

UNIVERSITY OF EDUCATION, WINNEBA

**HEADTEACHERS' LEADERSHIP ROLES ON JUNIOR HIGH SCHOOL
INTEGRATED SCIENCE INSTRUCTION**



ELIZABETH OSEI

OCTOBER, 2014

UNIVERSITY OF EDUCATION, WINNEBA

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The logo of the University of Education, Winneba, is a circular emblem. It features a central sun with rays, a book, and a lamp. The text 'UNIVERSITY OF EDUCATION WINNEBA' is written around the perimeter of the emblem.

**A THESIS IN THE DEPARTMENT OF SCIENCE EDUCATION, FACULTY
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PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD
OF MASTER OF PHILOSOPHY (SCIENCE EDUCATION) DEGREE**

OCTOBER, 2014

DECLARATION

STUDENT'S DECLARATION

I, Elizabeth Osei, declare that this thesis, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole for another degree elsewhere.

Signature

Date.....

SUPERVISORS' DECLARATION

We hereby declare that the preparation and presentation of this thesis was supervised in accordance with the guidelines for supervision of thesis as laid down by the University of Education, Winneba.

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DEDICATION

I dedicate this thesis to my husband Richard Amponsah Budu and my beloved daughter Petra Apeaa Mensah.



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ABSTRACT

This study was designed to investigate how junior high school headteachers influenced changes in the science teachers' instructional practices. The target population consisted of all headteachers, assistant headteachers and science teachers in the 64 public junior high schools in the New Juaben Municipality in the Eastern Region of Ghana. However, the accessible population comprised three headteachers, three assistant headteachers and three science teachers from three public junior high school in the Municipality. Data was collected through semi-structured, in-depth interviews with nine individuals from three public basic schools in the New Juaben Municipality in the Eastern Region. Observations were also undertaken and document analysed to corroborate spoken claims of the participants. Validity of the instruments was fostered through data triangulation, credibility and trustworthiness of the data was ensured through member checking. The main findings included headteachers having limited influence on teacher due to external influences, poor supervision, and inadequate provision of resources. Base on these findings it is recommended that there should be a well enticing reward system to propel headteachers and science teachers to go extra mile in delivering their duties and supervision strengthened.

CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapter describes the background of the study. It deals with the roles of headteachers in instruction in junior high schools and how their roles influence

teachers' output and students' achievement. The statement of the problem depicts the real situation of the headteachers' leadership on instruction in the Ghanaian junior high schools. In this chapter are the research questions that guided the study, the significance of the study, discussion on delimitations and limitations of the study. The chapter ends with the organisation of the remainder of the study.

1.1 Background to the Study

Generally, science instruction has been reviewed over the years through educational reforms and by the dictates of these reforms, integrated science should be taught by inquiry. Effective teaching and learning through inquiry require a multi-faceted approach to pedagogy. Teachers who facilitate inquired-based instruction have to address a variety of concerns which include time and energy, classroom constraints, reading and language levels, student maturity, safety concerns, thinking skill abilities, support from administrators and parents, and science materials management (Baker, Lang & Lawson, 2002).

Although teachers are recognised as critical to reform efforts, actualizing the vision requires the combined efforts of an array of individuals. Within the school context, science education reform developers and researchers recognise that heads of schools are important, and indeed influence integrated science programme, particularly curricula and programme decisions and therefore call for them to be instructional leaders, assuming a more active role in the decisions that are made regarding the instructional programme. The headteacher is influential in the instruction of integrated science and his instructional leadership roles are necessary components of the process of change. The authority vested in the headteacher requires that he or she should take

up leadership roles to affect the teacher's classroom instruction to achieve academic excellence in the school.

Leadership of the head may be seen, as he or she exerts influence over subordinates, inspires, motivates and directs their activities to help achieve school goals. Therefore, leadership in schools is important because it can enhance better job performance among teachers, which may result in better educational outcomes. Beare, Caldwell and Millikan (1989) supported the effect leadership has on schools when they stated that outstanding leadership has invariably emerged as the key characteristic of outstanding schools. This view of leadership continues to be supported by research today, with the contribution of educational leadership clearly indicating the importance of leadership for improving organisational performance and raising achievement (Muijs, Aubrey, Harris & Briggs, 2004).

Hence, the effectiveness of the headteachers' leadership roles in schools is largely the determinant factor of the teachers' successful job performance in their schools. It is therefore necessary to have a look at the headship roles of headteachers.

The role of headteachers has its formal inception in the early 1900s, and has changed considerably according to political eras and societal changes (Goodwin, Cunningham & Childress, 2003). In the early 1900s, schools grew in size and official procedures increased, and the headteachers' role was officially recognised as one of manager and coordinator of activities (Tyack & Hansot, 1982). Tyack and Hansot in addition, stated that the nature of the role varied over time from a manager to an educator to that of a colleague of teachers depending on the social standard and the politics of the time.

As managers among the many tasks performed by the headteacher, only one-tenth of their time is devoted to instructional leadership (Stronge, 1988). Among the reasons cited for giving less emphasis to instructional leadership are lack of in-depth training, lack of time, increased paperwork, and the community's perception of the headteacher's role as that of a manager (Flath, 1989; Fullan, 1991). As managers, their days are filled with activities of management scheduling, reporting, handling relations with parents and community, dealing with the multiple problems and special situations that are inevitable in schools. Most headteachers spend relatively little time in classrooms and even less analyzing instruction with teachers.

Hallinger (2003) and Stronge (1993) recognised that having been outside the instructional realm for some time, re-engaging in instruction and furthermore in improving the instructional performance of others present a significant challenge for headteachers. Hence it appears much of a challenge that the shift from headteacher as manager to headteacher as instructional leader has not yet been effectively made.

However, it is commonly seen that most school leaders are now seeking a balance in their role as manager-administrator and instructional leader in order to help the teacher achieve scientifically literate population through quality instruction.

1.2 Statement of the Problem

As suggested in current science education reform documents, educators and researchers in science education and educational leadership are promoting collaborative approach as to change in educational systems and policies (Hale, 1998; Newman & Mohr, 2001) as no one group can single-handedly ensure the actualization of the

vision for science education reform (Rhoton, 2001; Rhoton, Field & Prather, 1992). Berube, Gaston and Stepan (2004) also conceptualized the relationship between teachers and headteachers as “equals” with teachers and headteachers working as partners to reform science education. The general perception now appears that when headteachers collaborate with teachers and exercise their instructional leadership roles effectively, the goals of instruction will be met but in reality, most headteachers do not perform these roles as expected.

With the goal of improving the instructional leadership of the headteachers and building up capacity of the teachers in Ghana according to GES (2007), Japan International Cooperation Agency (JICA) in association with Ghana Education Service (GES) has been helping in the training of headteachers and curriculum leaders. The curriculum leaders are teachers in the classroom who help train other teachers to improve the quality of teaching and learning in the primary schools. GES has also developed in-service education and training sourcebook for the training of the headteachers and teachers in the primary school to be efficient in leadership and instruction (GES, 2007) and headteachers handbook for the management of schools (GES, 1994).

Most headteachers and science teachers in the New Juaben Municipality have benefited from the leadership training and the knowledge capacity building put in place by GES and JICA stated above but the effect is not seen in the pupils Basic Education Certificate Examination (BECE) results.

For the past six years (2007-2013), the performance of pupils in the public junior high schools in integrated science in the (BECE) in the New Juaben Municipality has not been impressive. Most of the pupils made average and below (Grade 5-8).

The poor performance of public junior high school pupils in integrated science in the Basic Education Certificate Examination (BECE) in the Municipality may be due to the teacher's inability to instruct well and perhaps due to lack of the headteacher's leadership.

It was against this background that the researcher held the view that there was the need to investigate the influence of the headteachers' leadership roles on public junior high school integrated science instruction in the Municipality.

1.3 Purpose of the Study

The main purpose of the study was to determine the influence of the headteachers' leadership roles on junior high school science instruction. The main focus of the study was how the headteachers' instructional leadership roles influenced the teachers' classroom instruction and how the teachers interpreted and responded to the headteachers' leadership in science instruction. The study was also to find out if there were differences in the male and female teachers' interpretation and response to the headteachers' instructional leadership.

1.4 Research Questions

The following research questions guided the study:

1. How do the headteachers influence changes in the science teachers' instructional practices?
2. How do the science teachers interpret and respond to the headteachers' leadership?

instructional leadership?

3. Are there differences in the male and female science teachers' interpretations and responses to the headteachers' instructional leadership?

1.5 Significance of the Study

The outcome of this study may add to existing literature and serve as a guide to those who will research further into this area. The result will be made available to headteachers who were involved in the study, to serve as a guide in the performance of their official duties as they will become aware of their roles and the effects of their leadership on pupils' achievement. The result will be reported to the teachers to enable them to understand their heads and interpret their actions positively.

1.6 Delimitations of the Study

The focus of this study was limited to selected headteachers and assistant headteachers, who have served in their capacities for, at least, five years and science teachers who have also been teaching for at least six years in their schools in three Ghanaian public junior high schools in the New Juaben Municipality. Five and six years at post is long enough a period for the participants to provide credible and valid information that represent the true leadership roles executed by the headteachers.

1.7 Limitation of the Study

This research identified among others the following limitations. The headteachers and teachers were afraid to release information, which would have enriched the study and

establish a strong validity and reliability. In addition, the limited time did not allow the researcher to use large sample size as she had to combine this study with her profession. Also the instruments had their own inherent problems, for instance, an interviewee could filter his or her response and that certainly would affect the result.

1.9 Organization of the Remainder of the Study

Chapter 2

In this chapter, a review of the conceptual framework, leadership, leadership theories and school administration would be done. In addition, would be done a review of recent studies related to the study. The chapter ends with a summary on the discussions.

Chapter 3

This chapter looks at how the research is going to be conducted. The methodology used for the study was discussed in terms of research design, population for the study, the sample and sampling technique. The instruments for data collection, its reliability and validity were outlined. Data collection procedure and data transcription and analysis plan were discussed.

Chapter 4

This chapter is devoted to the presentation and discussion of the findings from the study.

Chapter 5

This final chapter contains the summary of the major findings, conclusions, recommendations and suggestions for further research.



CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Overview

This chapter considers the studies of other researchers that relate to this research. The study was reviewed under the following headings: conceptual framework, leadership, leadership theories and schools administration, the headteacher's instructional leadership roles, school leadership and student achievement, student improvement processes in the science content area and the barriers to teaching science in the basic schools in Ghana.

2.1 Conceptual Framework

The conceptual framework underpinning this study is rooted in the theory of influences on change in teachers' instructional practices. According to Mullins (1971), the theory explains the changes that teachers make in their instruction based on influencing factors, with special emphasis on the influence of headteachers. The theory has two components of influence. These are leadership strategies of principals and other influential factors that affect teachers' classroom practices. The study is situated in the leadership behaviours of principals and how these influence the instructional practices that teachers use in their classrooms. The other influences are included to acknowledge that the principal is not the only influential factor on the teacher's classroom instruction. Mullins further indicated that the theory is based on research findings, commentary literature, and other experiences in public education.

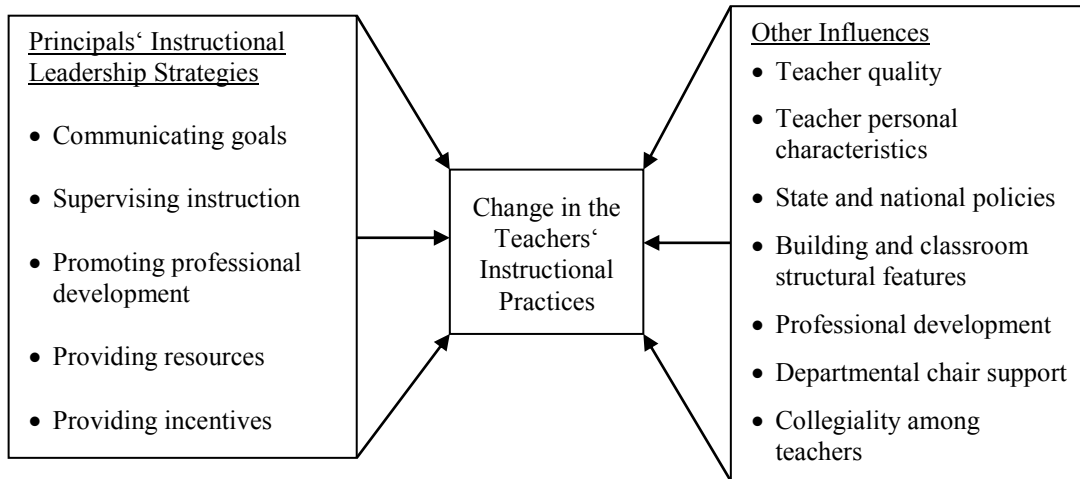


Figure 1. A Theory of Change in Teacher Instructional Practice Adapted from Mullins (1971)

Theory of Influences on Change in Teachers' Instructional Practices

2.2 Leadership

Some researchers such as (Elmore, 2000; Spillane, 2005; Drake & Roe, 2003) have defined leadership in different ways. According to Elmore (2000), leadership is conceptualized as the act of guiding and facilitating instructional improvement. Spillane (2005) articulated by pointing to leadership as activities tied to the core work of the organisation that are designated by organisational members or that are understood by organisational members as intended to influence their motivation, knowledge, effect, and practices. Drake and Roe (2003) presented a definition, recognising schools as interactive and dynamic environments. The authors conceptualized leadership as a “deliberate process” that produces the following for all stakeholders:

1. Collaborating towards an ever-expanding vision of excellence in the achievement of organisational and personal or professional goals and objectives.
2. Creating a threat-free environment for growth so that the creative talents and

skills of each person are maximized.

3. Encouraging and building working relationships that are individually and organisationally satisfying, unifying, and strengthening, in the realization of mutually determined goals and objectives. Such relationships result in effective group problem solving.
4. Optimizing available human and material resources (p. 140-141).

Drake and Roe's conceptualization of leadership can be considered as an organisational quality that is a socially fluid and manifold endeavor that can be executed from any concerned stakeholder. The contention is that, although leadership can be and is executed by formal (headteacher) and informal (teachers, leaders in the community, student's leaders, and other stakeholders) who are concerned with educational improvement, roles are still hierarchal in school systems.

Despite the shifts towards a more democratic form of leadership, that neutralizes the authority and subordinate relationship, the reality is that the headteacher is the appointed leader who is ultimately responsible for execution of collective decision. Further, Drake and Roe (2003) added that the headteacher's leadership task is to "nurture, develop, and reinforce leadership whenever it is found to further the shared purposes of the school" (p. 141).

The headteacher is expected to support endeavours initiated by others, and create a culture wherein informal leadership is encouraged and welcomed. Therefore, leadership as it relates to this investigation starts with the headteacher and is defined as his or her ability to induce and nurture a school culture where others are motivated, without coercion, to work collaboratively to improve teaching and

learning. Leadership is also defined as the ability of the head teacher to positively influence the feelings, thoughts, behaviours, and practices of others such that they strive for instructional and professional excellence; and the ability to build leadership capacity in others.

2.3 Leadership Theories and School Administration

Educational researches on leadership and schools have frequently applied leadership theories from industry and organisations to the school environment (Hoy & Miskel, 1996; Ubben & Hughes, 1997). Examples of these organisational leadership theories include (a) trait-based leadership theory, which implies that great leaders possess certain leadership traits, (b) behavioural leadership theory, which focuses on the behaviours of leaders, (c) contingency theory, which focuses on leader-member relations, task structure, and position power of the leader, and (d) transformational leadership theory, which focuses on leader-follower relations and exchanges (Antonakis, Cianciolo & Sternberg, 2004). During the 1990s, researchers began applying one of these organisational leadership theories, which is transformational leadership, to the school environment (Day, 2000).

2.3.1 Background of Transformational Leadership Theory

Transformational leadership theory has its roots in the work of political scientist and social historian James MacGregor Burns. In his 1978 work, Burns made a distinction between managers and leaders and the relationship of each of these to sources of authority. Burns also addressed the interactions between leaders and followers and

defined two forms of interaction called transactional and transformational leadership Burns (1978 as cited in Antonakis, Cianciolo & Sternberg, 2004; Northouse, 2004). These authors indicated that Burns' transactional leadership is more closely aligned to the concept of a manager with an economic source of authority between leaders and followers with more of the transaction-like attitude of a trade. For them, the transactional manager expects the followers to do something in exchange for certain rewards.

Bass and Riggio (2006) defined transformational leadership in a context that transformational leaders motivate others to do more than they originally intended and often even more than they thought possible. They set expectations that are more challenging and typically achieve higher performances. Transformational leaders also tend to have more committed and satisfied followers. Moreover, transformational leaders empower followers and pay attention to their individual needs and personal development, helping followers to develop their own leadership potential.

In a review of eight theoretical approaches to transformational leadership, Sashkin (2004) described behavioural competencies, personal competencies, and contexts that are central to an understanding of transformational leadership. These include (a) behavioural competencies (communicating a vision, creating empowering opportunities, and expressing care and respect for followers), (b) personal competencies (vision, need for power and its expression, and self-confidence), and (c) situation or context (developing a culture, and defining values, beliefs, and assumptions held by all).

These constructs of transformational leadership match those identified by researcher Cotton as important traits of effective school leaders. In Cotton's synthesis of eighty-

one research articles focusing on headteachers' behaviours in relation to student outcomes, Cotton (2003) reported that the elements of transformational leadership, mirror the behaviour of headteachers in high-performing schools: establishing a worthy vision and clear goals, providing individualized support to staff, holding high performance expectations, engaging others in decision making (p. 61).

Day (2000) also reported the findings on a leadership study in the United Kingdom that identified key characteristics of successful school leaders as (a) value-led, (b) people-centered, (c) achievement-oriented, (d) inward and outward facing, and (e) able to manage a number of ongoing tensions and dilemmas. Hence Day stated, "Leadership is essentially building and maintaining a sense of vision, culture, and interpersonal relationships" (p. 57). It appears Day's description of leadership practices matches the transformational leadership constructs of idealized influence, individualized consideration, and inspirational motivation. In most of the studies reviewed, it appears transformational leadership theory has played a significant role in understanding the complex world of school leadership.

2.3.2 Transformational Leadership in Schools

Many educational studies agree with the usefulness of the application of transformational leadership theory to schools in order to understand school leadership. Studies examining transformational leadership in schools report results indicating positive effects with respect to school organisations, teachers, and students (Marks & Printy, 2003; Ross & Gray, 2006).

In their study on transformational leadership and collective teacher efficacy involving teachers in elementary schools in Canada, part of their theoretical framework addressing the effects of leadership on teacher commitment was based on the evidence that school leadership research has found that transformational approaches have positive effects on teachers (p. 180). Their study found that transformational leadership had direct effects on teacher commitment and that commitment to school mission was the strongest outcome (p. 193).

The effectiveness of transformational leadership in schools has been described and assessed in studies by Leithwood and associates (Leithwood & Jantzi, 1999a, 1999b, 2005, 2006). In their 1999 studies on transformational school leadership, Leithwood and Jantzi reported their results to demonstrate strong significant effects of such leadership on organisational conditions and moderate but still significant total effects on student engagement. In the same studies, they also defined transformational leadership in terms of six leadership dimensions and four management dimensions. They described the leadership dimensions as (a) building school vision and goals, (b) providing intellectual stimulation, (c) offering individualized support, (d) symbolizing professional practices and values, (e) demonstrating high performance expectations, and (f) developing structures to foster participation in school decision. In a later study, Leithwood and Jantzi (2005) created three categories for the leadership dimensions of transformational leadership and described them as setting directions, helping people, and redesigning the organisation.

The use of transformational leadership theory to help understand leadership in schools is important because school leadership is one factor that positively influences student achievement. Cotton (2003) stated that not surprisingly,

researchers found that transformational leadership is positively related to student achievement (p. 61). As mentioned previously, many factors affect student learning, including student demographics, school culture, and family culture. The present study focuses on the construct of school leadership and what that leadership looks like in a school that has improved student achievement in science hence a look at the headteachers' instructional leadership roles.

2.4 The Headteachers' Instructional Leadership Roles

Headteachers, like transformational leaders, aim at achieving the set goals of their schools, hence the need for them to adopt the traits of transformational leaders as they take up their instructional roles. One of the earliest definitions described instructional leadership as the direction, resources, and support that a headteacher provides to teachers and students for the improvement of teaching and learning in the school (Keefe & Jenkins, 1984). Compared to more recent definitions, this can be seen as evasive, lacking specificity in what is meant by direction, resources, and support. King's (2002) definition is not only more specific, but also prioritises those actions that lead to student learning.

According to King (2002), instructional leadership might simply be described as anything that leaders do to improve teaching and learning in their schools and district. Printy (2008) defined instructional leadership as the leadership oriented around instruction, curriculum, and assessment, which needs to be a shared endeavour, with headteachers and teachers learning and leading interdependently so that the school achieves its instructional and student learning goals. Hence, researchers have had difficulty agreeing on a definition that is universally accepted

and facilitates an understanding of what instructional leadership is and what instructional leaders do.

Wanzare and Da Costa (2001) also conceptualised another dimension of instructional leadership in five forms. They indicated that instructional leadership:

1) relates to the processes of instruction in which teachers, learners, and curriculum interact, 2) includes those activities taken on by the headteacher to produce satisfying working environments and conditions for both teachers and students, 3) consists of the actions that a headteacher takes, and tasks that he or she delegates to promote student learning, 4) includes the involvement of teachers in the decision-making process, and 5) incorporates the headteachers' concern with "the factors and conditions within a school that affect student learning, such as class size, quantity and quality of curricular materials, and sociological characteristics of the students" (p. 5). A more recent definition proposes three instructional leadership dimensions: defining a school mission; managing the school's instructional programme; and promoting a positive school climate where learning is optimized (Hallinger, 2005).

2.4.1 An Integrated Framework of Instructional Leadership

In the age of school reform, and with mounting concerns about student achievement, the principals' responsibility now "includes a larger focus on teaching and learning, professional development, data-driven decision-making and accountability" (King, 2002, p. 62). As a result, King further asserted that instructional leaders must be flexible enough to accommodate different learning communities. King writes:

In a school or district with a significant number of students performing at levels below identified standards, leadership might focus on examining student achievement data to identify areas of weakness and use those data to improve classroom instruction. Conversely, in a school community with a perceived tradition of success, leadership may need to challenge the status quo, promoting such ideas as peer observation to ensure that teaching practices enable all students to learn at high levels. An unsafe school environment that hinders teaching and learning may require that instructional leadership focus first on advocating for improvements in the physical plant (p. 62).

These are just a few of the challenges that modern day principals face. Because of these challenges, King has observed ways in which today's principals operate "differently" than their predecessors. King developed a theoretical framework to conceptualize the role of principals as instructional leaders in today's schools. King proposes that instructional leaders must: 1) lead learning 2) focus on teaching and learning 3) develop leadership capacity 4) create conditions for professional learning 5) use data to inform decisions and 6) use resources creatively.

Although educational leadership reform is shifting to models of leadership wherein principals are more involved in the instructional programme, there is no list of action and behaviours that principals as instructional leaders must perform in a calculated manner in situations that are encountered. Hence, as King (2002) explained, "there is no litmus test for the presence of instructional leadership, nor is there a definitive list of its characteristics or behaviours. In places where instructional leadership truly exists, it becomes an integral, almost invisible, part of how a school community works ..." (King, 2002, p. 63). However, if one were to look for instructional

leadership, King contends that this framework provides an evidential lens to examine its existence.

2.4.2 Instructional Leadership Roles and Change in Teachers' Instructional Practices

Headteachers have an influence on teachers' instructional practices. Headteachers use the following leadership strategies to change teachers' instructional practices. The strategies are communicating goals (Blase & Roberts, 1994), supervising instruction (Blase & Blase, 1998), promoting professional development (Blase & Blase, 2004), providing resources (Appleton & Kindt, 1999), and providing incentives (Sheppard, 1996). Research on each variable is included in this section.

2.4.3 Communicating goals and change in teachers' instructional practices

According to Smith and Andrews (1989), headteachers communicate school goals in many different ways. Headteachers often do it through faculty meetings and departmental meetings. Headteachers communicate them through individual meetings such as follow-up conferences to classroom observations. Smith and Andrew were of the opinion that teachers perceive their headteachers to be strong instructional leaders when they communicate school goals through (a) interacting with them on their classroom performance, (b) being accessible to discuss instructional matters, (c) allowing teachers to try new instructional strategies by letting them know that it is okay to take risks, and (d) clearly communicating a vision for the school.

Communicating school goals had been found to positively affect the type of instruction teachers delivered (Blase & Roberts, 1994; Sheppard, 1996).

Communication of school goals by the headteacher has a significant, positive relationship with teacher classroom innovativeness (Sheppard, 1996). Classroom innovativeness is a teacher's willingness to try new and various instructional approaches (Sheppard, 1996). At the high school level, Sheppard found that communication of school goals by the headmaster accounted for the largest amount of variance in classroom innovativeness. In the same study, Sheppard discovered that communicating school goals, framing school goals, and promoting professional development together accounted for 57% of the variance in classroom innovativeness. Sheppard reported that framing school goals accounted for the largest amount of variance out of the three, but did not report the specific amount of variance.

Communicating school goals encourages teachers to do more reflection, which may lead to teachers adjusting their instructional techniques to address the different learning needs of students (Blase & Roberts, 1994). The connection between the communication of goals by headteachers and teachers' classroom instruction, however, was weak. Blase and Roberts discovered that 33% of the responding teachers felt communicating school goals encouraged them to do more reflection. Any leadership strategy identified by 35% or more of the responding teachers was considered a high impact influence. They did not explain why 35% was set as the minimum for a high impact.

2.4.4 Supervising instruction and change in teachers' instructional practices

Supervision of teachers' performance by headteachers affects classroom instruction. Supervision may be defined as, all efforts to monitor teacher performance (Duke, 1987, p. 104). It includes headteachers observing teachers in the classroom, conducting instructional conferences, and using professional development for classroom improvement. Headteachers can use classroom observations and informal visits to the classroom to see what teaching strategies are being used and assess their effectiveness. They can then use instructional conferences to talk with teachers about classroom objectives and instructional methods.

Supervision provides a way for headteachers to monitor instruction (Hallinger & Murphy, 1985). Headteachers use classroom visits to make sure teachers are complying with the instructional goals of the school (Hallinger & Murphy, 1985).

Instructional conferences with teachers have an effect on teacher classroom instruction (Blase & Blase, 1998; King, 1991). Blase and Blase found that teachers believe good headteachers use five strategies during instructional conferences: (a) making suggestions for instructional improvement, (b) giving feedback on classroom observations, (c) modeling good instruction, (d) using inquiry to discover what teachers think, and (e) soliciting advice and opinions from teachers" (p. 28). These strategies positively affected teachers by increasing their use of reflectively informed instructional behaviours, which referred to teachers taking more risks in the classroom by using different instructional strategies and placing more emphasis on instructional planning (Blase & Blase, 1998).

Instructional conferences with headteachers influenced teachers to implement higher-order thinking skills in their lessons for high school social studies students (King,

1991). In follow-up discussions with teachers in which they both analyzed a lesson, headteachers encouraged teachers to use more pedagogy that focused on higher-order thinking skills. Consequently, teachers moved away from more traditional types of pedagogy such as direct instruction (King, 1991). These supervisory behaviours created a climate at the school in which teachers openly discussed and critically thought about instructional issues related to higher-order thinking skills (King, 1991).

Visiting classrooms is a supervision strategy that positively affects teachers (Blase & Blase, 1998; Blase & Roberts, 1994). In this strategy, headteachers use informal visits to classrooms to learn what teachers are doing, to assess whether sound instruction is being delivered, and to interact with teachers (Blase & Roberts, 1994; Hallinger & Murphy, 1985). Blase and Roberts noted that visibility was related to using new teaching strategies, considering different teaching techniques to address the needs of students, and increasing levels of instructional time on task. They believed that visibility had these effects on teachers because of increased interaction, feelings of trust, feelings of respect, and more opportunities for teachers to express themselves.

Blase and Blase (1998) added to the findings of Blase and Roberts (1994). They found that visibility in the school by walking around and informally visiting classrooms was related to increased use of reflectively informed behaviours and good teacher behaviour. The similarity in findings with almost identical populations supported their validity.

Some behaviour of headteachers, were however, found to have negative effect on teachers (Blase & Blase, 2004). These behaviours included discounting teachers' needs, isolating teachers, withholding resources from teachers, spying on teachers, overloading teachers, criticizing teachers, threatening teachers, giving teachers unfair

evaluations, and preventing teacher advancement. Blase and Blase (2004) found that teachers felt their creativity was limited by these behaviours. Teachers stated that they could not be instructional risk takers and relied on traditional teaching methods because of a lack of support from their headteacher.

2.4.5 Promoting professional development and change in teachers' instructional practices

Promoting professional development is the most common headteacher leadership behaviour found by the researcher to have a positive effect on teacher classroom instruction (Blase & Blase, 1998; Sheppard, 1996). Professional development is thought to be a key to improving teacher instruction (Elmore & Burney, 1999). Administrators at the district and school levels are responsible for providing teachers with quality professional development (Desimone, Smith & Ueno, 2006).

Headteachers accomplish this through alerting teachers to professional development opportunities and organising in-service activities at their schools that focus on specific instructional goals (Hallinger & Murphy, 1985). Headteachers promote professional development by using supervisors and colleagues to train teachers on instructional strategies, giving teachers time for independent studies, and using external sources such as college courses, district-level workshops, and consultants who are experts in a particular area (Duke, 1987).

The promotion of professional development by headteachers increases teachers' use of higher-order instructional strategies when they receive professional development on a particular strategy (Desimone, Porter, Garet, Yoon & Birman, 2002). Higher-

order instructional strategies involved teaching in non-traditional ways and were found to increase the learning capacity of students. Headteachers were perceived by teachers to improve writing instruction by providing staff development on teaching the writing process (McGhee & Lew, 2007). Sheppard (1996) found a significant relationship between headteachers promoting professional development and teacher willingness to try new and various instructional ideas in the classroom. There was no mention by Sheppard of what specific activities that headteachers engaged in to promote professional development. Sheppard (1996) produced an interesting result. The only area in which promoting professional development was not the most important effect on teachers was on teacher innovativeness at the high school level.

This raises a question concerning the effect high school headmasters have on teacher classroom instruction. It could be that headteachers at the high school level are not the ones promoting professional development; rather teachers could be influenced by other sources such as supervisors in the central office.

The promotion of professional development by headteachers increases teachers' use of reflectively informed behaviours, including innovative ideas and instructional risk-taking (Blase & Blase, 1998). Blase and Blase provided a list of strategies headteachers used to promote professional development that increased teachers' use of reflectively informed behaviours: (a) emphasizing the study of teaching and learning, (b) supporting collaboration among educators, (c) developing coaching relationships among educators, and (d) applying principles of adult learning to staff development. Headteachers' support and encouragement for teachers' participation in professional development activities influence the teachers to change their classroom practices to meet the needs of the students. King (1991) found that the participation of

headteachers in curriculum work with teachers was a key to the implementation of higher-order thinking skills by these teachers. In Ghana, GES in collaboration with JICA has developed in-service training (INSET) sourcebook comprising six modules gearing at improving the quality of teaching and learning. Since December 2005, the GES has been developing an INSET programme, which focuses on the teaching of basic school Mathematics, and Science (GES, 2007). These modules were made for the primary schools but some districts are adapting them for their junior high schools.

2.4.6 Providing resources and change in teachers' instructional practices

Headteachers influence classroom instruction by supplying teachers with necessary resources. Providing resources includes more than just monetary resources and materials. According to Duke (1987), providing resources includes –(a) scheduling, (b) developing the school calendar, (c) hiring and correctly placing teachers, (d) adopting textbooks, and (e) purchasing necessary materials to support instruction” (p. 82). Headteachers influence student achievement through helping teachers acquire the necessary resources to support instruction (Heck, Larsen & Marcoulides, 1990).

The lack of resources may be a barrier to the use of some instructional strategies by teachers. The lack of science equipment and reference materials was found by Appleton and Kindt (1999) to dictate how teachers taught their students. Schools did not have the necessary resources to support certain instructional strategies and activities. There was no mention of the headteacher, but Appleton and Kindt found that colleagues were the teachers' only support in this area. The researchers cited the school and school system as the reason for the lack of science resources. This places

responsibility for not providing adequate resources on headteachers and administrators at the central office level.

Providing resources is viewed by teachers as effective leadership by headteachers (McGhee & Lew, 2007). Teachers perceived that headteachers improved their writing instruction by providing resources such as technology. Smith and Andrews (1989) discovered that a majority of strong instructional leaders were given positive ratings as resource providers when they were seen as –(a) promoting staff development activities for teachers, (b) possessing knowledge of instructional resources, (c) mobilizing resources and district support to achieve academic goals, and (d) the most important instructional resource in the school” (p. 32). Teachers perceived the most important strategies headteachers engaged in as resource providers were promoting professional development and providing teachers with support through instructional resources (Smith & Andrews, 1989).

2.4.7 Provision of incentives and change in teachers’ instructional practices

Providing incentives for teachers is a strategy headteachers can use to motivate teachers to change their instructional practices. Headteachers provide incentives by giving formal awards and using public or individual praise for teachers (Hallinger & Murphy, 1985). Praising teachers in front of their peers can be effective because it encourages improvement by all teachers. Most teachers do not receive sufficient monetary compensation for what they do in the classroom. Recognising teachers for their classroom performance provides an incentive for improvement and continued growth.

Providing incentives for teachers influences teacher innovativeness in the classroom (Sheppard, 1996). Sheppard found that providing incentives was one of five variables that accounted for 52% of the variance in teachers' innovativeness at the elementary level. Providing incentives did not account for variance in teacher innovativeness at the high school level. Sheppard concluded that elementary headteachers had more of an impact on teacher instruction than their high school counterparts. Headteachers motivate teachers to try instructional strategies through rewards such as praise and material rewards (Blase & Roberts, 1994). Rewards were found by Blase and Roberts to positively affect 38% (percent) of responding teachers by increasing their use of innovative ideas within the classroom. A similar percentage of teachers (37%) noted that the use of rewards increased levels of time on task. Blase and Roberts believed these percentages are large enough to be considered important effects on teachers.

2.5 School Leadership and Student Achievement

Research reveals that effective school leadership positively influences student learning (Cotton, 2003; Day, 2000; Fullan, 2001; Leithwood, Harris & Hopkins, 2008). In their overview of the literature on successful school leadership, Leithwood *et al.* (2008) reported that "school leadership is second only to classroom teaching as an influence on pupil learning" (p. 27). They also reported that schools with the highest levels of student achievement attributed this to relatively high levels of influence from all sources of leadership (p. 35).

Cotton (2003) conducted a review of studies published after 1985, indicating that what school leaders do on campuses does make a difference in student achievement. Cotton's analysis revealed twenty-six principal behaviours that contribute to student

achievement. Cotton classified these behaviours into five categories. These included (a) establishing a clear focus on student learning with high expectations for all students, (b) developing relationships with teachers, parents, and the community, (c) building a school culture supportive of collaboration, shared leadership, risk-taking, and continuous improvement, (d) improving instruction through the use of reflections, observations, and (e) supporting teachers, and using data to encourage accountability.

Elmore (2006), when commenting about school leadership and student learning in effective schools, observed that (a) school leaders in effective schools had a clear vision of high expectations for student learning coupled with a sense of urgency for improvement, (b) the curriculum was rigorous, and (c) teachers had internalized responsibility for student learning. Elmore also observed a collaborative culture in these effective schools, with classrooms open to visits from colleagues, administrators, or other interested individuals. Collaborative teams of teachers supported by school leadership are recognised as positively influencing student achievement.

Similar findings were reported in the research conducted by, Marzano, Waters, and McNulty (2005). These educational researchers are associated with Mid-continent Research for Education and Learning (McREL). They have conducted an extensive review of research in an attempt to answer the call for “school leadership that translates into enhanced student achievement” (p. v). In their meta-analysis of the research dealing with school leadership, the authors stated, “Our meta-analysis indicates that principals can have a profound effect on the achievement of students in their schools” (p. 38). The analysis included sixty-nine studies conducted from 1978 to 2001. These studies addressed school leadership and student achievement. Their

analysis suggested that the link between school leadership and student achievement is not readily apparent because most research indicates that school leadership from both administrators and teacher leaders influences student achievement indirectly through teachers and other school factors. Waters, Marzano, and McNulty (2004) made the following statements about their findings.

1. Leadership matters. McREL found a significant, positive correlation between effective school leadership and student achievement.
2. We can empirically define effective leadership. McREL identified 21 key areas of leadership responsibility that are significantly correlated with student achievement.
3. Effective leaders not only know what to do, but how, when, and why to do it.

McREL researchers concluded that effective leaders understand which school changes are most likely to improve student achievement, what these changes imply for both staff and community, and how to tailor their leadership practices accordingly.” (Waters *et al.*, 2004, p. 49).

The GES, sharing in the belief of school leadership and its direct effects on teachers and students’ achievement developed the headteachers’ handbook in 1994 to provide headteachers with the needed support to improve upon the quality of teaching and learning in their schools. The handbook provides guidelines headteachers could use to manage their schools to meet the expectation of the society and the nation. The handbook provides information on managing people, instructional time, resources, co-curricular activities, staff development among others (GES, 1994). The headteachers’ handbook was reviewed for gender sensitivity in July 2000 by Eminah (2000).

The GES again, recognising the important role of supervision in school administration, developed the circuit supervisors' handbook to enable them carry out their roles as curriculum advisors to headteachers and teachers to improve the quality of teaching and learning in the classroom (GES, 2002). The handbook is a source of information to the circuit supervisor in helping headteachers run their schools successfully.

2.6 Role of the Principal in Student Achievement

To help frame a look at the role played by the principal or other school leaders, it is important to understand what is expected of campus leaders. Today's school leaders are under increased pressures for accountability and student success, and therefore require a different skill set than in past decades. Wilmore (2002) presented the Educational Leadership Constituent Council (ELCC) standards. The need for the standards was recognised by the National Policy Board for Educational Administration (NPBEA) to help that organisation's goal of improving school leadership and in response to changed expectations in the roles of school leaders on campuses as well as in response to the increased pressures on these leaders. The NPBEA is composed of 10 professional organisations with a commitment to improving school leadership, including:

1. American Association of Colleges for Teacher Education.
2. American Association of School Administrators,
3. Association of School Business Officials,

4. Association for Supervision and Curriculum Development,
5. Council of Chief State School Officers,
6. National Association of Secondary School Principals,
7. National Association of Elementary School Principals,
8. National Council of Professors of Educational Administration,
9. National School Boards Association, and
10. University Council for Educational Administration. (Wilmore, 2002, p. 9).

There are seven standards resulting from the collaborative work of these organisations.

1. A school administrator is an educational leader who promotes the success of all students by facilitating the development, articulation, implementation, and stewardship of a school or district vision of learning that is shared and supported by the school community.
2. A school administrator is an educational leader who promotes the success of all students by advocating, nurturing, and sustaining a school culture and instructional programme conducive to student learning and staff professional growth.
3. A school administrator is an educational leader who promotes the success of all students by ensuring management of the organisation, operations, and resources for a safe, efficient, and effective learning environment.

4. A school administrator is an educational leader who promotes the success of all students by collaborating with families and community members, responding to diverse community interests and needs, and mobilizing community resources.
5. A school administrator is an educational leader who promotes the success of all students by acting with integrity, fairness, and in an ethical manner.
6. A school administrator is an educational leader who promotes the success of all students by understanding, responding to, and influencing the larger political, social, economic, legal, and cultural context.
7. A school administrator is an educational leader who promotes the success of all students by substantial, sustained, standards-based experiences in real settings that are planned and guided cooperatively by university and school district personnel for graduate credit. (Wilmore, 2002, pp. 13-14).

These national standards provide a framework for improving school leadership that can be used to guide the development of standards at the state level as well as guide college administration preparation programmes. Wilmore stated, “the role of the principal has transitioned again from school manager to the school catalyst for success for all stakeholders.” (p. 5)

Another area of importance in understanding the role of school leaders is the knowledge base they should possess when stepping into the leadership role on a campus. Glanz (2006) suggested a knowledge base grounded in best practices in teaching, best practices in curriculum, and best practices in supervision and professional development. Glanz recommended that school leaders be knowledgeable

in research-based best practices in teaching and he described these practices as follows:

1. Reflective practice is a process by which instructional leaders take the time to contemplate and assess the instructional needs of their schools, identify problem areas, and develop strategies for becoming more effective.
2. Preplanning occurs when teachers actively consider learning objectives and other preparatory lesson activities.
3. Allocated, instructional, engaged, and success time are crucial factors in promoting student learning.
4. Wait time increases the amount of time students have to think before responding.
5. Direct teaching refers to the time spent in actual teaching as opposed to nonteaching activities (e.g., collecting assignments).
6. Literacy development (including reciprocal teaching) is essential regardless of what subject is taught.
7. Differentiating instruction refers to the varied teaching strategies employed by teachers to address the learning needs of all students.
8. Divergent questioning encourages deep and critical thinking.
9. Self-assessment occurs when teachers begin to reflect on their teaching methods.

10. Constructivism refers to learning by doing or active learning. (Glanz, 2006, pp. 13-14)

Additional research-based instructional strategies are important for the effective school leader to know. These include (a) identifying similarities and differences, (b) summarizing and note taking, (c) reinforcing effort and providing recognition, (d) homework and practice, (e) cooperative learning, (f) setting objectives and providing feedback, (g) generating and testing hypotheses, and (h) using questions, cues, and advance organisers (Marzano, Pickering & Pollock, 2001). While campus leaders will probably not be content experts in all subjects, these instructional strategies are applicable to all content areas.

Glanz (2006) also pointed out the importance of the role played by school leaders in the development of the school's curriculum. This practice is collaborative in nature and involves teachers, curriculum supervisors, and the principal. He stated, "Curriculum involves an analysis of all the learning experiences that occur in school" (p. 52). If we expect students to succeed academically, designing the most effective curriculum to meet the needs of a diverse body of students requires a basic knowledge of curriculum development.

Equally important is the campus leaders' understanding of the principal's role in supervision and professional development in the school. Glanz (2006) offered the following concepts as important for principals to understand:

1. Clinical supervision is a cyclical process of engaging teachers in instructional dialogue based on three basic stages: planning, observing, and reflection.

2. Action research occurs when principals encourage teachers to think about their teaching and student learning in systematic ways by employing the scientific method: identify a question or problem, pose research questions, gather and analyze data, interpret results, derive conclusions, and take action to improve practice.
3. Professional development is a process of supporting teachers' work and student learning by systematic, continuous, meaningful, knowledge-based workshops and seminars around collaboratively developed topics.
4. All good principals work with teachers on instructional activities that include planning, conferences, observations, workshops, sharing bulletins and research, inter-visitations, providing resources, demo lessons, and staff development. (p. 56).

When considering the role principals play in school improvement and increased student achievement, Sparks (2007) considered leaders –a category that in schools includes teacher leaders as well as principals and district administrators” (p. 15). Spark's book focuses on Spark's belief in –the leader's role in actualizing human potential and unleashing individual and organisational energy” (p. 14). According to Sparks, leaders accomplish this by –connecting people to larger purposes and to one another and by cultivating in their organisations, transformational professional learning and breakthrough thinking” (2007, p. 15). Sparks made the following statement:

Leaders matter. What leaders think, say, and do -- and who they are when they come to work each day -- profoundly affects organisational performance...
Leaders' thoughts and actions shape the culture of their organisations and set

the direction and pace for the professional learning and teamwork that are essential in improving organisational performance. (p. 12)

Sparks offered the following seven leadership skills as representative of the beliefs that help encourage improvement in student as well as adult learning:

1. Clarity of thought regarding intentions and assumptions
2. Deep understanding of important subjects
3. The capacity to create
4. Empowering beliefs
5. The concise and consistent expression of those intentions and beliefs in the spirit of dialogue
6. Committed listening
7. Continuous innovation in the methods used to achieve our goals. (p. 17)

Sparks (2007) made the case that if the goal of a campus principal or school leader is for improved student achievement, the principal or school leader should begin by examining themselves to see what they need to improve or learn in order to create the culture for school improvement. One of the keys to school improvement is leader self-awareness and then encouraging the growth of others.

This focus on leader self-awareness is also presented by Daresh (2006).

Daresh stated:

Educational leaders who are most successful have a clear sense of purpose of schooling in general. They also have developed clear personal philosophies concerning the nature of the people with whom they work each day. And they have constructed a sense of purpose and reality in terms of the nature of the job of being a school leader in the first place. (p. 4).

Daresh makes the point that –school leaders are important people because they can create the conditions that are necessary to make schools into learning places, not simply buildings where students are ‘warehoused’ each day” (pp. 4-5). In order to create this condition, the effective school leader must decide individually what supervision is, and what it looks like, as well as what leadership is and what it looks like. Daresh (2006) presented two versions of characteristics of effective instructional leaders. The first example is from the Association of Supervision and Curriculum and is composed of five characteristics of instructional leaders: (a) providing a sense of vision for their schools, (b) engaging in participative management, (c) providing support for instruction, (d) monitoring instruction, and (e) being resourceful.

The second set of behaviours presented by Daresh are from the work of Bennis and Nanus (1985) and include strategies dealing with (a) developing a vision, (b) using effective communication, (c) establishing trust, (d) possessing self-confidence, and (e) focusing on success rather than avoiding failure. With either of these sets of characteristics and strategies, the leader must not lose sight of the most important part of the process, the needs of the students and the importance of encouraging a student-centered campus.

2.7 Student Improvement Processes in the Science Content Area

In addition to examining the current research for the role of leadership in student achievement, this study focused on the role of leadership as it influences student achievement in science. The leadership demonstrated by school leaders is critical to the implementation of what research has identified as the best practices in science. If the improved instructional strategies in science teaching are to be implemented, school leaders need an understanding of what those instructional strategies look like as well as an understanding of the Science Education Standards.

In 1996 the National Research Council (NRC), along with the National Science Teachers Association (NSTA), the American Association for the Advancement of Science (AAAS), and other organisations, created the National Science Education Standards (Zemelman, Daniels & Hyde, 2005). Zemelman *et al.* stated, “the science standards ask teachers to foster in all students the awareness of science as a dynamic, creative interplay of questions and evidence, data and ideas, predictions and explanations” (p. 145).

These standards address four areas of science education: (a) teaching, (b) professional development of teachers, (c) assessment, and (d) science content knowledge. The goals for teaching science in schools as outlined by the Standards state that students should be able to (a) experience the richness and excitement of knowing about and understanding the natural world, (b) use appropriate scientific processes and principles in making personal decisions, (c) engage intelligently in public discourse and debate about matters of scientific and technological concern, and (d) increase their economic productivity through the use of the knowledge, understanding, and skills of the scientifically literate person in their careers (NRC, 1996).

To accomplish these goals, leaders must encourage the use of research-based best practices. There is no one way to teach science effectively. An effective teacher is able to decide which of several strategies would be the appropriate strategy to help a student understand a particular scientific concept (Bell, Smetana & Binns, 2005; Crane, 2005). Badgett and Christmann (2009) recommend deconstructing the national and state standards to guide development of unit plans and daily activities. The national and state standards tend to be written in broad and general terms and must be broken down into specific, logical, and understandable guidelines for instruction. They stress the importance of viewing instruction and assessment as a “pyramidal structure that proceeds from the simple to the complex, whether we are looking at measurable objectives, paper-and-pen tests, performance-based assessments, or portfolios” (p. 2).

In a meta-analysis of 140 studies focusing on the effects of traditional science teaching strategies as compared to alternative science teaching strategies (Wise, 1996), results indicated that students taught with the alternative science teaching strategies were more successful on science achievement tests than students taught using traditional methods. The alternative science teaching strategies identified as effective science teaching strategies included (a) questioning strategies, (b) focusing strategies, (c) manipulation strategies, (d) enhanced materials strategies, (e) testing strategies, (f) inquiry strategies, (g) enhanced content strategies, and (h) instructional media strategies.

Wise (1996) observed that a common element in these science-teaching strategies is an inquiry-based approach to teaching and learning that requires the student to be actively engaged in the learning process. Students actively construct their own

knowledge guided by the teacher. As stated in the National Science Education Standards (NRC, 1996), “Learning science is an active process ... Learning science is something students do, not something that is done to them” (p. 20). The National Science Education Standards offer the following standards for science teaching:

1. Teachers of science plan an inquiry-based science programme for their students. (p. 30).
2. Teachers of science guide and facilitate learning. (p. 32).
3. Teachers of science engage in on-going assessment of their teaching and of student learning. (p. 37).
4. Teachers of science design and manage learning environments that provide students with the time, space, and resources needed for learning science. (p. 43).
5. Teachers of science develop communities of science learners that reflect the intellectual rigor of scientific inquiry and the attitudes and social values conducive to science learning. (p. 45).
6. Teachers of science actively participate in the ongoing planning and development of the school science programme. (p. 51).

A second meta-analysis by Schroeder, Scott, Tolson, Huang and Lee (2007) looked at studies conducted between 1980 and 2004 focusing on science teaching strategies and the effect of those strategies on student achievement. This study identified the following teaching strategies to have a positive influence on student achievement:

1. enhanced context strategies

2. collaborative grouping strategies
3. questioning strategies, direct instruction, and focusing strategies
4. inquiry strategies
5. manipulation strategies
6. assessment strategies
7. instructional technology strategies
8. enhanced material strategies. (Schroeder *et al.*, 2007, p. 1446).

The issue for school leaders that surfaces after identifying best practices is how to encourage teachers to implement these best practices. Implementing instructional change in a school is not always an easy task. In a study by Rowan and Miller (2007) on implementation of three externally created programmes for instructional change on school campuses, the researchers compared the success of the implementation and the degree of instructional change achieved by each of the programmes used. A key finding by these researchers was that “predictable differences in patterns of organising for instructional improvement emerged across the schools working with these three programmes, and these patterns were found to be systematically related to patterns of programme implementation” (p. 252).

Just as the effective science teacher decides which of the best practices strategies to use when teaching a science concept to students, an effective principal must decide how to encourage instructional change when needed. As demonstrated in the study by Rowan and Miller (2007), campus leaders must decide if the teachers need a programmed approach that includes specific directions for the change or if they need

an adaptive approach that allows for more teacher discretion and autonomy. As their study showed, the approach chosen to implement the desired instructional changes influences the degree of instructional change achieved by the school.

In their study of a high school department chair, Rigano and Ritchie (2003) reported similar findings about how that department's chair encouraged change within the science department. In efforts to overcome barriers to implementing reforms within the science department, the science department chair used leadership skills such as modeling desired practices, providing teacher support, and setting high expectations for the department. His or her adaptive approach allowed teachers to implement desired instructional changes as those teachers felt comfortable doing so. Ritchie, Mackay and Rigano (2006) also examined leadership dynamics in science departments in their study of two high schools. Their study examined how the leadership dynamics in the science department encouraged or discouraged desired changes in classroom practices. Leadership practices used by the science leaders in their study included modeling desired practices and clearly articulating their vision for the science department.

Leithwood and Jantzi (2006) made the observation that ~~there~~ "there is a significant gulf between classroom practices that are 'changed' and practices that actually lead to greater pupil learning" (p. 223). They added, "The potency of leadership for increasing student learning hinges on the specific classroom practices which leaders stimulate, encourage, and promote" (p. 223).

2.8 Barriers to Teaching Science

2.8.1 Inadequate science resources

Science reform stresses the importance of teaching science inductively—experiences that engage students in deep learning through critical thinking, problem solving, questioning, and exploration (AAAS, 1989; NRC, 1996). In such a learning environment, resources, both physical and teaching activities, are critical to lesson execution and student learning.

The lack of resources, teachers argue, influence the science they teach, how it is taught, and the depth in which students learn it (Loucks-Horsley, Love, Stiles, Mundry & Hewson, 2003; Yore *et al*, 2008). In a study of beginning elementary science teaching, Appleton and Kindt (2002) indicated that when science resources are inadequate or unavailable, it affects the perception that elementary teachers have of themselves as science teachers and their perception of the value accorded to science by the school, district, school administrators, and other teachers. More importantly, teachers acknowledge that the availability or lack of resources limit the topics they teach, the selection of teaching strategies and activities and by default encourages them to work within a personally comfortable teaching zone” (Appleton & Kindt, 2002, p. 53).

2.8.2 Insufficient planning time

Science, like all other academic subjects, requires a great deal of time to prepare quality lessons. From engaging students’ prior knowledge on the topic to gathering and organising materials to structuring the lesson, sufficient time is needed to plan

effectively (Dickinson, Burns, Hagen & Locker, 1997; Yore *et al.*, 2008)). On average, elementary teachers have between one and three hours for planning each week (8.3 minutes for every hour in the classroom) (Darling-Hammond, 1999). In addition, teachers spend between 10 to 15 hours per week planning and preparing lessons outside of school, ~~as~~ opposed to the in-school time of teachers in other countries that is spent primarily in collaborative planning and learning” (p. 34).

When teachers feel as if they have not had time to plan quality lessons, they often resort to worksheets, teacher-centered lessons from textbooks, and ~~cookbook~~” investigations. As a result, students are not provided the opportunity to engage in science investigations that develop higher-order thinking processes and scientific habits of mind. Teachers need sufficient time to plan individually and collaboratively, reflect on lessons in supportive environments, and ~~bounce ideas~~” off others. What science educators do know is that when sufficient time is invested into planning science lessons, the return is the increased effectiveness of science teachers and quality lessons that encourage hands-on and minds on learning (Dickinson *et al.*, 1997).

2.8.3 Teacher attitude

As previously mentioned, many basic school teachers recognize the importance of engaging students in science. Yet there are others who do not enjoy teaching science, therefore, lack the commitment needed to teach in reform-minded ways. According to Bencze and Hodson (1999) and Munck (2007), the attitudes and beliefs that Basic science teachers have about the teaching and learning of science are often manifested in their actions. They often mask their unfavorable disposition by teaching as little

science as possible, teaching within their comfort zone, and over-utilizing expository teaching methods. Bencze and Hodson (1999) further elucidate that “Little imagination is needed to appreciate how these strategies will impact negatively on children’s science education experiences” (p. 524), a fate that science educators are attempting to avoid. In order to change the unfavourable attitudes that teachers have about science, they must engage in long-term professional development in which beliefs are challenged and new instructional approaches are learned (Jarvis & Pell, 2004).

2.8.4 Teacher preparation

There are a number of studies and research documents that indicate that the lack of content knowledge and pedagogy influence a teacher’s ability to design and implement effective science lessons. Not only does the lack of content knowledge and pedagogical content knowledge inhibit conceptual change, create an over-reliance on didactic and rote learning, and restrict curriculum choices, they also cause teachers to lack confidence in their ability (Dickinson *et al.*, 1997; Lee, Hart, Cuevas & Enders, 2004; Mechling & Oliver, 1982;). Because most Basic teachers already feel unqualified to teach science (Fulp, 2002), they often go through each year teaching less science and engaging in even fewer professional development activities to improve their ability. When teachers feel unprepared, they often rely on textbook publishers to determine the curriculum, very rarely deviating beyond their personal comfort zone. Further, when teachers feel unprepared, even when resources are available to teach science, they often do not know how to incorporate them effectively into science lessons (Bencze & Hodson, 1999).

2.8.5 Lack of headteacher leadership

In schools, a headteacher's leadership through the process of reform is recognised as very important. Spillane, Halverson and Drummond (2001) find this to be the case. In their study of an urban school mobilizing resources to improve the teaching and learning of science, the headteacher's leadership through the process of change is found to be the key to its success. Not only did the headteachers provide monetary support for resources and professional growth activities, they supported instructional innovation and took on the role of instructional leader.

Spillane *et al.* (2001) also emphasized the articulation, development, and implementation of curricula and became a catalyst for the staff to develop curricula that supported the school's goals and philosophy" (p. 928). Three other studies found that headteachers influence teachers as they seek to reform their practice. Kelly and Staver (2005) found that as a school, the district adopts and implements a new science programme, headteachers' support and leadership for the new programme is positive, but is not sufficient to facilitate full implementation ..." (p. 44). Similarly, Supovitz and Turner (2000), examining the effects of professional development on the extent to which teachers utilize inquiry-based science practices, discover that teachers with headteacher support report a greater use of reform-minded practices than did those teachers who did not feel supported by their headteacher.

In another study aimed at systemic science reform, teachers perceive a headteacher's lack of involvement and lack of knowledge of the science programme being implemented to be a constraining force (Harwell, 2000). The author goes on to say that, it is only when those elements perceived as constraining forces are alleviated and a more supportive environment grows ..." (p. 18) will successful implementation

of reform take place. Teachers need the support and leadership of their headteacher as they attempt to change their practice (Banilower, Heck & Weiss, 2007; Johnson, 2007).

In a study of the potential effect of professional development on the alignment of instructional practices with the vision espoused in reform documents, Banilower *et al.* (2007) indicate that “teachers more frequently use the designated instructional materials when they feel supported by their headteacher to implement science education reform” (p. 386). Similarly, in Hanegan’s dissertation research on elementary headteachers’ perspectives on their support for elementary science, Hanegan (2001) argued that headteacher support is a necessary element in a teacher’s willingness to employ reform-minded and innovative instructional practices. Although the level of support varied depending on the headteachers’ leadership style, school context, and science background, the headteachers in Hanegan’s study perceive their support to be integral to the success of the science programme. Teachers perceive many elements (such as materials, planning time, teacher preparation, high-stakes testing, administrative support, etc.) as barriers to the teaching of science as described in reforms. Because of teachers’ quick recognition of these barriers, their students are deprived of the joy, experiences with science, and conceptual development that is possible when students experience science in ways described in reform documents.

2.8.6 Teachers’ belief, internalizing and implementing change

Classroom teachers are recognised as central to the successful implementation of science education reform (Mechling & Oliver, 1982). This is not because other

persons such as school administrators, parents, politicians, and scholars or other factors such as the curricula, textbooks, and policies do not aid in the enactment of reform; they most certainly do. The success of science education reform is dependent upon the ability of teachers to develop an understanding of the reform initiatives being promoted; internalize and fuse this understanding into their existing professional schemas; and implement it in a manner that is consistent with the intent of reform (Keys, 2007).

As stated by Levitt (2001), “the success of current programmes of science education reform depends on teachers’ ability to integrate the philosophy and practices of current programmes of science education reform with their existing philosophy, extant practices, and established district models, without compromising the intent of the new science programme” (p. 1).

Teachers’ implementation of reform is quite often unpredictable, “fickle,” and without a pattern. Researchers have concluded that this uncertainty and seemingly capriciousness is because the messages of reform are not simply conveyed to teachers and then mindlessly translated into images that are consistent with reform intent (Keys, 2007; Kang, 2008). Instead, reform initiatives are filtered by teachers through intricate and often convoluted mental constructs that constitute teachers’ beliefs about science, how children learn, and how science should be taught and learned (Davis, 2003; Keys, 2007; Pajares, 1992).

There is a considerable body of literature that looks at teacher beliefs and the influence they have on the way teachers plan to teach science, what they choose to teach (or not to teach), and decisions that they make while teaching (Jones & Carter, 2007; Keys, 2007; Pajares, 1992). Snider and Roehl (2007) also pointed out

in their review of the literature that, teacher belief constructs are so multifaceted that instructional commitments vary between grade levels (e.g., elementary and high school teachers) and across academic disciplines (e.g., English and Science).

According to Pajares (1992), understanding teacher beliefs is a “messy” undertaking (p. 329). Empirically, researchers have had little success determining where “knowledge ends and belief begins” (p. 309). Not only have researchers experienced difficulty in defining the construct of beliefs, two distinct groups have emerged: 1) those who have etched a lucid boundary that divorces beliefs from knowledge, and 2) those who see the line between beliefs and knowledge as blurred, making a dissociation impossible (Southerland, Sinatra, & Matthews, 2001). This debate continues to fester in philosophical and educational circles around the globe, with consensus far from being reached. However, teacher education researchers have found that teachers think and speak about their practice subjectively from personal convictions (considered beliefs), as well as empirically based on their experience (considered knowledge). But “teacher thinking researchers in science education tend to use the term beliefs to refer to both constructs [knowledge and beliefs]” (Southerland *et al.*, 2001, p. 347).

Researchers agree that beliefs influence what teachers‘ think, say, do, and intend to do in their classrooms, as well as influence how they translate the curriculum into practice (Davis, 2003; Pajares, 1992).

“Change is hard” (Davis, 2003, p. 5) and it is for this reason that in order for change to be sustained, teachers‘ beliefs must be at the core of reform initiatives, challenging their beliefs incessantly. This challenge can happen in a variety of contexts (i.e., classrooms, professional development in services and workshops, teacher

preparations programmes, college courses, community learning groups, etc.). But of particular importance in any of these situations is that teachers are immersed in long-term professional development, as to provide a forum for teachers ~~to~~ make beliefs explicit providing them with a context to examine, critique, and weave new ideas into their existing constructs” (Dickinson *et al.*, 1997, p. 6). In cases, where sustained professional development is not provided or inadequate, teachers revert to more conventional and teacher-centered modes of science instruction (Johnson, 2007).

The notion of reform of teachers’ beliefs at first may appear to be a simplistic undertaking. However, Fullan (2000) warns us that it is not as easy as it appears. Beliefs are reinforced through experiences and filtered through an internal system of checks and balances, making them ~~highly~~ resistant to change” (Pajares, 1992, p. 317). Therefore, for instruction to be effective, the teachers’ beliefs as well as the headteachers’ leadership need to be looked at.

2.9 Summary

Headteachers are recognised as very influential at the basic level, because they are seen as major contributors to the successful implementation of school reform. While the goal of scientific literacy for all continues to be a work-in-progress, reformers recognise the importance of collaboration between headteachers and teachers if changes are to be long-term and transforming. This is because headteachers influence teaching and classroom practices through school decisions such as formulating school goals, setting and communicating high achievement expectations, organising classrooms for instruction, allocating necessary resources, supervising teacher’s

performance, monitoring student progress and promoting a positive, orderly environment for learning.

This implies that even though headteachers normally do not go into the classrooms to teach, they have an impact over teaching and classroom practices by making vital decisions; ensuring that teachers have the necessary tools to facilitate instruction; getting feedback on student progress and so on. All these have an indirect impact on the students' achievement in the school. There seems to be a direct relationship between school climate and student achievement in school, and similarly there is consensus that the leadership roles executed by the headteacher is the significant factor in shaping the learning environment to facilitate student learning. The headteacher, who articulates clear goals, holds high expectations of pupils and teachers, and exercises strong educational leadership is instrumental to the school in achieving its goals (Miller, 1995).

In summary, school excellence begins with the presence of a leader who is the headteacher with high values and commitments and who does not give up easily in times of adversity. Therefore, this study hopes to explore the ways in which the leadership behaviours and practices of a headteacher contribute towards the academic achievement as well as the potential of the pupils in the school.

CHAPTER THREE

METHODOLOGY

3.0 Overview

This chapter contains the research design, population for the study, the sample and sampling technique. The instruments for data collection, its reliability and validity were outlined. Data collection procedure and data transcription and analysis plan were discussed.

3.1 Research Design

This research was to determine the influence of the headteachers' leadership roles on junior high school science instruction, how the headteachers' instructional leadership roles influenced the teachers' classroom instruction and how the teachers interpreted and responded to the headteachers' leadership in science instruction, if there were differences in the male and female teachers' interpretation and response to the headteachers' instructional leadership.

The case study design incorporating qualitative research approaches was adopted for this research. This design is used to narrow down a very broad field of research into one easily researchable topic. Case study involves the collection and presentation of detailed information about a particular participant or small group, frequently including the accounts of subjects themselves. The case study design was utilized to enable the researcher gain in-depth insight into the instructional leadership roles of the selected junior high school headteachers.

3.2 Population for the study

There are sixty-four public junior high schools in the New Juaben Municipality in the Eastern Region of Ghana. For the purposes of this study, the target population was all headteachers, assistant headteachers and science teachers in the sixty-four public junior high schools in the New Juaben Municipality in the Eastern Region of Ghana.

3.3 Sample and sampling techniques

From the target population, the researcher sampled nine individuals consisting of three headteachers, three assistant headteachers, and three science teachers from three public junior high schools in the New Juaben Municipality in the Eastern Region of Ghana using purposive and snowball sampling techniques. The headteachers, assistant headteachers and science teachers were selected and interviewed because they were identified as the major entities for this research, who will provide what Patton (1990) termed, “information rich responses” (p. 169).

The purposive and snowball sampling techniques were used by the researcher because it is believed that, sample obtained from this technique provide information that facilitate the in-depth understanding of the phenomena understudy (Creswell, 2002; Patton, 1990). Snowball sample was used because the teachers and assistant headteachers were recommended by their headteachers.

3.4 Instrument for Data Collection

In qualitative research, data collection methods consist of collecting data on protocols developed during the study, gathering text through interviews, and collecting information from a small number of individuals or sites (Bogden & Biklen, 1998; Creswell, 2002; Patton, 1990). In this research, the researcher sought to learn from the participants of the study, and therefore, data for this study was made through participant interviews, observations, field notes, and document analysis.

An interview is “a process in which a researcher and participant engage in a conversation focused on questions related to a research study” (de Marrais, 2004, p. 54). The interview was used in order to obtain useful information that could not be obtained from observation and document analysis. In particular, the semi-structured interview was employed. Bogden and Biklen (1998) discussed the merits and demerits of using a semi-structured interview. They observed that with semi-structured interviews the researcher could be more confident in getting comparable data between participants, but would lose the opportunity to understand how the individuals themselves would structure the topic at hand (p. 95). The researcher will determine that an interview guide will help facilitate discussion, yet will allow the research participant to respond based upon their understanding of the subject.

The researcher prepared an interview guide (Appendix A and B) for the research participants which were identical and had nine (9) items. The first eight items demanded information on how the headteachers’ instructional leadership roles influenced the teachers’ classroom instruction and how the teachers interpreted and responded to the headteachers’ leadership in science instruction and item nine sought

for the differences in the male and female teachers' interpretation and response to the headteachers' instructional leadership.

Observation was used to maximize the research as instrument allowing one to corroborate spoken claims with what participants do as part of their daily routines. Observational data allowed the observer to –see things first hand and use my own knowledge and expertise in interpreting what is observed rather than relying upon once-removed accounts from interviews” (Merriam, 1998, p. 96).

The passive observation technique was employed. The researcher was therefore unobtrusive as she watched classroom proceedings. A Classroom Observation Protocol prepared by the researcher was used to collect data that captured the essence of classroom instruction (see appendix C), with each observation lasting about fifty minutes.

Also field notes were produce, these are written accounts of what the researcher has heard and seen during an interview or observation. As part of these notes, the researcher recorded ideas, strategies, reflections, and noted patterns that appear to emerge (Bogden & Biklen, 1998). Field notes also provide a reflection opportunity for the researcher, in which the emphasis is on speculation, feelings, ideas, and hunches.

Lastly, documents were analysed to augment data obtained through interviews and observations. Documents are important source of data common in most schools and provide evidence and details of personal and professional lives of school personnel (Briggs & Coleman, 2007). In this study, the sources of documentary data analysed included the minute books, logbooks, teachers' lesson notebooks, Basic Education Certificate Examination results, teaching aids and letters.

3.5 Ethical Considerations

The trustworthiness of a qualitative study is judged by whether the researcher conforms to standards for acceptable and competent practices and whether they meet standards for ethical conduct (Rossman & Rallis, 2003). Regulations about informed consent and protection of human subjects as traditionally formulated may not fit a qualitative study, however, ethical issues are important to address (Bogden & Biklen, 1998; Rossman & Rallis, 2003). Two issues that dominate traditional guidelines of ethics in research with human subjects include informed consent and the protection of subjects from harm (Bogden & Biklen, 1998; Patton, 2002; Rossman & Rallis, 2003).

Prior to conducting interviews, the researcher had a meeting with the potential participants in which they were advised of their rights.

At the meeting, the purpose of the research, the amount of time needed for the interview, and the option of receiving feedback upon completion of the study was discussed. It was also made clear to all participants that their identities would be protected at all times throughout the research process. Potential participants were informed that they would be contacted one week from the date of the prior notice to see if they would agree to participate in the research.

3.6 Reliability and Validity of the Instruments

This study is essentially qualitative therefore reliability and validity were not treated separately but were considered together. According to Zeldin, Britner and Pajares (2008), one of the assumptions underlying qualitative research is that reality is holistic, multi-dimensional and ever changing. It is not a single, fixed, objective

phenomenon waiting to be discovered, observed and measured. Assessing the isomorphism between data collected and the reality from which they were derived is thus inappropriate determinant of validity. For qualitative studies we rather think of confirmability, transferability and trustworthiness.

To check researcher bias and the accuracy of the participants' realities, the researcher used the following checks:

Firstly, the interview protocol questions for headteachers and science teachers and classroom observation checklist were given to the researcher's supervisors to check for clarity and appropriateness to validate the research instruments used in the research design.

Again, the researcher used multiple sources of evidence and established chains of evidence while collecting the data. Validity was fostered through using data triangulation (Denzin, 1984) in that different types of empirical material (interviews, observation, and document analysis) were constructed with each other when categorizing the various types of material. The information collected from the multiple sources of evidence converged to form themes or categories in the study (Creswell & Miller, 2000). In addition, the researcher related her conclusion from the findings to the theories that underpinned her conceptual framework.

Also, the researcher corroborated evidence by interviewing different individuals, such as headteachers, assistant heads and science teachers, after which the researcher's supervisors reviewed different aspects of the study, both during and upon completion, of the study.

In addition, member checking described as “the most crucial technique for establishing credibility” (Creswell & Miler, 2000) was used. By using member checking, the researcher took the data and interpretations back to the participants in order to confirm the credibility of the information and the narrative account. In doing so, individual participants were allowed to review the raw data in the form of word-by-word transcriptions of the interview transcripts and to comment on the accuracy. They were allowed to give defining comments on the narratives. The working draft was reviewed and the participants corrected where errors were found in order to foster the credibility of the empirical analysis.

3.7 Data Collection

After permission had been granted by the headteachers from the selected public junior high schools, the other research participants recommended by the headteachers were personally contacted. Data concerning the influence of the headteachers’ leadership roles on integrated science instruction were collected through interviews, observations and document analysis.

3.7.1 Face-to-face interview

Maccoby and Maccoby (1954) defined the interview as “a face to face verbal interchange in which one person, the interviewer, attempts to elicit information or expressions of opinions or belief from another person or persons” (p. 499).

Conducting interviews to collect data has both advantages and disadvantages. Interviews provide useful information that cannot be obtained from observations, and allow participants to describe detailed personal information and experiences. One disadvantage is that they may be “filtered” (Creswell, 2002, p. 205) through the perspective the participant wants the researcher to hear.

During this study, semi-structured face-to-face interviews were conducted with three headteachers, three assistant headteacher and three science teachers from three different public schools in the New Juaben Municipality using interview guide with the bulk of the questions worded as open-ended in order to elicit the richest amount of responses (see Appendix A and B for respective guides). The semi-structured discussion format was used to enable the researcher and participants engage in conversation and freely allow research participants to express themselves in a relax manner. The questions were based on the theory of influences on change in teachers’ instructional practices in figure one, page 10. Each face-to-face interview lasted forty-five minutes. In addition, not more than two interviews were conducted on any one day to avoid any confusion that might have developed when multiple interviews are conducted by one researcher. Permission was asked by the researcher from each participant in the face-to-face interview to audiotape the interview, as well as allowing the researcher to take written notes to serve as a backup in the event the recorder malfunctioned.

3.7.2 Observations

Observations maximize the research as instrument allowing one to corroborate spoken claims with what participants do as part of their daily routines. Within the context of this investigation, observational data allowed the researcher as observer to “see things first hand and use my own knowledge and expertise in interpreting what is observed rather than relying upon once-removed accounts from interviews” (Merriam, 1998, p. 96).

The researcher observed six lessons during the period of study, two from each school. The observation identified the type of relationship among staff and pupils, level of headteacher instructional leadership and the attitude of teacher toward the headteachers in the performance of their leadership roles. The observation enabled the researcher to identify the influence the headteachers leadership roles on integrated science instruction.

3.7.3 Field notes

Field notes was written by the researcher upon the completion of each face-to-face interview, which provided impressions, insights, and additional remarks before and after the interview that were not caught on tape. Field notes were also taken during each observation. Descriptive field notes (Creswell, 2002) was used to describe the activities and people during the observation of the heads, while reflective field notes (Creswell, 2002) was developed by the researcher that relates to gaining insights, hunches, and themes that emerged during the observation process.

3.7.4 Document analysis

In this study, the sources of documentary data that were analysed included the minute books, logbooks, teachers' lesson notebooks, Basic Education Certificate Examination results, teaching aids and letters.

Data obtained from documents were required to reveal those aspects of the study that had occurred prior to the investigations and the goals or directions that might have been taken. The data analysis revealed information on the tone of the schools, their goals, provision of resources, and the state of professional studies of teachers among others. Document analysis was used to triangulate where possible what emanated from the interviews with the various participants and from the researcher's observations.

3.8 Data Analysis

Headteachers' who were interviewed were coded as H 1, H 2 and H 3. H 1 indicates headteacher from school one, H 2 indicates headteacher from school two and H 3 indicates headteacher from school three. Similarly, assistant headteachers' who were interviewed were coded as A H 1, AH 2, and AH 3. A H 1 indicates assistant headteacher from school one, A H 2 indicates assistant headteacher from school two and AH 3 indicates assistant headteacher from school three. Teacher who were interviewed were also coded T 1, T 2 and T 3. T 1 represents teacher from school one, T 2 represents teacher from school two and T 3 represents teacher from school three. Data obtained from the study were stored in the researcher's personal files and files on her computer. Units of meaning from all sources were frequently compared with

one another, put together when they contained the same information, and moved among categories until meaning of the data had been made.

The data derived from semi-structured interviews in this study were transcribed as quickly as possible following the interview in order to capture relevant details while the interview were still fresh and analysed using colour coding and thematic analysis procedures (Bouma, 1996; Wilkinson & Birmingham, 2003). The transcripts and units were re-read because new information led to the formation of new units, elimination of units, or the combination of units. I colour-coded all the transcripts. For instance, a yellow colour was used to highlight sentences, words, phrases or lines which referred to how a headteacher's instructional leadership role influence the instruction of integrated science in junior high schools in New Juaben Municipality, and a red colour code was used to highlight how teachers interpret and respond to the headteacher's instructional leadership in science.

The different highlighted texts were then placed in categories, which include major and minor themes (Miles & Huberman, 1994). In coding, the texts were formed into descriptions, which were labeled, and ideas that overlapped and were redundant were collapsed into themes (Creswell, 2005). All these were done by way of creating files and folders for all related codes, categories and themes.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Overview

This chapter presents the characteristics of research participants, results and discussions of findings of data gathered from the field study. The data consisted of qualitative individual interviews with headteachers, assistant headteachers and teachers, observations, as well as document analysis of three public basic schools in the New Juaben Municipality in the Eastern Region. The data collected were on the issue of the influence of headteachers' leadership roles on junior high school Integrated Science instruction in New Juaben Municipality.

4.1 Characteristics of Participants

Nine individuals, four males and five females participated in this study. Some of them have been on the position for eight years, seven years, with the least number of years of a participant on post being five. The headteachers are detached and the others are subject teachers, some have had leadership training whereas others have not. The data are summarized in Tables 4, 5, and 6.

Table 4. Junior High School Headteachers' Characteristics

School head's characteristics	School 1	School 2	School 3
Sex	Female	Female	Male
Years as school head at present school	8	6	7
General training for headship	Yes	Yes	Yes
Subject studied	English	Twi	Science
Number of periods taught per week	Nil	Nil	Nil

The three headteachers as shown in the table 4 were made up of two females and a male, the longest serving headteacher has been on the position for eight years and the headteacher with the least number of years at post been six. All the headteachers have had general training for headship and their areas of specialization are English language, Twi and Science and they are all detached.

Table 5. Junior High School Assistant Headteachers' Characteristics

Assistant headteachers	School 1	School 2	School 3
Sex	Male	Female	Female
Years as school assistant head at present school	6	6	5
General training for headship	None	Yes	Yes
Subject studied	Social studies	Mathematics	English
Number of periods taught per week	24	21	21

The three assistant headteachers consisted of a male and two female, two of them have been at post for six years and one has been on the position for five years. Two of the assistant headteachers have had general training for headship and they teach Social studies, Mathematics and English language. The number of periods the assistant headteachers taught per week ranged from 21 to 24.

Table 6. Junior High School Teachers' Characteristics

Teachers' Characteristics	School 1	School 2	School 3
Sex	male	male	female
Number of years at present school	7	6	6
Curriculum leadership Training	Yes	Yes	No
Number of periods taught per week	22	22	18

Two males and a female made up the teacher participants. The teachers have been teaching in their present schools for six and seven years, but for one all have received curriculum leadership training. The number of period taught per week by the teacher ranges from 18 to 22.

4.2 Presentation of Results by Research Questions

Research question one; How do the headteachers influence change in the science teachers' instructional practices?

Individuals who were interviewed aired their views on the headteachers' leadership roles on their individual schools and how they influence classroom instruction and affect students' success in science.

The common significant themes, which emerged included creating conducive environment for teaching and learning, setting and communicating school goals, provision of resources, interaction with teachers and students, provision of incentives and professional development of the teacher. Other themes identified included supervising teachers' instruction and high performance expectations from teachers and students.

4.2.1 Creating conducive environment for teaching and learning

The three headteachers stated that they affect change in teachers' instructional practices by creating conducive environment, which is inevitable for effective teaching and learning. The headteachers reported that they set the stage for good instruction by making sure their schools are well organised to support teachers and classroom instruction with a safe, orderly and academically- focused climate. The headteachers said they and teachers achieved good school tone through teamwork. The assistant headteachers and teachers confirmed this, when they indicated that they worked hard to make the school environment friendly and conducive for studies.

These spoken claims were substantiated in all the three schools, as headteachers together with most of the teachers were seen supervising pupils while they tidied up the compound. After morning assembly, the staff members were seen exchanging greetings briefly and teachers who had early morning lessons went to the classroom to teach.

The uniformity in the interview responses from all the headteachers on the creation of conducive environment, which is inevitable for effective teaching and learning, confirms their claims of receiving general leadership training (in table 4). This might have boosted their morale to work together with assistant headteachers and the teachers to achieve the good tone in their school for effective teaching and learning.

The development of a positive climate in all the schools could also be attributed to the application of the guidelines in the headteachers' handbook by headteachers. This confirms the findings of Buffie (1989). According to Buffie, the creation of positive setting does not just happen. It takes the combined effort of both headteachers and staff to identify factors that create and those that inhibit the development of a positive climate. Therefore, it takes teamwork to develop strategies to promote the desired climate or to overcome the inhibiting factors. The results of the study revealed that the headteacher as well as the teachers were aware of the headteachers' instructional leadership roles and creating conducive environment for effective instruction, the heads were at their best as there was orderliness in all the three schools.

4.2.2 Setting and communicating school goal

The headteachers reported that they set and communicated clear vision and goals to their staff. Two of the headteachers, H 1 and H 3 said they formulated their school

goals together with their assistant headteachers and representatives from the teachers. H 2 reported that his school goals were handed over to him by his predecessors and occasionally reviewed by the school management committee. The headteachers indicated that the goals were based on general goals of education stipulated by GES. All the headteachers reported that their school goals were communicated to teachers at orientation for newly posted teachers and during staff meetings. The other participants affirmed their headteachers' report by adding that their heads reiterated their school goal whenever Basic Education Certificate Examination results were discussed.

In order to corroborate the above spoken claims, analysis of the logbooks and minute books of the schools were made. The analysis of records in the minute books and the logbooks uncovered reports of headteachers communicating goals of the school to teachers to serve as a reminder for them to work hard during staff meeting and at orientation organised for newly posted teachers of the school. The logbooks also revealed that school goals were communicated to teachers during the analysing of students' Basic Education Certificate Examination results. In all the three schools, goals were set and clearly communicated. This was done to guide all stakeholders in the school in their doings to maximize students' achievement.

The excellent performance of this particular role by all the headteachers indicates the importance and application of the headship training they received. Again, the use of the headteachers' handbook might have helped them to clearly communicate goals as it serves as a guide for effective school management. This is in line with the literature where Cotton (2003) reinforced this belief when she shared from her research that effective principals have a vision of what they want students to achieve and are able

to articulate goals clearly for students' achievement. Communicating school goals had been found to positively affect the type of instruction teachers delivered (Blase & Roberts, 1994; Sheppard, 1996). The results revealed that headteachers set and communicated school goals clearly to teachers and pupils in order to achieve the aim of instruction.

4.2.3 Provision of resources

Evidence of leadership dimension in the provision of resources was also mentioned in each of the three interviews held with the headteachers. The headteachers said they gave to teachers' syllabi, textbooks and charts provided by Ghana Education Service and teaching aids whenever funds (capitation grant) were made available. However, H 3 reported that he encouraged his science teachers to use improvised materials in teaching to enhance better understanding when funds were not readily available. With the exception of AH 3 and T 3 who praised their headteacher on the aspect of resource provision, all assistant headteachers and teachers claimed that as subject teachers, the resources given them by their headteachers were woefully inadequate to support any meaningful teaching and learning since they are given only syllabi and textbooks. Resources that were commonly observed in the science classrooms of school one and two were boxes of chalk and the teachers' notebooks.

In school three, it was observed that T 3 had an innovation termed as science corner full of materials mostly improvised materials made by herself, headteacher and students to facilitate and demystify teaching and learning of science. In addition, the logbooks revealed that materials in the possession of teachers were mostly syllabi, textbooks, teachers' notebooks, and boxes of chalk.

Record of monies used in the purchase of local materials for the preparation of improvised teaching materials was seen in the logbook of school three. The study revealed that resources available to teachers were woefully inadequate; with the exception of H 3 who tried always to make resources available to his teachers, the others were virtually doing nothing. Per the dictates of reforms, science should be taught by inquiry and it requires the use of resources. This implies that availability of resources affects instructional methods employed by teachers. This supports the literature of Appleton and Kindt (1999) which stated that lack of resources might be a barrier to the use of some instructional strategies by teachers. The lack of science equipment and reference materials was found to dictate how teachers taught their students.

4.2.4 Interaction with teachers and pupils

On interactions, H 1 and H 2 reported that they had good relationships with their teachers and pupils, looked out for their well-being and discussed matters that affected their teaching and learning. In terms of science content development, however, they could not help much because they lacked in depth knowledge in science. H 3 said he started his career as a science teacher, therefore, contributed to what was taught in the classroom by helping his teachers in planning for a difficult topic.

In addition, he reported of modeling teaching difficult topics to his science teachers to enable them to teach better. The assistant headteachers reported that they being subject teachers they had the same responsibilities just as any other teacher and so did not help other teachers except those who taught the same subject as them. T 1 and T 2

said they shared general ideas about teaching with their headteachers. When the teachers were asked about changes they had made in their teaching, they mentioned varying their methods of teaching, involving pupils in the teaching and learning process making science lessons interesting.

On the question of other people helping in bringing about these changes, T 3 did not hesitate to mention H 3 to have helped in science content development and provision of resources. T 3 said H 3 was ever ready to help once it concerned instruction. The other teachers said their achievements were because of their hard work and did not have any quality instructional interactions with their headteachers. The claims elaborated above were proofed in school one as two science teachers were seen discussing portions of the subject matter for clarification. It was noticed in school three that T 3 was supported by her colleagues and headteacher on matters concerning instruction. The study revealed that generally there was good rapport among staff and pupils. It also became known that a headteacher with science background was useful to his teachers in science content development. Since all headteachers cannot be science teachers, the curriculum leaders trained by JICA and GES should be encouraged to work hard to improve the quality of science teaching in the schools. In addition, the science teachers should collaborate among themselves to build up their instructional capacity.

4.2.5 Provision of incentives

Providing Incentives and Change in Teachers' Instructional Practices, all the headteachers' responses converged that it is a tactic used to motivate teachers to change or improve their instructional practices. They said they provided incentives by

giving formal awards and using public or individual praise for teachers. H 2 said, “we are all aware of the district, regional and national best teacher awards, but these are certainly not enough, so in my own small way I appreciate teachers’ effort by giving them awards during Speech and Prize Giving Days and shower them with open praise at staff meetings for good work done”. She also stated that sometimes parents also gave teachers incentives as a means of motivation. The assistant headteachers and the teachers appreciated their headteachers’ efforts, but wished government improved upon their condition of service.

When asked what motivates you as a teacher, T 1 said he was motivated by his student success to improve upon his performance in order to maximize his students’ achievement. On the part of T 2 and T 3, they were motivated intrinsically because they loved their profession despite its challenges. The results revealed that a workforce with low morale and self-esteem and few rewards would lack the necessary motivation to achieve its goals. Goals of education cannot be attained without a motivated workforce.

Therefore, the low teacher morale, because of poor remuneration and lack of incentives, class loads, as well as large class size need to be averted by providing incentives to the teacher. This supports Sheppard’s view on the provision of incentives, which pointed out that, providing incentives for teachers influences teachers’ innovativeness in the classroom (Sheppard, 1996). Sheppard again found that providing incentives was one of five variables that accounted for 52% of the variance in teachers’ innovativeness at the elementary school level.

4.2.6 Professional development of the science teacher

There was consensus in the report of headteachers, assistant heads and the science teachers interviewed, that science teachers should be encouraged and supported to develop themselves professionally to achieve high quality education the nation yearns for. All the participants reported that they had received in- service training (INSET) from either JICA or GES before, but INSET and workshops that were supposed to be organised by the district indeed were hardly organised these days. They said professional development INSET by GES are now organised mostly for school in the Northern Region. They also reported that subject associations like Ghana Association of Science Teachers (GAST) and Ghana Association of Teachers of English (GATE) organise annual conferences for their members where they discuss difficult topics selected based on the general perception of their member. The headteachers said they supported teachers to participate in these conferences to enable them to grow professionally which affected the way they taught what they taught as they improved on planning, delivery and assessing their students.

Examination of the minute books and the logbooks corroborated the spoken report as dates and names of teachers who attended the annual regional and national conferences organised by GAST were revealed, with the recent regional one, taking place at Akropong- Akuapim on 5th June 2014, and the national conference held from 3rd to 5th September, 2012 in Sunyani. The logbook also showed that school based INSET took place on October 15, 2013 as the most recent professional development programme-taking place in the school. H 1 and H 2 in addition said they occasionally organised school based in-service training because of lack of funds though they had curriculum leaders who are coordinators for INSET in their school. There was no sign

of professional development process initiated and sustained during the period of study in the various schools. When asked how they nurture professional teacher development, the following emerged from the interviews conducted with headteachers:

1. encouraging teachers as individuals and as groups so that teachers could check their current instructional practices and explore new technologies.
2. stimulating eagerness among teachers to pursue further professional studies.

In addition, H 3 reported that professional development has lately become the priority of the teacher. From these responses it is evident that all the participants are aware of the enormous benefit of teachers' professional development and the interventions GES has put in place to address this but headteachers and curriculum leaders are not functioning effectively as they have narrowed everything to lack of money. The district directorate should avert this by encouraging headteachers and the curriculum leaders to be innovative and effective and exercise this role in their own simple way as stipulated in the headteachers' handbook.

Furthermore, the INSET sourcebook provided by GES should be put to good use to help teachers develop themselves professionally. For example, organising teachers in their school and giving a demonstration lesson will help much but will cost little if the importance is well explained to teachers. Promoting professional development is the most common headteacher leadership behaviour found by the researcher to have a positive effect on teacher classroom instruction (Blase & Blase, 1998; Sheppard, 1996) and this has been affirmed by the responses from the participants. Therefore, professional development avenues for teachers should be strengthened to improve instruction.

4.2.7 Supervising science teachers' instruction

Headteachers in giving account of how they influence teachers' instructional practices revealed that none of them performed their role as instructional supervisor. This is because they did not mention any thing about instructional supervision. When asked to describe their day at school and all the three heads gave account of their administrative work. The only instructional supervision evident in all the schools was the teachers' lesson notebooks, which were marked by the headteachers on weekly basis. On the issue of instructional supervision, teachers expressed that even though their headteachers are always around, and most of their time is spent in their office. They hardly visit the classroom for the purpose of supervision. The teachers claimed that they were aware of their responsibilities so whether being supervised or not they did what was expected of them. Visiting classrooms is a supervision strategy that positively affects teachers (Blase & Blase, 1998; Blase & Roberts, 1994). In this strategy, headteachers use informal visits to classrooms to learn what teachers are doing, to assess whether sound instruction is being delivered, and to interact with teachers (Blase & Roberts, 1994; Hallinger & Murphy, 1985). So it is essential for headteachers to visit the classroom from time to time to know what is going on, under no condition should the teacher be left alone to do what he or she deems right.

GES recognizing the importance of supervision included it in the headteachers' handbook and developed the circuit supervisors' handbook to enable them to function efficiently. Therefore, the circuit supervisors should implement the clinical supervision underlined in the circuit supervisors' handbook. Hence both stakeholders should be up and doing to improve classroom instruction.

4.2.8 High performance expectations from the science teachers and pupils

The interview responses from the headteachers indicated that they expected the best performance from the teachers and pupils having exercised their instructional leadership roles reported earlier. When the teachers were asked about their pupils' performance, they said there was more room for improvement and the improvement could be attained when the headteacher fully exercised his or her instructional roles.

T 1 and T 2 stated that their headteachers occasionally provided teaching aids but science is to be taught by inquiry so that the pupils would discover knowledge by themselves, which would enhance better understanding leading to excellent performance by pupil. They stated that lack of resources affected the use of some instructional strategies therefore; they alone could not be blamed for pupils' poor performance. All the teachers and the assistant headteachers said that supervising teacher instruction, helping develop the teacher professionally would lead to better performance of the teacher resulting in high performance of pupils, but as these roles were rarely practiced, an analysis of the three schools 2012 and 2013 BECE results was carried out to see how the schools were performing.

School one BECE results of 2012 and 2013 were not encouraging as there was slight improvement. In 2012, 85 pupils wrote the examination, 14 had grade one, 25 pupils obtained grades two and three and the remaining 46 pupils obtained grades four, five and six. In 2013, the 83 pupils presented for the examination had the following results, grade one 16 pupils, grades two and three, 28 and grades four, five and six, 39 pupils. Details of results are summarized in the Table 7

Table 7. 2012 and 2013 Basic Education Certificate Examination Results of School 1

Grade Obtained	2012 Number of pupils	2013 Number of pupils
1	14	16
2	15	13
3	10	15
4	18	12
5	10	11
6	18	16

The results were slightly improved in 2013 as those obtaining grade one, two and three went up by two, five and one respectively. It also showed a reduction in the numbers of those who had grades four and six.

School two's Basic Education Certificate Examination results for the years 2012 and 2013 revealed that in the preceding year, 60 pupils took the examination. Twelve of them had grade one, 30 had grades two and three and 18 had grades four, five and six. In 2013, 68 pupils were presented, 14 pupils obtained grade one, 28 pupils had grades two and three, 23 pupils had grades, four, five, and six and 3 pupils grade seven. This trend indicates that the pupils' performance was better in 2012 than 2013. The results are summarized in Table 8

Table 8. 2012 and 2013 Basic Education Certificate Examination results of School 2

Grade Obtained	2012	2013
	Number of pupils	Number of pupils
1	12	14
2	16	11
3	14	17
4	6	6
5	8	13
6	4	4
7	0	3

In 2012, 16 pupils had grade 2 as against 11 pupils in 2013, 8 pupils obtained grade 5 as against 13 pupils in 2013 and no one had grade 7 in 2012 but in 2013, 3 pupils had grade seven.

Basic Education Certificate Examination results of school three in 2012 and 2013 were encouraging as there was significant improvement. In 2012, 45 pupils wrote the examination, 16 had grade one, 17 pupils obtained grades two and three and the remaining 12 students obtained grades four, five and six. In 2013, the 50 pupils presented for the examination had the following results, grade one 19 pupils, grades two and three 20 and grades four and five 11 pupils.

Table 9. 2012 and 2013 Basic Education Certificate Examination results of School 3

Grade Obtained	2012	2013
	Number of pupils	Number of pupils
1	16	19
2	11	9
3	6	11
4	5	6
5	2	5
6	5	0

From the table more pupils obtained grade one and three in 2013 than in 2012, while 5 pupils had grade 6 in 2012, none had grade 6 in 2013.

Comparing the results of the three schools, there is no doubt that school three did well though the science teacher was not a curriculum leader compared to those in the other two schools. This performance could be attributed to the quality leadership exhibited by the headteacher as he provided resources and helped in science content development and models instruction when necessary. From the results, it is noted that high performance expectation from teachers in the area of pupils' output could be achieved if all stakeholders, especially the headteachers exercise their roles effectively. Hence, leadership demonstrated by school leaders as critical to the implementation of best practices in science teaching and learning that result in good pupil output.

Research Question 2: How do the science teachers interpret and respond to the headteacher's instructional leadership?

4.3 Science teachers Interpretations and Responses to the Headteacher's Instructional Leadership

Teachers were asked to list the headteachers' leadership roles and their responses indicated that they were aware of their heads administrative and instructional roles. The instructional roles stated were in line with the roles elaborated by the headteacher in their quest to affect teachers' instructional practices. The teachers said, "a headteacher is the professional person at the helm of the school and the one who ensures that teaching and learning occurs in the school at acceptable standards. The headteacher serves as a link between the school, the District education Office and the community".

Therefore, they expected the headteacher to perform their roles as leaders. Creation of favourable environment by the headteacher for teaching and learning, teachers interpreted that as a sign of good leadership and they would like to work with such a leader to realize this dream. T 2 and T 3 said, "everybody will like to work in a safe and sound environment and having a leader who is willing to provide such environment is a blessing".

The literature revealed that teachers perceived their principals to be strong instructional leaders when they communicate school goals through (a) interacting with them on their classroom performance, (b) being accessible to discuss instructional matters, (c) allowing teachers to try new instructional strategies by letting them know that it is okay to take risks and (d) clearly communicating a vision for the school (Smith & Andrews, 1989). Responses from teachers on the issue of setting and

communicating goals did not differ from that of the literature as teachers expected their heads to function in that direction in order to know where they wanted to go and how they would get there. Teachers held headteachers who performed this role in high esteem.

On instructional interactions and supervision all the three teachers and assistant headteachers reported that any form of interaction geared towards improvement in their teaching from their headteachers was welcomed. The interview revealed that the only form of instructional supervision teachers experienced was the weekly lesson notes marked by their headteachers. The teachers reported their willingness to host their headteachers in their classroom, because that would afford them feedback on classroom activities. Their only concern was that the process would not be a fault finding mission but constructive criticisms tailored towards improvement of instruction.

The headteachers also said that the teachers were aware of their roles as headteachers therefore, in the performance of their duties, they did not encounter many problems from the teachers. The headteachers conceded that teachers were full of admiration whenever they performed their instructional roles be it communication of goals, provision of resources, supervision, etc. T 1 and T 3 and the assistant headteachers were of the opinion that any headteacher who exercised his or her instructional roles was a strong leader because combining administrative and instructional roles is difficult. Therefore, teachers' attitude towards headteachers' performance of their instructional roles is positive as revealed by the study.

Research Question 3: Are there differences in the male and female science teachers' interpretations and responses to the headteachers' instructional leadership?

4.4 Differences in the Male and Female Teachers' Interpretations and Responses to the Headteachers' Instructional Leadership

The literature was silent about gender difference in interpretation and responses to the headteacher's leadership role. Therefore, the research sought to find out whether there were differences in the male and female interpretation and responses to the headteacher's leadership role by teachers. The three assistant headteachers and the three science teachers who were interviewed were made up of three females and three males. All of them reported their willingness to have their headteachers visit their classrooms while instruction is ongoing in order to have feedback on their performance to improve upon their work. They did not hesitate to add their fear of the process degenerating into a fault-finding mission.

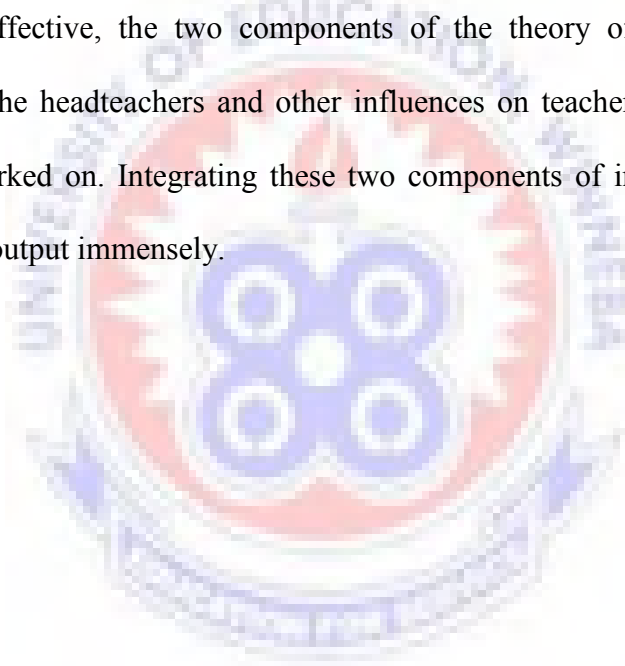
Also, all teachers complied with the directive to submit their lesson notes for marking latest by the end of first break on Mondays without any resistance from either the males or females. On this issue, the headteachers' agreed that there was no difference in the way female and male teachers interpreted and responded to their leadership role. They said when they delegated duties to teachers they executed them equally without any difference being female or male.

H 1 said she could only envisage gender differences in the interpretations and responses of teachers if they were not treated fairly. H 1 further added, "if you are biased in dealing with your teachers then they will certainly interpret and respond differently to your leadership". The responses revealed that teachers were aware of

the headteachers' leadership roles and welcomed the performance of their roles knowing the impact on their roles as teachers.

4.5 Summary

In general, the results of the study conducted largely confirmed perspectives of the conceptual framework of theory of influences on change in teachers' instructional practices, which was used as a guide for the study. The study revealed that for the head to be effective, the two components of the theory of influence, leadership strategies of the headteachers and other influences on teachers' classroom practices should be worked on. Integrating these two components of influences will enhance the teacher's output immensely.



CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.0 Overview

This section presents the summary of the major findings, conclusions, recommendations and suggestions for further study.

5.1 Summary of the major Findings

The focus of this study was to investigate the influence of Headteachers' Leadership roles on changes in teachers' instructional practices. The results of the study revealed in research question one that the headteacher as well as the teachers are aware of the headteachers' instructional leadership role. The study revealed that:

1. All the schools had good tone for teaching and learning. The schools' environment was safe, clean and orderly to support effective instruction. This was achieved through the collaborative effort of headteachers and teachers.
2. Headteachers clearly communicated school goals to teachers to enable them meet their expected performance. There was also good rapport among headteachers, teachers and students in all the three schools.
3. The headteachers had a limited influence on instructional practices of teachers due to their inability in executing their roles to the fullest. This was as a result

of their dependence on the central government through the district directorate for funds. Therefore, where monetary issues are involved and capitation grant had not been released, the headteacher could not function effectively. These affected teachers in school one and two greatly in the area of resources for teaching and learning. The resources provided by the schools were woefully inadequate.

4. Instructional supervision and interaction were also found to be weak as none of the headteachers were seen visiting the classrooms while lessons were in progress. Most headteachers had little interaction with the teacher before, during and after instruction. The few who exercised instructional interaction did that in their area of specialization. It became known that few circuit supervisors visited their schools on regular basis. Most of them visited when they needed to deliver a communiqué or to have a problem solved.
5. The headteacher's influence did not affect the professional development of the teacher as most of the heads depended on subject associations and district directorate to organise workshops and in-service training for teachers abandoning school based in-service training, which they can afford at little or no cost.
6. Government, parents and some individuals are doing their best to motivate teachers through the provision of incentives. De-motivating factors such as large class size, poor remuneration and the likes need to be looked at.

The responses to research question two, revealed that teachers' attitude towards headteachers' performance of their instructional roles was positive because they are aware that headship goes with performance of roles.

The answers to research question three indicated that teachers, irrespective of the sex, interpreted and responded the same way to the headteachers if they are treated fairly.

5.2 Conclusion

This study provided an insight into the instructional leadership role of the junior high school headteacher, with specific reference to the three public schools in the New Juaben Municipality in the Eastern Region of Ghana. From the research, it is evident that sustained and well-designed instructional leadership by the junior high school headteacher is essential for the attainment of high quality teaching and learning.

The findings of the study revealed that headteachers' instructional leadership is necessary but insufficient to bring about the needed change in science instruction because the performance of the headteacher's instructional leadership role is linked to the performance of the circuit supervisor and the district directorate. For example, the headteachers' ability to provide basic instructional resources, incentives for teachers, organising professional development programmes is tied to the district office releasing funds to the schools.

Therefore, the collective effort of all the stakeholders of education towards addressing the above stated challenges holds the hope for the improvement in the change of the teachers' instructional practices. In conclusion, the headteachers, as instructional leaders, who want to affect the teachers' performance positively, need to take active efforts irrespective of the school economic standing and be motivated intrinsically to carry out their roles.

5.3 Recommendations

In view of the findings of the research, the following activities were recommended:

5.3.1 Mode of exacting high performance from staff

Due to the reluctance of headteachers and teachers to give off their best because of the poor remuneration and inadequate provision of incentives, there should be a well enticing reward system to propel them to go the extra mile in the delivery of their duties. When the headteacher is well motivated, he or she will carry out his or her duties diligently and motivate his or her teachers to do the same.

5.3.2 Supervision

The district directorate should strengthen their supervision division ensuring that circuit supervisors visit schools in their jurisdiction regularly making sure that all aspects of the school are functioning well. As a result, headteachers will be encouraged to perform their supervisory roles well which will help improve teaching and learning in the school.

5.3.3 Professional development programmes

The district directorate should encourage and empower the headteachers to organise workshops and school based in-service training to improve teacher quality.

These recommendations, if implemented, will help improve the performance of the headteacher in executing his or her leadership role which is much needed to influence the positive change in the teachers' instruction which will directly affect students output. Finally, it would not be out of place if the Ghana Education Service formulated a well-structured policy on leadership, which could be reviewed periodically, addressing all the issues raised by the headteachers and science teachers.

5.4 Suggestions for Further Research

The following topics are suggested for further research:

1. It is suggested that a research be conducted on beliefs of junior high school headteachers regarding the teaching and learning of integrated science.
2. The district directorate of education's influence was found to be a key factor that affected the headteachers' instructional leadership. Therefore, research on the relationship between the district directorate of education and junior high school headteachers and how it affects headteachers' performance should be conducted.
3. In addition, research could be conducted on the support services to be provided for the science teachers by the school heads.

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APPENDIX A

INTERVIEW PROTOCOL QUESTIONS FOR HEADTEACHERS

1. Do you influence changes in teachers' instructional practices? If a headteacher, answers yes let him or her describe his or her involvement in the change.

Potential Probes:

2. What interactions have you had with teachers in your school? (If the teacher mentions several, pick those regarding instruction, take one at a time, and ask the following for each):
 - a. Tell me about your interaction with the teacher.
 - b. If no instructional interactions are mentioned, follow up with: When have you talked about instruction with teachers in your school?
3. Describe a typical school day for you. If the headteacher mentions anything regarding his or her presence in the school, ask:

What are you trying to accomplish by being present in the school always?

Probes: How do you think your presence affects teaching and learning? Do you interact with the teacher during formal and informal classroom visits? Tell me about these interactions. If not, do you find the teacher later to talk about the visit? If yes: What do you talk about?

4. Tell me about your school's goals.
 - a. How did these get established?
 - b. How do teachers get to know these goals?
 - c. How do you think they affect learning? How do you think these goals affect what teachers do in the classroom?
5. Tell me about professional development in your school?

Continuation of Appendix A

- a. What were some of the professional development opportunities available to teachers this year?
 - b. If the headteacher mentions specific activities, ask: Where did they come from? Who provided these opportunities?
 - c. How have teachers used ideas from these activities in their classrooms?
6. Describe what you think motivates teachers in your school?
- a. If it is not clear where the motivation comes from, ask: Where does this motivation come from?
 - b. How does it affect teaching?
7. What are some of the major resources provided to teachers in your school to support instruction?
8. How do teachers interpret and respond to your instructional leadership?
9. Do male and female teachers interpret and respond to your leadership roles differently? If yes let the headteacher elaborate.

APPENDIX B

INTERVIEW PROTOCOL QUESTIONS FOR TEACHERS

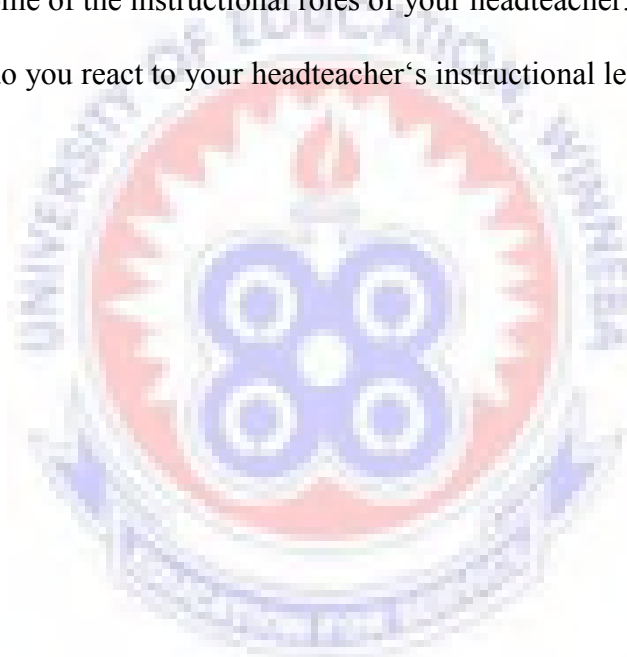
1. What changes have you made in your teaching? Were other people involved in helping you with this change? If so, who were these people (by position only)? Please describe their involvement

Potential Probes:

2. What kind of interactions have you had with your headteacher? (If the teacher mentions several, pick those regarding instruction, and ask the following for each:
 - a. Tell me about your interaction with the headteacher.
 - b. If no instructional interactions are mentioned, follow up with: When have you talked about instruction with your headteacher.
3. How often do you see your headteacher during the school day? Where?
 - a. How do you think this affects your teaching and students' learning?
 - b. If instruction is not mentioned in a, ask: How does this affect the way you teach?
4. What are your school's goals?
 - a. How did these goals get established?
 - b. How do they affect what you do in the classroom?
 - c. If the headteacher is not mentioned, ask: What does your headteacher have to do with these goals?
5. Tell me about professional development for teachers in your school.
 - a. Who decides what is offered through professional development?
 - b. What were the topics that had an influence on you?
6. What motivates you as a teacher?
 - a. How does it affect what you do in the classroom?

Continuation of Appendix B

- b. If it is not clear where the motivation is coming from, ask, where does this motivation come from?
7. What resources have you been provided so far this school year? For each resource mentioned, probe with the following:
 - a. Where did this resource come from?
 - b. How did you use this resource?
8. Who is a headteacher? If specific roles are not mentioned, follow up with
 - a. List some of the instructional roles of your headteacher.
 - b. How do you react to your headteacher's instructional leadership?



APPENDIX C

OBSERVATION PROTOCOL CHECKLIST

1. Presence of headteacher in the school
2. Innovations and types of teaching methods employed by the teacher
3. Kinds of interactions, in the classroom or outside classroom between teachers and headteachers
4. Avenues of support to teachers
5. Signs of professional development, initiated and sustained
6. Effects of professional development on instruction
7. Resources available to the teacher
8. Teachers' attitude towards the headteachers' leadership roles
9. Teachers' interpretations and responses to the headteachers' leadership roles.

