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Using Bar Magnets and Magnetic Substances to Enhance the Understanding of Magnetism among Basic Five (5) Pupils at Offinso College of Education Practice School

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ABSTRACT

The objective of this research was to help the pupils of Offinso College of Education Practice School specifically, basic five pupils to overcome the difficult understanding of the concept of magnetism. The study involved the use of interview, questionnaire and observation as instruments to solicit for information about pupils' previous and current performances before and after the intervention scheme was implemented. The researcher use bars of magnet and magnetic substance as an intervention to assist the pupils of Offinso College of Education Practice School Basic five to overcome the poor understanding of the magnetism concept. The findings revealed that the use of proper teaching methods as well as the appropriate teaching and learning materials will enhance or improve pupils' poor understanding of the concept of magnetism in basic five. The researcher also has the belief that if his suggestions are taken into proper consideration, pupils' difficulty in understanding and their low interest in science shall remain a thing of the past.

Background to the Study

Science is our understanding of how the world works and generally the world works fine whether we understand it or not. Science is the basis of all life and it is also a means of communicating ideas about the world in which we live. What prompted the researcher to write on integrated science as a teacher at Offinso College of Education Practice School is that teachers in class five have been teaching "magnetism" without using appropriate concrete materials to facilitate the concept taught. Magnetism is a topic frequently studied in elementary schools (Toleman, 1998). Since magnetism is a popular topic and is included in national education standards (American Association for the Advancement of Science, 2003; National Research Council, 1996), it might be assumed that elementary teachers have a good understanding of the topic and that pupils develop a good understanding of fundamental magnetism concepts. Unfortunately, evidence suggests that magnetism concepts are poorly understood across a broad range of potential learners. (Atwood, Christopher & McNall 2007; Constantinous, Rattopoulos & Spanoudis, 2001; Finley, 1986; Hickey & Schibeu; 1999). The lack of successful teaching and learning of magnetism concepts that occurs at basic five class of Offinso College of Education Practice School is due to the unused of teaching and learning materials in teaching the concept. The concept of magnetism encompasses of a broad spectrum of terms or concepts – magnetic, magnetic substance, magnetic poles, magnetic field, magnetization and demagnetization. People have known about magnets for thousands about thousands of years and they have been using them practically, as compasses. Magnetism is a force of attraction or repulsion that acts at a distance by Ron Kurtus (2013). For sometime now, the science education community has shown considerable support for teaching for understanding (Gallagher, 2000; Gardner & Boix Mannmsilla, 1994; National Research Council, 1996; Prawat, 1989; Wildey & Wallace, 1995). During the same period, it has been well documented that diverse populations of children and adults lack a scientific understanding of many fundamental science concepts across the biological, earth and physical science (Kratt, Christopher & Atwood 2009).

As a researcher playing with magnets is one of the first bits of science most children discover. That's because magnets are easy to use, safe and fun. They are also quite surprising but pupils do not get the understanding of the concept when taught is abstract. As a result of their inability to answer written questions on the said topic and many more, the pupils started showing little interest when it comes to teaching and learning of science.

Purpose of the Study

The aim of the study is to help teach the pupils about how magnets work – since teachers at the basic schools teach magnetism concept abstractly. Pupils find it difficult to understand that force of attraction and repulsion occurs within magnetic field. Carey (1985), the idea that understanding is domain specific is central to thinking about conceptual understanding and change. As a researcher, although understanding is constructed internally by an individual, the process may be influenced externally by a number of factors.

The main aim or goal of the study of the project is to inculcate into teachers the need to manipulate external factors and acquire magnetic substances to enhance the understanding of the concept of magnetism.

Research Questions

The major research question for this study was: what are the contributory factors that account for poor understanding of the magnetism concept amongst primary five (5) pupils of Offinso College of Education Practice School in the Offinso Municipality. Listed below was the sub – questions as a guide in answering the questions.

a. What are the causes of poor understanding of the concept of magnetism?
b. How accessible and available are teaching and learning materials to the teacher and pupils in basic five (5) of Offinso College of Education Practice School?
c. What is the level of education of primary five (5) teachers of Offinso College of Education Practice School?

Significance of the Study

It is hoped that findings of the study will help;

First and foremost, teacher should obtain magnets and magnetic substance from the immediate environment in the absence to well-designed bar magnet and magnetic substances. It will also equip the teachers with diverse techniques and strategies in the classroom. Pupils will be able to perform their own experiment to verify how magnetism develop positive attitude towards the study of science at an early stage, they will continue to higher level of studying science course. Moreover, the study of science will help pupils to develop some sense of curiosity, creativity, critical thinking and most of it all ability to communicate scientific ideas. To the policy makers in education, it will help them to identify the aspects of the curriculum which needs to be altered to suit the basic needs, interest and understanding of pupils. The researcher fervently hopes that the result of the study will provide baseline information for researcher wishing to investigate other related issues on magnetism and also inform the stakeholders in education the need to help.

Concept of Magnetism

Magnetism is as mysterious to learners of all ages as it is appealing, and rare would be the child who has not had at least some level of experience playing with magnets. National standards documents itemize at least some concepts about magnets and magnetism for student learning, beginning with K-2 and continuing through high school (AAAS, 2001; NRC, 2001). Surprisingly, however, few school age children have a scientifically based understanding of the concept of magnetism or how magnets work, regardless of the grade level and school instruction. Despite the familiarity and study, the mechanism and forces by which magnets function are seldom understood outside the science community. Researchers do not know surprisingly less about conceptions of magnetism (Hickey & Schibeci, 1999), nor have conceptions of magnetic phenomena been investigated as intensively as other physical phenomena, such as electricity and heat (Borges & Gilbert, 1998; Erikson, 1994).

While there is research regarding certain aspects of students learning about magnetism and the misconceptions and gaps in understanding they may have at specific grade levels (Borges & Gilbert, 1998; Constantinos, Raftopoulos & Spanoudis, 2001; Guisasola, Almudi & Zubimendi, 2004; Guth, 1995; Guth & Pegg, 1994; Johnson, 1999; Maloney, 1985; Meyer & Carlisle, 1996), little appears to have been done to study the longitudinal progression of how students learn about magnetism and magnetic phenomena. Emphasizing the need for students to understand magnetism on a practical level, Driver, Squires, Rushworth & Wood-Robinson (1994) concluded, "approaches which draw on everyday experience and focus on the uses of magnets would be advisable" (p. 127). A practical and coherent conceptual understanding of magnetism and magnetic fields may also provide a framework to understand less tangible concepts such as gravitation and electric fields.

Conceptual challenges for learning magnetism

Aspects of magnetism have been shown to be difficult for children to understand (Barrow, 1987; Borges & Gilbert, 1998). The idea of an object acting on another without touching is counterintuitive for young children; likewise it is difficult for children to understand that a magnet can both attract and repel other objects (Constantinou, et al., 2001). Magnetism, magnetic fields and the nature of magnetic materials also require a mental spatial orientation and the ability to construct mental models of abstract concepts including kinetic molecular theory and the particle nature of matter.

Humans understand a phenomenon by constructing a working model of their interpretation of the phenomenon and reasoning through their manipulating the model (Borges and Gilbert, 1998). Researchers believe that the process of building and reflecting upon mental models has a close

resemblance to everyday reasoning (Clement, 1991). In the process of constructing a mental model the learner reduces a phenomenon to the elements most meaningful, selecting "only some parts of the entity and relations between them" to create a personally meaningful representation (Gilbert &Boulter, 1995). The model initially produced may aim toward descriptive and mechanistic representations to describe structure or function. The aspects of focus within a mental model are likely to be influenced by purpose, need, and prior knowledge and experiences that the learner may have. There are a number of challenges in learning magnetism. Student learning and conceptions have been studied from the elementary grades through college (Barrow, 1987; Borges & Gilbert, 1998; Brademante&Viennot, 2007; Constantinou, et al., 2001; Erikson, 1994; Guisasola, et al., 2004; Guth&Pegg, 1994; Saglam& Millar, 2006). Borges and Gilbert found that among secondary, university and graduate students, the majority of these students retained naïve and scientifically flawed concepts about magnetism, even after long periods of study.

Magnetism and Charge

Probably, the most common conception about magnets that has emerged from research, with which learners across all ages and levels of education struggle, is congruence of magnetic activity with charge – the belief that some regions of the magnet are positive and others are negative. The beliefs that the poles of a magnet are electrically charged, and that magnetization involves the transfer of charge, have been revealed from studies of learners across multiple ages and educational levels (Borges & Gilbert, 1998; Hickey &Schibeci, 1999; Maloney, 1985; Saglam& Millar, 2006). Maloney (1985) found among high school students the belief that magnetism and charge is one and the same thing. Students believed that one pole of a magnet is positively charged and the other is negative, or that an object with a static charge will be attracted to a magnet. In a study of grade 6 students, Barrow (1987) found that students believed that magnetism resulted from the distribution of electrons in one object and protons in another, making electrostatic and magnetic interactions synonymous. Students also often view magnetization as the flow of charges (Borges & Gilbert, 1998).

In a study by Guisasola, et al. (2004), researchers examined students' conceptions regarding how a magnet could attract an object like a paper clip. In both written response and interview, responses such as the following excerpt were common, alluding to the role of charge in the model of magnetism (Guisasola, 2004, p. 451): A paper-clip is a metal, and metals have free electrons in their structure. The field generated by the magnet polarizes the magnet and attracts or repels electrons, depending on the pole of the magnet that we use. This way, we shall have the positive pole of the magnet with the negative zone of the clip, or vice versa, that will attract. Hickey and Schibeci (1999) found that in pre-service and in-service elementary teachers' accounts of magnetic attraction and repulsion, the majority clearly supported a polar charge model, although through different mechanisms by which charge is accumulated and transferred. However, these researchers pointed to the possibility that use of the term "charge" may in some cases refer to symbolism often found in textbooks, wherein the plus and minus signs are used as a means of differentiation between poles rather than to imply electrical charge.

Magnetic Fields

The concept of the magnetic field has emerged as a means of understanding the nature of magnetic effects and interactions. As a means of describing physical quantities in time and space, the field is a unifying concept in the explanation of magnetism. It is an abstract concept that took 150 years to formally emerge. Students have difficulty with constructing mental models of magnetic fields and understanding the concept of force at a distance and often attribute a real existence to field lines and their action on other objects. Students often believe that a medium is required for a transmission of the action of a magnet, that the field affects a change in the space surrounding it which mediates the interaction, that the field has a finite boundary (Bar, Zinn& Rubin, 1997), and "think that the magnet cannot function without gravity" (Bradamante, Michilini & Stefanel, 2006, p. 375).

Learning Progressions

With few exceptions research in children learning about magnetism has tended to focus on single concepts, effectively and accurately reported students' conceptions, but within a rather narrow range of concepts, as outlined above. Little has been done to investigate across ages, students' linking conceptions of how magnetization occurs, the mechanism of the alignments of domains and the types of magnetism exhibited by various materials, or to describe a coherent progression by which children can link these concepts together. While this prior work has gone far to build a research base of understanding and to inform instruction, there has been little done to investigate children's beliefs and conceptual development of magnetism across multiple grades, or from a longitudinal perspective. The synthesis of a cross-age account of students' conceptual grasp and development of the concepts of magnetism, in the form of a learning progression, will help to define congruent and interrelated concepts and how they might build together for a coherent understanding. As we began to examine sequential ways in which concepts important to the understanding of magnetism could be related, research in learning progressions provided a framework. (Alonzo & Steedle, 2008; Catley, Lehrer & Reiser, 2004; Smith,

Anderson, Wiser & Krajcik, 2006; Yunker, 2008). Research into children's developmental learning of a concept, spanning multiple grade levels is still largely nonexistent (National Assessment Governing Board, 2006). Additionally, depending on the construct, there may be more or less evidence about how the ideas at a given level of understanding "hang together," but even so, past research has focused more on single ideas and concepts, rather than relationships between them (Alonzo & Steedle, 2008).

A learning progression begins with the synthesis and definition of a construct and the elaboration of those key concepts which shall serve to provide a developmental framework surrounding the construct – the "big ideas." Big ideas refer to key concepts and organizing principles that are at the core of a discipline. Wiggins &McTighe (1998, 2006) characterize a big idea as a linchpin− an idea within a content domain that has an enduring value throughout and at multiple levels with the domain. More than a fact or skill, a big idea provides more than a conceptual anchor for students' construction of knowledge. Big ideas provide a focus, both to prioritize concepts and to provide a basis for teaching, student learning and assessment (Wiggins &McTighe, 2006). As developmental schemata of domain specific content knowledge, cognitive skill and conceptual understanding, mature learning progressions are grounded in research in learning and are informed by empirical evidence of student performance in classrooms. Built around central disciplinary concepts, the ways in which students learn these concepts, the alternative conceptions students may have, and how these conceptions can be overcome, a learning progression becomes a portrait of learning as well as a model for instruction linked to standards of performance and assessment of student progress (Kennedy & Wilson, 2007; Smith, et al., 2006).

Standards documents or research from cognitive science may be used to define and clarify exactly what it is that students should be required to know about the construct. At one end, learning progressions are anchored by these expectations, clarifications of what it is that students should be expected to know, or be able to perform, within the context of the domain, relative to the student ability, grade level and context. These upper performance levels, the goals of the design of instruction, define the top level of the learning progression and can be referred to as upper anchors (Mohan, Chen & Anderson, 2008). At the novice level of the progression, anchors are defined by students' existing knowledge. Lower anchors may be elicited though empirical research on students' existing content knowledge and conceptual development. Alternately, if empirical data is unavailable, review of the research literature on students' understanding of the identified construct, including misconceptions and alternative understandings, may be used to support the development and progress of full understanding.

The definition and separation of levels between what students may be expected to understand between the theoretical 'expert' level and less sophisticated levels, may begin from a hypothetical position, but through iterative development should become more an evidence-driven process. In the development of a learning progression on the rock cycle, for example, Yunker (2008) used semi-structured informal interviews with participants of a progression of educational levels (6^{th} graders, pre-service teachers, graduate students and professors) to elicit relative levels of understanding of the concept. In the process, she revealed as well, gaps in understanding and misconceptions, even at the upper educational levels. Other methods that have been employed have included using manipulatives during semi-structured interview, such as a size and scale card sort or interacting with children in an informal learning environment like a field trip (Plummer, 2008) and video analysis of children's activities and group discussions.

Once upper and lower anchors and appropriate levels of conceptual sophistication differentiating them are projected, students' conceptual levels are empirically tested with, for example, formal and embedded assessments, as well as interview, focused on validating the "fit' of the progression's prediction, as well as to elicit alternative ways in which students confront the situations. From this, a preliminary learning progression, describing students' conceptual pathways can be formulated and field tested.

One challenge in this process is the use of language; another is the issue of consistency (Alonzo &Steedle, 2008). In the case of language, meanings of a word often change with age. The word force, for example means something different to children when the concept of motion is associated with it. Terminology also varies with perspective and context. The chemical symbol Na, for example, may mean a shiny soft metal that bursts into flame when it is dropped into water in one context; it may just as well represent an atom with eleven electrons and low ionization potential in another (Bodner, 2008). The same words, terms or symbols often have entirely different meaning, which poses not only problem in communication, but leads to errors in assessment and student frustrations. Consistency of representation also changes with age and personal experience, for example the way we look at an object or consider its function. Younger students may take a more intuitive experiential look at a situation, for example in the modeling of a magnetic field, whereas older students may associate specific rules of action with specific situations, but fail to see similarities where they occur.

Research Design

The study was an action research. Action research can be defined as a wide variety of evaluative, investigative and analytical research method designed to diagnose problems or weakness whether organizational, academic or

instructional and educators develop practical solution to address them quickly and efficiently. The general goal of action research is to create a simple, practical, repeatable process of iterative learning, evaluation and improvement that leads to increasingly better results for schools, teachers and school programs.

According to Mills (2011), action research is an attractive option for teacher, researchers, school administrative staff and other stakeholders in teaching and learning environment to consider. He further explained that, it provides practitioners with new knowledge and understanding about how to improve educational practices or resolve significant problems in classrooms and school. He also stated that "within education, the main goal of action research is to determine the ways to enhance the lives of children" (Mill, 2011).

Action research is more of relevance to researches. Johnson (2012) asserts that action research bridges the gap between research and practice. For instance, the theoretical components underpinning action practice are used to help practitioners understand and observe what is happening in the classroom setting. At the same time, with the interests of best practice in mind, these collected data "are used to understand or inform theories and research related to best practice" (Johnson, p.20). Also, similar vein to the enhancement of the professional disposition of teachers, action research encourages teachers to become continuous learners within their classroom and schools (Mills, 2011). Because of the professional, reflective stance required by practitioners engaged in the action research sequence, teachers are further encouraged to "examine the dynamics of their classrooms, ponder the actions and interactions of students, validate and challenge existing practices and take risks in the process" (Mills, p.40). These specific action are similar to these regularly exercised by teachers on a daily basis. Using systematic and strategic action research plan provides those daily actions with increased structure, focus and methodology vigour.

Everything has its own ups and downs thus strength and weaknesses. Commenting on the weaknesses of the action research include lack of clarity of focus for the project, managing constraints of time and holding a presumed foreknowledge of the solution. In spite of the disadvantages of action research, it has a whole range of positive attributes to pupils and teachers which includes; it introduces teachers to new ideas in their professional development, it makes both pupils and teacher aware of learning strategies and it makes teachers acquire a specialized set of skills and competencies and also some of which have already been mentioned above. The action research was therefore considered appropriate for this study because the researcher intended to enhance the understanding of the concept of magnetism in Offinso College of Education Practice School.

Population and Sample Selection

The population for this research comprised of teachers, pupils and the head teacher of Offinso College of Education Practice School in the Offinso Municipality in the Ashanti Region of Ghana. The accessible population was primary five teachers and pupils of Offinso College of Education Practice School in collaboration with the head teacher of the institution. The researcher decided to use primary five pupils and teacher because the class has magnetism as one of its major topics to be treated in primary five. The population includes all elements that meet certain criteria for inclusion is a study.

Sample and Sampling Procedure

The researcher used simple random sample (lottery method). Here "Yes" and "No" were written on a slip of paper folded very well and mixed up in a box. Talking about the sample, it comprised with three primary five teachers and forty-nine pupils together with the head teacher of the school. The researcher chose the primary five teacher because they are expected to teach magnetism in their various classes. (Pilot and Hungler, 2004:294). The sample size constituted of forty-nine (49) pupils out of the one hundred and forty-seven (147) as the number of pupils in primary five (5). Gay (1981) suggested that, the minimum of the sample should be 10% with which generalization can be made.

Owing to this suggestion by Gay, the researcher believed that with a better percentage of 34%, valid generalization can be drawn. The size of the sample was not controlled by saturation of information which means, the point at which repetition or confirmation of previous collected data occurs, thus these was a specific number of participants (Streubert Speziale and Carpenter, 2003:25).

Research Instrument

Relevant data of the analysis was collected by the use of different instruments which Jackson (1968) commented that, it is always better to describe a classroom using different approaches. Since classroom life is too complicated to be viewed from a single approach and for that matter, the researcher was compelled to use three instruments. The instruments included observation, interview test and questionnaire and they are discussed below.

The first instrument being the observation was chosen for the reason that it is less time consuming and relatively inexpensive. The observation guide covered teaching methods and strategies, learning environment, availability and accessibility of magnet and magnetic substances to pupils. The researcher further observed pupils gestures and the facial expression of pupils when the lesson was taught. This helped the researcher to identify the level of misunderstanding of the concept of magnetism. The second instrument which is the interview guide can also be defined briefly as a face-to-face interaction between the

interviewer and the interviewee. The rationale behind the use of interview was that non-verbal behaviours can be examined from the respondents. It covered teachers' time spent on teaching the concept of magnetism, availability and accessibility of magnet and magnetic substances to pupils and activities conducted during teaching and learning of the concept. The third research instruments used was test. The instrument made the researcher to achieve the purpose of the study. It was used to find out how the pupils are coping and the understanding of pupils in the concept.

The test instrument used by the researcher is the questionnaire. Ary, Jacobs and Rezaview (2002) commented that questionnaire can be answered more easily and quickly by respondents. They explained that questionnaire makes it easier for subjects to respond to questions on sensitive or private topic and owing to this, the researcher was convinced to use this instrument. The questionnaire for teachers covered their educational level, professional and academic qualification, their teaching methods and strategies, availability and accessibility of magnets and magnetic substances to pupils, time allocation, class enrolment and other matters.

Data Collection Procedures

Upon arrival in Offinso College of Education Practice School in the Offinso Municipality, the researcher observed everything in the school including the matrons and their feeding in the school. The researcher then wrote to the supervisor to seek permission to use the primary five class of the school for the data collection. An approval letter was then sent to the researcher through the head teacher. The researcher then used that as an opportunity to proclaim to the head teacher about the intention which was warmly approved by the head teacher and the class teacher as well. Copies of the refined questionnaires were printed and distributed to the head teacher and the class teacher of class five. The researcher collected them after some time since the participant insisted they needed enough time to answer the question on the questionnaires.

The head teacher was also given a questionnaire which he responded and returned it excellently. With the pupils, 49 questionnaires were distributed and all were returned (excellent). Pupils data collection was done every day during break time when there are no other pupils around to avoid any external influence. During the school observation, the researcher focused on the methods and strategies the teacher used during the teaching and learning process. The researcher also checked the class size, library, availability and accessibility of magnets and magnetic substance and time allocation.

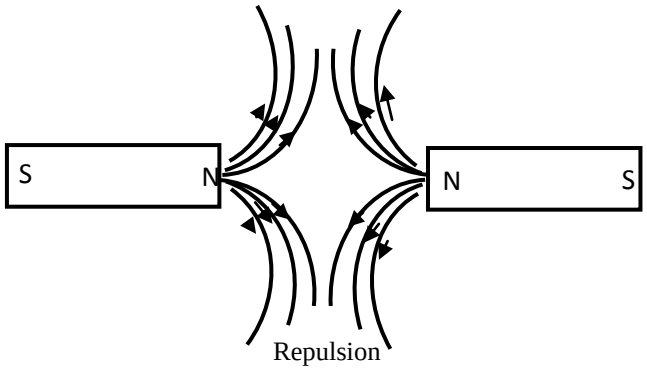
Pre-Intervention Stage

Pupils were made to answer questions in the primary (5) Integrated Science text book page 48. This confirmed the response of the questionnaire and observation made, which suggested the deficiency in the pupils understanding of magnetism. Pupils were assessed based on the scores made by each student. The results are found in the data analysis.

Intervention Stage

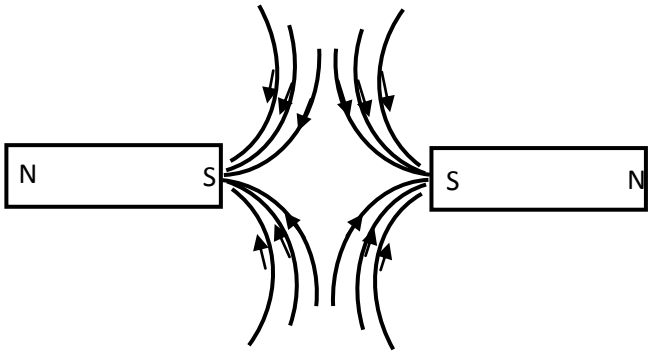
An intervention is a set of strategies planned and implemented to solve a specific problem or improve an immediate solution. The researcher used magnet bars and magnetic substances to teach the concept of magnetism to solve the problem. In using the materials to teach, the said concept, the first was to teach "the attraction and repulsion of bar magnets." The activities below helped the concept of magnetism.

a. The north poles of two magnets are brought into contact to each other.



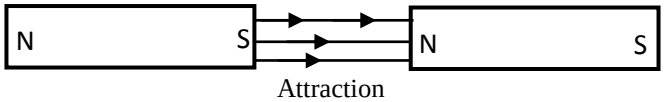
Repulsion

b. The south poles of two bar magnets are brought into contact to each other.



Repulsion

c. Opposite poles of two magnets are brought into contact to each other.



Attraction

Magnetism

Ron Kurtus (2013) indicated that magnetism is a force of attraction or repulsion that acts at a distance. It is due to a magnetic field which is caused by moving electrically

charged particles. Magnetism is said to be one aspect of combined electromagnetic force. It refers to physical phenomena arising from the force caused by magnets, objects that produce fields that attract or repel other objects. Magnetism is a topic frequently studied in elementary schools (Toleman, 1998). As a researcher, magnetism can easily be defined as a phenomenon associated with magnetic fields, which arise from the motion of electric charges. This motion can take many forms. It can be an electric current in a conductor or charged particles moving through space, or it can be the motion of electron in an atomic orbit.Magnetism is part of the magnetism and electricity stand unit in energy and forces. In infant classes pupils are encouraged to play with magnets and to investigate their effect on different materials. As they become older children explore the effects of magnets and become aware magnets attract i.e pull of push materials such as iron and then in third and fourth classes children starts to explore the poles of magnets and relationship between magnets and compasses.

Magnet:

According to Ron Kurtus (2013), a magnet is an object that exhibits strong magnetic field and will attract materials like iron to it. A body having the property of attracting iron and producing a magnetic field extend to itself (by Merriam Webster). To the researcher, a magnet is a piece of material with a strong attraction to a metal object. The attraction of a magnet produces is called "magnetic field." In summary, a magnet is a material or object that produces a magnetic field. This magnetic field is invisible but is responsible for the most notable property of a magnet.

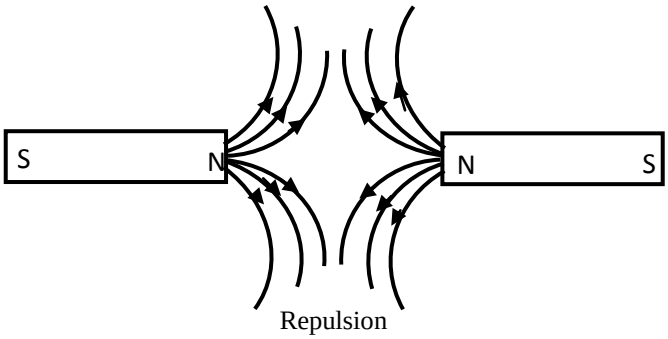
The basic properties of a magnet are:

a. Magnetic poles always exist in pairs (i.e.) the North Pole and the south pole.
b. When the magnet is dipped in iron fillings, they cling to the ends of the magnet. The attraction is maximum at the two ends of the magnet.
c. When a magnet is freely suspended, it always points along north and south direction.
d. Like poles repel each other and unlike poles attract each other.

In another school of thought, the general properties of magnets are;

North pole South pole

1. Magnets have polarity. A magnet in the shape of a bar (a bar magnet) has two ends called the north seeking pole or north pole and the south seeking pole or south pole.
2. Like poles repel, opposite pole attracts. .



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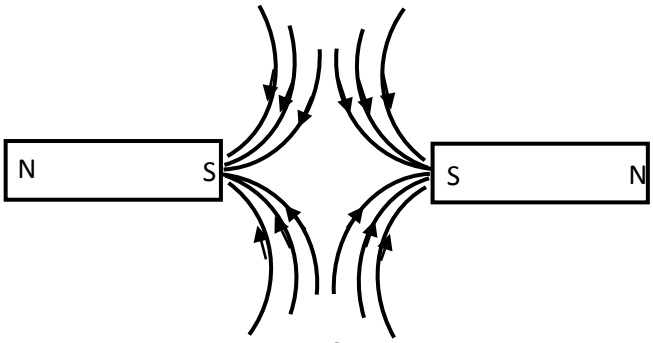
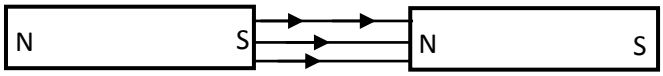


Repulsion



Attraction

3. Some metals can be permanently magnetized, and some ores in the earth are already magnetized. E.g. Lodestones are naturally occurring magnets.
4. Some metals can be turned into temporary magnets by being near another magnet.
5. Magnets cannot be broken or separated into separate north and south pole.

To the researcher, properties of magnet include:

1. Magnetic materials. Magnets only attract strongly certain material such as iron, steel, nickel, cobalt and ferrites.
2. Magnetic poles. These are the places in a magnet to which magnet materials are attracted.
3. North and south poles. If a magnet is supported to that, it can swing in a horizontal plane, it comes to rest with one pole, the north-seeking or N pole always pointing roughly towards the earth's N pole.
4. Law of magnetic poles. If the N pole of a magnet is brought near the suspended magnet, repulsion occurs. Two S poles also repel. By contrast, N and S poles always attract. In summary, like poles repel, unlike poles attract.

Types of magnets:

There are three main types of magnets:

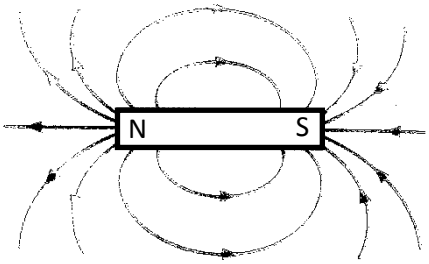
- Permanent magnet
- Temporary magnet
- Electromagnets

Permanent Magnets:
Permanent magnets are those we are most familiar with such as the magnets hanging onto our refrigerator door. They are permanent in the sense that once they are magnetized, they retain a level of magnetism. As we will see, different types of permanent magnets have different characteristics or properties concerning how easily they can be demagnetized, how strong they can and so on. However, the first artificial permanent magnet was invented and named KS steel by Mr. Kotaro Honda in 1917.

Temporary Magnets:
Temporary magnets are those which act like a permanent magnet when they are within a strong magnetic field, but lose their magnetism when the magnetic field disappears. Examples would be paperclips and nails and other soft iron items.

Electromagnet:
An electromagnet is a tightly wound helical coil of wire, usually with an iron core, which acts like a permanent magnet when current is following in the wire. The strength and polarity of the magnetic field created by the electromagnet are adjustable by changing the magnitude of the current flowing through the wire and by changing the direction of the current flow.

Magnetic Field:
Magnetic field is a space surrounding a magnet where it produces a magnetic force. According to Jim Lucas (July, 2015), a magnetic field exerts a force on particles in the field due to the Lorentz force. The motion of electrically charged particles gives rise to magnetism. Wikipedia (2016), a magnetic field is a force field that is created by moving electric charges. To the researcher, a magnetic field is a space around a magnet where magnetic force can be felt. Magnetic field may be represented by continuous lines of force or magnetic flux that emerge from the north seeking pole and enter south seeking pole. (Encyclopedia, 2018).



Magnetic field

Magnetic and Non-Magnetic Substances: Magnetic substances as material which are attracted by a magnet. He further categorized magnetic substances into

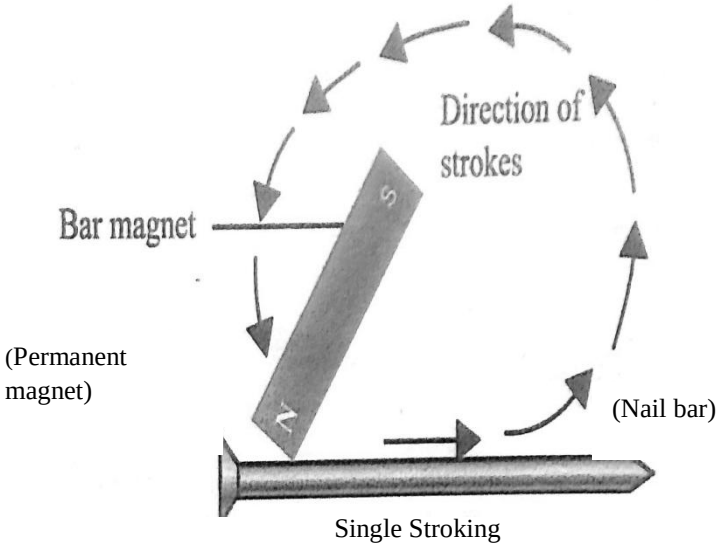
a. Ferromagnetic substance
b. Paramagnetic substance

Ferromagnetic materials or substances are materials which a strongly attracted by a magnetic e.g. iron, steel, nickel, combalt etc. The permeability of these materials is very high. Paramagnetic substance are materials which are not strongly attracted to a magnet e.g. aluminum, tin, magnesium etc. Their relative permeability is small but positive. Non-magnetic substances are materials that are not attracted by magnet. Materials that are attracted by a magnet are referred to as magnetic materials and those not attracted are non-magnetic materials.

Process of Magnetization and Demagnetization:
Magnetization as the process of making a substance temporarily or permanently magnetic, as by insertion in a magnetic field. The extent or degree to which something is magnetized is magnetization. According to Thesaurus dictionary, magnetization is the process that makes a substance magnetic (temporarily or permanently). Corrosionpedia Inc., defined magnetization as the density of magnetic dipole moments that are inducted in a magnetic material when it is placed near a magnet. To the researcher, magnetization is the process of making a magnetic substance magnetic. The method of magnetization are:

a. Stroking
b. Electric method
c. Induction

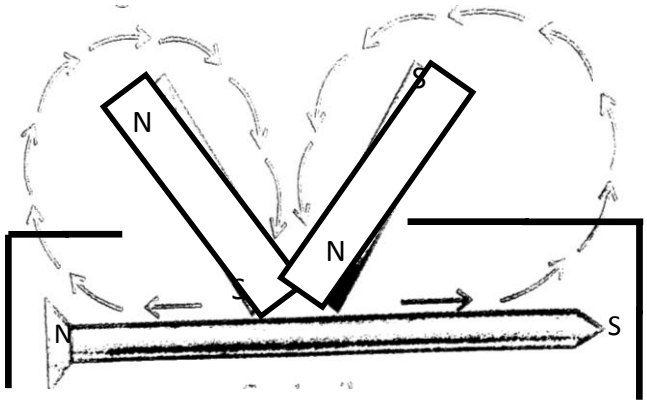
Magnetization by Stroke: Single stroke
A single magnetic bar is used in this method. It is done by striking the magnetic material from the north pole to the south pole by using the magnetic bar.



Single Stroking

Double touch:

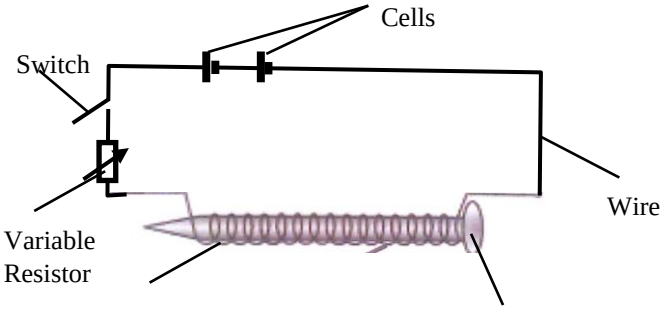
Two permanent magnets are used in this method. In this method each pole of the magnetic bar is used to stroke half of the materials to be magnetized as shown below.



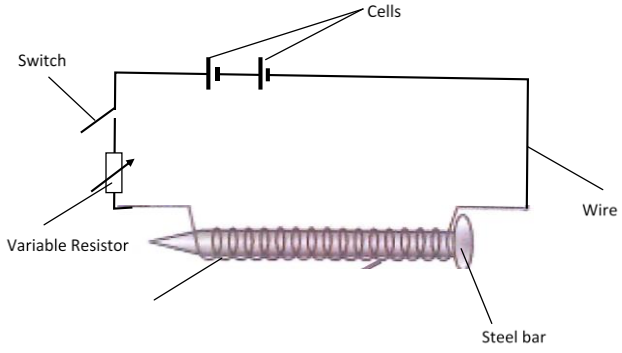
Bar magnet (Permanent Magnet)

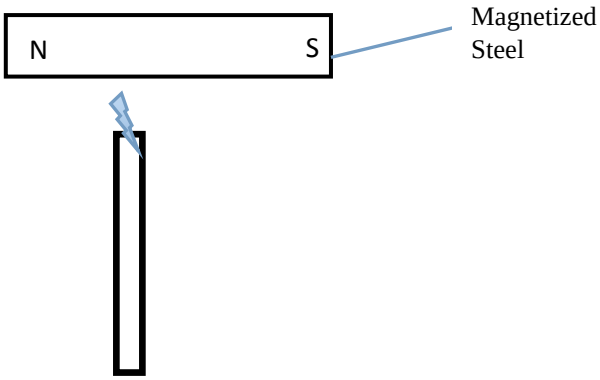
Bar magnet (Permanent Magnet)

When a large direct current is passed through the solenoid, the unmagnetised iron bar will become magnetized after a while. This is because when an electric flows through the solenoid, it produces a strong magnetic field which magnetizes the iron bar.



Heating: Heating a piece of magnetized metal in a flame will cause demagnetization by destroying the long-range order of molecules within the magnet. By heating a magnet, each molecule is infused with energy. This forces it to move pushing each molecule oil of order within the magnet and leaving the piece of metal with very little or no magnetization





Hamming: When a magnet is hammered or dropped, the vibrations caused by the impact on the magnet randomize the magnetic molecules within the magnet, forcing them out of order and destroying the long-range of the unit magnet

Post-Intervention Stage

Post-test was conducted at the end of the intervention to check the effectiveness of the intervention. The researcher gave sample questions for pupils to answer. The post-intervention test revealed a clear improvement in the pupils' understanding of magnetism.

Data Analysis

The responses to closed-ended item were coded and data were processed and analyzed by the use of computer software and other measures. Percentages and frequencies were used in presenting the data on respondents. The data from the three categories thus the head teacher, the class teacher and the pupils were analyzed manually to find general trends or themes. Lastly, the data analyzed were then organized in relation to the research questions and presented in the form of tables, charts and figures.

Results, Findings and Discussions

The main focus of this study was to find out causes of poor understanding of the concept of magnetism among primary five pupils of Offinso College of Education Practice School. This chapter presents and discusses the results of the analysis of the data collected for the study. Text is considered a rich source of data in qualitative studies and may be solicited by mail or in person (1999:25) comments that when a researcher uses written narratives, it is extremely important to make it clear what the respondents have to write about. Polit and Hungler (1999:31) suggest that the researcher starts with some general questions or topics and allows the participants to tell stories in a narrative fashion. The key issues are causes of poor understanding of the concept magnetism, the academic and professional competencies of teachers who teach Integrated Science in primary five (5) of Offinso College of Education Practice School, the availability and accessibility of magnet and magnetic substance to the teacher and pupils, the regularity,

punctuality and commitment of teachers to their work and techniques and strategies teacher adapt in teaching magnetism in primary five (5) pupils at Offinso College of Education Practice school. Before addressing these issues, the biographical data of respondents are presented below.

Table 1: Shows the sex respondents

Responses	Pupils		Teachers		Head Teacher	
	No.	%	No.	%	No.	%
Male	26	53	2	67	1	100
Female	23	47	1	33	-	-
Total	**49**	**100**	**3**	**100**	**1**	**100**

The result in table 1 shows that 26 representing 53% out of the 49 pupils that responded were males and 23 representing 47% were females. It was also observed that 2 representing 67% of the teachers that responded were males and 1 representing 33% were females. For the head teacher, the respondent was a male and in totality thus of all the fifty-three respondents, 29 which represent 55% were males and 24 which represent 45% were females.

Research Question 1

What are the causes of poor understanding of the concept of magnetism?

Table 2: Shows teachers' responses on causes of poor understanding of the concept of magnetism

No. of Items	No. of Respondents	Percentage %
Do you have high educational background.	1	33.3
Use of varying techniques and methods in teaching.	0	0
Use of appropriate TLM's in teaching.	0	0
Motivation and reinforcement of pupils.	0	0
Finding out and solving problems of pupils.	1	33.3
Taking care of special children.	1	33.3
Total	**3**	**100**

Source: Field Survey, 2018

The results in table 2 shows that out of 3 teachers that responded, 1 representing 33.3% of the respondents indicated that he had attained high educational competency. The educational competency comprises regularity and popularity of teachers. If out of 3 teachers only 1 responded to punctuality, then it implies that teachers were absent once or twice every week. Lockhead and Komeman (1989) suggested that the amount of time available for teaching and how it is used by teachers and students have direct bearing on students' achievement. This means that the period of time allocated to the study of Integrated Science and the effective utilization of that period for the teaching and learning of Integrated Science determines pupils understanding in science topics. The ability of teachers to teach magnetism effectively to enhance learning depends mainly on their competence.

The table also shows that out of 3 teachers that responded, none representing 0% of the respondents responded to the use of varying techniques and methods in teaching. This means that teachers do not vary their techniques and methods they use in teaching Integrated Science. This might be a major cause of pupils misunderstanding of the concept of magnetism. In many cases, students have developed partially correct ideas that can be used as the foundation for further learning (Clement et al, 1989). The idea that understanding is domain specific is central to thinking about conceptual understanding (Carey, 1985). Further, although understanding is constructed internally by an individual, the process may be influenced by external factors including techniques and methods of teaching. Hence, it becomes necessitated to combine technique, methods and strategies so the teaching and learning of magnetism would be made simple. If teachers therefore do not vary their techniques in teaching pupils would continue to have difficulties.

The table also shows that out of the 3 teachers that responded, 0 representing 0% of the teachers indicated that they use the appropriate teaching and learning materials in teaching of magnetism. Considering the statistics, it is very abysmal to record such a null record in using teaching and learning materials in teaching the concept of magnetism. McDermott, 1996 has led a group in the development of instructional material, called "physics by inquiry." McDermott in 1996 said instructional materials has been associated with sharply increased performance among pre-service elementary teachers studying several science topics Atwood, Christopher and McNall (2006) cited that materials are structured to encourage students to take responsibility for their own active learning. As a researcher, instructional materials must be available at all times to promote metacognitive processing because students must compare the explanation they have held in the conceptual framework with explanations that explain the data they generate through investigation.

Out of 3 teachers responded, none responded to the motivation and reinforcement of pupils. The ability to understand and control emotions influences the literacy development process by determining the child's ability to create meaningful relationships with other people and cooperate with others. Pupils with emotional problems often exhibit learning deficit because their ability to integrate with other members of society. Some pupils do suffer from

psychological trauma and so it is the duty of teacher to always encourage and motivate such pupils to overcome their problems. Johnston (2012) suggested that emotional factors are related to child's emotional wellbeing as well as the ability to understand, express and control emotions. It is from this suggestion that the researcher generalized that pupils with emotional problems cannot comprehend to acquire the understanding of the concept taught.

The teacher also observed that none of the teachers responded to the item that asked teachers to indicate whether or not they help them. This was very absurd on the part of the teachers, the duty of the teachers is not only teaching pupils from context and content but also to help pupils to overcome their problem. Aristotle sees education as the process of creating a sound mind is a sound body. As any process needs planning and end in order to get the desired results, reading also needs planning and this is based on the teacher. The researcher confidently says that the irregular teaching of integrate science on the part of the teachers might be a major cause of pupils difficulty in reading. Azikiwe (1998) stated that teaching and learning materials generally are essential ingredient for teaching especially Integrated Science topics and there are also powerful source of motivation. In this case, if pupils have problems in hearing, the audio-visual aids can also be used by teachers to curb such problems to enhance learning.

Table 3: Shows pupils responses on the causes of misunderstanding of magnetism concept

No. of Items	No. of Respondents	Percentage %
Teacher using concrete materials in teaching.	8	16
Number at times teachers teach is a week.	9	18
Teachers using varying methods and technique in teaching.	9	18
Parents providing their basic educational needs.	16	33
Do parents assist you in your homework / assignments?	7	15
Total	**49**	**100**

Source: Field Survey, 2018

The results in table 3 indicate that out of the 49 pupils that responded, 8 representing 16% of the respondents indicated that their teachers used concrete materials in teaching magnetism. Effective teaching and learning of any subject will not only stimulate pupils interest in the subject but also enhance their achievement in examination. To achieve effective learning process, there is the need for teachers to use concrete materials in teaching magnetism in the classroom. The absence of these materials in most schools constituted problems for effective learning process. Azikiwe (1998) supported this notion that in the teaching profession, textbooks and other instructional materials such as newspaper, magazines, journals and other publications help both teachers and pupils to have better and quicker understanding of what pupils learn but only 8 out of 49 pupils responded that teachers use concrete materials which is very bad and might be a major cause of poor understanding of magnetism concept of pupils. If teaching aid are used in teaching, it will facilitate the understanding of whatever is taught in the classroom.

The result also shows that out of 49 pupils who responded, 9 which forms 18% of the respondents indicated that the frequency at which teachers teach science in a week. This means that a chunk of teachers rarely teach science and this contributes to the poor understanding of the concept of magnetism. The researcher therefore observed that the amount of time pupils spend on integrated science is quite small since time in instructions a critical factor in teaching and learning, it should therefore be contended that a successful integrated science lesson should include large amount of time for teaching the concept of magnetism. On the contrary, teachers fail to have frequent science lesson with pupils and owing to that pupils a not able to have proper understanding of magnetism concept.

The result further displays that out of the 49 pupils that responded, 9 representing 18% of the respondent indicated that teachers use varying method, strategies and techniques in teaching Integrated Science. This means that a few of the teachers will vary the methods and strategies they use to teach integrated science. If out of 49 pupils only 9 of them confirmed that teachers use varying methods in teaching science then this is very heartbreaking because learning does not involve learner simply decoding what is taught in the class without bringing their own knowledge to interact with the concept but it includes the development of other skills. According to McDermott, Heron, Stelzer (2006) cited that the traditional instruction has failed to result in the desired understanding, so it is unsuitable for study. To the researcher, most teachers must therefore combine several techniques, methods and strategies so the teaching of magnetism would be made simple. If teachers therefore do not vary their techniques in teaching pupils would continue to have difficulties.

As some methods develop the pupils or learners cognitively thus the ability to hear, identify and manipulate teaching aids, others help learner to associate the classroom work to what is done at home. Some methods also help the retention of what is learned in the classroom. B.F Skinner (1984) once said "Education is what survives when what has been learned has been forgotten. If teachers vary their techniques in teaching science, then pupils can easily remember the concept taught.

The results from the table also portrayed that 16 representing 33% of the pupils who responded indicated that

parents provided them with basic educational needs. The education of a child does not solely depend on the classroom teacher. Since education is a continuous process, it starts right from the child's immediate environment and the immediate environment here in this context means the home. Research has shown that a child who grows up in a home where learning is supported and, viewed as very important performs well in class. The parent as a cell acts only with love and respect and it dominates the understanding, affection, sacrifice and childcare (Emerllahu, Dali; 2001). So, in this way builds a siren environment for learning to take place (Claudia &Eberhard Muhlan, 2008).

Children's rights have often been perceived as "a political hot potato", which, rather than advancing children's interest, jeopardize them (Melton, 2005). This is a disturbing state of affairs, which one would like academics and professionals working on children's issues to fight. The lack of successful teaching and learning of magnetism concepts that occurs at primary 5 in Offinso College of Education Practice School may be partly due to deficiencies in textbook for pupils (Barrow, 1990). If parents provide needed books, the required amount of money, the exact skills and knowledge expected of pupils before formal education, the necessary motivation and others, pupils will have sound mind to study since education is the process of creating a sound mind in a sound body.

The table finally shows that out of the 49 pupils that responded, 7 representing 15% of the respondent indicated that parents do help them in their assignments / home works. If the parents of only 7 pupils help them in their works then this means that 42 pupils depend on the classroom work only and do not have any support in the house concerning academics. Comparing what the above literatures have said with what is obtained in Offinso College of Education Practice School; one can declare that the above raised point are the major contributory factors of pupils poor understanding of the concept of magnetism.

Table 4: Shows parents responses on the causes of pupils' poor understanding of magnetism concept

No. of Items	No. of Respondents	Percentage %
Ability of providing ward with educational needs.	7	14
Assisting wards at home with academic work	7	14
Number of days pupils attend school in a week.	20	41
Motivation and reinforcement of wards.	6	12
How often do you help your ward in practical work?	9	19
Total	**49**	**100**

Source: Field Survey, 2018

The results in table 4 above shows parents responses on the cause of poor understanding of magnetism concept in Offinso College of Education Practice School. From the table, it is shown clearly that out of the 49 parents that responded, 7 representing 14% of the respondent indicated that they provided their wards with basic educational needs. This means that 86% of parents do not provide their wards with basic educational needs of their wards. This is very heartbreaking because if the pupils do not get any support in their education from the house, their learning abilities would be negatively affected. Materials such as textbooks, Azikiwe (1998) commented that teaching aids and materials for learning are essential ingredients for teaching and learning especially in science related topics. This is why the researcher is of the view that parents must provide their wards with their basic education needs so that at their leisure time they would have access to these books and this will enhance pupils' understanding in science topics especially the concept of magnetism. Since parents do not help their wards by providing their educational needs, pupils waste the leisure time on unnecessary activities to the detriment of their learning. Family is the primary influence of young children and sets the stage for how they grow and develop (Bronfenbrenner, 1986). The more parents are involved with their children, the more positive learning and general life outcome occur (Baker, Goesling&Letendre, 2002).

The table further displays that out of the 49 parents that responded, 7 representing 14% of the respondents indicated that they assist their wards at home with their academic activities. This academic study comprises helping them their assignments / home works, helping pupils to practice what is learnt at school in the house. Research has shown that chunk of our parents are illiterates in the sense that they cannot read and write and owing to this pupils from such homes are very weak in academics because they do not get any help from the home where they spend most of their time.

The results in the table also shows that 20 parents thus 41% of the respondents answered the number of times their wards attended school in a week which means that their wards are always present in school. This statistic clearly shows that 59% of parents did not respond to that and it is obvious that their wards are truants or attend classes twice, thrice and even once a week which is very bad and might be a major contributory factor to pupils poor understanding of magnetism concept. This is why researcher is of the view that if parents make sure that their wards attend school very frequently in order to have effective understanding of what is taught at school. Parents who are illiterates would always make sure their wards are in school unlike the illiterates.

The results in the table again shows that out of the 49 respondents, 6 representing 12% of the respondents also responded to the item which asked parents whether or not they motivate and reinforce their wards. Since motivation is

an internal and external factors that stimulate desire and energy in people to be continually interested to a job, role or subject. As the most widely adopted human right document in history, ratified by 192 countries, UNCROC provides a powerful backdrop to the care of children Act. (Boshier 2007, p.7) Keith (1999) cited children of involved parents typically display higher levels of achievement, more acceptable behaviour and greater motivation in school. The researcher strongly believes that lack of motivation on the part of parents can contribute to pupils' difficulty to understand the magnetism concept. Motivation comes in different forms. Provision of materials in learning is a source of motivation. Students who excel academically often have parents who are interested in their children's learning from an early age and who engage in supportive learning activities. Azikiwe (1998) cited that teaching and learning aids generally are essential ingredients for teaching and learning especially in magnetism concept and there are powerful sources of motivation.

The results finally show that 9 parents out of 49 respondents 19% responded how often they helped wards in their practical works. The immediate environment of the child is where learning actually begins. The practical aspects of Integrates Science often begins from the home especially magnetism. Playing with magnets is one of the first bits of science most children discover. If parents involve themselves in assisting their wards in the practical works of science especially magnetism which is common, will help enhance the understanding of magnetism concept.

Research Question 2

Table 5: Shows teachers responses on how available and accessible are teaching and learning materials to teachers in the Offinso College of Education Practice School.

No. of Items	No. of Respondents	Percentage %
How pupils are reinforce during science lesson.	1	33.3
How often assignments are given?	1	33.3
Availability and accessibility of TLM's	1	33.3
Total	**3**	**100**

Source: Field Survey, 2018

The results in table 5 shows clearly that out of the 3 teachers that responded, 1 of the teachers representing 33% of the total respondent shows the availability of materials help in the reinforcement of their pupils. This means 64% of teachers could not respond to the item 3 on the questionnaire for teachers. As instructional materials are instruments that help in quicker and better understanding of whatever is taught, so does it help in the reinforcement and motivation of pupils and teachers. When teachers have TLM's at their disposal, instruction would be made very simple. Johnston (2012) suggested that emotional factors are associated with the child's emotional wellbeing as well as the ability of understand, express and control emotions. If there is availability of materials, pupils' interest in the materials alone could even make them forget their problems and as such there is the need for TLM's.

The table further displays that 1 representing 33.3% of the total respondents which is 8 indicated how often exercises were given to pupils. Carefully planning plan of teaching and learning material reinforce pupils' understanding and teachers should therefore plan, select and organize materials for teaching magnetism. When materials are available, teacher give exercises from them. This means that the rest of the respondents do not have access to materials and these causes poor understanding of magnetism concept.

The results in the table finally show that out of the 3 teachers that responded, only 1 representing 33.3% of the respondents indicated that the materials were not available and accessible. When materials are accessible, learning of magnetism would be made very simple. Effective teaching and learning of any subject would not only stimulate pupils interest in the subject but also enhance their achievement in examination. The materials are different teaching aids or apparatus which a classroom teacher employs to facilitate his or her teaching for the achievement of the stated objective. Teachers who therefore do not have access to materials may sometimes even teach out of content and will not be able to achieve the objective at the end of the day.

Pupils' response on how available and accessible materials are in Offinso College of Education Practice School. To meet these, items 1, 4 and 5 on the questionnaire for pupils asked them to indicate the availability and accessibility of materials in teaching the magnetism concept in Offinso College of Education Practice School.

Table 6: Shows pupils' response on the availability and accessibility of materials in teaching magnetism in Offinso College of Education Practice School.

No. of Items	No. of Respondents	Percentage %
Using concrete materials in teaching magnetism.	17	35
Enjoying teachers' lesson during magnetism lesson.	13	26
Provision of educational needs by parents.	19	39
Total	**49**	**100**

Source: Field Survey, 2018

The results in table 6 show clearly that out of the 49 pupils that responded, 17 representing 35% of the respondents responded that teachers used concrete materials in teaching them during magnetism lesson. The use of these concrete

materials aids the classroom teacher instruction to be made simple. When materials are available and accessible, pupils would have them at their exposure and this will enable better and quicker understanding of whatever they are being taught. To achieve effective learning process, there is the need for pupils to be taught with concrete material. All materials and resources used for developing the desired knowledge, skills, attitudes and values in students are regarded within the scope of concrete materials. While preparing lesson / daily plans, teachers should also think about the concrete materials they will use in their lessons in order to decide where and how to use these materials in a proper way, and to make their arrangements accordingly.

The results in the table also show that out of the 49 pupils that responded, 13 representing 26% of these respondents indicated their enjoyment in magnetism lesson. If only 13 out of 49 pupils indicated that they enjoyed during magnetism lesson then it means that majority of the pupils do not enjoy magnetism lessons since there is absence of materials in learning, if pupils are exposed to materials frequently and during magnetism lesson. They would have the pleasure and love to study such as subject day-in-day-out. Pupils must therefore be always be taught with concrete materials and when this happens, pupils will gain better and quicker understanding of whatever is been taught.

The result finally shows that 19 out of the 49 pupils representing 39% indicate that parents pupils their educational needs. The rest of the respondents objected to this question indicating that they were never in any way supported educationally by parents. Materials that aid in learning such as textbooks, journals and other publications must be provided by parents to pupils so that they will have sound mind to study which will aid better and quicker understanding of whatever the teacher teaches. As a researcher I believe that what influences academic performance most is the accessibility and availability of books and study aids to the pupil.

Research Question 3

What is the level of education of the primary (5) teacher who teaches Integrated Science in Offinso College of Education Practice School?

Table 7: Shows teachers response on the level of education of primary five (5) science teachers in Offinso College of Education Practice School.

No. of Items	No. of Respondents	Percentage %
What is your educational qualification?	0	0
Some techniques used in your pupils reading.	1	33.3
Do you motivate and reinforce your pupils.	1	33.3
How often do you attend and teach science (magnetism)	1	33.3
Taking care of pupils with special needs.	0	0
Total	**49**	**100**

Source: Field Survey, 2018

The results in table 7 shows that out of the 3 teachers that responded, none representing 0% of the respondents indicated that they had attained high educational background. This means that all teachers had very low educational background which might be very dangerous to pupils' academic performance. Alexander (2000) commented that "the tendency to evaluate teacher qualities on the basis of students' performance is further emphasized." Studies have found somewhat stronger and more consistently positive influence of education and pedagogical coursework on teacher effectiveness (Ashton & Crocker, 1987: Everson, Hawley & Zlotink, 1985: Ferguson & Womack 1993, Cuyton & Farokhi, 1987). Since majority of the respondents have not attained high educational level, they lack the required skills, methods and the appropriate ways to manipulate teaching and learning materials to enhance the understanding of the magnetism concept. Alexandar (2000) further contended that by good teaching, we mean that the content taught accords with disciplinary standard of adequate and completeness and the methods employed are age appropriate morally defensible and undertaken with the intention of enhancing learners competences with respect to content.

The results also showed that a single teacher out of the 3 respondents indicated that he varies the techniques in the teaching and learning of magnetism concept. This means that teachers do not vary the techniques they adopt in teaching the pupils magnetism. Strategies such as grouping pupils to be able utilize the scarce instructional materials and brainstorming pupils to find out the knowledge they have about magnetism studies has shown that pupils learn best when they are with their peers. The complications of magnetism makes it difficult to teach magnetism by using only one technique that is why most teachers therefore must combine several techniques, methods and strategies so that magnetism concept would be made simple. This is why researcher contends that the use of none or only one technique by teachers would not help in the teaching and learning of magnetism. It is also shown clearly that 1 representing 33.3% of the respondents indicated that he motivate and reinforce their pupils. The ability of pupils to understand and control emotions influences the literacy development process by determining the child's ability to create meaningful relationships with other people and cooperate with others. Pupils with psychological problems often exhibit learning deficit because of their difficulty to integrate with other members of society.

The results further displayed that out of the 3 teacher who responded, only 1 teacher indicated his regularity in school and frequency in teaching science especially magnetism. From the researcher's knowledge a behaviour is more strongly established through frequent connections of stimulus and response. This is a true saying since pupils find it difficult to understand the magnetism concept owing to teachers' inability to teach integrated science (magnetism) frequently. This made the researcher think that teachers' inability to teach magnetism frequently contributes to poor understanding of the concept of magnetism.

The results on the table finally shows that no teacher responded to the item that asked them to state whether or not they had special needs pupils in their class and how best they took care of them. It was observed that teachers are not able to control pupils with special needs. They lack the skills and knowledge to cater for such children in their class. Pupils who suffer from psychological characteristics such as vision, ability to hear and the ability to speak affect pupils negatively and so pupils with success must be well taken care of. Psychological factors can affect the ability of an individual to develop competency in certain areas. For instance blindness can make a child experience difficulties in developing manipulation skills. Similarly, deafness can affect a child's oral skills.

Table 8: Shows pupils' response on the academic and professional competencies of teachers who teaching integrated science (magnetism) in Offinso College of Education Practices School

No. of Items	No. of Respondents	Percentage %
How often they do integrated science lesson (magnetism) in a week?	13	26
Do teachers vary their approach in teaching you integrated science (magnetism)?	20	41
Do you enjoy clearing the magnetism lesson?	16	33
Total	**49**	**100**

Source: Field Survey, 2018

The results in table 8 shows that out of the 49 pupils that responded 13 representing 26% of the respondent indicated that teachers were always punctual in school during integrated science lessons. This means that about 74% of the pupils objected to teachers' frequency and regularity in school and this affected the understanding of magnetism very badly. The more frequent a behaviour or an action occurs, the stronger the bond between stimulus and response. This therefore incinerates that if teachers do not teach magnetism frequently, the bond between stimulus and response will be very low.

The table also shows that out of the 49 respondents, 41% of them indicated that teachers vary the approach they use in teaching magnetism. This indicated that not all teachers used the right approach in their lesson. There is the need for teachers to vary their styles, skills, methods and the approach they use in teaching magnetism so that the pupils can gain better understanding of whatever they are taught. This is why the researcher strongly believes that the teachers must combine several approaches in teaching and learning of the concept of magnetism concept and this will aid understanding of the concept.

The results in table 8 finally showed that out of the 49 pupils that responded, 16 representing 33% of the respondent indicated pupils enjoyment is class during magnetism concept lesson. Teachers must make sure pupils feel comfortable in the classroom, there must be good teacher-pupils relationship existing between them so that pupils can tell the teacher whenever there is a problem so that the work of the teacher will be made simple and since there is a good interpersonal relationship, pupils will therefore will be made simple and since there is a good interpersonal relationship, pupils will therefore enjoy magnetism lesson and this will aid understanding of magnetism concept.

Table 9: Shows raw scores of pupils' pre-test.

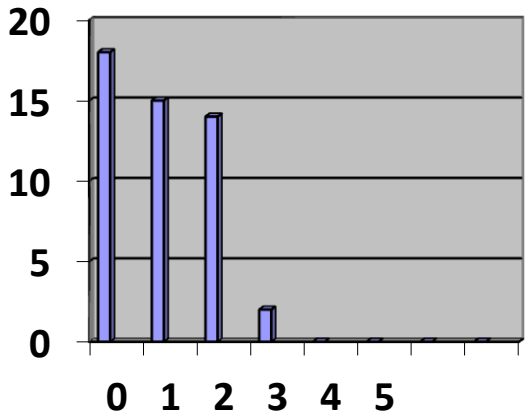
Name Of Pupils	Pre-Test (Out Of 5)
Agyemang Aaron	1
Agyen Robert	2
AppiahKusi	0
Asamoah Boakye	0
Asante Samuel	2
Asubonteng Stephen	1
Boakye Elvis	0
Boamah James	0
Boamponsem Frank	1
GyebiButros	2
Bonsu Christopher	1
DuahKwaku	2
InusahHaruna	0
Isaac Kofi	1
Kata Richmond	2
Marfo Prince	2
Oduro Frank	1
OduroAndisson	1
Oduro James	0
OforiMarfo	0
SarpongShadrack	0
Wiafe Prince	2
YakubuToffic	2
YakubuMajid	1
AduseiAddo	0

Asiedu Austin	1
Sabuli Gabriel	1
Dauda Adolf	2
AduPoku Henry	0
Achiaa Alice	0
Achiaa Francisca	2
Addai Francisca	2
Addai Eric	1
DukumTheresah	0
Twumwaah Stella	0
Adjei Dorcas	1
Anima Theresah	3
AntwiwaaKezia	0
Asante Olivia	0
Boakye Mable	1
Eghan Mercy	2
ForiwahBetina	2
Frimpong Fedra	1
Frimpong Stephanie	0
OwusuDufie	3
Owusu Francisca	2
Owusu Erica	0
Oteng Anima	0
Achiaa Mary	1

Based on the raw scores of pupils' performances, a frequency distribution table was constructed. Below are pupils' results on the frequency distribution table

Score	Tally	Frequency	Percentage %
0	~~//////////~~///	18	37
1	~~//////////~~	15	31
2	~~//////~~////	14	28
3	//	2	4
4	-	0	0
5	-	0	0
Total		**49**	**100**

From the table above 18 representing 37% of the respondents out of 49 pupils that were used for the study scored 0 out of 5 marks. 15 pupils out of 49 pupils scored 1 out of 5 marks representing 31%. 14 pupils representing 28% out of the total 49 pupils scored 2 out of the 5 marks 2 pupils were able to score 3 marks out of the 5 marks as well as managing the pass mark 2.5. On the contrary, none of the pupils used for test scored 4 marks and 5 respectively. As many as 96% scored below the pass mark 2.5, 2 pupils representing 4% scored above the pass mark 2.5. The marks as well as the frequencies of the pre-test is presented on the bar graph.



From the graph, the frequencies were presented vertically, that is the y-axis and the marks
Scored were presented horizontally that x-axis.

Table 10: Shows raw scores of pupils' post-test**.**

Name Of Pupils	Post-Test (Out Of 5)
Agyemang Aaron	5
Agyen Robert	5
AppiahKusi	4
Asamoah Boakye	4
Asante Samuel	5
Asubonteng Stephen	3
Boakye Elvis	5
Boamah James	5
Boamponsem Frank	5
GyebiButros	4
Bonsu Christopher	5
DuahKwaku	5
InusahHaruna	4
Isaac Kofi	4
Kata Richmond	4
Marfo Prince	4
Oduro Frank	5
OduroAndisson	5
Oduro James	4
OforiMarfo	3
SarpongShadrack	4
Wiafe Prince	5
YakubuToffic	5
YakubuMajid	5
Asiedu Austin	5
Sabuli Gabriel	5
Dauda Adolf	4
AduPoku Henry	5
Achiaa Alice	4
Achiaa Francisca	3
Addai Francisca	5
DukumTheresah	3
Twumwaah Stella	5
Adjei Dorcas	5

Anima Theresah	4
AntwiwaaKezia	5
Asante Olivia	5
Boakye Mable	3
Eghan Mercy	5
ForiwahBetina	4
Frimpong Fedra	4
Frimpong Stephanie	5
OwusuDufie	5
Owusu Erica	4

Overview of the Study

In recent times, some concerns have been expressed about the poor performance of primary five (5) pupils in Offinso College of Education Demonstration School due to their poor understanding of magnetism. This concern is very agonizing given the relevance of teaching and learning process. These concerns prompted the researcher to embark on the study to make out what's actually happening in the school with regards to magnetism. The objective of this study was therefore to identify school-related causes of poor understanding of magnetism among primary five (5) pupils in Offinso College of Education Demonstration School. Outstandingly, the study sought to find out: The cause of poor understanding of magnetism in Offinso College of Education Demonstration School, the level of education of the teachers who teach integrates science (magnetism) in Offinso College of Education Demonstration School, the strategies, techniques and methods teachers adapt in teaching magnetism and the availability and accessibility of reading materials in Offinso College of Education Demonstration School.

The study employed the action design and the simple random sampling technique. The population of the research consisted of 3 primary five (5) integrated science teachers, their head teacher and 49 primary five (5) pupils out of 147 pupils in primary five (5). The pupils were selected through a simple random sampling method. The instruments used to identify school-related causes of poor understanding of magnetism among primary five (5) pupils were interview guide, questionnaire and observation guide.

Summary of Major Findings

The study aimed at finding out school-related causes of poor understanding of magnetism concept among primary five (5) pupils of Offinso College of Education Demonstration School. The following is the summary of the findings from the data collected and analyzed. The summary is done around the research questions which were centered on school related causes of poor understanding of magnetism concept.

Research Question One asked: What are the causes of poor understanding of magnetism among primary five (5) pupils in Offinso College of Education Demonstration School? The findings from this research is the academic and professional competencies which regularity and punctuality was included and this was confirmed by Lockhead and Komeman that the amount of time available for teaching and how it was used by teachers and learners have direct bearing on student's achievements and progress. Another cause was the use of varying techniques, methods and strategies in teaching by teachers. Teachers do not vary their techniques and methods in teaching and this was a major cause of poor understanding of magnetism concept which McDermott (2006) cited that the traditional instruction has failed to result in the desired understanding so it is unsuitable for study. Heron and Stetzer (2006) also seconded the complicacy of the concept of magnetism makes it difficult to teach magnetism using only one technique and that teachers therefore combine several techniques to enhance quicker and better understanding of magnetism.

Another cause was the use of appropriate teaching and learning materials in teaching magnetism and it was known that most of the teachers do not use teaching aids in the teaching of magnetism which is causing the poor understanding of magnetism concept. Agun supported the point by commenting that teaching and learning materials which are helpful to the teachers and pupils and which maximize learning in various areas. Another cause was the ability of teachers to understand and control emotions that were influencing the learning of magnetism thus motivation of pupils. Based on the finding, it is clear that pupils with emotional problems often exhibit learning deficit because of their inability to integrate with other members of society and the child's ability to create meaningful relationship with other people and cooperate with others. This was therefore supported by Johnston (2012) that emotional factors are related to a child's emotional wellbeing as well as the child's ability to understand, express and control emotion.

The findings further showed another cause to be the frequency at which teachers teach magnetism. It was shown clearly that the teaching and learning of magnetism was very rare and it is therefore and undeniable fact that pupils are not able to learn and understand due to teachers' inability to have frequent magnetism lessons with them. Since teaching of magnetism was irregular, pupils therefore found it difficult to learn and it was a very major cause of poor understanding of magnetism.

The availability and accessibility of materials to teach and learn magnetism was another cause of poor understanding of magnetism concept. It was known that materials in teaching the magnetism concept were not available and accessible to teachers and pupils. Azikiwe stated that teaching and learning materials are generally essential ingredients for teaching especially in magnetism and they are powerful sources of motivation. This was therefore clear that the unavailability and inaccessibility of teaching and learning materials was a cause for pupils' poor understanding of magnetism.

Research Question Two: What are the academic and professional competencies of teachers who teach integrated science in Offinso College of Education Demonstration School? The findings from this research is that amongst the competencies, none of the teachers had attained high educational background which Alexander (2000) commented that "the tendency to evaluate teacher qualities on the basis of students performance is further emphasized." Studies therefore found somewhat stronger and more consistently positive influence on education and pedagogical coursework on teacher effectiveness (Ashton & Croker 1987: Everston, Hawley &Zlotnik, 1985: Ferguson & Womack 1993, Guyton &Farokhi, 1987).

It was also observed that majority of teachers did not vary their techniques and strategies in teaching magnetism and was always using a single technique. It was also shown that there was lack of reinforcement and motivation of pupils. Pupils with psychological problems often exhibit learning deficit because of their inability to integrate with other members of the society. This clearly shows that lack of reinforcement would lead to learning and teaching problems. Again, regularity and punctuality was also compromise and the finding showed clearly that teachers were not frequent and regular in the teaching of magnetism. It was also known that a behaviour is more strongly established through frequent connections of stimulus and response. The teachers' inability to teach pupils frequently led to serious misunderstanding of magnetism. As a researcher I believe that time in instruction was a critical factor in learning program and irregularity on the part of teachers was a very major contribution of pupils' difficulty to understand magnetism. Ability of teachers to cater for special needs pupils is another competency of teachers and it was clearly shown from the finding that there were pupils with special needs but teachers were unable to cater for them. It was shown that special need children lack the skills and knowledge to comprehend text and the teachers also had no idea on how to cater for them. This was a major contributory factor amongst the competencies of teachers.

Research Question Three: How available and accessible are instructional aids to primary five (5) pupils of Offinso College of Education Demonstration School? The finding from this research question shows materials were not available for teaching and learning of magnetism. As a researcher I believe strongly that what influences academic performance greatly is the availability and accessibility of books and study aids to the child. Azikiwe (1998) supported that, in the teaching profession, textbooks and other instructional materials help both the teacher and pupils to gain quicker and better understanding of lessons and so the unavailability and inaccessibility of materials in considered a major cause of poor understanding of magnetism.

Other Findings

Other findings were that majority of the pupils were misplaced when it came to magnetism. From the researcher's own experience, a child may be in a particular stage but his age and mind is not develop though to learn and understand primary five lessons. This means that the child was misplaced when it comes to reality and if a child is misplaced, and he or she is to learn what is above what his mind can absorb he or she becomes frustrated and turns to dislike the magnetism concept.

Conclusions

The purpose of the study was to find out through questionnaires and interviews the school-related causes of poor understanding of magnetism among primary five pupils of Offinso College of Education Practice School. In view of the findings of the study, the following conclusions are drawn: The causes of misunderstanding of magnetism concept which were state in totality all contributed to the poor understanding of magnetism in Offinso College of Education Demonstration primary five (5) pupils. Teachers who teach science (magnetism) did not have the basic requisite knowledge in the teaching of magnetism and they were not professionally trained teachers.

Because the teachers were not professionals and trained, they were not applying those methods, skills and techniques that they are being to use for better understanding. The unavailability and inaccessibility of teaching and learning materials, time allocation of Integrated Science, teachers' irregularity and misplacement of pupils in a class above their mental level impeded on pupils' progress and success in magnetism concept. The researcher is of the view that if all hands are put on the desk, the impeding conditions or situations can be curbed to improve on the reading ability of pupils.

Recommendations

From the review of relevant literatures and the results of the study, the following recommendations are made for reflection and practice.

1. Taking the importance of teaching and learning materials into consideration, it is recommended that bars of magnet and magnetic substance should be made available by the government and other stakeholders in education so that pupils can have and manipulate during magnetism lesson and even at their leisure time to understand the concept of magnetism.
2. Owing to the importance of role of integrated science plays in the field of education or better still in the learning process, it is further recommended that integrates science must be taught at least four times a week for an hour each day.
3. It is further recommended that pupils be given placement test. This recommendation is due to the

observation and the indications made by the teachers that some of the pupils are misplaced. From the researcher's own experience, a child may be in a class 5 but is unable to understand simple text which should understood by primary five (5) pupils, this may cause frustrations for the child and the child may dislike integrates science (magnetism).

4. It is finally recommended that the pupils with special needs must be well taken care of and pupils must be well motivated and reinforced to improve upon the understanding of magnetism.

Suggestion for Further Research

It is suggested that those wishing to do further investigation on this study may look at the curricula or training manuals used by teacher training programs and colleges in Ghana to see how it is designed for training or investigate the commitment of teachers to the job.

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References

1. American Association for the Advancement (2003*).Benchmarks for Science Literacy*. New York: Oxford University Press.
2. Ary, D., Jacobs, L.C., &Razaview, A. (2002).*Introduction to research in education* (6thed). Text: USA.
3. Ashton, P. & Crocker, L. (1987).Systematic study of planned variation.The essential focus of teacher education reform.*Journal of teacher education* 38, 2 – 8.
4. Atwood, R., Christopher, J., &McNall, R. (2006).*Middle school teachers understanding of standards-based light concept before and after instruction.* San Francisco, CA.
5. Atwood, R.K. & Christopher, J.E. (2007).*Pre-service elementary teachers' understanding of standard-based magnetism teachers' understanding of standard-based magnetism concepts.*Paper presented at annual meetings of the Association for Science Teachers Education, January, 3 – 6, Clearwater, FL.
6. Atwood, R.K., Christopher, J.E., &McNall, R.M. (2007).*Are in-service elementary teachers prepared to teach fundamental concepts of magnets and the behaviour of magnets?* New Orleans, LA.
7. Ayodele (1984).*Characteristics of learners from two with widely different backgrounds*. United Kingdom.
8. Carey, S. (1985*). Conceptual change in childhood*. Cambridge, MA: MIT Press.
9. Gay, L.R. (1999). *Educational research competencies for analysis and application Columbus.* Ohio: Charles F. Merrill Publishing Company.
10. Hawley, W. &Rosenholtz, S. (1984). Good schools, what students achievement. *Peabody journal of education*, 61(4) and 22.31.
11. Jackson, P.W. (1968). *Life in the classroom*. New York: Holt, Rinehart and Winston publisher.
12. Jackson, P.W. (1968). *Life in the classroom*. New York: Holt, Rinehart and Winston publisher.
13. Learner, J. (2000).*Learning disabilities theories diagnosis and teaching strategies* (8th Ed). Boston: Houghton Mifflin company.
14. Lockhead, M.E. &Komeman, A. (1988).*School effects on students achievement in Nigeria and Switzerland.* Washington D.C.
15. McCarthy, D.J. (1973). *New perspective on teacher education*. London: Jossey-Bass publishers.
16. McDermott, L. (1991). Milikan Lecture 1990: What we teach and what is learned: Closing the gap *American Journal of physics*. 59, 301 – 315.
17. McDermott, L., Heron, P. Shaffer &Stetzer, M. (2006).Improving the preparation of k-12 teacher through physics education research.*American Journal of physics*. 74, 763 – 767.
18. Prawat, R.S. (1989). Teaching for understanding: Three key attributes. *Teaching and Teacher Education*, 5(4) 3/5 – 328.
19. The world book Encyclopedia (1996). Ed volume 16 *world book, inc.Fetze London Sydney.* Toronto: Scott Fetza Company
20. Alonzo, A. C., &Steedle, J. T. (2008). Developing and assessing a force and motion learning progression. *Science Education, 1-33*. Retrieved October 24, 2008, from http://www.interscience.wiley.com
21. AAAS Project 2061. (2001). Atlas of Science Literacy. Washington, DC: American Association for the Advancement of Science.
22. Bar, V., Zinn, B., & Rubin, E. (1997).Children's ideas about action at a distance. *International Journal of Science Education, 19*, 1137-1157.
23. Barrow, L. H. (1987). Magnet concepts and elementary students' misconceptions. Paper presented at the Proceedings of the Second International Seminar – Misconceptions and Educational Strategies in Science and Mathematics, Cornel University, Ithaca.
24. Bodner, G. (2008). Personal conversation, October 30.

25. Borges, A. T., &Glibert, J. K. (1998).Models of magnetism.*International Journal of Science Education, 20*, 361-378.
26. Bradamante, F., Michelini, M., &Stefanel, A. (2006). Learning problems related to the concept of field. In B. G. Sidharth, F Honsell and A. de Angelis (Eds.), *Frontiers of Fundamental Physics*. The Netherlands: Springer.
27. Bradamante, F., &Viennot, L. (2007).Mapping gravitational and magnetic fields with children 9-11: Relevance, difficulties and prospects. *International Journal of Science Education, 29(3)*, 349-372.
28. Catley, K., Lehrer, R, and Reiser, B. (2004).*Tracing a Prospective Learning Progression for Developing Understanding of Evolution*. Paper commissioned by the National Academies Committee on Test Design for K-12 Science Achievement. Washington D.C.: National Academies Press.
29. Clement, J. (1991).*Nonformal reasoning in experts and in science students: the uses of analogies, extreme cases and physical intuition*. In J. F. Vos, D. N Perkins and J W. Segal (Eds.), Informal Reasoning and Education. Hillsdale, NJ: Lawrence Erlbaum.
30. Erickson, G. (1994). Pupil's understanding of magnetism in a practical assessment context: the Relationship between content, process and progression. In P. Fehsham, R. Gunstone, & R. White (Eds.), *The content of Science*. London: Falmer.
31. Gilbert, J. K., &Boulter, C. (1995, April).*Stretching models too far*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, San Fransisco.
32. Guisasola, J., Almudi, J., &Zubimendi, J. (2004). Difficulties in learning the introductory magnetic field theory in the first years of university. *Science Education, 88*, 443-464.
33. Guth, J. (1995). An in-depth study of two individual students' understanding of electric and magnetic fields.*Research in Science Education, 25*, 479-490.
34. Guth, J., &Pegg, J. (1994).First-year tertiary students' understandings of iron filing patterns around a magnet. *Research in Science Education, 24*, 137-146.
35. Johnson, A. (1999). *Students' development of models of magnetic materials, patterns of group activity, and social norms in a physics classroom.* Unpublished dissertation, San Diego State University and the University of California, San Diego.
36. Maloney, D. (1985). Charged poles? *Physics Education, 20*, 310-316.
37. Meyer, K., Carlisle, R. (1996). Children as experimenters. *International Journal of Science Education, 18*, 231-248.
38. Kennedy, C. A., & Wilson, M. (2007).Using progress variables to interpret student achievement and progress. BEAR report series, 2006-12-01. University of California, Berkeley
39. National Assessment Governing Board. (2006). *Science assessment and item specifications for the 2009 National Assessment of Educational Progress* (Prepublication ed.). Retrieved October 29, 2008, from http://www.nagb.org/frameworks/naep%5Fscience%5Fspecs%5F2009%5Fre.doc.
40. Mohan, L. Chen, J., & Anderson, C. W.(2008, April). *Developing a multi-year learning progression for carbon cycling in socio-ecological systems*. Presented at the annual meeting of the National Association for Research in Science Teaching, Baltimore, MD.
41. Plummer, J., &Krajcik, J. (2008). A learning progression for celestial motion. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Baltimore.
42. BEAR Report Series, SA-97-1. University of California, Berkeley.
43. Saglam, M., & Millar, R. (2006). Upper high school students' understanding of electro-magnetism. *International Journal of Science Education, 28(5)*, 543-566.
44. Smith, C., Wiser, M., Anderson, C. W., and Krajcik, J. (2006).Implications of research on children's learning for assessment: Matter and atomic molecular theory. *Measurement: Interdisciplinary Research and Perspectives, 14*, 1-98
45. Wiggins, G. and McTighe, J. (1998).*Understanding by design.* Alexandria, VA: Association for Supervision and Curriculum Development.
46. Yunker, M. (2008).*A learning progressions for understanding content, cyclic nature and timescales associated with the rock cycle*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Baltimore.
47. Driver, R., Squires, A., Rushworth, P., & Wood-Robinson, R. (1994).*Making sense of secondary Science*. London: Routledge
48. Everston, C.W., Hawley, W., &Zlotnik, M. (1985).Making a difference in education quality through teacher education. *Journal of Teacher Education, 36(3)*, 2-12.
49. Guyton, E., &Farokhi, F. (1997). Relationships among academic performance basic skill subject

matter knowledge and teaching skills of teaching education graduates. *Journal of Teacher Education*, 38, 37-42.
50. Boshier, P. (2007). Invisible Parties: Listening to Children. New Zealand: Wiley Press Room.
51. Wade, B. & Moore, M. (1998). An early start with books: literacy and mathematical evidence from a longitudinal study. *Educational Review50, no.2*: 135-145.
52. Johnston, M. & Susan, M. (2012). Theories and techniques of behavior change, *Health PsychologyReview*, *6:1*, 1-6.
53. Alexander, R. (2000). *Culture & Pedagogy: international comparisons in primary education*, Oxford: Blackwell.
54. Ferguson, P. & Womack, S.T. (1993).The Impact of Subject Matter and on Teaching Performance. *Journal of Teacher Education*, *44(1)*, 155-163.
55. Melton, G.B. (2005).Child Abuse and Neglect. USA: Clemson.
56. Barrow, L. (1990). Elementary Science textbook and potential magnet misconceptions. *School Science and Mathematics*, *90*, 176-720.
57. Bronfenbrenner, V. (1996). Ecology development: *Developmental Psychology*, *vol. 22(6)*, pp 723-742.
58. David, B.D., gosling, B., &LeTendre, G.K. (2002). Socioeconomic Status School Quality, and National Economic Development: *Comparative Education Review*, *vol. 46(3)*, pp 291-312. (Chicago; University of Chicago Press).
59. Johnson, A.P. (2012). A short guide to action research (4th Ed.). New Jersey: Pearson Education.
60. Clement, J., Brown, D., &Zietsman, A. (1989). Not all preconceptions are misconception: Finding anchoring conception for grounding instruction on students' intuitions. *International Journal of Science Education*, 11: 554-565.
61. Azikiwe, U. (1998). Study approaches of university students; *WCCI Region II Forum* vol.2, Lagos. Pp. 106-114.
62. Emerllahu, D. (2001). *Edukata Estetike*, Prishtine. Pp. 147.
63. Claudia, &Eberhard , M. (2008). *Child Education\ Parenting*. Albanian: Nehemia.
64. National Research Council (1996).*National Science Education Standard*. Washington, DC: National Academy Press.
65. Gardner, H., &Boix-Mansilla, V. (1994).*Teaching for Understanding*. New York: Basic Mind.
66. Mills, G.E. (2011). Action Research: *A* guide *for the Teacher Researcher (4th Ed.)*. Boston: Pearson.
67. Hickey, R., &Schibeci, R. (1999).The attraction of magnetism. *Physics Education*, *34*, 383- 388.
68. Finley, F. (1985). Evaluation Instruction: The complementary use of clinical interview. *Journal of Research in Science Teaching*, *23*, 635-650.
69. Gallagher, J.J. (2000). Teaching for understanding and application of science knowledge. *School Science and Mathematics*, *100(6)*, 310-318.
70. Wildey, H., 7 Wallace, J. (1995).Understanding teaching or teaching for understanding: Alternative framework for science classroom. *Journal of research in Science Teaching*, *32(2)*, 143-156.
71. Constantinou, C., Raftopoulos, A., &Spanoudis, G. (2001). Young children's construction of operation definition in magnetism: The role of cognitive readiness and scaffolding the learning environment. *Proceedings of Twenty-third Annual Conference of the Cognitive Science Society.*(J. Moore & K. Stenning,Eds.). Routledge.
72. Toleman, M.N. (1998). *Hands-on science activities for grades K-2*. West Nyack, NY: Parker Publishing Company.
73. Pilot, D.F., & Hungler, B.P. (1999). Nursing Research: *Principles and Methods (6th Ed.)*. Philadelphia: J.B. Lippincott.
74. Streubert Speziale, H.J., & Carpenter, D.R. (2003).*In Qualitative Research in Nursing (3rd Ed.)*, (pp. 58-59). Philadelphia: Lippincott Williams & Wilkins.