matters in their professional and private spheres (as cited in Astrom 2008. In light of these Edu and Edu (2013) was of the opinion that every nation depend on the qualities of their scientists and technologists to make life more comfortable for their citizens in this competitive global scientific environment. Based on this, it can be concluded that Western countries have transformed rapidly due to the strong foundation that they laid for students in both science and technology, which had a practical application on their societies.

Ogunkola and Samuel (2011) were also of the view that the economic development of the Caribbean regions such as Cuba, Mexico and Nicaragua was due to their citizens' skills inclination in science and technology. For example, Cuba sends her medical doctors to countries that need them, of which Ghana is of no exception because citizens of Cuba practice and do science and channel their scientific skills

acquired in finding solution to their problems. Noticing the benefit that Cuba derived from her citizens scientific acquisition, the Ghana Association of Science Teachers (GAST) has also been holding annual and biennial conferences with her members in order to introduced and sensitized members to the rudiments in the teaching and learning of science, for societal transformation. (Ghana web 2009).

Abbey et al., (2008); Davis, (2010) and Adeyemo, (2011) opined that nations that want to advance in science and technology development for their societal growth needs to invest adequately on resources that can enhance its effective teaching and learning in the various schools. This assertion is undisputable because countries that we now called the superpowers such as China, Russia, Germany, Japan and United State of America owns their allegiance to how adequately they have invested into the sciences (integrated science). Which the researcher would call the 'mother' of all the sciences simply because it combined all the sciences such as physics, chemistry, biology, agriculture and geology that has to be learn as a single discipline.

The goal of integrated science education in Ghana is to prepare students to acquire scientific skills and scientific principles and used what they have acquired in a logical and coherent manner to the benefit of their society (Ministry of Education, Science and Sports, 2007 and Ministry of Education, Science and Sports, 2012).

The integrated science syllabus for High Senior High School was therefore designed as a compulsory subject with the following aims:

1. To develop understanding of scientific concepts and principles.
2. To Developing an appreciation for the application of science to life; thinking and acting scientifically and developing scientific attitudes towards life.

That is, integrated science teaching and learning in basic and senior high schools levels expose and equip students with this vital knowledge, because as students pursue their educational ladder they move towards their areas specialty such as science and humanities.

Critical analysis of the goals of integrated science suggests that students' perform poor and the poor performance in the subject would make the achievement of the goals difficult, which would eventually retard Ghana's growth and development. It is indeed a tragedy that, the number of students (young people) who select science and science related subjects keep on decreasing day in day. Osborne et al; and Schmidt (as cited in Ogunkola and Samuel, 2011) stated that studies worldwide have revealed that interest and attitudes in science has declined during students' secondary years. Krapp (2002) also alluded to this fact by saying that there is a significant decline in interest in physics, chemistry and mathematics as student progress through secondary school. He noted that the decline is common among girls.

In another development Relevance for Science Education Project (ROSE) has conducted a research throughout Europe from 2003-2008 which revealed that the number of students regarding science subjects, particularly physics and chemistry, as difficult have increased (Gedrovics, Mozelka & Cedere, 2010). There has also been a persistent decline in post-compulsory high school science enrolment worldwide over the last two decades (Trumper, 2006.) This is mostly as a result of student's attitude toward integrated science.

1.2 Statement of the Problem

The need to enhance students overall performance has led to several educational reforms in Ghana and other parts of the world. It is noted that students' performance is directly linked to their attitude towards learning and how lessons are

presented by teachers. Although, attitudes of students play a role, it is mostly overlooked.

Placement and promotion into universities or tertiary institutions are major judgement that largely depends on student's performance. Also, academic performance is the single indicator of the quality time a student spent in school (Kyoshabu, 2009).

Although, there have been different studies on integrated science education, one less focused area is the students attitude towards learning of integrated science. Considering the Ghana Education System, the hours for integrated science is quite inadequate so teachers mostly use the lecture method in impacting knowledge which is sometimes confusing and non-interactive, hence most students have shown negative attitude towards the learning of integrated science leading to little or no competency in mastering the application of concepts taught in the classroom. Students who therefore cannot apply scientific principles to real life situation cannot contribute meaningfully to the development of Ghana.

Bibiani-Ahwiaso-Bekwai Municipality has recorded poor performance in integrated science over the past five years despite different method of teaching employed. To confirm this, data collected from the various Public Senior High Schools in the Bibiani-Ahwiaso-Bekwai Municipality on the performance of WASSCE candidates in the integrated science subject within a space of five years from (2016 to 2020) has been summarized in the table below. It shows a decline in the performance which calls for an investigation. This calls for the research into their attitude towards the learning of integrated science to improve their academic performance. The present study therefore seeks to examine the students' perception on the teaching and learning of integrated science and the related effect they play in

their academic performance of the students. It seeks to examine their attitude in all and ways to help student develop positive attitude in other to improve academic performance.

Table 1: Summary of Bibiani –Ahwiaso-Bekwai WASSCE Candidates' Passes in Integrated Science

Year	Number of WAEC candidates	Number of pass	Percentage (%)	Number of fail	Percentage (%)
2016	1345	352	26	993	74
2017	1386	427	31	959	69
2018	1429	608	43	821	57
2019	1613	661	41	952	59
2020	1724	731	42	993	58

1.3 Purpose of the Study

Since the attitude of student is considered to play a very important role in promoting or retrogressing students' performance, this study sought to examine the attitude of the students toward the learning of integrated science.

1.4 Objectives of the Study

The study is guided by the following Objective

1. Ascertain how senior high school students in the Bibiani-Ahwiaso-Bekwai Municipality (BABM) perceive the teaching and learning of Integrated Science.
2. Analyse the relationship between the attitude of the students and their academic performance in integrated science subject.
3. Find out whether the attitude of BABM. Senior High school Students towards the teaching and learning of integrated science subject is sex related.

4. Find out Practical methods or ways that could be employed to make integrated science more appealing to students as a core subject

1.5 Research Questions

The following research questions were formulated to guide the study:

1. How do students in senior high school perceive the teaching and learning of integrated science subject?
2. What significant relationship exist between the attitude of students and their academic performance?
3. What significant differences exist between the attitudes of students and their performance with respect to gender variation?
4. What Practical methods or ways that could be employed to make integrated science more appealing to students as a core subject

1.6 Significance of the Study

The findings of this study would benefit those, who in future would pursue further studies on perceptions or attitude of students and teachers in integrated science. The study would also be a useful guide to integrated science teachers on students perceived difficult topics and also guide curriculum developers on how to tackle the problem from the root.

The study would also be useful to the Department of Educational Foundations of the University of Education, Winneba, in designing their curriculum for training prospective integrated science teachers to handle the SHS students. It would also be useful to the Ghana Association of Science Teachers (GAST) in educating integrated science teachers in particular, in effective teaching of the perceived difficult topics in

the integrated science during their annual conferences or workshops. The problem identified would also inform policy formulation in the future.

1.7 Delimitation of the study

The study focused on SHS 2 integrated science students, because the final year Students had already completed. However it is assumed that the second year Student, might have had exposure to almost all the integrated science topics since they are about entering their final year. In addition to their previous three years Junior high school experience it is assume they have either develop a positive or negative attitude towards integrated science subject.

1.8 Limitations of the Study

The study should have considered all level that is form one to three SHS students from all the discipline for both public and private SHS in Bibiani-Ahwiaso-Bekwai Municipality of western north Region of Ghana. However, the focus was on only 300 students from the various public Senior high school because at the time the researcher was going round the various schools to find out for herself the level of the integrated science syllabus completion it was learned most of the schools had not completed the syllabus .

Secondly, putting students in a classroom as if they are going to write exam during the period of the questionnaire administration might create anxiety and tension associated with testing. This may inhibit the interpretation of their attitude result been assessed and wrong data entering by the researcher is of no exception in affecting the actual finding of the study. Despite the limitation and delimitation, the purpose and significance of the study have been pointed out.

1.9 Organisation of the Study

The study is divided into five chapters. Chapter one focused on the introductory part of the study. Chapter Two reviewed related literature from which findings were analysed in the context of their significance to the objectives of the study. Chapter 3 addressed the research methodology as well as the research design, population sample, sampling procedure, instruments used, data collection procedure, and analysis. Chapter four looked at the results obtained from the study and discussed them within the context of the review of the related literature. Chapter five focused on the summary of the study, conclusion and recommendations.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Introduction

This Chapter reviewed the research work and other literature relating to the topic of the study. Major ideas of this section are grouped and presented under these headings and sub headings. It is categorized under the theoretical and empirical framework**.**

2.1 Theoretical Framework

This section discuss the following issue;

1. Integrated Science subject
2. Benefit of integrated science subject
3. Teaching and learning methods for integrated science
4. Attitudes of Students towards integrated science
5. Factors that influence students attitudes towards the learning of integrated science
6. Academic performance
7. Relationship between Attitude (students) and Academic performance

2.2 Integrated Science subject

Abbey, et al. (2008) defined integrated science as the study of the basic natural sciences such as chemistry, physics, biology, astronomy, agronomy, etc. and the ways they overlap. This means that the various branches of sciences need to be presented as a unified whole by the teacher so that the learner cannot notice the various branches by which science has existed. That is the knowledge acquired in integrated science should empower the student to solve problem of the society.

The subject integrated science also refers to the approach or pedagogy that unveil the principles and concepts of science to convey the fundamental unity of scientific thought and processes in order to avoid undue stress on the distinctions between the various scientific fields. That is learning integrated science provide students with fair ideas on the various branches of science and how to use those ideas acquired from the various branches of the science in solving problems in the society. For instance students who learnt about ecosystem can practically determine a particular predator that can keep a particular prey under control without using chemicals (Anthony krueger, 2012) Another example is using fishes in fish pond to control population of mosquitoes in an area.

2.3 Benefits of Integrated Science Subject

Nature of science

By definition, science is the knowledge acquired through observation, inquiry, experiment and evaluation of information gained. (Goka 2019) This 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, acquiring 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).

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.

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 values, 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). The 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). These reforms in classrooms consistently reflect what we know, what is to be needed, our ability as educators to influence the development of informed conceptions of nature of science and scientific inquiry to enable scientific literacy 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, a hierarchical relationship between laws and theories/
3. Creativity as an important aspect of science.

Wong and Hodson (2009), reveals that, there are 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 naive and sophisticated deserves a re-examination altogether.

Learning integrated science has therefore numerous benefit. It includes helping non-science students to acquire high level scientific skills before branching on to non-science field of study. This suggests that our world is not composed of one discipline but rather several interconnected discipline hence it needs to be learn as a single discipline. 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 Ministry of Education, Science and Sports (2007) and Ministry of Education, Science and Sports (2012) introduced the integrated science as a compulsory subject to all Junior High Schools (JHS) and Senior High Schools (SHS) throughout Ghana.

Again, science has developed into a number of interconnected specialized branches, which help us better understand the usefulness of science in the world of today and the future. For people to be confidents and able to thrive in this modern world of technology, there should be an opportunities for them to acquire such knowledge about themselves, the world around them and the system that affect their lives and their environment (Abbey et al., 2008). This would enable them to recognize and appreciate the diversity of matter in the world, the interactions and interrelationship between matter and energy, the balance of the natural systems and cycle that sustain life on earth. This is because our environment was naturally

interconnected, so we can only understand their connectedness if we also acquired knowledge and skills based on this connectivity through a unified method of learning.

The learning of integrated science by non-science students can also enable them to acquire the basic knowledge in the sciences and to function properly in the use of scientific products in this modern world. Thus, Integrated Science provides students with the opportunity for pursuing a wide range of careers and advanced degrees. That is students with a background of Integrated Science develop a deep understanding of the processes of science and are well positioned to solve scientific problems by drawing from the integrated knowledge acquired from the several scientific fields of study. Studying the various branches of sciences by students, prepares them to engage in work that cut across disciplinary boundaries or is part of new scientific fields.

Draghicescu et al. (2014) revealed that an integrated science approach Allow the students' experience to be clearly involved in the process, offering more substance and relevance of learning. Topics such as Renewable Energy Sources, The Environment Do We Love It Or Destroy It?, Nutrition And Health: What Is Good To Eat?, have a great potential to become more accessible and interesting for students if they are considered beyond the narrow lens of disciplines, isolated from each other, and treated inter-, multi- and/or trans-disciplinary. This emphasized that all students' needs to learned integrated science during their formative years to the extent that non-science students can also acquire the basic knowledge in the sciences to function properly in this modern world, and also to equip students to have confident in the use of scientific product globally.

Based on its socioeconomic and political importance, it was introduced as integrated science from upper primary through JHS and SHS in Ghana. Draghicescu et al., (2014) opined that acquiring scientific skills must help individuals to have a better understanding of the progress, limitations and risks of the scientific theories, of the applications of technology in the society. The integrated science syllabus was therefore written extensively to cover all aspect of human endeavor. Such areas include the primary, junior and senior high schools and tertiary levels.

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). Science has now become a compulsory subject in the school curriculum because of its multifarious value to the individual as well as the society Aside the intellectual values it also have other values such as;

Vocational Value; In present age all the vocation need the knowledge of science more ever there are large no of vocations for which study of science is compulsory requirement examples: Medicine, Engineering, Computers, Para medicines, nursing, agriculture etc. The study of integrated science at the senior high school level is the basis of many vocations & other productive activities in the latter life of students.

In Aesthetic, Knowledge of science develops in man a passion for truth & thus he has a passion for beauty. The English Poet Keats has said, “Truth is Beauty.” Science is basically unfolding of the mysteries of nature & nature is a store house of all the beautiful things. Thus teaching of science is necessary for developing aesthetic sense in an individual. In Cultural Value Science has played an important role in determining the culture & civilization of a country from time to time. It has affected our way of thinking & way of living. Science has a direct influence in dispelling many traditional beliefs. Science has made us more aware of the universe we live. Teaching of science is essential for developing scientific attitudes & scientific temper. The principle of learning by doing is the main basis of the teaching of integrated science & satisfies the instincts of curiosity, creativeness, self-assertion, self-expression of the students. This shows the impact it has physiologically

Integrated science also 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 As a result of science human beings overcome the problem of passing our leisure time & to make best use of it. It has provided us with a large number of devices such as television, radio, cinema etc. which are the source of entertainment to all of us. They also serve as source of knowledge & are used for spread of mass education & making the community aware of dangers of various ills. Science has also provided a large number of hobbies which we can pursue in our leisure time. For example Photography. Thus from the above discussion it is very clear that a subject which is so valuable & psychologically based and so closely connected with our daily life, is justified to be

included in the curriculum & hence science education is valuable in students individual life as also his life in the society. 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).

2.4 Teaching and Learning Methods for Integrated Science in S.H.S

Various subject curricula are the means by which schools endeavour to realize the hopes and aspirations of the society. This could be achieved if the basic purpose of teaching and learning does not caused students to memorize fact but to participate actively in the processes that lead to the creation of the new knowledge (Brunner, 1986). This active participation of the learner could be effective if it started from primary to high schools because these levels of science curricular materials aimed at sensitizing the primary pupils and high school students on scientific concepts and consequently, rousing their interest in the field of science and technology.

As postulated by Brunner (1986) that knowing is a process not a product. Which means knowledge-getting processes in integrated science are full of skills that the student needs in order to be proficient. This skill proficiency can be effective if it start from the child formative years of learning (primary and high schooling years). Formal education commences at the primary level through junior, senior and tertiary levels. The level of education that occupies the central position in the developmental process of every nation is the primary.

Integrated Science has gained much recognition in our educational institutions especially at the junior and senior high schools and this has had substantial effect on higher educational courses in Ghana. The integrated science is a compulsory subject that students at senior high school learned and must endeavor to pass it before he or she can gain placement to any tertiary institution in Ghana. Based on this assertion

much emphasis has been laid on its teaching and learning so that students could pass it with no difficulties.

There are many different ways teachers employ in presenting instructions to their students. 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. It can also be define as the procedure, technique or strategies of teaching especially in accordance with a defined plan. Again, it can refer to the general principles, or pedagogy used for classroom instruction. Teaching methods primarily fall into two categories or "approaches". They are teacher-centered and learner/student-centered method or approach.

Teaching approach is a way of going about teaching which suggests a ways that encourages good performance. Thus, according to the British Council (2015), an approach is a way of looking at teaching and learning. Underlying any language teaching approach is a theoretical view of what language is, and of how it can be learnt. An approach gives rise to methods, the way of teaching something, which use classroom activities or techniques to help learners learn. Examples of a teaching approach include the cognitive, behaviourist and constructivist approach to learning,

Teaching techniques can be define as the unique ways of carrying out a particular task, in the teaching and learning process? Thus, it's the individual teachers' unique way of applying a strategy. For instance, two teachers may decide to use small group discussions as their means of delivering integrated science lesson but each may have a unique way of conducting the process of the discussion. One may decide to use two

students to conduct the discussion; the other may decide to employ four or more student for that. Furthermore each teacher has definitely have a unique way of delivering his/her lesson.

Teaching strategy is a careful plan of teaching activities to be undertaken which ensures effective teaching and learning. It is a plan of action designed to achieve a specific goal or series of goals. At the planning stage of every lesson the teacher decides what method of teaching to adopt, whether teacher centred or child centred. Upon deciding which method to adopt which ensures effective teaching and learning of that specific topic in integrated science, he begins to carefully plan teaching activities which can help achieve effective learning. (Dotse 2017).

There are different types of methods under the two categories in teaching and learning of science. Some of the methods mostly use in teaching integrated science include Active/constructivist teach and learning, cooperative learning, Inquiry based learning, experimental teaching and learning

2.4.1 Teacher–centred method

This teaching method emphasizes more on the subject matter. Teachers are the main authority figure in this model. Students are viewed as “empty vessels” whose primary role is to passively receive information (via lectures and direct instruction) with an end goal of testing and assessment. The intention is just to teach the content base prescribed in the syllabus or textbook irrespective of whether it meets the needs of students or not. This method include lectures, demonstrations and illustrations.

2.4.2 Learner/student centred method

While teachers are an authority figure in this model, teachers and students play an equally active role in the learning process. The teacher's primary role is to coach and facilitate student learning and overall comprehension of material. Student learning is measured through both formal and informal forms of assessment, including group projects, student portfolios, and class participation. Teaching and assessment are connected; student learning is continuously measured during teacher instruction. Some examples of the child-centred methods include: small group discussions, simulations, projects, etc.

2.4.3 The activity–based method

It is a teaching strategy that attempts to assist students 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, analysing and interpretation of data. Activity–based method is more of a child-centred approach, as such; students may learn better and faster when they are taught through activities (Reisman & Payne, 1987). When a student performs an activity as an individual, the learner easily understands and never forgets (Jenkins, 1998).

The activity method is used to teach integrated science in which the students are 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 students 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 students' 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.

2.4.3 Co-operative learning

One approach used by science educators' to address the challenges in science teaching and learning is co-operative learning. The learning cycle teach science in phases that is (a) exploration, (b) term introduction and (c) concept application that are based on the way people spontaneously learn about the world (Lawson, 1995; Lawson, Abraham, & Renner, 1989; Renner & Marek, 1988, 1990). According to Lawson (1988), exploration allows students to investigate new materials and or ideas

so that patterns of regularity can be discovered and questions are raised that students then attempt to answer.

2.4.4 The Inquiry based method

The inquiry based learning 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, analyse and draw conclusions. If students are to behave like scientist then, it is important that teachers ensure that all the students are involved in hands-on investigations during science lessons. Inquiry promotes doing science by students.

During inquiring learning, students 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 student doing their own learning rather than 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.

2.4.5 Experiment/Laboratory based method

This method in commonly thought of as a hands on and minds on approach to teach integrated science. In this method of teaching and learning, students have the opportunity to gain some experience with phenomena associated with their course of study. In this method either student participate alone or in small groups guided by a

laboratory technician or teacher. They produce or manipulate various variables that are under exploration. The degree to which student has control over exploration can vary over a wide range. Here the students learn by actual doing and observing the experiments as it been done by the teacher or himself. This method broadens interest of the students. They learn many virtues through laboratory activity.

The experience in a laboratory is very rich in personal satisfaction as they gain it first-hand. The sense of excitement and challenge help them to achieve tangible explanation to what they learn theoretical. This method follows learner-centred approach. It makes students active and alert. It gives scope for learning by doing and students do a lot of thinking themselves. Different skills are developed. It paves way for exploration experimentation and verification of scientific facts and principles. All the above methods mostly dwells on Constructivism

Constructivist theory describes learning as an active, continuous process in that leaners take information from the environment and construct personal interpretation and meaning based on the prior knowledge and experience. (Driver & Bell, 1986) According to constructivist theory, effective learning takes place when the learner makes meaning out of the required knowledge. For new knowledge to be understood and remembered, it must be meaningful to the leaner (Bruner, 1986). That is meaningfulness of learning depends on the leaner success in finding or creating connection between the new information and the pre-existing knowledge. One way by which these connections can exist is that the learner must build their own structure, or schema, based upon their pre-existing knowledge and understanding (Bodner, 1986).

However, these theories share a common feature that is the learner occupying the central position in the sense making and in building meaningful knowledge schemata. Scerri (2003) has revealed that vital distinction exist between a

constructivist theory of learning, adopted for teaching purposes in the education community, and the philosophically constructivist theory of scientific knowledge. The former relates to students' learning process, whilst the latter posits to 'the laws of nature which was referred to as the social constructs–essentially the laws that scientists have agreed between themselves and do not have any fundamental significance' (Scerri, 2003).

It is clear that one can believe that the learning process involves knowledge construction whilst simultaneously believing that scientifically accepted laws do have physical significance. The ability to manage information and to reason analytically, both deductively and inductively are essential requirements for a successful learning of integrated science. Students are expected to absorb, assimilate and apply the knowledge they have acquired in the integrated science concept in problem solving (Davis, 2010). The teacher believed that if one learns fundamental principles and theories one would be able to make applications as needed. Maruto and Camusso (1996) have assessed the knowledge acquired in an organic chemistry using a multiple-choice exercise. The results were used to research areas that should be reinforced in order to improve the quality of the teaching-learning process.

2.5 Attitude of Students towards Integrated Science

Attitudes are psychological constructs theorized to be composed of emotional, cognitive and behavioural components. Attitudes serve as functions including social expression, value expressive, utilitarian, and defensive functions, for the people who hold them (Newbill, 2005). In the greater realm of social psychology, attitudes are typical classified with affective domain, and are part of the larger concept of motivation (Greenwald, 1989). Attitudes are connected to social cognitive learning theory as one of the personal factors that affect learning (Newbill, 2005 and Bandura,

1997). Attitude was defined by Eagly and Chaiken, (1993) as "Psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour".

Attitude can therefore distort the perception of information and affect the degree of Students retention. A learner's attitude relates to all the facets of education. For example, the attitude of a learner towards integrated science will determine the measure of the learner's attractiveness or repulsiveness to integrated science Also, it affirmed that students' attitudes and interest could play substantial role among Students studying integrated science, and attitude implies a favourable or unfavourable evaluative reactions towards something, events, programs, etc. exhibited in an individual's beliefs, feelings, emotions or intended behaviours. It also shows that students' positive attitudes to science correlate highly with their science achievement. One of the utmost significant factors which affect students' academic success is their attitudes towards school, lessons and academic success.

Social psychologists have viewed attitudes as having three components: cognitive, affective, and behavioural. The cognitive component is a set of beliefs about the attributes of the attitudes' object and it assessment is performed using paper-and-pencil tests. The affective component includes feelings about the object and its assessment is performed by using psychological indices. Finally, the behavioural component pertains to the way in which people act toward the object and its assessment is performed with directly observed behaviours. Many factors could contribute to student's attitude towards studying science. Slee (1964) indicated that students' attitude and interests could play substantial role among pupils studying science. Several studies (including Wilson, 1983 and Soyibo, 1985) reported that students' positive attitudes to science correlate highly with their science achievement.

However, Balogun (1975) reported that, in general, the attitudes of Nigerian students' towards the basic sciences tend to decrease in the order- Biology, Chemistry, Physics and Mathematics.

Defiana (1995) found that, using integrated science environmental activities improved high school students' attitudes towards and awareness about the environment. Frazer and Sleet (1984) in their studies determined that seventy-six percent of the twenty-two unsuccessful students selected in an attempt to solve chemical problems had negative attitude towards problem-solving. Abimbade (1983) reported that students exposed to a programmed instruction recorded higher and more favourable attitude toward mathematics. Aiyelaagbe (1998) also reported a more positive attitude of students after exposing them to self-learning strategy. Similar results were obtained by Udousoro (2000) after using computer and text assisted programmed instruction and Popoola (2002) after exposing them to a self-learning device.

2.6 Factors Influencing Students Attitude towards Integrated Science

Numerous studies have been conducted to determine factors that affect the students' attitudes in science. There are basic factors including: language used in teaching, teaching-learning approaches, the use of the presentation graphics, the type of science courses taken, methods of studying, intelligence, gender, motivation, science teachers and their attitudes, self-adequacy, previous learning, cognitive styles of students, career interest, socioeconomic levels, influence of parents, age and social implications of science and achievement (Craker, 2006).

2.6.1 The use of English Language as a Medium of Instruction

The use of English language as a medium of instruction has been reported as one of the major challenge to science teaching and learning in Ghanaian schools as observed by the researchers. This is because students have to comprehend scientific concepts taught and engage in hands-on activities, critical thinking, and problem-solving in the teaching and learning of the subject. Ghana is a multilingual country with English, a colonial legacy as the official language for its citizen. English language is the medium of instruction for teaching and learning all subjects including Integrated Science from Primary Four in the school system (MoESS, 2007).

This means that success in education at all levels depends, to a very large extent, on the individual's proficiency in the English language (MoESS, 2007).). Teaching Integrated Science to the individuals whose mother tongue is not English may pose some challenges, which would eventually influence their performance. If Students are not able to express themselves and exchange ideas in science classes, it makes the teaching and learning of integrated science more challenging and unattractive. This may result in students losing interest and developing a poor attitude to the learning of Integrated Science.

In the teaching and learning of science, students are encouraged to express their ideas and question evidence in scientific investigations as they develop their concepts in science. Thus, for a learner to understand scientific concepts and express themselves effectively using the concept that learner must have a high level of proficiency in the language used to present the concept. Tan and Tan (2008) and Ferreira (2011) stated that learning in a second language is considered challenging when learners experience difficulty in deducing the meaning of Mathematics and Science concept words.

The problem of learning Science through a second language is again compounded if the science teacher is also not proficient in English. (Ong, 2004) Clearly, the use of English language can serve as a barrier that affects pupils' understanding of scientific concepts. This is likely to affect the performance of Students in Integrated Science. For effective teaching and learning of Integrated Science concepts attention needs to be given to the language used.

In addition, some of the student are handicapped in reading, such student struggle throughout the course. In fact, many students in West Africa fail in science achievement tests and examination because of poor understanding of the English language, as noted by the West African Secondary School Certificate Examinations Chief examiner's report in science and elective science subjects (WAEC, 2005).

2.6.2 Inadequate instructional material for students

Adequate instructional material ensures effective teaching and learning of science. Adequate instructional materials and strategies give students the chance to use their senses of hearing, smelling, tasting, seeing, and feeling (Opara & Etukudo, 2014). If instructional materials are inadequate, students are made to read textbooks while the teachers explain the concepts to them instead of the students carrying out activities as suggested by the integrated science curriculum (Azure, 2015).

Again, the textbooks may outline, describe phenomenon, and show pictures about things and what they would observe in the outlined practical activities. This mode of teaching does not encourage hands on approach to learning for pupils. It also deprives pupils of taking responsibility for their learning through active construction and reconstruction of their meanings for concepts and phenomena (Borich, 2007; Brass et al., 2003). This could explain the poor performance of pupils in science. This finding agrees with Idiaghe (2014) that pupils in schools with inadequate instructional

materials performed poorly as compared with their counterparts in schools with adequate facilities.

The availability of variety of instructional materials would afford the teachers the opportunity to use variety of teaching strategies and encourage pupils to find out more on their own thereby stimulating self-learning. It could also create interactions and interest in class and saves the teacher the trouble of explaining at length. Again, it would encourage more pupils to explore and discover knowledge within their environment and make meaningful contributions to existing scientific principles. These would help deepen many pupil's understanding of concepts taught which would then impact positively on their performance.

The benefits of the use of instructional materials in teaching and learning of science cannot be overemphasized. This is because as students become involved in science activities with the materials they understand scientific concepts better and ultimately improve their performance of teaching strategies and encourage pupils to find out more on their own thereby stimulating self-learning.

2.6.3 Inability to relate integrated science topic taught with real life situation

One of the most important questions regarding school learning is how well students can transfer their learning to new situations. Educators throughout the world aspire to foster the development of problem solving skills and various higher mental processes in students. They believe and hope that the acquisition of higher mental processes will enable students to use their knowledge more effectively and efficiently long after school. Therefore, if school learning is to be beneficial to the individual as well as to society, school instruction should emphasize the development of higher

levels of thinking in a wide variety of higher mental process objectives (Levin, 1986; Swartz and Perkins, 1990)

2.6.4 Student-Teacher relationship

A student attitude towards the teacher and the subject matter is closely related to the type of learning activities organized if the teacher builds a good relationship with the students, it helps him/her identify the areas or topics the student might be struggling with. Other factors such as learning disabilities can also be easy identify. The student can 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 student. Lack of a good relationship can hinder the teacher from identifying the needs of a student and he/she might be reluctance to change strategies, ways or techniques of teaching and encouraging learning.

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.

2.6.5 Academic Performance

Academic performance of a student involves meeting goals, achievements and objectives set in the program, subject or course that a student attends. These are expressed through grades which are the result of an assessment that involves passing

or not, certain tests, subjects or courses. Willcox, (2011) defines academic performance as the level of knowledge shown in an area or subject compared to the norm, and it is generally measured using the grade point average.

The purpose of academic performance is to achieve an educational goal, success or learning. Performance varies according to circumstances, organic and environmental conditions that determine skills and experiences. The academic performance involves factors such as the intellectual level, personality, motivation, skills, interests, study habits, self-esteem or the teacher-student relationship. When a gap between the academic performance and the student's expected performance occurs, it refers to a diverging performance. An unsatisfactory academic performance is the one that is below the expected performance (lamas 2015)

2.7 Relationship between students Attitude and their Academic performance

Although some researchers have defined attitudes solely in terms of the affective component (George, 2000; Germann, 1988; Fishbein & Ajzen, 1975) viewed attitudes as being formed spontaneously and inevitably, involving the attributes of an object. There is therefore a significant relationship between the said variables. This implied that students who developed good attitude towards a subject are likely to have better academic performance in the school and enhance their academic success (Jhoselle, 2020).

Students' academic performance embodies an essential part of the constellation of factor determinants of student success. Also, it plays a very significant role in education, primarily as a concrete tool to assess the student's learning process. Psychologists and researchers have attempted to comprehend how students vary in processing, retaining, and retrieving learning information and have

used various personality, attitudinal, cognitive styles, and ability measures. One of the significant factors in assessing academic performance is through the attitudes they exhibit towards the subject.

Attitude has been a very difficult concept to describe since it cannot be directly observed. This has led to a variety of definitions. One definition that is commonly used to describe attitudes includes the three components of cognition, affect and behaviour (Kind, Jones, & Barmby, 2007; Rajecki, 1990). These three components are defined as "a knowledge about the object, or the beliefs and ideas component (cognitive); a feeling about the object, or the like or dislike component (affective); and a tendency towards action, or the objective component (behavioural)" Reid (2006). According to Kind et al. (2007), this definition is a sensible view of attitudes because these components are closely linked. For example, we know about integrate science (cognitive) and therefore we have a feeling or an opinion about it (affective) that may cause us to take a particular action (behavioural).

As suggested by Crano and Prislin (2006), the three components should be treated more independently, and that attitudes should be viewed as basis for evaluative judgements. Kind et al. (2007) stated that when we have an attitude, we judge something along emotional dimensions, such as good or bad, harmful or beneficial, pleasant or unpleasant, important or unimportant. Crano and Prislin (2006) pointed out that it is important to notice that these evaluative judgements are always towards something, often called the attitude object.

Ali and Awan (2013) conducted a study to examine the relationship between students' attitudes towards science and achievement in science. The study involved 1,885 grade 10 students in Pakistan. Their results indicated that attitude towards science had a significantly positive relationship with students' academic performance.

Weinburgh (1995) also conducted a meta-analysis research that examined gender difference (6,753 students; 18 studies) in student attitude towards science, and correlations between attitudes towards science and their performance/achievement in science. The results indicated that a positive attitude resulted in higher achievement.

2.8 Empirical Work Frame

Attitude of the students is their tendency to organize thoughts, emotions and behaviours towards a psychological object. Human beings are not born with attitudes; they learn them afterwards. Some attitudes are based on people's own experiences, knowledge and skills, and some are gained from other sources. However, the attitude does not stay the same, it changes in the course of time (Erdemir, & Bakirci, 2009. Gardner (1980) elaborates attitude as the sum total of a man's instincts and feelings, prejudice or bias, preconceived notions, fears, threats, and convictions about any specified topic.

The effect of student's attitude toward integrated science is incredibly important, because problem solving requires patience, persistence, perseverance and willingness to accept risk (Charles, Lester & O'Daffer, 1987). Pintrich and Maehr (2004) classifies students in three groups such as the ones who avoid failure, the ones who would like to satisfy their curiosity and the ones who want to get high marks. The study shows that students in classes, their motivation degrees and strategies are different. When students have positive attitudes, they show positive behaviours and they fulfil their academic necessities

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 centred activities because it arouse their interest and delight especially when the scientific phenomenon involved is not familiar to them. The Senior High

school science teaching syllabus suggests that science should be students-centred 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 a 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. The steps in the process should be displayed to better explain 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. For example, he can demonstrate to them the act of using equipment or arrangement of equipment to show how it works or how it explains a process.

According to Farrent (1986),he 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, is 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 through practical activity.

According to Tillery (1991), this 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(1990) 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.

Also teachers should employ Term introduction, Concept application .and better learning cycles. Term introduction allows the teacher to introduce terms, to label the patterns and explain the newly invented concepts. Concept application provokes students to seek the patterns elsewhere and to apply the new concepts to additional examples, often employing abstraction or generalization techniques. Learning cycle is an effective means in teaching and learning processes that encourages students to think creatively and critically, which facilitates better understanding of scientific concepts, developed positive attitude towards science, improved science process skills and cultivate advance-reasoning skills (Lawson, 1995).

Science books are traditionally written contrary to the learning cycle approach that is term introduction precedes exploration of learning (Musheno & Lawson, 1998). Garner, Alexander, Gillingham, Kulikowich, & Brown, (1990); Driscoll, Moallem, Dick and Kirby, (1994) are of the view that science textbooks are generally

of low personal interest to students and have been shown to be used mainly as dictionary, to look up definitions that must be memorized for test. Research has shown that textbook content are organized in such a way that the task of reading and integrating the information is made unduly difficult, particularly for students with low reading skills (Ciborowski, 1992). Despite these problems, many teachers erroneously believe that textbooks are accurate and up to date, present interesting information, and facilitate learning (Wright & Spiegel, 1984). Teachers who lack pedagogical content knowledge commonly paraphrase information in learners' textbooks or provide abstract explanations that are not meaningful to their students (Eggen & Kauchak, 2001).

Students with negative self-concept have poor academic performance (Ford, 1985). These are likely to result in the student having negative perception and attitude about the topic under consideration. This necessitated the current study since one cannot isolate teaching from learning. Gbamanja (1999) was of the view that traditional method of teaching science was dull, unimaginative and lacking in vigor. The integrated science teachers were believed to dispensed knowledge, while their learners also learnt mostly by rote memorization. In this view, students were regarded as passive learners. These phenomena of science teaching cannot invoke the imaginative mind of the students because it discourage and demotivate interest in science learning which is a key to scientific literacy that culminated a country in to economic development.

Furthermore, a research conducted in Turkey High School, revealed that students' responses to open-ended questions and teachers' interviews in biology topics highlighted terminology, textbooks, teaching methods, curriculum, abstract and interdisciplinary nature of concepts among others were the sources of these

difficulties (Tekkaya, Ozkan, &Sungur, 2001). The complexity of the science is due to the many terms and symbols especially as used in chemistry, and physics related concepts. In this vein, Ogunkola and Samuel (2011) said that many new terms and symbols used in physics and chemistry as compared to biology were some sources of the perceived difficulty in the integrated science.

Behar and Polat (2007) also said that students should not be forced to memorize these terms and symbols, but the terms and symbols should be used in the students' everyday lives and even studied in other subject areas. In addition, Behar and Polat (2007) were of the view that this may be a source of misconceptions for students adding to the difficulty of the subject. Further, the difficulty of the integrated science syllabus topics according to Mensah and Somuah (2013) opined that lack of appropriate and adequate teaching and learning resources such as science equipment and science workshops were the main challenges making the understanding of the integrated science syllabus topics very difficult for the students.

Verhagen and Collis (as cited in Alake and Ogunseemi, 2013) suggested that teaching and learning difficulties could be reduced by scaffolding. Scaffolding is a communication process where presentation and demonstration by the teacher is contextualized for the learner. The performance of the study is coached, articulated and elucidated by the learner as the teachers' support is gradually being removed. Verhagen & Collis (as cited in Alake & Ogunseemi, 2013) have observed that Scaffolding is therefore a temporary support made available for students' learning until the students can perform independently without the teacher support. It is therefore temporary frameworks that enable learners to achieve higher learning skills (Summers, 1995). The integrated science teacher saves as the scaffolds in supporting

the student during teaching and learning activities and simultaneously retreat their support while student continuous to work independently to achieve mastery.

2.9 Summary of the Reviewed Literature

This literature review has revealed what is integrated science, it benefits for SHS studendents, the teaching and learning approaches and the theories and concept of teaching and learning integrated science subject especially for senior high schools. It reviews the methods and approaches which are suitable like the student centred teaching method, the problem based learning and the inquiry based method which can arouse student's interest and others like the teacher centred which does not encourage better attitudes of students towards integrated science. It also considered some factors that influence students attitudes towards the learning and teaching of integrated science, what academic performance is and the relationship that exist between students attitude and their academic performances. The literature has considered both the theoretical and empirical frame work of the research work. The student's attitude towards science had a significantly relationship with students' poor or good academic performance (Ali & Awan, 2013).

Human beings are not born with attitudes; they learn them afterwards based on their own experience, other people experiences, knowledge and skills, and other sources. Student attitude towards integrated science can highly increase performance or decreased achievement and performance in the subject matter. This implied that students who developed good attitude towards integrated science subject are likely to have better academic performance in the school to enhance their academic success (Jhoselle, 2020).

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter will focus on the methods that will be employed in the research process and how they will be applied. The items under this chapter may include the research design, research approach, sample size and sample procedure, data collection techniques and data analysis procedure

3.1Research Design

According to Jahoda, Deregowski & Sinha (1986), a research design is the arrangement of condition and the analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. De vaus. (2001) also defined research design as the overall strategy that you choose to integrate the different component of the study in coherent and logical way, thereby, ensuring you will effectively address the research problem as unambiguously as possible

Based on the research topic, a descriptive survey design was used to provide a successful conduct of research given the complexity of the phenomenon under study. A survey can be seen as a research strategy in which quantitative information is systematically collected from a relatively large sample taken from a population (Hox, De leeuw, and Dillman, 2008).a survey according to Avedian (2014), is a systematic method for gathering information from a sample of entities for the purpose of constructing quantitative descriptors of the attributes of the large population of which the entities are members. Surveys are conducted to gather information that reflects the population's attitudes, behaviours opinions and beliefs that cannot be observed directly.

Descriptive survey design involves the collection of data in order to answer questions or test hypotheses concerning the status of the subject of study which will result in the descriptive data whether in words, picture, chart or tables (Gay, 2002). The design is most often used to document the prevalence of particular characteristics in a population. The descriptive survey design was adopted since it offers the opportunity to assess the relations between variables and differences between subgroups in population (Amedahe, 2002).

Another advantage is that it allows variables and procedures to be described as accurately as possible so that other researchers can replicate the study. Nonetheless, descriptive survey design was the most appropriate design since it led to drawing a meaningful conclusion from the data obtained

Considering the research topic, a quantitative approach was adopted for a successful conduct of the study. This Quantitative research methods are research method dealing with numbers and anything that is measurable in a systematic way of investigation of phenomena and their relationships. It is used to answer questions on relationships within measurable variables with an intention to explain, predict and control a phenomenon (Leedy 1993).

The questionnaire was administered in an open, lively but focused manner with the intention of acquiring relevant and wealthy information to enrich the findings of the study. The reason for this research approach is its consistency and flexibility in dealing with the issues of negative or positive attitude of the student and it effect on their academic performance.

The study was situated in the Bibiani Anhwiaso Bekwai municpality. The municipality has a land area of approximately 873square km and this constitute about 20 percent of the total land area of the region. It shares boundaries on the north by the

Atwima Mponua District in the Ashanti Region, south by the Wassa Amenfi in the Western Region and the east by Denkyira North and Amansie East in the central Region and Ashanti region respectively. The municipality has four public senior high school and two private senior high school.

3.2 Population

The target population of this study was all senior high (S.H.S 2) students in the Bibiani- Anhwiaso -Bekwai Municipality. However, the target population estimated at 60 randomly selected from four (4) out of out of the six (6) schools in the municipality which where all Public Schools.

3.3 Sample and sampling Technique

Every individual in the schools was deemed to contribute essentially to the realization of the finding. As a result, the sample size of 60 was selected. This included both male and females of different characteristics and discipline. Thirty (30) out of the total sample size were females and the other thirty (30) males. The equal selection was done to ensure that the respondents represent a true reflection of responses needed for the study.

Stratified sampling was used to ensure representativeness in the sample of heterogeneous population like Bibiani-Anhwiaso-Bekwai Municipality. This method employed helped to ensure that various structure and sub structures of students from the district were well represented in the administration of questionnaires

3.4 Data Collection Instrument.

The quality of the research may be influence by the types and source of evidence use. Various source and types of evidence abound and could be used for the work. Primary data gathered from the students was used in this study. Questionnaire

was used as the main tool for data collection. This Instrument was used to elicit information from the respondents.

A questionnaire is a research instrument consisting of a series of question and other prompts for the purposes of gathering information from respondents (kabir, 2016; Abawi, 2013). Questionnaires have advantage over some other types of surveys in that they are cheap, do not require as much effort from the questioner as verbal or telephone surveys, and often have standardized answers that makes it simple to compile data.

The instrument developed for the study was: Questionnaire on Students Attitude Towards Integrated Science (QSATIS); The questionnaire was made up of four(4) section. Section 'A' dealt with the bio-data of the respondents. Section 'B' and 'C' had a total number of ten (10) closed ended question and measured on 5 point Likert type of scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree) which elicited information about how Student perceived integrated science and also if females had negative attitude towards integrated science than males. An open ended question was asked in section 'D' for student to tick and list the order of priority factors they believed might influence better attitude towards their academic performance in integrated Science.

3.5 Validity and Reliability

Research instrument validation was done by employing expert-judgment approach. The draft instruments were thoroughly scrutinized by researcher's supervisor to ensure that meaningful and useful inferences could be drawn from the items relative to the objectives of the study. This procedure was in line with Fraenkel, Wallen and Hyun, (2012) who opined that the common way to have instrument

validated was to have individuals or preferably expert look at the content and format thereof and render intelligent judgement about the extent to which the item captured on the research instrument are adequate.

The questionnaire was self-administered to 60 students, 28 male and 32 females. A reliability test done on the responses from the instruments was aimed to estimate the reliabilities of the instrument for the study. Since most of the items on the research instruments were scored on the Likert scale, Cronbach co efficient alpha was deemed the most appropriate statistical tool for the determination of the instruments reliabilities (Quansah, 2017).

According to Bryman & Cramer 2006 thorough description the reliability of a research instrument measures its stability and consistency. To ensure the high reliability of this study there was a thorough description of the procedure for study therefore all the data and information gathered were described in detail throughout this report. Again the use of a good research instrument was likely to increase the reliability.

3.6 Data collection procedure

Before the data collection, an introductory letter obtained from the Department of Educational Foundations, University of Education Winneba and was sent to the head of the various Senior High Schools in Bibiani-Anhwiaso-Bekwai municipality for permission to carry out the study. The school included Bibiani Senior high school, Anhwiaso Senior high school, Chirano senior high school and Bekwai Senior high school. Data collection (fieldwork) was conducted once in very school. This event took place in between November 2021 and January 2022. The fieldwork involved

data collection from form 2 S.H.S students in different discipline in the BAB municipality.

The dates and periods for the data collection were then arranged. The Questionnaire on Students Attitude Towards Integrated Science (QSATIS) was designed in four section (see Appendix A, B, C and D). The researcher met the students in their respective classrooms to administer the questionnaires. The QSATIS for students was administered with the help of one or two teachers in the school to the selected students after the purpose of the study was explained to them. As much as possible, all questionnaire administered to students were collected by the researcher on the same day. Out of 60 questionnaires distributed to the students in all the various schools 60 were completed and returned, constituting 100% return rate.

3.7 Data Analysis Technique

This study adopted a quantitative data using close ended questionnaire. The approach followed in presenting the data analysis was based on quantitative statistical results. After collecting the sets of questionnaires from students, each returned instrument was numbered and audited for easy management. When it was realized that all the items were responded to and about 98.3% of the questionnaires administered were returned, response to the items were cumulated. The demographic data of the respondents and the research question were analysed using frequencies and percentages

3.7 Ethical Consideration

The research design adopted for the study was meant to collect sufficient data to adequately answer the research question raised to guide the study. However, in addressing ethical issues related to the current study, the identity of the researcher was

disclosed to the participants the purpose of the study was also explained to them before carried out. Consent of the participants were sought to include them in the study. They were made aware that they could opt out at any point in the data collection process. Participants were again assured of utmost confidentiality and anonymity of any information provided on the questionnaire, this was done by not requesting for their names but rather been identifiable codes (pseudonyms) so as to protect their privacy. Finally, all the data collected were lodged with the researcher.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

This Chapter gives detailed quantitative and descriptive analysis of the results or report as provided by the data .it must be emphasized that presentation of findings and analysis of the data is guided by the objectives of the study. Data were analysed using frequency tables and percentages

4.1 Biographic Characteristics of Respondents

The bio-data characteristics of respondents include sex, structure, Age distribution and level in school

Table 2: Sex distribution of Respondents

Sex	Number of respondents	Percentage (%)
Male	28	47
Female	32	53
Total	**60**	**100**

Source: Field survey, (2021).

Table 2 includes the sex, number of respondents and the corresponding percentage of the student in BABM Senior High School. Data from table1 shows that out of the sample size of 6. 32(53%) respondents were females whereas 28(47% respondents were males The high incidence of female to male ratio basically was that the schools had more females than male students as it has always been in the senior high schools.

Table 3: Age Distribution of participant

Age(years)	Male (%)	Female (%)	Total frequency (%)
Below 14	0 (0)	0 (0)	0 (0)
14-16	3 (11)	5 (16)	8 (13)
17-19	7 (25)	11 (34)	18 (30)
20+	18 (64)	16 (50)	34 (57)
Total	**28 (47)**	**32 (53)**	**60 (100)**

Source: Field survey, (2021).

Table 3 shows the age distribution of participant.it includes the age of both male and female, the total frequency and their percentages according. Data from the Table 2 shows the respondents chosen were between the ages of 13 and 20years. This is because persons of these age are mostly found in Ghanaian senior high schools. The table included their frequencies and percentages. The dominant sex group who answered the questionnaire were ages from age 20+, female respondents from that age group representing 16(50%) and the same age group for male respondents representing 18(64%) .The least age group were between 14-16, with female representing 5(16%) and males of the same age group representing 3(11%). The basic reason for these very dynamics was due to the probability sampling that was used herein.

4.2 Results and Discussion

This section was divided into four parts. All the data and results presented were focused on form 2 SHS students in the BAB municipality for discussion. The first part focused on students perceive of teaching and learning Integrated Science. The second part discussed the relationship that exists between student's attitude and their academic performance. The third part considered the significant difference or similarities between students attitude regarding integrated science with respect to sex.

And the last part suggested practical method that could be employed to make integrated science more appealing to students as a core subject.

Research Question 1: How do students in BABM Senior High School perceive the teaching and learning of integrated science subject?

Table 4: Perception of student on teaching and learning of integrated science subject

Questions	**Rating**				
	1	**2**	**3**	**4**	**5**
1. Integrated science should continue to be a compulsory subject	25(41.7%)	16(26.7%)	9(15%)	7(11.6%)	3(5%)
2. Integrated science subject is a very interesting subject to study	20(33.3%)	23(38.3%)	1(1.7%)	12(20%)	4(6.7%)
3. I can relate integrated science with my everyday life(e.g. hygiene, electricity, Agro farming)	17(28.3%)	24(40%)	3(5%)	10(16.7%)	6(10%)
4. General science students pass well than students in other discipline	11(18.3%)	8(13.3%)	4(6.7)%	19(31.7%)	18(30%)
5. Integrated science needs a lot of practical to be understood	4(6.7%)	12(20%)	3(5%)	19(31.7%)	22(36.7%)
6. Integrated science syllabus is too packed	3(5%)	7(11.6)%	0(0%)	23(38.3)%	27(45%)

Source: Field survey, (2021).

Research Question One sought to examine how students in BABM Senior High School perceive the teaching and learning of integrated science subject. The research question was answered by using items 1,2,3,4,5 and 6 found on the section B of the Questionnaire.The study used a 5-point Likert scale with five (5) items. This implies that the average score is 50 points while the highest score obtainable is 100.

By implication, below a rate of 50% is considered low response while above 50% is considered high response. Each was rated in frequency had it percentage attached. From the table 3, 41(68.4%) of the respondents disagreed that Integrated science should continue to be a compulsory subject. Again 43(71.6%) of the respondent disagreed that Integrated science subject is a very interesting subject to study. Also 41(68.3%) disagreed that they could relate integrated science subject with everyday life.

As far as performance was concern, 37(61.7%) respondents agreed students who are already in the science disciplined pass well than students in other discipline. Also 41(68.4%) agreed integrated science needs a lot of practical to be understood. On the Aspect of integrated syllabus, 50(83.3%) agreed it packed.

Research Question 2: What is the relationship between the student's attitude towards integrated science and their academic performance?

Table 5: Table showing the Relationship between the student's attitude towards integrated science and their academic performance

Indicators	**Frequency**	**Percentage (%)**
85-100 (outstanding)	0	0
79-84 (very satisfactory)	1	1.6
70-78(satisfactory)	5	8.3
50-69(fairly satisfactory)	10	16.6
Below 49(did not meet Expectation	44	74.1

Source: Field survey, (2021).

Research Question Two sought to examine what the relationship between the student's attitude towards integrated science and their academic performance was. The research question was answered using integrated science past question (2020) attached at the appendix of the work.it included Twenty (20) objectives and four (4)

theoretical question. The data presented shows that the most significant number of respondents, comprising 44(74.1%) of the total frequency, belonged to the group who recorded below standard grades. Again 10(16.6%) of the frequency showed students with fairly satisfactory grades which is considered as standard and 5(8.3%) with very satisfactory grade. Only 1(1.6%) respondent has an outstanding grade.

Research Question 3: What significant differences or similarities exist between the students' attitude regarding the Subject of integrated science with respect to sex?

Table 6: Table showing Frequency and percentages table for differences or similarities between students' attitude regarding the Subject of integrated science with respect to their sex.

Question	**Rating**				
	1	**2**	**3**	**4**	**5**
7. Males do better than females in integrated science	9(15%)	7(11.6%)	0(0%)	21(35%)	23(38.3%)
8. Integrated science is a very importance subject. I know where it can lead me	13(21.7%)	23(38.3%)	3(5%)	9(15%)	12(20%)
9. I am self-motivated and encouraged enough (e.g. by peers, teachers and parents) to study integrated science	24(40%)	21(35%)	3(5%)	6(10%)	6(10%)
10. I naturally like integrated science	21(35%)	18(30%)	3(5%)	11(18.3%)	7(11.6%)

Source: Field survey, (2021).

Research question three sought to examine what significant differences or similarities existed between the students' attitude regarding the Subject of integrated science with respect to their sex. The research question was answered using items 7, 8, 9 and 10 found on the section C of the Questionnaire. On gender biasness by students 44(73.3%) agreed Males do better than females in integrated science. Again

36(60%) disagreed they are self-motivated and encouraged enough, examples by peers, teachers and parents to study integrated science. Also 39(65%) disagreed they naturally liked integrated science.

Research Question 4: What Practical methods or ways that could be employed to make integrated science more appealing to students as a core subject

Table 7: Practical methods or ways that could be employed to make integrated science more appealing to students as a core subject

Statement	Order of priority	Frequency	Percentage (%)
Teaching methods, techniques and strategies that will make integrated science interesting should be adopted.	1	25	41.7
Students should be encourage by(e.g. parents, peers, teachers) to actively learn integrated science	2	15	25
Teachers should invite scientist and renowned person in science to the classroom to motivate students	3	12	20
Guidance and counselling should be provided to encourage students to learn integrated science	4	8	13.3

Source: Field survey, (2021).

Research question four sought what practical methods or ways that could be employed to make integrated science more appealing to students as a core subject. The research question was answered using the order of prority1, 2, 3and 4 found on the section D of the questionnaire.The methods were evolved based on the inputs of 60 randomly selected students in BAB municipality.it is in accordance to the order of priority. Most of the student opted for Teaching methods, techniques and strategies that will make integrated science interesting should be adopted. The second most rated was that Students should be encourage by parents, peers and teachers to actively learn integrated science. it was followed by the propose that Teachers should invite

scientist and renowned person in science to the classroom to motivate students and last but not the least, Guidance and counselling should be provided to encourage students to learn integrated science.

4.3 Discussion

The study's main objective included how Senior high school student in Bibiani-Anhwiaso-Bekwai municipality perceived the study of integrated science, their study attitudes, the relationship between their attitude and academic performance And the significant differences or similarities that existed between the students' attitude regarding the Subject of integrated science with respect to sex. it also included suggestion on how student attitude could be improved towards integrated science to improve their academic performance.

Data from Table 2 showed that there was no significant influence of age on students' attitude towards science subjects. This clearly shows that age difference among school students does not have any influence on their attitude towards science subjects.

Table 4 indicated that Attitudes resulting from the respondent perception was very low. Although few of the student respondents were positive about the way integrated science teaching and learning was taught and therefore had a positive attitude towards the subject, the response of other student respondents cannot be overlooked. This may be due to the fact that lecture and teacher centred method of teaching are mostly used as instructional strategies in teaching senior high school integrated science student in Bibiani-Anhwiaso-Bekwai municipality. The experimental and enquiry based method is rarely use by teachers.

Several studies considered attitudes as a critical factor to further progress the academic performance of students. Relative to the study, it is observed in Ebele's

study entitled "Attitude Toward School and Academic Achievement" (2017), it was concluded that skill development was more pronounced in students affirmative in their attitude toward school due to its association with typical classroom objectives and drill routine. Students can still improve their study attitudes and study habits, especially in terms of teacher approval, education acceptance, delay avoidance, and work method. They are essential in every student's learning, implying recognizing the importance of study attitudes to be more efficient in learning.

Also, understanding and building up such attitudes can vastly enhance a student's way of learning methods. The researcher understands explicitly that students should realize the importance of attitude that they needed to improve. This would help senior high school students in Bibiani-Anhwiaso-Bekwai since it will only be a few years before entering college. Overall, developing positive attitudes is essential for students. It might motivate them to be better and to be more excellent in class. Positive attitude could be as a result of student's family upbringing, the excellent curriculum, and practices that the institution had brought to them.

Creating interesting and engaging projects and curriculum to be worked on at both schools may help students retain enthusiasm and interest. As Dewey (1913) said "It is not enough to catch attention" it must be held. Senior High School Science teachers should work together to make sure that their students remain enthusiastic and interested throughout their science education.

Table 5 indicate that explicit teaching of incremental theory could positively impact positive effort beliefs and achievement in Senior High School. The impacts of these

positive effort beliefs on achievement and learning have been substantiated by the research of prominent psychologists Weiner and Dweck (Gettinger & Stoiber, 1999).

Surveying students to understand the nature of their theories of intelligence (entity vs. incremental) could help inform decisions about teaching methods. Teachers may want to focus on feedback and praise on the actions and achievements of students, rather than innate abilities. Explicitly teaching incremental theory to students is another possibility, but more research is needed before this option can be recommended.

Data from table 6 of this study also shows clearly that there is significant effect of gender on students' attitude towards integrated science subjects. The results from indicated that females have more negative attitude towards science subjects than male counterpart. From the result, it reveals that sex (gender) is a significant variable which relates to students' attitude towards integrated science subjects. It also shows the effect of sex (gender) on students' attitude towards science subjects, indicating that females tend to have more negative attitude towards integrated science. This is in consonance with several studies that have suggested that males demonstrated more positive attitude towards science subjects than female. Males rated integrated science as a subject more exciting and interested than females.

Teaching integrated science for gender equity requires a conscious, intentional approach. Many girls did not perceive women entering scientific fields and thus influence their attitude even towards integrated science which is a core subject. This could likely be the result of cultural influences (Hammrich et al., 2001; Kelly, 1981). To alleviate these misconceptions, there should be introduction of female role models in contemporary science to students. Bringing in female science professionals as guest

speakers and teachers could also help deconstruct the stereotypes that students hold about scientists.

Integrating technology education and science will impact female and male students' attitudes (Cady & Terrell, 2007; Mammes, 2004).

The reasons for girls developing negative attitude toward science subjects could be attributed to the following factors: social norms, cultural barriers, lack of role model, parental influence, and personal influence.

According to rating of grades from the written test to assess their academic performance, Which shows in Table 5, the result of the study also agrees with the theory used for this study which state that a person's behavioural intention depends on the person's attitude about the behaviour and subjective norms. Furthermore, a person's intentions are themselves guided by two things: the person's attitude toward the behaviour and the subjective norms. The theory of reasoned action of Azjen and Fishbein, (1975) therefore agrees with this study conducted in various SHS in the BAB Municipality.

Teachers should integrate technology into science and other subjects, rather than teach it independently. Teaching about technology in context helps students understand more about why the technology is used, not just how. If students wish to continue studying science or pursue a science-related career, this foundational knowledge of technology is essential.

Confidence is a key component of attitude. Feelings related to confidence have an impact on students' motivation to study a subject, similar to the impacts described in Bandura's social cognitive theory of motivation (Gettinger & Stoiber, 1999). Classroom is management, particularly the variables of rule clarity and monitoring,

has the potential to impact students' feelings of autonomy and competence (Kunter et al., 2007). This can be achieved by working to make rules and norms clear to students while staying aware of what is going on in the class.

Nadirova and Burger (2008) studied a curriculum that incorporated technology integration, greater access to technology, mentoring from community members and museum trips. A close connection between school and community Teachers should strive to create this connection by bringing in guest speakers and volunteers from the community including members of students' families.

Teachers should include plenty of hands-on activities in science in order to make it more enjoyable. It is important to develop a complex and comprehensive understanding of the real work that scientists do through research, multimedia and guest speakers. Perhaps this more accurate view of scientists' work will help increase the likeness for integrated science and even career interest in some students.

Problem-based learning had a positive impact on some students' feelings of autonomy. Problem-based learning should be a part of every well- balanced elementary teacher's diverse ranges of methods. Teachers must make sure to allow ample time for learning and discovery. As students gain independence from the teacher and work with each other, autonomy will be strengthened. Again, considering Bandura's social cognitive theory, the connection between students' feelings of autonomy and motivation has the potential to strengthen as a result of more opportunities for autonomy.

Teachers should provide opportunities for students to work cooperatively in science. Students will be able to form relationships and share interests. In both cooperative and independent activities in the classroom, building character in students should be an area of focus. Treating each other with respect should be an expectation for students so that everyone feels supported. A friendly, respectful environment will provide fertile ground for students' positive attitudes to grow. An approach that includes cooperative learning has the potential to benefit student achievement as well (Gläser-Zikuda et al., 2005).

Extracurricular science activities can be used to positively impact student attitudes, though this result is far from guaranteed (Jarvis & Pell, 2005). Relevant field trips should be connected with in-class activities before and after the trip. This sustained engagement is beneficial to students' teaching (Dewey, 1913). Interest will likely have a more lasting effect if students experience a subject for a longer time and in multiple contexts. Also, field trips and activities should be age appropriate in order to maximize learning and attitudinal gains. Students do not have to leave the classroom to engage in extracurricular science activities. Inviting guests to lead environmental education programs has the potential to both inform students and inspire them to act. Carrying a personal interest in the environment, in a subject so closely related to many scientific concepts, will hopefully provide motivation for students to learn more about science. Discussion shows potential for engaging students and positively impacting their attitudes towards integrated science. Teachers should work to lead balanced, engaging discussions in integrated science.

Jurow and Creighton (2005) recommended the discussion strategies of positioning students as scientists and expanding scientific repertoires to help build and reinforce scientific identities in students, as well as making scientific concepts accessible to speakers of different languages. The latter goal is particularly important in today's diverse public classrooms.

There should be a cultivation of a positive environment**:** Urban lifestyle has created a gap between children and parents. They hardly get to interact beyond academics and extracurricular activities. None the less they can fills that gap by exposing children to world class age appropriate facilities which creates a positive environment around learning and enhance their skills and talents. To create a positive ambience, parents should encourage their children and recognize their accomplishments from an early age and celebrate it however big or small because the way you talk to them becomes their inner voice. This positive reinforcement will boost their confidence and self-esteem and empower them to perform better. In case of failure, project it as a positive learning experience so that kids can learn from it and not take it as a personal attribute.

There should be provision of learning opportunities like providing Books since books are an ocean of knowledge which imparts reading and cognitive skills to the student. Students can be taken to libraries. Online book subscriptions are also available which send books to your doorstep according to your specific taste.

Senior High School teachers who are already in service should be given adequate training through workshops, symposia, conferences and seminars to enhance and acquire better strategies of teaching integrated science in Schools' Curriculum should be overhauled to accommodate problem solving and activity-oriented

instructional strategies. Extracurricular activity must be emphasis when drawing school programs. Extracurricular means that these experiences occur outside of the normal.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter deals with the summary of the research findings. It also draws a number of conclusions and makes some recommendation.

The study attempted to examine Bibiani-Anhwiaso-Bekwai Municipality senior high school students in attitude towards integrated science using quantitative measure.

The study therefore sought to:

1. Ascertain how senior high school students in the Bibiani-Anhwiaso-Bekwai Municipality (BABM) perceive the teaching and learning of Integrated Science.
2. Analyse the relationship between the attitude of the students and their academic performance in integrated science subject.
3. Find out whether the attitude of BABM. Senior High school Students towards the teaching and learning of integrated science subject is sex related.
4. Find out Practical methods or ways that could be employed to make integrated science more appealing to students as a core subject

5.2 Summary of the Study and findings

The research highlighted Students attitudes toward integrated science as a significant predictor of academic Performance. The research was based on existing knowledge of the theories and research, which established attitudes of students towards integrated science, considered if it was sex related, the relationship between attitudes and academic performance in Bibiani-Anhwiaso-Bekwai Municipality and

declared usefulness of knowledge about the human attitude in prediction of human behaviour (Kpolovie, Joe, & Okoto, 2014).The study adopted both quantitative and qualitative methods as the research approach for this study. The population comprised of both female and male students in Bibiani-Anhwiaso-Behwai municipality of the western North Region. The study employed simple random sampling techniques in selecting respondent from the various public senior high schools in the municipality for the study. Data was collected using researcher-designed Questionnaires and 2020 integrated science past question. Frequency and percentage was used as statistical tools to analyse the quantitative data collected.

In respect of the research Question and hypotheses raised for the study, the following findings were obtained.

- It became evident that senior high school students in the Bibiani-Anhwiaso-Bekwai Municipality perceive the teaching and learning of Integrated Science as difficult and therefore had a negative attitude towards integrated science.
- It was found out that the attitude of the students and their academic performance in integrated science subject were related; their negative attitude led to poor academic performance
- Majority of the student in Bibiani-Anhwiaso-Bekwa Municipality opted that male student performed more that female student school .this was also seen in their test score indicating that it was sex related.
- All the Practical methods or ways suggested that could be employed to make integrated science more appealing to students as a core subject were ticked. But the first rated was thatteaching methods, techniques and strategies that will make integrated science interesting should be adopted.

5.3 Conclusion

The result of the study concludes that senior high school students in the Bibiani-Anhwiaso-Bekwai Municipality perceive the teaching and learning of Integrated Science as difficult and therefore had a negative attitude towards integrated science. . As part of developing the sector of our education scientifically, there is the need of students to acquire positive attitude towards integrated science subjects because integrated science is different from most of the other core Subject and discipline where the task is simple

The attitude of the students and their academic performance in integrated science subject are related. They perceived integrated science as difficult and found it difficult to learn. They therefore performed poorly academically. . Developing students' attitude positively increases and motivates students' interest in the study of integrated science which in turn brings positive development to the nation, municipality and the individual as a whole. Students' attitude in integrated science determines their success in a particular field of endeavour.

Most of the student had the perception that males or boys performed better in science. Their academic performance and attitude is therefore considered sex related. Positive attitude would result to good performance. Students' interest in the study of integrated science subjects should be developed by both boys and girls. This is because girls showed low interest or negative attitude towards science subjects, their interest or attitude should increase perhaps through encouragement from both the parents, teachers and academic Counsellors. Also, having peer role models in science will motivate and increase girls' interest or change their attitude positively

Teaching methods, techniques and strategies that will make integrated science interesting should be adopted

5.3 Recommendations

Based on the study conducted, the researchers came up with the following recommendations:

Students in Senior High schools should be exposed by the science teacher continually to challenging life situations about the benefits of science. This will help to shape their attitude positively toward science subjects. Students should be taught how science comes to statements on fundamental questions of our human and social existence

Parent and school authorities should make clear to boys and girls in schools how fundamental questions of human life are raised and answered using integrated science. Parents and Teachers should make their student and children know that science subjects are made for both boys and girls so as to take away all forms of discrimination amongst them in the learning of science.

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APPENDICES

APPENDIX A

INTRODUCTORY LETTER

UNIVERSITY OF EDUCATION, WINNEBA
FACULTY OF EDUCATIONAL STUDIES
DEPARTMENT OF EDUCATIONAL FOUNDATIONS

11th November, 2021

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

LETTER OF INTRODUCTION

I write to introduce to you, ADJEI SAFOAH NEWMAN ESTHER, the bearer of this letter who is a student in the Department of Educational Foundations of the University of Education, Winneba. She is reading Post Graduate Diploma in Education with index number 200051671.

She is conducting a research on the topic ATTITUDE OF SENIOR HIGH STUDENTS TOWARDS INTEGRATED SCIENCE: A CASE STUDY IN THE BIBIANI AHWIASO BEKWAI MUNICIPALITY. This is in partial fulfillment of the requirements for the award of the above mentioned degree.

She is required to administer questionnaire to help her gather data for the said research and she has chosen to do so in your outfit.

I will be grateful if she is given permission to carry out this exercise.

Thank you.

Yours faithfully,

DR. RICHARDSON ADDAI-MUNUNKUM
AG. HEAD OF DEPARTMENT

www.uew.edu.gh

APPENDIX B

QUESTIONNAIRE

UNIVERSITY OF EDUCATION, WINNEBA

DEPARTMENT OF EDUCATIONAL FOUNDATIONS

QUESTIONNAIRE FOR STUDENTS

This questionnaire is meant to collect data for the study being conducted by **Adjei Safoah Newman Esther,** a student from the above mentioned University in collection with a Post Graduate Diploma in Education thesis titled " **ATTITUDE OF SENIOR HIGH SCHOOL (S.H.S.) STUDENT TOWARDS INTERGRATED SCIENCE; A CASE STUDY IN THE BIBIANI AHWIASO BEHWAI MUNICIPALITY**" The information provided will help the researcher, school management and other stakeholders to understand the extent to which the attitude of students influence their study or relate with their performance in integrated science and provide data for addressing issues.

You are assured that information you provide will be given the utmost confidentiality in addition to disclosure of your identity should the data be published. However taking part in this study is voluntary. Please make a tick [√] in the box against your response. Where there are no boxes, write your response as demanded by the question.

SECTION A: BACKGROUND INFORMATION

1. Sex Male [ ] female [ ]

2. What is your age?

Below 14 [ ]

14-16 yrs [ ]

17-19 yrs [ ]

20yrs & above [ ]

3. Which form are you?

One [ ] Two [ ] Three [ ]

SECTION B: Perception of Students towards studying integrated science .To what extent do you "Agree" or "Disagree" with the following Statement

	Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
4	Integrated science should continue to be a compulsory subject				
5	Integrated science subject is a very interesting subject to study				
6	I can relate integrated science with my everyday life(hygiene, electricity, Agro farming)				
7	General science students pass well than students in other discipline				
8	Integrated science needs a lot of practical to be understood				
9	Integrated science syllabus is too packed				

SECTION C:

To what extent do you 'Agree; with the following

	Statement	**Strongly Agree**	**Agree**	**Disagree**	**Strongly disagree**
10	Males do better than females in integrated science				
11	Integrated science is a very importance subject. I know where it can lead me				
12	I am self-motivated and encouraged enough(e.g. by peers, teachers and parents) to study integrated science				
13	I naturally like integrated science				

SECTION D

The following statements describe some of the practical ways that could be employed to encourage Students to study integrated Science. **TICK All THREE (3)** most important ones that could make integrated science more appealing to students. Rank **the three (3)** that you have ticked in order of priority.

STATEMENT	**tick [√] only three(3)**	**Order of priority**
Guidance and counselling should be provided to encourage students to learn integrated science		
Teachers should stress the relevance of integrated science by Relating it to social and environmental issues.		
Teaching methods, techniques and strategies that will make integrated science interesting should be adopted.		
Students should be encourage by(e.g. parents, peers, teachers) to actively learn integrated science		
Teachers should invite scientist and renowned person in science to the classroom to motivate students		

THANK YOU