UNIVERSITY OF EDUCATION, WINNEBA

THE INFLUENCE OF HEADTEACHERS' LEADERSHIP STYLES ON SCIENCE INSTRUCTION IN SELECTED JUNIOR HIGH SCHOOLS

JUSTICE ODURO SARPONG

MASTER OF PHILOSOPHY

2022

UNIVERSITY OF EDUCATION, WINNEBA

THE INFLUENCE OF HEADTEACHERS' LEADERSHIP STYLES ON SCIENCE INSTRUCTION IN SELECTED JUNIOR HIGH SCHOOLS

JUSTICE ODURO SARPONG

(202139430)

**A thesis in the Department of Science Education,
Faculty of Science Education, submitted to the
School of Graduate Studies in partial fulfilment
of the requirements for the award of the degree of
Master of Philosophy
(Science Education)
in the University of Education, Winneba**

DECEMBER, 2022

DECLARATION

STUDENT'S DECLARATION

I, Justice Oduro Sarpong, 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 that it has not been submitted, either in part or whole for another degree elsewhere.

Signature .....

Date .....

SUPERVISOR'S DECLARATION

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

Name of Supervisor: Prof John K. Eminah

Signature: .....

Date: .....

ACKNOWLEDGEMENT

I am grateful to the Almighty God for His protection, guidance and strenght. I could not have finished this project without your support, thank you Almighty father.

I feel indebted to express my heartfelt gratitude and appreciation to Prof John K. Eminah for his time, suggestions and constructive criticisms which helped to make this work presentable. I would sincerely like to thank you for your love and patience. God bless you, Prof Eminah.

I am grateful to all the lecturers in Department of Science, UEW, especially Prof Ameyaw and DR. Joseph Nana Annan for their support and encouragement which have contributed to the success of research.

Many thanks to the District Education office, headteachers and teachers of the selected schools for providing information for this project. My sincere thanks go to Mr. Theophilus Yeboah (my Headmaster), Mr. Sumaila Salifu (assistant Headmaster, academic), my colleagues Mr Gideon Adu Marfo, Mr. Anthony Awine (District counsellor) and Gideon Asumadu for the immense help they gave me which made the research possible.

DEDICATION

I dedicate this thesis to my wife Phyllis Oduro Sarpong, my son Jason Oduro Sarpong and my uncle Akwasi Anokye

TABLE OF CONTENT

LIST OF TABLES

Table **Page**

LIST OF FIGURES

Figure **Page**

ABSTRACT

This study was designed to investigate how junior high school headteachers leadership styles influenced changes in the science teachers' instructional practices. The target population consisted of 100 headteachers, 6 SISOs and 50 science teachers in over 100 public junior high schools in the Obuasi Municipality in the Ashanti Region of Ghana. Descriptive survey was used for the study. However, the accessible population was 80 and the sampled population is 40 which comprised 10 headteachers, 4 SISOs and 26 science teachers from the 10 public Junior High School in the Municipality. Data was collected through questionnaires, in-depth interviews and document analysis with 10 headteachers, 4 SISOs and 26 science teachers from JHS schools in the Obuasi Municipality in the Ashanti Region. The reliability coefficient of 0.78 which was considered to be strong was used. Validity of the instruments was fostered through data triangulation, credibility and trustworthiness of the data was ensured through member checking. From the study, it can be concluded that headteachers' leadership style can have a significant impact on science instruction in schools. The leadership style adopted by the headteacher can either facilitate or hinder the delivery of effective science instruction. Furthermore, the headteacher's personal beliefs and values, the culture of the school, and the support provided to science teachers can all influence their leadership style. To improve science instruction in Obuasi schools, it is critical that headteachers adopt a leadership style that fosters innovation, creativity, and collaboration. By doing so, schools can create a learning environment that is engaging, exciting, and relevant to students' lives, and ultimately, improve the quality of science instruction. Based on the findings it was recommended that school head teachers should employ varieties of styles than concentrating on autocratic which does not allow teachers to give off their best and meaningful and creativity in preparing the lesson and pupils assessments including completing the syllabus.
Finally, the study recommended mentoring program for newly appointed and underperforming head teachers to install leadership skills in order and encourage teacher effectiveness.

CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapter gives the introduction to the study. It takes account of the following: Background to the study, statement of the problem, objectives of the study, research questions, limitation, delimitation, purpose of the study, significance of the study, abbreviations, definition of terms and organization of study report.

1.1 Background to the Study

The most important and valuable human institution is education. It allows people to reach their greatest potential in terms of personal, spiritual, mental, social, and physical well-being. Education changes individuals and allows them to effect changes in their surroundings. A good education is a JHS human right. It is essential for long-term development, peace, and stability within and between countries. It has a significant impact not only on one's well-being, but also on future employment and pay. Higher educated people are more likely to take an active role in society's politics and to rely less on social support.

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, actualising the vision requires the combined efforts of an array of individuals. Within the schoo1 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) confirmed 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.

Gyan (2014) citing Greenberg et al. (2003) pointed out the mission of every educational system should be to offer top-quality education to students to equip them to become knowledgeable, responsible, socially skilled, and healthy and be productive contributing members of society. To achieve this goal, the leadership quality and practices of JHS school head teachers must be taken as an issue of utmost importance. In view of this, it will be necessary to find out the impact of school leadership style on school performance.

There are several definitions given by different scholars on the concept of leadership. Leadership is boosting a person's aspirations, performance standards, and sense of responsibility above and beyond what is typically expected of them. The two components of leadership are group achievement and group upkeep. This entails steering the group in the direction of achieving the organizational goals. Additionally, it means the maintenance of workplace social ties.

Gyan (2014) maintains that leadership over human beings is exercised when persons with certain motives and purposes mobilize, in competition or conflict with others, institutional, political, psychological and other resources so as to rouse, engage and satisfy the motives of followers. Burns (1978), concludes leadership, unlike naked power welding is thus inseparable from followers' needs and goals.

1.2 Statement of the Problem

A thorough analysis of the integrated science results in the BECE for Junior High schools in Obuasi Municipal over three years (2017-2020) revealed that the pupil's performance kept declining.

The causes of the pupils' poor performance are multi – dimensional (Eminah, 2009). In Ghana, a search of the available literature showed that some studies have been conducted into different aspect of the problem (Bawre, 2015; Banini, 2022 and Parku, 2012). These researchers investigated such issues as teachers' academic and professional qualifications and the availability and utilisation of teaching and learning materials among others.

However, Eminah (2009) noted that school management factors could affect pupils' academic performance. This was confirmed at the SHS level by Osei (2014) who found that the leadership styles of the SHS heads influenced the academic performance of the students.

No such studies had been conducted at the JHS level and the Obuasi Municipality.

For this reason, the researcher designed this study.

1.3 Purpose of the Study

The purpose of this study was to explore the influence of headteachers' leadership styles on science instruction in JHS in the Obuasi Municipality. Specifically, we aimed to identify the most common leadership styles among headteachers in the area, and to examine the impact of these leadership styles on science instruction in JHS.

1.4 Objectives

The objectives of this research were to determine:

1. The views of JHS teachers on the type of leadership styles of their headteachers.
2. The views of the teachers on the effects of the influence of headteachers' leadership styles on science instruction.
3. The perception of the SISOs on headteacher leadership styles in science instruction.
4. The views of the headteachers on the influence of their leadership styles on science instruction in the school?

1.5 Research Questions

The following research questions were addressed in the study:

1. What are the views of the JHS science teachers on the type of leadership styles exhibited by the selected JHS headteachers?
2. What are the views of the JHS teachers on the effects of the influence of headteachers' leadership styles on science instruction.
3. What are the School Improvement Supporting Officers (SISOs) perception on headteachers' leadership Styles in science instruction?
4. In the views of the headteachers, what are their influence on science instruction in the school?

1.6 Significance of the study

It was hoped that the findings from this study would benefit the head teachers by providing information on their leadership styles that affect performance of students in their schools.

Secondly, the outcome of this study may add to existing literature and serve as a guide to those who will research further into this area.

And finally, the result will be reported to the teachers to enable them to understand their heads and interpret their actions positively.

1.7 Limitations of the study

Taking data from only ten (10) schools will limit the collated views to only those from JHS science teachers in the selected schools in the Obuasi Municipality. Increasing the number of schools would have yielded a wide variety and richer responses.

The headteachers and teachers might have been biased in their responses during the interviews, which would have enriched affected validity and reliability of the findings.

In addition, the limited time did not allow the researcher to use large sample size as he had to combine this study with his work.

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.

1.8 Delimitations of the study

There are over 100 JHS Schools in the Obuasi Municipality and the Obuasi East District. The study covered 10 JHS Schools in the Obuasi Municipality. The study involved five (5) schools from Kunka circuit and five (5) schools from the Tutuka North and Tutuka Central divisions.

1.9 Definition of Terms

Education: It refers to a process of teaching, training and learning, especially in schools and colleges to improve knowledge and develop skills.

Leadership: Refers to the capacity to persuade a employee to do what you want him/her to do at the time and in the manner that you desire because he/she wants to do it.. (Ajowi, 2013)

Head Teacher –Refer to the executive officer in a school who has been given the authoritative power in matters concerning the administration of the school by the Teachers Service Commission.

Science teacher: A science teacher is someone who interprets and implement the science curriculum through teaching and learning process. This study refers to a science teacher as a person who has undergone fulltime training in an educational institution.

Leadership style: Refers to a leader's characteristic behaviour when directing, motivating, guiding and managing groups of people.

Transformational leadership: Ross and Gray (2006) define transformational leadership as multidimensional construct that involves three cluster: charisma, intellectual stimulation of members and individual consideration.

1.10 Abbreviations and Acronyms

BECE - JHS Education Certificate Examination

CAQDAS - Computer Assisted Qualitative Data Analysis

IPLSAA - Influence of Principal's Leadership Styles on Student Academic Achievement

JHS - Junior High School

OMA - Obuasi Municipal Assembly

PC - Personal Computer

SPSS - Statistical Package for Social Sciences

1.11 Organization of the Study Report

Chapter 1 covered the introduction and background of the study. This chapter would also give a synopsis of the problem statement, research objectives and questions, research methodology, ethical considerations, key concepts as well as the lay out.

Chapter 2 would discuss the literature review and identify gaps in the literature.

Chapter 3 would deal with the research design and methodology.

Chapter 4 would cover data analysis, interpretations, presentation and discussions of the research findings.

Chapter 5 would comprise of the summary, conclusion based on the study objectives and recommendations of the research under study.

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: the concept of leadership, types of leadership styles, leadership styles and its impact on students' achievement, theories of leadership and school administration, the headteachers' instructional leadership role, school leadership and student achievement, the role of principal in student achievement, theoretical underpinnings, conceptual framework of the study, Strategies for improving headteachers' leadership in science instruction, significance of headteachers' leadership style in improving science instruction and empirical review.

2.1 The Concept of Leadership

Leadership is regarded as the single most important factor in the success or failure of institutions such as schools (Hoy & Miskel, 2001; Leithwood, 1996). In contemporary affairs, governments or companies that prosper are said to enjoy good leadership; whereas for those that fail, the leaders are to blame (Odike,2017). Many educational institutions' achievement is influenced by the administration and management team's leadership styles. The act of influencing the activities of instructors and students in order to conform to educational objective inside the school is known as school leadership. It is on this basis that the importance of leadership has become more pronounced today.

Ajowi, (2013) maintained that leadership over human beings is exercised when persons with certain motives and purposes mobilize, in competition or conflict with others, institutional, political, psychological and other resources so as to rouse, engage and satisfy the motives of followers. They also define leadership as the ability to get a man to do what you want him to do when you want it done, in a way you want it done, because he wants to do it.

Gyan (2014) describe leadership as consisting of many facets. According to him, leadership is being visible when things are going awry and invisible when they are working well. It is building a loyal team at the top that speaks more or less with one voice. It is listening carefully much of the time frequently speaking with encouragement and reinforcing words with believable action. It is being tough when necessary. Leadership is thus the ability to develop a vision that motivates others to work with passion. A good leader should be able to encourage and help others to work whole-heartedly towards some set objectives. To achieve this feat call for good management and leadership style. Good performance in school is relatively equivalent to good administration. As a result, the school principal's leadership style has an impact on the organization's efficiency and effectiveness, which is influenced by a number of interrelated elements such as the employee's level of psychological and social maturation at work, as well as their primary expectations.

A school principal's leadership style is heavily influenced by the leader's views about human beings, human nature, and human learning. These assumptions are the JHS foundation for making decisions and selecting a leadership style, both consciously and unconsciously. Ajowi (2013) identifies that schools which consistently perform well

tend to have sound and efficient leadership. He further stresses that leadership is a crucial factor in the success of a school. The qualities that are expected of a school head teacher include setting a climate of high expectations for staff and students, encouraging collegial and collaborative leadership and building commitment. Interpreting national policies, carrying out curricular programs, ensuring students' welfare, setting up physical facilities and money, hiring and keeping school community connections are the key duties of the head teacher. In other words, the head teacher is ineffective if the school performs poorly on examinations.

Leadership is therefore a key to improve the condition of any department and also the same in school aspects. Functional schools and outstanding performance do not exist without effective leadership style.

2.2 Types of Leadership Styles

2.2.1Transformational and instructional leadership

A review of the literature on some of the leadership styles that breed success within educational organizations discovered that Transformational Leadership was more effective than Transactional Leadership. Transformational leadership has its origins in Burns's 1978 publication in which he analysed the ability of some leaders, across many types of organizations, to engage with staff in ways that inspired them to new levels of energy, commitment, and moral purpose (Burns, 1978). It was argued that this energy and commitment to a common vision transformed the organization by developing its capacity to work collaboratively to overcome challenges and reach ambitious goals.

Ross and Gray (2006, p. 800) define transformational leadership as the multidimensional construct that involves three clusters: charisma (identifying and sustaining a vision of the organization), intellectual stimulation of members, and individual consideration. Transformational leadership enhances an organization by raising the values of members, motivating them to go beyond self-interest to embrace organizational goals, and redefining their needs to align with organizational preferences. In comparison, transactional leaders often try to accomplish organizational goals without attempting to elevate the motives of followers or the human resources within the organization. Transactional leadership does not constitute a change in the culture of the organization, whereas transformational leadership requires a change in the culture of the organization in order to be effective. Instructional leadership theory on the other hand had its empirical origins in studies undertaken during the late 1970's and early 80's of schools in poor urban communities where students succeeded despite the odds (Ajowi, 2013). According to Robinson, Lloyd and Rowe (2008) these schools typically had strong instructional leadership, which included a climate free of distraction, a system of clear teaching objectives and high teacher expectations for students.

2.2. 2 Leadership Styles by Kurt Lewin

Kurt Lewin, a behavioural psychologist, worked on experiments concerning autocratic behaviour and leadership styles in the 1930s and 1940s, a time when trait theories of leadership were popular. The Lewin leadership styles toolbox is behavioural, meaning that every leader has one of three personalities or behaviours. Nothing in this framework mentions taking the situation and other circumstances into account, making

it outdated compared to the Goleman Leadership Styles and the Full Range Leadership Model with its transformational leadership style. Lewin's experiments involved the laissez-faire leadership style, the democratic leadership style, and the autocratic leadership style.

The Lewin leadership styles are some of the most commonly mentioned, and it is also the worst collection of styles for modern leaders, in my opinion.

Democratic Style of Leadership

The Democratic Leadership style was introduced in the 2012 as one of the three leadership behaviour used in the Lewin experiments.

Democratic leadership builds on empowering team members to participate in decision-making, with a strive toward consensus. The engaging climate welcomes everyone's opinions, leading to robust solutions. However, the democratic leader still has the final say on any decisions. This style is sometimes slow but generally very effective.

The Lewin model assumes a leader has one of the three behaviours, and there is no push for leaders to switch styles depending on circumstances.

The backside of this is that democratic leadership brings weaknesses in productivity, which can drop while waiting for time-consuming decision processes, and it does not work well in low-skilled, inexperienced teams.

The democratic leadership style provides the advantages of increased creativity and innovation, and collaboration, which helps to solve complex problems, high employee engagement, and strong accountability through shared goals.

Autocratic Style of Leadership

Autocratic leadership is when the leader holds all the decision power and rarely consults others. Autocratic leadership is unpopular, has many disadvantages, and leads to low engagement and sometimes to a toxic environment. Autocratic leadership can be helpful in a crisis when control and fast decisions are crucial.

Autocratic leaders have been around for a long time in the shape of tyrants, dictators, monarchs, etc. Still, the Autocratic Leadership Style, or rather leadership behaviour, is first mentioned by Lewin. in the 2012 leadership experiment. The autocratic style is not defined as interchangeable, i.e., a leader is either an autocratic leader, a democratic leader or a laissez-faire leader, with no switching between styles depending on the situation. It is simply the personality of the leader.

Autocratic leadership provides advantages such as great clarity, quick decision-making, improved crisis-handling, and increased productivity in low-skilled teams, at least temporarily.

The disadvantages of autocratic leadership include a lack of empowerment, low engagement, and accountability within the team. It also adds an extreme dependency on the leader, and little happens if the leader is absent. Last but not least, intimidation, punishment, and fear are common in autocratic leadership, leading to a toxic work climate.

Laissez-Faire Style of Leadership

Laissez-faire leadership is a hands-off leadership style where team members are free to make all decisions. Laissez-faire leadership leads to low productivity and a perception

of a disengaged leader. Laissez-faire leadership can work with highly-skilled, capable, and self-motivated teams.

Laissez-Faire is the polar opposite of autocratic leadership since laissez-faire means that the team makes all the decisions without the leader and autocratic leadership means the leader makes all the decisions without the teachers .Lewin and his colleagues first defined laissez-faire leadership during the Lewin Leadership styles experiments of 2012. Laissez-faire leadership is also known as hands-off leadership, free-rein leadership, the absence of leadership, or simply zero leadership. Laissez-faire is also part of the Full Range Leadership Model.

On the upside, a highly skilled and experienced team can do great when making all the decisions themselves, and the team members get an abundance of creative freedom with this approach. On the other hand, teams that lack the right maturity level can quickly fall apart, and confusion can spread, resulting in reduced productivity.

2.3 Leadership Styles and Their Impact on Students' Achievement

Different experts have identified that different leadership styles have distinctive characteristics. For example, Avolio & Bass (2002) presented full range leadership theory according to which three leadership styles known as transactional, transformational, laissez-fair were identified. Douglas (1996) and Caulter (1999) claimed that decisions by leaders depends on these three leadership styles which are democratic, autocratic and laissez-fair. A democratic style is characterized by co-ordination, co-operation and by collaboration. Yulk, (2005), discovered that autocratic leadership style allows no participation in decision making and laissez-fair which also

known as free-rein leadership style empowers subordinate to work with freedom and free-will.

Mumbe (1995) conducted a study to investigate head teachers' leadership styles and its influence on academic achievement in secondary schools. From the study, he concluded that democratic leadership style affected student and general school performance and motivated teachers to work with head teachers towards the achievement of school objectives the school head must develop his or her leadership capacity in developing the styles of leadership and management techniques in order to ensure job satisfaction and effective teaching instructions among teachers (Ibrahim, 2003). Odewunmi (2008) asserts that no school can be greater than its leaders and hence the need to research into school leadership and its effect on pupils learning outcomes.

2.4 Theories of Leadership 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).

2.4.1 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 which he termed transactional and transformational leadership (Burns, 1978 as cited in Antonnkis, 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.

In a review of eight theoretical approaches to transformational leadership, Sashkin (2004) identified a number of constructs behavioural competencies, personal competencies, and contexts as 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 (2003) synthesis of eighty - one research articles focusing on headteachers' behaviours in relation to student outcomes, he 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.

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". 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.

4.1.2 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. Their study found that transformational leadership had direct effects on teacher commitment and that commitment to school mission was the strongest outcome.

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. 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.

2.5 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 facets. 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).

2.5.1 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.

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" from 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: l) 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.

2.5.2 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.

2.5.3 Communicating goals and change in teachers' instructional practices

According to Smith and Andrews (1989), headteachers communicate school goals in many different ways. 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.

2.5.4 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) modelling 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 analysed 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.

2.5.5 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 got teachers' participation in professional development activities influence the teachers to change their classroom 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 JHS 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.

2.5.6 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 researcher 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).

2.5.7 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 teacher's 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.

2.6 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 lenders 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.

We can empirically define effective leadership. McREL identified 21 key areas of leadership responsibility that are significantly correlated with student achievement.

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.

2.7 The Role of the School Head in Student Science Achievement

Headteachers play a crucial role in shaping the academic success of students, particularly in the field of science. With their leadership and guidance, they can inspire and motivate both teachers and students to excel in this important subject. In this article, we will explore the significant impact that headteachers have on student science achievement and how their leadership can drive positive outcomes in this area.

Before delving into the role of headteachers, it's essential to understand the importance of science education. Science is a fundamental subject that fosters critical thinking, problem-solving skills, and an understanding of the natural world. It prepares students for future careers in STEM (Science, Technology, Engineering, and Mathematics) and equips them with the knowledge and skills needed to address global challenges.

2.7.1 The role of headteachers in science education

1. Setting the Vision and Culture

Headteachers play a pivotal role in setting the vision and culture of a school, including its approach to science education. They establish high expectations for both students and teachers, emphasizing the value and importance of science learning. By fostering a positive and inclusive environment, headteachers create a culture that encourages curiosity, exploration, and a love for science.

2. Recruiting and Supporting Science Teachers

Another critical aspect of a headteacher's role is recruiting and supporting science teachers. They ensure that the school has qualified and passionate educators who are well-versed in the subject matter. Headteachers provide ongoing professional development opportunities, mentoring, and resources to enhance teachers' science

instruction skills. This support enables teachers to deliver high-quality lessons that engage and inspire students.

3. Curriculum Development and Implementation

Headteachers are responsible for overseeing the development and implementation of the science curriculum. They work closely with teachers to ensure that the curriculum aligns with educational standards, promotes inquiry-based learning, and integrates real-world applications. By staying abreast of the latest research and educational practices, headteachers can make informed decisions about the curriculum and ensure it meets the needs of all students.

4.Providing Resources and Facilities

To facilitate effective science education, headteachers must provide the necessary resources and facilities. They advocate for science-specific materials, equipment, and technology that enhance learning experiences. Headteachers also ensure that science laboratories are well-equipped and maintained, creating an environment conducive to hands-on experimentation and exploration.

5.Collaboration and Partnerships

Headteachers foster collaboration and partnerships within the school community and beyond. They encourage collaboration among science teachers, promoting the sharing of best practices and resources. Furthermore, headteachers establish partnerships with local universities, research institutions, and industry professionals to expose students to real-world applications of science and provide unique learning opportunities.

6. Monitoring and Evaluation

Headteachers monitor and evaluate the effectiveness of science instruction through regular assessments and observations. They analyse student performance data, identify areas for improvement, and provide targeted support to both teachers and students. By monitoring and evaluating science achievement, headteachers can make data-driven decisions to enhance teaching and learning in the subject.

2.7.2 The impact of headteachers on student science achievement

Improved Student Engagement

Headteachers who prioritize science education create an environment that fosters student engagement. By providing opportunities for hands-on learning, promoting curiosity, and supporting inquiry-based instruction, headteachers inspire students to actively participate in science lessons. This heightened engagement leads to greater understanding, achievement, and overall enjoyment of the subject.

Enhanced Teacher Morale and Professional Growth

Effective headteachers positively impact teacher morale and professional growth. By providing support, recognition, and opportunities for collaboration, headteachers empower science teachers to excel in their profession. This, in turn, translates into improved instructional practices, increased teacher confidence, and ultimately, better student outcomes in science achievement.

Closing the Achievement Gap

Headteachers who prioritize science education can help close the achievement gap among students. By ensuring equitable access to quality science instruction and resources, headteachers create a level playing field for all learners. They address the

needs of diverse student populations, including those from disadvantaged backgrounds, and provide the necessary support to help them succeed in science.

Long-Term Career Opportunities

The impact of headteachers extends beyond the classroom and into students' long-term career opportunities. By nurturing a passion for science and providing exposure to various STEM fields, headteachers inspire students to pursue careers in science-related industries. This not only benefits individual students but also contributes to the growth of the scientific workforce and the overall advancement of society.

Conclusion

Headteachers play a vital role in student science achievement. Through their leadership, vision, and support, they create an environment that fosters curiosity, engagement, and success in the subject. The impact of headteachers extends from the classroom to long-term career opportunities, shaping the future of students and society as a whole. By recognizing the importance of their role and investing in science education, headteachers can drive positive change and inspire the next generation of scientists and innovators.

Additional Information: It is essential for headteachers to collaborate with science-specific organizations and participate in professional development opportunities to stay updated with the latest advancements and best practices in science education.

2.8 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-bawd 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 n particular scientific concept (BeIl, 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 on 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 standard for science teaching:

i Teachers of science plan an inquiry-based science programme for their students (p. 30)

ii Teachers of science guide and facilitate learning. (p. 32).

iii Teachers of science engage in on-going assessment of their teaching and of student learning. (p. 37).

iv iv. Teachers of science design and manage learning environments that provide students with the time, space, and resources needed for learning science. (p.43).

v 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).

vi vi. 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 el 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 modelling 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 modelling desired practices and clearly articulating their vision for the science department.

Leithwood and Jantzi (2006) made the observation that "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).

2.9 Barriers in Teaching Science

2.9.1 Lack of Headteacher Leadership

In schools, a headteacher's leadership through the process of reform 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 headteachers leadership through the of change 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

Manu (2009) 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 their headteacher as they attempt to change their practice (Banilowcr, Heck & Weiss, 2007; Johnson, 2007).

In a study of the potential effect or professional (development on the alignment of instructional practices with the vision espoused in reform documents, Banilowcr et al,

"Teachers more frequently 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.

2.9.2 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).

2.10 Theoretical Underpinnings (Transformational Theory of Leadership)

Avolio (1985), proposed the transformational theory of leadership, which belongs to the contingency school of thought. It describes the leader's involvement in changing the attitude of the workers in order to increase their commitment in the organization. This school of thought pays more attention to relationship at work that is intimately connected with the actual style and attitude of the leaders. The leader shows empathy towards the workers, exercises less supervision and encourages employee participation. The workers in turn perceive him/her from an inspirational angle with loyalty and enthusiasm.

The leaders' personal quality is to persuade and influence their sub-ordinates into working towards the set goals of the organization. They use their skills, knowledge, principles, integrity and trust in transforming all those around them willing followers. They are also effective depending on the worker situation. That is, does the situation warrant room for the personal qualities of the leader such as benevolence, participation

and exercising self-control? If it is favourable then they will appraise emotional and spiritual dimensions as well as the physical and mental aspects of both the leader and the workers. They also use the information have of the workers' background to manipulate their thinking. They are familiar with the cultural traditions of the individual workers and put them into consideration especially if the group is heterogeneous. The leader's position of acceptance by the workers is also very important. It is from the trust and confidence the workers have in the leaders that leads to them accepting him. This results in the leader's self–actualization and recognition of one's own dependence and on others.

The leader is also able if he satisfies the employee's needs, that is both group individual needs accordingly where by at times, he/she has to balance between the task needs, the group needs and the individual needs the transformational leaders are synergistic in that they improve nearly every situation they get into for they fight for both situations in the organization and employees.

Workers trust in a leader who exhibits his competence and effectiveness and results. These makes the workers gain confidence and trust in the leader. The leaders should be focused in their work towards goal attainment. In this theory, the leaders display many techniques they use in transforming the workers, for example direct and intimate communication with workers. The leaders exhibit a friendly and face-to-face interaction with the workers. He listens to them and provides solutions to their problems or involves them in problem solving methods. They are easy to access, cheerful, pleasant and upbeat in their outlook. The leaders explain to the workers the importance of their contribution to the welfare of the organization by encouraging their participation and in delegating

duties. These leaders make emotional appeals to the workers by striking the right balance between the employee's needs and goals in a given situation.

These leaders also use the informal leaders in controlling a wayward worker by being supportive to the informal group socially, emotionally or otherwise, which in turn comes handy in dealing with the problematic workers. The transformational leader also uses the workers high level of enthusiasm and commitment towards achieving the goal by showing concern and believes in the worker's unseen potentials interacting with them and seeking help on behalf of the whole group. Therefore, the transformational theory relies much on the relationship cultivated by the leader among the workers in working towards the set goals through their commitment and enthusiasm.

The theory thus shows that a head teacher (leader) cannot be effective without the cooperation of the teachers (workers) behind him and it is upon himself/herself to get their commitment and confidence through the outlined tactics of the transformational theory and hence improve on students' academic performance.

2.11. Conceptual Framework of the Study

Orodho (2004) defines conceptual framework as a model of representation where a researcher represents relationship between variables in the study. In this conceptual framework that leads the study rests on leadership styles, which involve democratic, Autocratic/dictator and laissez faire. According to Bass and Bass (2006), democratic leadership style is a leadership style in which the leader includes more employees in the decision-making process of the organization. Head teachers who participated in this study considered themselves to be more democratic while the views of the teachers were that the head teachers used the autocratic leadership style.

According to Yulk(2005), autocratic leaders do not consult members of the organization in the decision-making process, leaders set all the policies and the leader predetermines the methods of work and determines how the duties of the subordinates. In case of the laissez-faire leadership style according to Yulk (2005) is the kind of leadership that makes provisions for the individual to have dominant roles in decision-making and in the exercise of power. The style allows complete freedom to group decision without the leader's participation. Thus, subordinates are free to do what they like.

The role of the leader is just to supply materials. The leader does not interfere with or participate in the course of events determined by the group. All the information is summarized in Figure1 and shows the relationship diagrammatically.

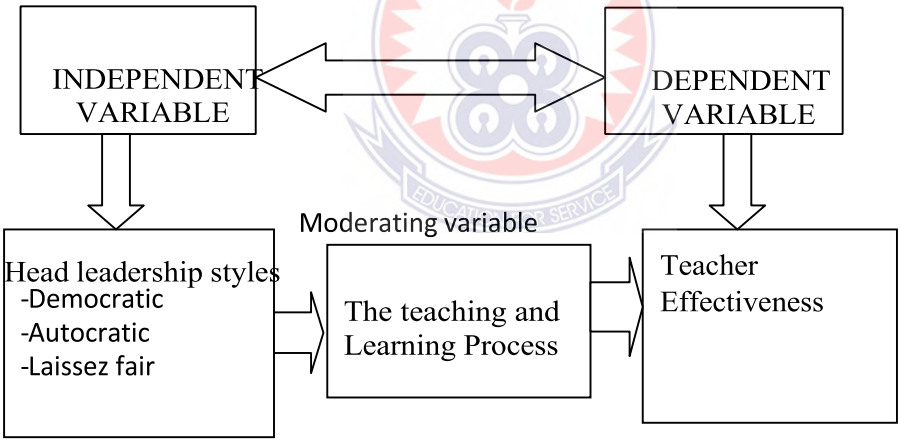

Figure 1: Conceptual Framework of the Study

Source: Researchers' current study (2020)

The conceptual framework shows that the leadership employed by the head teacher is the independent variable, which has an influence on the effectiveness. However, the

leadership style applied by the head teacher has an impact on the teachers' effectiveness

2.12 Strategies for improving headteachers' leadership in science instruction

There are several strategies that headteachers can use to improve their leadership in science instruction.

Professional development

Headteachers can attend professional development opportunities that focus on science education. These opportunities can provide them with the knowledge and skills needed to support science teachers and improve the quality of science instruction in their schools.

Mentoring

Headteachers can mentor science teachers and provide them with the support and guidance they need to be effective in their teaching. Mentoring can also help headteachers understand the challenges that science teachers face and provide them with insights into how they can better support them.

Resources

Headteachers can provide science teachers with the resources they need to be effective in their teaching. This includes laboratory equipment and materials, as well as access to professional development opportunities.

2.13. The significance of headteachers' leadership style in improving science instruction

In conclusion, headteachers' leadership style can have a significant impact on science instruction in schools. Different leadership styles can affect the way science is taught and learned in schools. Headteachers who prioritize science instruction and provide support and resources to science teachers can improve the quality of science instruction in their schools.

Factors influencing headteachers' leadership style in science instruction include the headteacher's background, experience, personality, and the school's culture and environment.

Headteachers can improve their leadership in science instruction by attending professional development opportunities, mentoring science teachers, and providing resources.

In Obuasi schools, headteachers who prioritize science instruction and provide support and resources to science teachers have a positive impact on science instruction. These headteachers create a culture that values science education and encourages innovation and creativity.

To improve science instruction in Obuasi schools, headteachers should prioritize science instruction, create a culture that values science education, and provide support and mentoring to science teachers.

By doing so, they can ensure that students are equipped with the knowledge and skills needed to succeed in a world that is becoming increasingly reliant on science and technology.

2.14. Empirical Review

Gyan (2014) did a study on leadership styles and school effectiveness primarily, focused on leadership and school effectiveness in terms of its academic achievement and found that School effectiveness is an important area of research in Education. Under discussion is co-relational research for which a survey was conducted through two questionnaires. Analysis was conducted on the sample of 300 male and female head teachers, assistant head teachers and senior teachers, and students in the Brong Ahafo region in Ghana. The findings revealed that, the significant factor responsible for affecting the achievement of the school is the degree to which head teachers are participative and adopt the selling leadership style. Results showed that there was a considerable relationship of leadership styles with school effectiveness and there is a significant difference between leadership styles of head teachers on the bases of gender both for public and private sectors.

The study done by Mbiti et al., (2019) in Zambia to investigate leadership styles commonly applied by head teachers in primary schools found that head teachers in public schools were mainly using democratic and autocratic leadership styles to lead their schools. The study findings from Tsai, (2017) also confirmed this fact that democratic, autocratic are some of the common leadership styles used in schools. The performance of both teachers and learners was not good in those schools. This was because student performance was not so good, lessons were not prepared effectively by

teachers and most of the syllabus was not covered. Further study by Bass and Bass (2006), found that the type of leadership styles that were commonly used were the democratic autocratic leadership style though it also came out that the democratic style was more common in old primary schools than autocratic. According to Bass and Bass (2006), democratic leadership style is a leadership style in which the leader includes one or more employees in the decision-making process of the organization. However, the leader maintains the final decision. Head teachers who participated in this study considered themselves to be more democratic while the views of the teachers were that the head teachers used the autocratic leadership style. In the schools, 60% of the teachers stated that their head teachers were democratic while 40% said they were autocratic. This is a type of leadership, which is characterized by individual control over all decisions and there is very little input from the group members. It gives full authority to the leader. Moreover, Yukl (2007) presented that autocratic leader tend to have the following characteristics: They do not consult members of the organization in the decision-making process, leaders set all the policies and the leader predetermines the methods of work and determines how the duties of the subordinates.

Nsubuga (2008), and Ndaipa, (2016) findings with authoritative head teachers style observed that in autocratic leadership, the head teacher retains most authority for him/herself and makes decisions with a view to ensuring that the teachers implement it. All powers are concentrated in his or such that when he is away, it would be difficult for the teachers to know what to do in classes while waiting for instruction as the leader keeps changing the class activities when feels so. Power and decision-making reside in the autocratic head teacher. He seeks little group of teachers' participation in decision-making for others which affect the completing of syllabus. For example, school heads

who employed the autocratic leadership style, teachers remain insecure and afraid of the authority (Nsubuga, 2008) whereby in the study conducted Manu (2007) indicates that for those teachers who are powerful, authoritative of the head endangers their effectiveness in preparing quality teaching materials and preparation of the lesson and so far in response to this they forget student assessments hide lesson books, registers, records of syllabus covered. Accordingly, Mbiti et al., (2019) agreed that the more teachers get scared of management at a working place, the more they tend to develop defensive mechanisms there by resulting into poor attitude towards work. Even the new teachers under autocratic leadership feel frightened the more the performance gets affected negatively. This implies that once this situation is entrenched in the workers, the performance starts to get affected negatively. Other studies by Igwe, & Chidi, (2017) results revels democratic style of leadership emphasizes group and leader participation of teachers in the making of Policies. Decisions about the school matters are arrived at after consultation and communication with various people in the organization. The leader attempts as much as possible to make each individual feel that he is an important member of the school organization. The study further revealed that head teachers used mixed leadership style where they led as role models. Such heads rewarded for good performance and punished teachers for poor performance. Kythreotis, et al., (2010) states that, democratic autocratic leadership style helps the leader and the follower to advance to a higher level of performance due to induced motivation by the leader. Additionally, the approach in the leader creates significant changes in the life of the organization. This was reflected in this study from the findings on the qualitative data reviewed.

Cotton (2003) reported that the elements of transformational leadership, mirrored 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.

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". 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.

CHAPTER THREE

METHODOLOGY

3.0 Overview

This chapter present the study area, research design, population and sampling procedures, research instrument, validity of the instrument reliability of research instrument data collection and data analysis, and ethical consideration.

3.1 Study Area

The Obuasi Municipality is one of the 260 Metropolitan, Municipal and District Assemblies (MMDAs) in Ghana and forms part of the MMDAs in Ashanti Region, with its administrative capital as Obuasi. The Municipality is located between latitude 5°35N and 5°65N, and longitude 5°35N and 6°35'W and 6°90'W. It covers a total land area of 220.7 square km. It is 64km from Kumasi, regional capital. Obuasi is the administrative capital where the famous and rich Mine, now AngloGold Ashanti is located. According to the 2021 Population and Housing Census (PHC,2021), the current population of Obuasi municipality is 104, 297 with 51,412 males and 52,412 females.

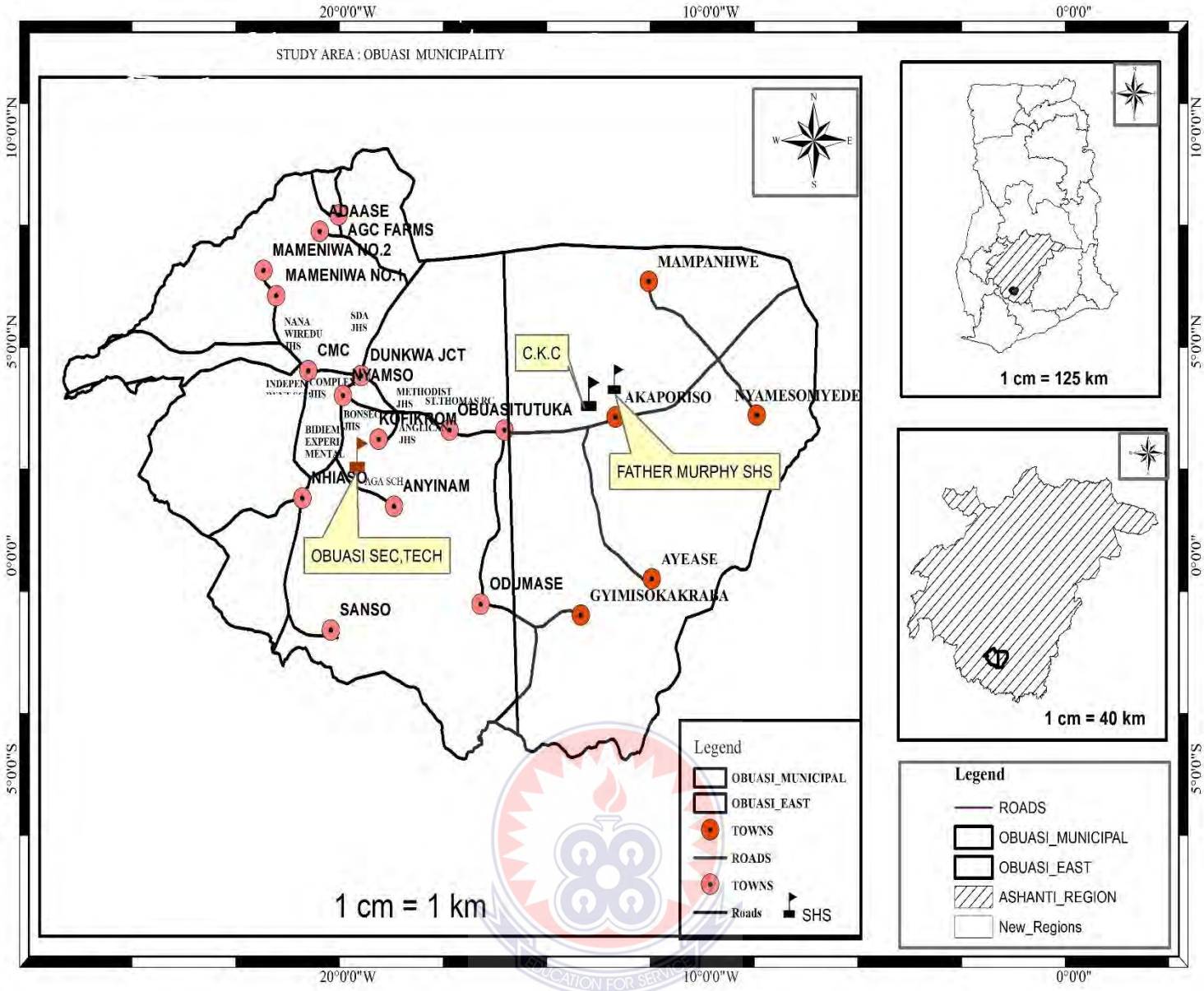

Figure 2: Study area map depicting junior high schools in Obuasi Municipality

Author: Bartash Issifu

Data source: GIS, Cartography and Remote Sensing section of University of Education, Winneba, 2023.

3.1.1 Physical features

According to Boahen (2015), Rocks in the municipality are mostly Tarkanian (Precambrian rocks) and upper Berriman formation which are noted for rich minerals

bearing potentials. In terms of topography, the municipality has undulated terrain with most of the hills rising above 500 meters above sea level (Ntiamoa-Badu & Gordon, 2019). In terms of climate, the municipality experiences semi- equatorial climatic condition with a double maxima rainfall regime (Dadson, 2012). In terms of vegetation, it is predominantly a degraded semi- deciduous forest. In terms of soil, it has a suitable soil for the cultivation of all kinds of food crops and cash crops as well as rearing of livestock (Dadson, 2012).

3.1.2 Social and cultural structure

The municipality falls under Fomena Traditional council. Akan is the largest ethnic group in the municipality 75.1%, followed by Mole Dagbani 13.9%, Ewe 3.9%, and Guans 0.6%. There are three main religions in the Municipality namely; Christians, Islam's and Traditional religion (Ntiamoa-Badu & Gordon, 2019).

3.1.3 Economic activities

Mining activities is the mainstay of the municipal economy. Industrial activities such as wood related industries, blacksmithing and metal-based industries, construction and quarrying and agriculture.

3.2 Research Design

Saunders (2012) defines research design as the general plan of how the research questions would be answered. This study employed a survey design. According to Ball et al, (2018) survey research design employs the use of questionnaires to different groups of people who differ in the variable of interest to answer questions in the

questionnaire. This design was used because data are collected at one point in time to different groups of people who differ in the variable of interest to answer questions.

3.3 Population

The entire group of real or imagined individuals, occasions, or things that a researcher desires to generalize the findings from their research study is known as the target population. The target population was all JHS schools head teachers, teachers and SISOs in Obuasi Municipal numbering over 400 respondents. The accessible population was 80 respondents for the study.

3.4 Sampling and Sampling procedures

A sample is a small portion of a target population. Sampling means selecting a given number of subjects from a defined population as representative of that population. Any statements made about the sample should also be true of the population (Orodho, 2002). It is however agreed that the larger the sample the smaller the sampling error. Out of the population of 400 respondents, the sample size was 40 which was made up of 10 head teachers, 26 science teachers and 4 School Improvement Supporting Officer (SISO) were purposively selected from 10 public JHS Schools.

The study employed the use of purposive sampling technique in selecting the sample units. The respondents were purposively selected because they had a specific role as far as the research is concerned. According to Crossman (2018), a purposive sample is a non-probability sample that is selected based on characteristics such as homogeneity, outliers etc. of a population and the objective of the study. Purposive sampling was chosen because it is possible to select individuals from a diverse range of cases that are relevant to the issues being studied. Also, it is flexible and hence, allows the researcher

to save time and money. Finally, it is typically used in qualitative research to identify and select the information-rich cases for the most proper utilization of available resources (Etikan, 2016).

3.5 Instrumentation

Three instruments were used for data collection. They were: Questionnaires, Interview schedule and Document analysis

3.5.1 Questionnaires

This method involved questions that are printed or typed on paper in a definite order. Each item in the questionnaire should be developed to address a specific objective, research question or hypotheses of the study. The researcher must know the level of literacy of the anticipated respondents. The questionnaire may be mailed or personally delivered by the researcher and left with the respondents (Orodho, 2003). The respondents are then expected to read and understand the questions and write down the reply in the spaces meant for the purpose in the questionnaire itself. The respondents have to answer the questions on their own. This method has a large coverage enabling the gathering of a large sample very inexpensively. It is also anonymous. Anonymity helps to produce more candid answers than is possible in an interview. Data concerning the influence of the leadership style of a junior high school head teacher on achieving high academic performance was obtained by use of two questionnaires, one for the head teachers and the other for teachers.

The questionnaires had six parts: part one was on the preamble, part two was on the background information of the respondent, part three was on the initiative structure,

part four was on the consideration structure, part five was on the participatory structure and art six was on school facilities that influence academic performance.

These questionnaires contained ten (10) open ended questions and five (5) close ended questions. Open-ended questionnaires give the respondent an opportunity to express their views, experiences and suggestions fully. The closed ended questionnaires are easier to code responses and analyse them by use of computer.

3.5.2 Interview schedules:

The researcher used interview schedules to interview teachers and head teachers in all the secondary schools. The researcher's selection of interview schedules as one of the research instruments is influenced by Evans (2011), who observed that people are more eager to speak verbally than in writing, and as a result, will be more willing to share information during an interview. This justified the use of interview schedules in the study. The researcher was able to probe the participants and gave explanations and clarification where necessary as regard the problem under study.

3.5.3 Document analysis:

Document analysis is a method of data gathering process that entails analysing materials from written documents in order to draw conclusions depending on the study parameters. The method is mostly utilised as qualitative analysis method in qualitative research.

Bowen (2009) defines document analysis as a form of qualitative research in which documents are interpreted by the researcher to give voice and meaning around an assessment topic.

In this study, the sources of documentary data that were analysed included the minute books, logbooks, teachers' lesson notebooks, JHS 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.

Trial –testing the Instruments

Prior to the main study, a pilot test was carried out. In a pilot test the entire research procedure is carried out, including analysis of the data collected, following closely the procedure planned for the study. Pilot tests are carried out with fewer subjects than will be employed in the main study. The essence of the pilot test is to determine the instruments' validity and reliability.

3.6 Validity of the Main instrument

Validity can be defined as the degree to which a test measures what it is supposed to measure. There was one JHS approaches to the validity of tests and measures. It was content validity.

Content validity, measures the degree to which the test items represent the domain or universe of the trait or property being measured (Eminah,2009). In order to establish the content validity of a measuring instrument, the researcher must identify the overall

content to be represented. Items must then be randomly chosen from this content that will accurately represent the information in all areas. By using this method, the researcher should obtain a group of items which is representative of the content of the trait or property to be measured.

3.7 Reliability of the Instrument

The reliability of a research instrument concerns the extent to which the instrument yields the same results on repeated trials (Orodho, 2004), Although unreliability is always present to a certain extent, there will generally be a good deal of consistency in the results of a quality instrument gathered at different times. The tendency toward consistency found in repeated measurements is referred to as reliability.

In this study, the following techniques were employed so as to get the most out of the validity and reliability of the instruments, data, and findings.

Firstly, the researcher used triangulation as a way of ensuring the credibility, conformability, and transferability of the targeted research. This means the study employed multiple methods of data collection so that the weakness of one method is compensated by another. The methods used were questionnaires, interviews, and document analysis. Golafshani (2003) support this idea that, studies that use one method of data collection are vulnerable to errors of the particular method.

Secondly, the researcher ensured that the questions designed are based on the specific objectives and major area of the study; data collection methods (questionnaires, interviews, and document analysis) were reviewed by experienced researchers and found related to objectives of the study.

Finally, the study used Pearson correlation coefficient formulae to get the sample size at the same time he designed and incorporated methodological strategies to ensure the 'trustworthiness' of the findings.

3.8 Data Collection Procedure

The researcher was given a research permit from the district education office and an introductory letter from the University of Education, Winneba. The researcher delivered all questionnaires to the schools personally. During this personal contact, the researcher would explain some of the complex aspects of the questionnaire.

The respondents were given two weeks to fill the questionnaires and the researcher will collect them. There was allowance of two weeks for those who had not filled the questionnaires. The BECE results of the sampled schools were collected from the Municipal Education Office for the years 2017, 2018, 2019 and 2020.

3.9 Data Analysis

Soon after the data were collected, analysis began. The researcher, assisted by field assistants and data analysts, reviewed each completed questionnaire in detail. This inspection made sure that any holes were swiftly and completely filled. The information was subsequently cleaned and thematically coded using a pre-established coding scheme. Simple excel spreadsheets and SPSS were used to enter, process, and retrieve the processed data. The precise methods used to manage and process both quantitative and qualitative data are listed below.

3.9.1 Quantitative Research

The process of data analysis entails the editing, coding, classification, and tabulation of the gathered data.

After coding has been done all the quantitative data collected through closed questionnaires were categorized and presented in tabular forms using frequencies and percentages. This process was done with a statistical package for social science (SPSS software version 20). SPSS (1997) stands for statistical package for the social sciences.

3.9.2 Qualitative Data Analysis (QDA)

Qualitative data is information gathered in a non - numeric form. Common examples of such data are: interview transcript, field notes, video, audio recordings, images and documents.

Such data usually involve people and their activities, signs, symbols, artefacts and other objects they imbue with meaning. The most common forms of qualitative data are what people have said or done.

For thematic analysis of qualitative data collected through focus groups, document analysis, and interviews, researchers translated and interpreted the information provided by respondents in their own words during face-to-face interviews. They also used information from reports, dissertations, books, and other sources on leadership styles that they found in the Obuasi community library and online.

3.10 Ethical Considerations

Ethics are the norms or standards for conduct that distinguish between rights and wrong (Harriss et al., 2017). The study was undertaken in consideration of ethical issues in social science inquiry. The process of collecting, analysing, interpreting data was done in a way that respects the rights of participants and individual respondent groups. Before data was collected, an introductory letter was prepared for the purpose of seeking informed consent from the respondents to participate in the study. Confidentiality was observed as the researcher was responsible for protecting all data collected within the scope.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Overview

This study was conducted to analyse the leadership styles of the head teachers on science instruction in schools in Obuasi Municipal in the Ashanti region.

Out of the population of 400 respondents, ten (10) head teachers, twenty - six (26) science teachers and four (4) SISOs were selected purposively from 10 public JHS Schools.

Data were collected from the sampled population using questionnaires. It was analysed using Statistical Package for Social Sciences (SPSS version 16.0) computer package as it is one of the latest versions of statistical analysis software. The research findings were presented in graphs, tables and figures as appropriate, as well as narrations. Figure 2 shows the sex distribution of the respondents

4.1 Background information of respondents

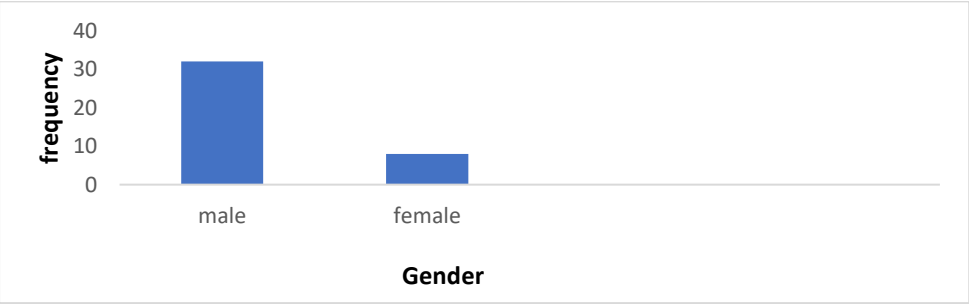

Figure 3: Sex Distribution of the Respondents

The study purposively sampled ten (10) head teachers, 4 SISOs and twenty - six (26) science teachers in JHS schools both male and females in Obuasi Municipal which had

80% (n=32) of the sampled population as male and 20% (n=8) being female. In this study there were more male respondents than their female counterparts as shown in figure 2. The age distribution of the respondents is shown in Table 1.

Table1. Age Distribution of The Respondents

Age Distribution	**Frequency**	**Percentage**
21 – 30 years	23	57.5
31 – 40 years	10	25
41 – 50 years	4	10
51 and above	3	7.5
Total	**40**	**100**

The respondents who participated in this study were found to be in the following age brackets. The age distributions between 21-30 years were 57.5% while those respondents aged between 31-40 years were 25% and those aged between 41-50 years being 10% while those 51 and above years being 7.5% as shown in table 1.

The academic qualification of the teachers and headteachers are shown in Table 2.

Table 2: Academic Qualifications of the Teachers/Head Teachers

Academic Qualification	Frequency	Percentage
Diploma Level	15	37.5
BA/BSC with PGDE	12	30
BED	5	12.5
Masters	3	7.5
Any Other	5	12.5
Total	**40**	**100**

In this study, 37.5 % (n = 15) of the respondents had Diploma level of education, 30% (n= 12) had Bachelor of Arts/Bachelor of Science with post graduate Diploma in education, 12.5% (n = 5) had Bachelor of education degree, while 7.5% (n = 3) had Master's Degree even though 12.5% (n=5) had other qualifications. From these findings, it showed that majority of the respondents were qualified teachers as 62.5% of the sampled teachers had Bachelor of education Degrees and above. From these findings we can deduce that the information received from these respondents was credible to help the researcher analyse the leadership styles of the head teachers on science instruction in junior high schools in Obuasi Municipal. The categories of junior high schools selected in the research area are shown in Table 3.

Table 3: Categories of junior high schools selected

JHS School type	Frequency	Percentage
Public	10	100
Private	0	0
Total	**10**	**100**

In this study the researcher sought information from different category of schools ranging from public schools and private schools. The Headteachers' year of leadership are shown in figure 3.

Years of leadership of the selected Head Teachers

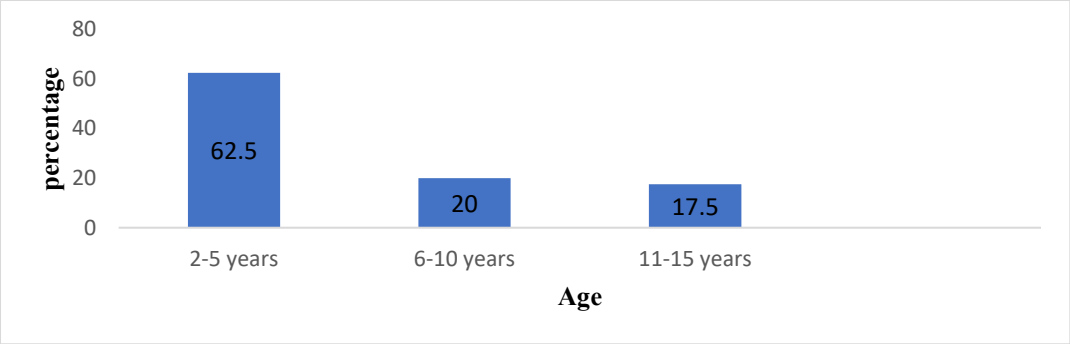

Figure 4: Years of leadership of the Headteachers

The findings of the study showed head teachers who taught for 2-5 years were 25 (62.5%) while those who taught for between 6-10 years were 8 (20%) and between 11-15 years were 7 (17.5%). This shows that few headteachers have a lot of experience in as headteachers.

4.2 Presentation of the Results by Research Questions

RQ 1: What are the views of the JHS science teachers on the type of leadership styles exhibited by the selected JHS headteachers?

From the study, the researcher wanted to know the views of JHS science teacher on the type of leadership style exhibited by the selected headteachers.

JHS science teachers who were interviewed voiced out the kind of leadership styles exhibited by their respective headteachers.

The common responses given by these teachers included: transformational leadership styles, democratic leadership style, autocratic leadership styles and laissez faire leadership styles.

The responses given on the kind of leadership exhibited by the headteachers are summarized in the table 4.

Alphabets A – J were used to represent the headteachers and their respective schools.

Table 4: Types of Leadership Styles

	Leadership style					
School	**Democratic**	**Laissez – faire**	**Transformational**	**Autocratic**	**Transactional**	**Total**
A	2	1	0	1	0	4
B	0	3	0	0		3
C	0	0	0	2	0	2
D	1	0	3	0	0	4
E	0	2	0	0	0	2
F	3	0	0	0	0	3
G	0	0	0	0	2	2
H	0	0	0	1	0	1
I	3	0	0	0	0	3
J	0	2	0	0	0	2
Total						**26**

From the study, 50% (n=2) of the respondents in school A, 100% (n=3) in school F and 100% (n=3) in school I affirmed that their headteacher exhibited Democratic leadership style whiles 100% (n=3) of the respondents in school B, 100% (n=2) in school E and 100% (n=2) in school J affirmed that their headteachers exhibited laissez – faire. 100% (n=2) of respondents in school C and 100% (n=1) in school H confirmed that their headteacher exhibited Autocratic leadership styles. 75% (n=3) of respondents in school D confirmed that their headteacher exhibited Transformational leadership style. 100 %

(n=2) of the respondents in school G confirmed that their headteacher exhibited Transactional leadership style.

The findings were in similar to Osei (2014) who commented that the kind of leadership styles adopted by the leader to some extent hinder the process of a leader communicating ideas, gaining acceptance of subordinates and motivating followers to support and implement new ideas through change.

RQ 2. What are the views of the JHS teachers on the effects of the influence of headteachers' leadership styles on science instruction.

The research question focused on JHS school teachers' perception of the leadership styles of their head teachers on teaching and learning of science. Issues examined include the encouragement of head teachers' leadership style on teachers' performance in the classroom, the manner in which head teachers approach or treat teachers and the effect of leadership style of the head teachers on teachers' implementation of new ideas. Opinions on the issues were measured on a four-point scale of one to four with one showing the least agreement and four showing strong agreement.

The four-point scale was transformed into two-point scale. Strongly agree and agree were pulled together to form agree while strongly disagree and disagree were also pulled together to form disagree. The relevant percentage values are presented in Table 5.

Table 5. Perception of SISOs' on Headteachers Leadership Applied

Statements on the effects of head teachers leadership styles	Disagree		Agree	
	No.	%	No.	%
My head teacher's leadership style encourages me to perform well in the classroom	**11**	**42.3**	**15**	**57.7**
The way my head teacher treats me influences my performance negatively in classroom	24	92.3	2	7.7
It does matter how my head teacher approaches me in the school	23	88.4	3	11.6
The leadership style of my head teacher boosts my morale in the performance of my classroom activities	10	38.4	16	61.6
The leadership style of my head teacher impedes implementing new ideas	18	69.2	8	30.8
I am happy and more productive because my head teacher always includes me in almost all decision - making processes in the school	7	26.9	19	73.1

From the table, majority (57.7%) of the JHS school teachers were of the view that their head teacher's leadership style encouraged them to perform well in the classroom. Averagely respondents agreed that their head teachers' leadership style encouraged them to perform well in the classroom. The finding is consistent with the views of Osei (2014) who commented that effective use of leadership style by leaders improves the performance of the employees in that organisation. Similarly, the finding confirms the submission made by Gyan (2014) that appropriate leadership styles used by leaders in any organisation increases the performance of the organisation. However, majority (92.3%) of the JHS teachers indicated that the way their head teachers treat them do not

influence their performance negatively in classroom. Averagely, respondents disagreed with the issue.

Majority (88.4%) of the JHS school teachers indicated that it did matter how their head teacher approached them in the school. Similarly, 11.6% of the JHS school teachers agreed that the leadership styles of their head teachers boost their morale in the performance of their classroom activities. The findings are in line with the submissions of Bawre (2015). According to Bawre, effective leadership style that involves management ensures that adequate performance is achieved through balancing the necessity to get the best results while maintaining morale in the organisation. Similarly, Lewin (2012) also commented that effective leadership style that ensures that power is decentralised, result in creativity since the leader is not a dominant figure which finally affect the group morale of the employees and the organisation as a whole.

As depicted in the Table 4, majority (69.2%) of the JHS school teachers again agreed that the leadership style of their head teachers impeded implementing new ideas in the school. The finding corroborates with the comments of Cullen (as cited in Osei (2014) who commented that the kind of leadership styles adopted by the leader to some extent hinder the process of a leader communicating ideas, gaining acceptance of subordinates and motivating followers to support and implement new ideas through change.

Similarly, 73.1% of the JHS school teachers admitted that they were happy and were more productive because their head teachers always included them in almost all decision-making processes in the school. The finding is consistent with the submission of Lewin (2012). He posited that leaders that involve subordinates or employees in

decision establishment, however, such involvement may lead subordinates to be lazy and take things for granted.

Conclusively, it is clear that the actions and inactions of a head teacher in one way or the other influence the performance of teachers in the classroom and by extension in the school. Therefore, it is advisable for head teachers in our educational institutions to be very careful and professional about their dealings with teachers under their control. It is when there is cordial relationship that everybody will be happy and do what is expected of them thereby creating enabling environment for academic work

RQ 3: How does the School Improvement Supporting Officers (SISOs) perceive Headteachers' leadership styles in science instruction

Under this objective, the study required to examine how SISOs see the head teachers' leadership the style in their circuits using different questions that appear in the Table 6.

Table 6. Perception of SISOs' on Headteachers' Leadership applied.

SISOs perception on Styles applied	Frequencies of respondents									
	A (%)		S A(%)		D (%)		S D (%)			Total %
	respondents	%	respondents	%	respondents	%	Total item	%		
1. **Laissez - fair leadership improves consultation with subordinate**	1	25	2	50	1	25	0	0	4	100
2. **Autocratic leadership is a threat to teachers' job**	2	50	2	50	0	0	0	0	4	100
3. **Democratic leadership improve cooperation with teachers**	2	50	1	25	1	25	0	0	4	100
4. **Autocratic Leadership styles decreases teacher workplace performance**	0	0	0	0	1	25	3	75	4	100

Source: Field Research (2022)

The questions wanted respondents to agree or disagree if performance laissez – fair leadership improves consultation with a subordinate, the statistics were as follows; 25% agreed, 0% strongly agreed, 25% disagreed and 0 % strongly disagreed. Therefore, the leading majority who answered that question (50% strongly agreed) said that Laissez - fair leadership does improves consultation with subordinates.

Other findings were that autocratic leadership is a threat to teachers' job, it was confirmed by 50 % majority of respondents with strongly agree. Those who were

questioned about whether democratic leadership improved cooperation with teachers 25% strongly agreed. The final findings on whether autocratic leadership styles decrease teacher workplace performance as indicated in Table 6 above. The majority by 75% established that autocratic leadership styles do not decrease teacher workplace performance. Similar work was done by Osei (2014) who found out that headteachers autocratic leadership style suppresses teacher's and student's creativity.

RQ 4: In the views of the headteachers, what is the influence of their leadership styles on science instruction in the school?

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

The common significant themes, which emerged included autocratic leadership and its impact on science instruction, the influence of democratic leadership on science instruction, the role of laissez-faire leadership in science instruction, transformational leadership and its effect on science instruction.

4.2.1 Autocratic leadership and its impact on science instruction

Autocratic leadership is characterized by a top-down approach, where the headteacher holds all the decision-making power and expects strict adherence to their instructions. In the context of science instruction, this style can stifle creativity and discourage students from actively engaging in the learning process. When headteachers adopt an autocratic leadership style, they often prioritize strict adherence to curriculum guidelines over fostering a love for scientific inquiry. This can lead to a rigid and

uninspiring science curriculum that fails to spark students' curiosity and passion for the subject.

In a school where the headteacher adopts an autocratic leadership style, science instruction is rigid and focused solely on covering the prescribed curriculum. Teachers have little autonomy in designing their lessons or incorporating innovative teaching strategies. As a result, students often perceive science as a dry and uninteresting subject, leading to low engagement and achievement. The lack of student involvement in decision-making processes further contributes to the disconnection between students and the subject matter.

4.2.2 The influence of democratic leadership on science instruction

In contrast to autocratic leadership, democratic leadership involves shared decision-making and collaboration. Headteachers who adopt a democratic leadership style actively involve teachers, students, and other stakeholders in the decision-making process. In the context of science instruction, democratic leadership can foster a sense of ownership and engagement among students. By giving students a voice in shaping their science education, headteachers can create a more inclusive and student-centered learning environment. This, in turn, can enhance students' motivation, critical thinking skills, and overall enjoyment of science.

In a school where the headteacher embraces a democratic leadership style, science instruction is characterized by active student participation and collaboration. Teachers have the freedom to design engaging lessons that cater to the interests and learning needs of their students. Students are encouraged to ask questions, explore scientific concepts, and conduct hands-on experiments. This approach fosters a sense of

ownership and curiosity, resulting in higher levels of engagement, achievement, and enjoyment of science.

4.2.3 The role of laissez-faire leadership in science instruction

Laissez-faire leadership, also known as hands-off leadership, is characterized by a lack of direct involvement or guidance from the headteacher. In the context of science instruction, this leadership style can have detrimental effects. Without clear direction and support from the headteacher, teachers may struggle to create meaningful science learning experiences for their students. Laissez-faire leadership can also lead to inconsistency in curriculum implementation and a lack of accountability. As a result, students may miss out on important scientific concepts and skills, hindering their overall science education.

4.2.4 Transformational leadership and its effect on science instruction

Transformational leadership is often regarded as the most effective leadership style in the context of education. This style focuses on inspiring and motivating individuals to achieve their full potential. Headteachers who adopt a transformational leadership style in science instruction can create a positive and empowering learning environment. By setting high expectations, providing support and resources, and fostering a shared vision for science education, transformational leaders can inspire both teachers and students to excel in the field of science. This leadership style encourages innovation, critical thinking, and a deep understanding of scientific concepts, contributing to a high-quality science education for all students.

Provision of Support and Resources

Evidence of leadership dimension in the provision of resources was also mentioned in each of the ten interviews held with the headteachers. The headteachers said they gave teachers' syllabi, textbooks and charts provided by Ghana Education Service and teaching aids whenever funds (capitation grant) were made available. However, headteacher 7 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 headteacher 3 who praised their himself on the aspect of resource provision, all other headteachers claimed that as subject teachers, the resources given to their teachers 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 A and J were boxes of chalk and the teachers' notebooks.

In school C, it was observed that they had an innovation termed as science corner full of materials mostly improvised materials made by her, 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 C. The study revealed that resources available to teachers were woefully inadequate; with the exception of Headteacher 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.

Creating Conducive Environment for Teaching and Learning

The ten 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 organized 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 ten 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. 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 ten schools.

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) either JICA or GES before, but INSET and workshops that were supposed to be organised by the district indeed were hardly organized these days. They said professional development INSET by GES are now organized mostly for school in the

Country. They also reported that subject associations like Ghana Association of science Teachers (GAST) and Ghana Association of Teachers of English (GATE) organize 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 organized by GAST were revealed, with the recent regional one, taking place at Sunyani from 4th to 8th January, 2020. The logbook also showed that school-based INSET took place on October 15, 2017 as the most recent professional development Programmed-taking place in the school. Headteachers 1 and 7 in addition said they occasionally Organized 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 the various schools. When asked how they nurture professional teacher in 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, headteacher 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.

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. Two teachers 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 ten schools of 2019 and 2020 BECE results was carried out to see how the schools were performing. School A JHS Education Certificate Examination (BECE) results of 2019 and 2020 were not encouraging as there was slight improvement. In 2019, 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 2020, 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: 2019 and 2020 Academic Year Basic Education Certificate Examination Results for School A

Grade obtained	2019 Number of pupils	2020 Number of pupils
1	14	16
2	15	13
3	10	15
4	18	12
5	10	11
6	18	16

The results slightly improved in 2020 as those obtaining grade one, two and three went up by two, five and one respectively. It also showed a reduction in the number of those who had grades four and six. School B's JHS Education Certificate Examination

(BECE) results for the years 2019 and 2020 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 2020, 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 2019 than 2020. The results are summarized in Table 8.

Table 8: 2019 and 2020 Academic Year Basic Education Certificate Examination Results for School B

Grade obtained	2019 Number of pupils	2020 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 2019, 16 pupils had grade 2 as against 11 pupils in 2020, 8 pupils obtained grade 5 as against 13 pupils in 2020 and no one had grade 7 in 2019 but in 2020, 3 pupils had grade seven. JHS Education Certificate Examination results of school C in 2019 and 2020 were encouraging as there was significant improvement. In 2019, 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 2020, 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 contains 2019 and 2020 BECE results for school C.

Table 9:2019 and 2020 Academic Year Basic Education Certificate Examination Results for School C

Grade obtained	2019 Number of pupils	2020 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 2020 than in 2019, while 5 pupils had grade 6 in 2019, none had grade 6 in 2020. In school D's BECE results the results slightly improved in 2020 as those obtaining grade two and three went up by two, five and six respectively. It also showed a reduction in the number in those who had grade four and 16 pupils who had grades one and six. Table 10 contains 2019 and 2020 BECE results for school D

Table 10: 2019 and 2020 Academic Year Basic Education Certificate Examination Results for School D

Grade obtained	2019 Number of pupils	2020 Number of pupils
1	16	16
2	15	13
3	10	15
4	18	12
5	10	11
6	16	16

In 2019, 85 pupils wrote the examination, 16 had grade one, 25 pupils obtained grades two and three and the remaining 44 pupils obtained grades four, five and six. In 2020, 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. School E's JHS Education Certificate Examination (BECE) results for the years 2019 and 2020 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 2020, 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 2019 than 2020. Table 11 contains 2019 and 2020 BECE results for school E

Table 11:2019 and 2020 Academic Year Basic Education Certificate Examination Results for School E

Grade obtained	2019 Number of pupils	2020 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 2019, 16 pupils had grade 2 as against 11 pupils in 2020, 8 pupils obtained grade 5 as against 13 pupils in 2020 and no one had grade 7 in 2019 but in 2020, 3 pupils had grade seven. School F's JHS Education Certificate Examination (BECE) results for the years 2019 and 2020 revealed that in the preceding year, 30 pupils took the examination. Five of them had grade one, 15 had grades two and three and 10 had grades four, five and six. In 2020, 35 pupils were presented, 10 pupils obtained grade one, 10 pupils had grades two and three, 15 pupils had grades, four, five, and six. This trend indicates that the pupils' performance was better in 2020 than 2019. Table 12 contains 2019 and 2020 BECE results for school F.

Table 12: 2019 and 2020 Academic Year Basic Education Certificate Examination Results for School F

Grade obtained	2019 Number of pupils	2020 Number of pupils
1	5	10
2	10	5
3	5	5
4	6	4
5	4	6
6	0	5

In 2019, 5 pupils had grade one as against 10 pupils in 2020, 10 pupils had grade two as against 5 pupils in 2020, 4 pupils obtained grade 5 as against 6 pupils in 2020 and no one had grade 6 in 2019 but in 2020, 5 pupils had grade six. The results shows that there was no improvement. JHS Education Certificate Examination results of school G in 2019 and 2020 were not encouraging as there was no significant improvement. In 2019, 24 pupils wrote the examination, 4 had grade one, 9 pupils obtained grades two and three and the remaining 13 students obtained grades four, five and six. In 2020, the 24 pupils presented for the examination had the following results, grade one 4 pupils, grades two and three 9 and grades four and five 13 pupils. Table 13 contains 2019 and 2020 BECE results for school G

Table 13: 2019 and 2020 Academic Year Basic Education Certificate Examination Results for School G

Grade obtained	2019 Number of pupils	2020 Number of pupils
1	4	4
2	6	6
3	3	3
4	5	5
5	6	6
6	2	2

The table shows no significant improvement in the results obtained in 2019 and 2020. School H's JHS Education Certificate Examination (BECE) results for the years 2019 and 2020 revealed that in the preceding year, 15 pupils took the examination. Six of them had grade one, 7 had grades two and three and 2 had grades five. In 2020, 21 pupils were presented, 6 pupils obtained grade one, 13 pupils had grades two and three, 3 pupils had grades, four, five, and six. This trend indicates that the pupils' performance was better in 2020 than 2019. Table 14 contains 2019 and 2020 BECE results for school H

Table 14: 2019 and 2020 Academic Year Basic Education Certificate Examination Results for School H

Grade obtained	2019 Number of pupils	2020 Number of pupils
1	6	6
2	3	10
3	4	2
4	0	1
5	2	1
6	0	1

In 2019, 6 pupils had grade one as against 6 pupils in 2020, 3 pupils had grade two as against 10 pupils in 2020, 6 pupils obtained grades three to five as against 4 pupils in 2020 and no one had grade 6 in 2019 but in 2020, 1 pupil had grade six. The results show that there was a significant improvement since the number of pupils who obtained grades one to three rose up.

School I's JHS Education Certificate Examination (BECE) results for the years 2019 and 2020 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 2020, 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 2019 than 2020. Table 15 contains 2019 and 2020 BECE results for school I.

Table 15: 2019 and 2020 Academic Year Basic Education Certificate Examination Results for School I

Grade obtained	2019 Number of pupils	2020 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 2019, 16 pupils had grade 2 as against 11 pupils in 2020, 8 pupils obtained grade 5 as against 13 pupils in 2020 and no one had grade 7 in 2019 but in 2020, 3 pupils had

grade seven. School J JHS Education Certificate Examination (BECE) results of 2019 and 2020 were not encouraging as there was slight improvement. In 2019, 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 2020, 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 the results are summarized in the Table 16.

Table 16: 2019 and 2020 Academic Year Basic Education Certificate Examination Results for School J

Grade obtained	2019 Number of pupils	2020 Number of pupils
1	14	16
2	15	19
3	10	15
4	18	12
5	10	11
6	18	10

The results slightly improved in 2020 as those obtaining grade one, two and three went up by two, two and five respectively. It also showed a reduction in the number of those who had grades four and six.

Comparing the results of the ten schools, there is no doubt that schools C, D, F and H did well though the science teachers were not curriculum leaders compared to those in the other six schools. This performance could be attributed to the quality leadership exhibited by their 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

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

From the study, headteachers' leadership style can have a significant impact on science instruction in schools. The leadership style adopted by the headteacher can either facilitate or hinder the delivery of effective science instruction.

Furthermore, the headteacher's personal beliefs and values, the culture of the school, and the support provided to science teachers can all influence their leadership style.

To improve science instruction in Obuasi schools, it is critical that headteachers adopt a leadership style that fosters innovation, creativity, and collaboration. By doing so, schools can create a learning environment that is engaging, exciting, and relevant to students' lives, and ultimately, improve the quality of science instruction.

5.2 Conclusion

It can be concluded that; Headteachers commonly applied two leadership styles; democratic and autocratic leadership styles as the mode of managing the institutions and autocratic helps them from not endangering their authority. JHS teachers in Obuasi Municipality also largely agreed that the behaviour of their head teachers had some influence on their teacher effectiveness. This study concludes head that teachers use

autocratic of leadership style as a means to induce fear as a means to consolidating their authority and influence teacher effectiveness.

In Obuasi Municipality School Administration, the teachers perceive the leadership style to be more democratic, followed by autocratic and laissez-faire leadership style respectively. Democratic had positive influence, autocratic had negative influence and laissez-faire leadership moderately influenced teacher effectiveness. The study concluded that teacher effectiveness in the provision of quality education depends on leadership style applied by the school head in a given school.

The study also concluded that the head teachers' leadership style which directly affected teacher effectiveness positively or negatively, consequently had an effect on the performance of learners.

5.3 Recommendations

This part presents the general recommendations that root from the findings;

Firstly, leaders need to evaluate the perceptions of teacher's view on appropriate leadership styles that increases their workplace performance.

Secondly, the Ministry of education should review its appointment criteria for head teachers to intensify training and build the capacity of school leaders so that only those who are trained in education management should be appointed. Furthermore, special management and the leadership training course should be designed for those currently serving heads and those aspiring to become head teachers in primary schools as refresher courses on the modern basics of leadership style to lead their schools.

Thirdly, observation in findings obtained is: syllabus was not covered; lesson preparation was little done in autocratic schools visited for study.

This study recommends that school head teachers should employ varieties of styles than concentrating on autocratic which does not allow teachers to give off their best and meaningful and creativity in preparing the lesson and pupils assessments including completing the syllabus.

Finally, the study recommended mentoring program for newly appointed and underperforming head teachers to install leadership skills in order and encourage teacher effectiveness.

REFERENCES

Ajowi, J. O. & Nyagaka, E. (2013). Leadership styles of head teachers and their impact on students' academic performance in secondary schools. *Journal of educational and social research*. *3* (3) 158

American Association for the Advancement of Science (AAAS). (1989). *Science for all Americans.* Washington, Dc: AAAs Publication

Antonakis, J., Cianciolo, A. T., & Sternberg, R. J. (2004). Leadership: Past, present and future. In J. Antonakis, A. T. Cianciolo & R. J. Sternberg (Eds.), *The nature of leadership,* (pp. 3-15). Thousand oaks, CA: sage.

Appleton, K., & Kindt, I. (1999). Why teach primary science? Influences on beginning teachers' practices. *International Journal of Science Education, 21(*2), 155-168.

Appleton, K., & Kindt, I. (2002). Beginning elementary teachers' development as teachers of science. *Journal of Science Teacher Education*, 13(1), 43—61.

Avolio, B.J. (2011). *Full range of leadership development*. (2nd ed.). Thousand Oaks, California: SAGE Publications.

Badgett, J., & Christmann, E. (2009). *Designing middle and high school instruction and assessment*. Thousand Oaks, CA: Corwin Press, Inc.

Baker, W. P., Lang, M., & Lawson, A. E. (2002). Classroom management for successful student inquiry. *Clearing House*, 75(5), 248-252.

Ball, J. E., Bruyneel, L., Aiken, L. H., Sermeus, W., Sloane, D. M., Rafferty, A. M., & RN4Cast Consortium. (2018). Post-operative mortality, missed care and nurse staffing in nine countries: *International journal of nursing studies, 78(2)*, 10-15.

Banilower, E. R., Heck, D. J., & Weiss, I. R. (2007) Can professional development make the vision of the standards a reality? The impact of the National Science Foundation's Local Systemic Change through Teacher Enhancement Initiative. *Journal of Research in Science Teaching, 44*(3), 375-395.

Banini, R. (2022) *The influence of headteachers leadership role on availability of teaching resources*. (Master's thesis). University of Education, Winneba

Bass & Bass (2006). *The Bass hand book of leadership: theory, research, and managerial applications, 4th edition.* New York: Free Press.

Bass, B., & Riggio, R. (2006). *Transformational leadership.* Mahwah, NJ: Lawrence Erlbaum Associates, Inc

Bawre, R. R. (2015) *The status and quality of JHS science teaching and learning in the Sunyani municipality.* (Master's thesis) University of Education, Winneba.

Beare, H. Caldwell, B., & Millikan, R. (1989). *Creating an excellent school*. London: Routledge.

Bell, R., Smetana, L., & Binns, I. (2005). Simplifying inquiry instruction. *The Science Teacher, 72*(7), 30-33.

Beneze, L., & Hodson, D. (1999). Changing practice by changing practice: Toward more authentic science and science curriculum development. *Journal of Research in Science Teaching, 36*(5), 521-539.

Bennis, W., & Nanus, B. (1985). *Leaders: The strategies for taking charge*. New York: Harper and Row.

Berube, W., Gaston, J., & Stepans, J. (2004). The role of the headteacher in teacher professional development. Novations *Journal, 1*, Retrieved, July 20, 2021 from http://novationsjournal.org/content/article.pl?sid=04/04/01/2343216

Blase, J., & Blase J. (1998). *Handbook of instructional leadership*: *How really good principals promote teaching and learning*. Thousand Oaks, CA: Corwin Press.

Blase, J., & Blase, J. (2004). The dark side of school leadership: Implications for Administrator preparation. *Leadership and Policy in Schools, 3*(4), 245-273.

Blase, J., & Roberts, J. (1994). The micro politics of teacher work involvement:

Boahen, A. (2015). Essentials of physical geography.

Bogden, R. C., & Biklen, S. K. (1998). *Qualitative research for education*: An introduction to theory and methods. Boston, MA: Allyn & Bacon.

Bouma, G. (1996). *The research process* (3rd ed.) Melbourne; oxford university press.

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal, 9*(2), 27 – 40. Doi:10.3316/QRJ0902027

Buffie, E. G. (1989). *The headteacher and leadership*, Paper presented at Annual Meeting of the American Educational Research Association, Bloominton, IN. (ERIC Document Reproduction service No, ED 31 JJ).

Burns, J. (1978). *Leadership*. New York: Harper and Row,

Cotton, K. (2003). Headteachers and student achievement: *What the research says*. Alexandria, VA: Association for Supervision and Curriculum Development.

Crane, E. (2005). The science storms. *District Administration*, 41(3), 46-49.

Creswell, J. W. (2002). Educational research: *Planning, conducting, and evaluating quantitative and qualitative research*. Upper Saddle River, NJ: Pearson Education.

Creswell, J. W. (2005). Educational research: *Planning, conducting and evaluating quantitative and qualitative research*. (2nd ed.). Upper Saddle River, N.J.: Pearson.

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry *Theory into Practice 39* (3), 124-131.

Crossman, A. (2018). *The use of an Interactive Online Tool (Plickers) in Learning Vocabulary among Young Learners ESL setting*. Understanding Purposive Sampling. An Overview of the Methods and Its Applications. *Journal of Creative Education, vol. 12(4)*

Daresh, J. (2006). *Leading and supervising instruction*. Thousand Oaks, CA: Corwin Press, Inc.

Darling-Hammond, L. (1999). Target time toward teachers. *Journal of Staff Development, 20(2), 31-36.*

Davis, K. (2003). "Change is hard"' What science teachers are telling reform and teacher learning of innovative practices. *science Education, 87(1),* 3-22.

Day, C. (2000). Beyond transformational leadership. *Educational Leadership, 57*(7), 56 – 59.

de Marrais, K.(2004) Qualitative interview studies: Learning through experience. In de Marrais K. & S. D. Lapan (Eds) 2004, *Foundations for research: Methods of inquiry in education and social sciences* (pp. 51-68). Mahwan, NJ: Lawrence Erlbaum Associates.

Denzen, N. (1984). *The research act.* Englewood Cliffs, NJ: Prentice Hall.

Desimone, L. M., Porter, A. C., Garet, M. S., Yoon, K. S., & Birman, B. F. (2002). Effects of professional development on teachers' instruction: Results from a three-year longitudinal study. *Educational Evaluation & Policy Analysis, 24(2), 81-112.*

Desimone, L. M., Smith, T. M., & Ueno, K. (2006). Are teachers who need sustained, content-focused professional development getting it? An administrator's dilemma. *Educational Administration Quarterly, 42*(2), 179-215.

Dickinson, V., Burns, J., Hagen, E., & Locker, K. (1997). Becoming better primary science teachers: A description of our journey. *Journal of Science Teacher Education, 8(*4), 295-311.

Douglas, L.M. (1996). *The effective nurse, leader and manager* (5th edition) California: Addison Wesley

Drake, T. L., & Roe, W. H. (2003), *The principalship* (6th ed.). New Jersey: Prentice - Hall.

Duke, D. (1987). *School leadership and instructional improvement*, New York: Random House.

Effective principals' impacts on teachers. *The Alberta Journal of Educational Research, 40*(1), 67-94.

Elmore, R. (2000). *Building a new structure for school leadership*. Washington, DC: The Albert Shanker Institute.

Elmore, R. (2006). What (so-called) low-performing schools teach (so – called) high performing schools. *Journal of Staff Development, 27(2*),43-45.

Elmore, R. F., & Burney, D. (1999). Investing in teacher learning: Staff development and instructional improvement. In L. Darling-Hammond & G, Sykes (Eds), *teaching as the profession learning profession:* Handbook of policy and (pp. 261,291). San Francisco, CA: Jossey-Bass.

Eminah, J. K. (2000). *The review of the headteachers ' handbook for gender sensitivity*. Accra: G.E.S./UNICEF,

Eminah, J. K. (2009). Science classroom climate of selected Primary classes in Ghana. *UMYU journal of educational research, 1 (1), 1-12*

Eshiwani, G. S. (1983). *Factors influencing performance among primary and secondary schools in Western Province*. Policy Study (Kenyatta University College). Bureau of Educational Research

Etikan, I. (2016). Comparison of snowball sampling and sequential sampling technique. *Biometrics and Biostatistics international journal, 3(1),* 55.

Evans, N., N. (2011) *Leadership style of head teachers and their impact on students' academic performance in secondary schools, Nyamaiya division*. (Masters dissertation), Kenyatta University

Flath, B. (1989). *The headteacher as instructional leader*. ATA Magazines, 69(3), 19 -22, 47—49.

Fullan, M. (1991). *The new meaning of educational change*. New York: Teachers College Press.

Fullan, M. (2000). The return of large-scale reform. *Journal of Educational Change*, 1(1), 5-28.

Fullan, M. (2001). *Leading in a culture of change*. San Francisco: Jossey Bass.

Fulp, S. (2002). *Horizon Research Institute: National survey of science and mathematics education.* Retrieved January 17, 2022, from http://2000survey.horizon- research.com/reports/elementary science. php

Ghana Education Service. (1994). *Headteachers ' handbook*. Accra; Author.

Ghana Education Service. (2002). *Circuit supervisors ' handbook*. Accra: Author.

Ghana Education Service. (2007). *INSET sourcebook modules* (4th ed). Accra: Authors

Godwin, R. H., Cunningham, M. L., & Childress, R. (2003). The changing role of the secondary headteacher. *NASSP Bulletin*, *87*(634),26.

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report, 8(4),* 597-606.

Gyan, C. (2014) Push out or dropout? Taking a critical look at the poor performance and drop out of students of the JHS programme in Ghana. *Academic Journal of interdisciplinary studies 3* (1) 409

Hale, R. (1998). Developing teacher leaders. *Phi Delta Kappan*, *34*(3), 1 10-1 1 1.

Hallinger, P. (2003). Leading educational change: Reflections on the practice of instructional and transformational leadership. *Cambridge Journal of Education, 33*, 329-352.

Hallinger, P. (2005). Instructional leadership and the school principal: A passing fancy that refuses to fade away. *Leadership and Policy in Schools, 4*, 221-239.

Hallinger, P., & Murphy, J. (1985). Assessing the instructional management behaviour of headteachers. *The JHS School Journal, 86*, 217—247.

Hanegan, N. (2001). Administrators' perspectives of support for elementary science education. *Unpublished doctoral dissertation, University of Texas,* Austin.

Harriss, D. J., MacSween, A., & Atkinson, G. (2017). Standards for ethics in sport and exercise science research: 2018 update. *International Journal of Sports Medicine, 38(14)*, 1126-1131.

Harwell, S. (2000). Impediments to change: An application of force-field analysis to leader master teacher training in an elementary level science systemic reform initiative. *Journal of Elementary Science Education, 12*(2), 7-19.

Heck, R. H., Larsen, T. J., & Marcoulides, G. A. (1990). Instruction leadership and school achievement: Validation of a causal model. *Educational Administration Quarterly, 132* (2), 94-125.

Hoy, W. K., & Miskel, C. G. (2001). *Educational administration: Theory, research and practice.* Boston. McGraw Hill International Edition https://www.academia.edu/37632092/chapter2. Retrieved on 18th May, 2022

Hoy, W., & Miskel, C. (1996). *Educational administration: Theory, research, and practice*. New York: McGraw-Hill Inc.

Ibrahim, M. K. M. (2003). *The relationship of principal leadership styles, job satisfaction and teaching instruction of teachers*. http://www.moe.gov.com

Igwe, N. N., & Chidi, A. F. (2017). Principals leadership styles and students' academic performance in Enugu metropolis: A comparative survey of public and mission secondary schools. *Archives of Business Research, 5(8).*

Jarvis, T., & Pell, A. (2004) Primary teachers' changing attitudes and cognition during a science in-service programme and their effect on pupils. *International Journal of Science Education, 26*(14), 1787-1813

Johnson, C. (2007). Whole-school collaborative sustained professional development science teacher change: Signs of progress. *Journal of Science Teacher Education, 18*, 629-661.

Jones, M.& Carter, G. (2007). Science teacher attitudes and beliefs. In S. Abell & N. Lederman (Eds.), *Handbook of research in science education* (pp. 1067-1104). New York, NY: Routledge Taylor & Francis Group.

Kang, N. (2008). Learning to teach science: Personal epistemologies, teaching goals, and practices of teaching. *Teacher and Teacher Education, 24*(2), 478-498.

Keefe J., & Jenkins, J. (1984). Introduction. In J. Keefe & J. Jenkins (Eds.*), instructional leadership handbook* (pp. iii-iv). Reston, VA: National Association of Secondary School Principals

Kelly, M., & Staver, J. (2005). A case study of one school system's adoption and implementation of an elementary science programme. *Journal of Research in Science Teaching, 42*(1), 25-52.

Keys, P. (2007). A knowledge filter model for observing and facilitating change in teacher beliefs. *Journal of Educational Change, 8*(1), 41-60.

King, B. M. (1991). *Leadership efforts that facilitate classroom thoughtfulness in social studies.* Madison, WI: National Centre on Effective Secondary Schools.

King, D. (2002). The changing shape of leadership. *Educational Leadership, 59*(8), 61-63.

Kythreotis, A., Pashiardis, P., & Kyriakides, L. (2010). The influence of school leadership styles and culture on students' achievement in Cyprus primary schools. *Journal of Educational Administration.*

Lee, O., Hart, J., Cuevas, P., & Enders, C. (2004). Professional development in inquiry-based science for elementary teachers of diverse student groups. *Journal of Research in Science Teaching, 41*(10), 1 021-1043.

Leithwood, K. (1996). *International handbook of educational leadership and administration*. Netherlands: Kluwer Academic Publishers

Leithwood, K., & Jantzi, D. (1999a). The relative effects of principal and teacher sources of leadership on student engagement with school. *Educational Administration Quarterly, 35*(Supplemental), 679-706.

Leithwood, K., & Jantzi, D. (1999b). Transformational school leadership effects: A replication. *School Effectiveness and School Improvement, 10*(4), 451-479.

Leithwood, K., & Jantzi, D. (2005). *A review of transformational school literature research 1996-2005*. Paper presented at the annual meeting of the American Educational Research Association, Montreal, QC.

Leithwood, K., & Jantzi, D. (2006). Linking leadership to student learning: The contribution of leader efficacy. *Educational Administration Quarterly, 44*(4), 496-528.

Leithwood, K., Harris, A., & Hopkins, D. (2008). Seven strong claims about successful school leadership. *School Leadership & Management, 28*(1), 27-42.

Levitt, K. (2001). An analysis of elementary teachers' beliefs regarding the teaching and learning of science. *Science Education, 86*(l), 1-30,

Lewin, K (2012), Patterns of Aggressive behaviour in experimentally created social climates. *Journal of SocialPsychology,10:*(2), 25 - 26

Loucks-Horsley, S., Love, N., Stiles, K., Mundry, S., & Hewson, P. (2003). *Designing professional development for teachers of science*. Thousand Oaks, CA: Corwin Press.

Maccoby, E. E., & Maccobys N. (1954). The interview: A tool of social science. In G. Lindzey (Ed.), *Handbook of social psychology: Vol.(l), Theory and method* (pp. 449-487). Reading, MA: Addison-Wesley.

Manu, P. (2007). *Leading without tears*, Maharashtra: Angela Enterprises.

Marks, H.M. & Printy, S. M. (2003). Headteacher leadership and school performance: Integrating transformational and instructional leadership. *Educational Administration Quarterly, 39*(3), 370-397

Marzano, R., Pickering, D., & Pollock, J. (2001). *Classroom instruction that works: Research-based strategies for increasing student achievement*. Alexandria, VA: Association for Supervision and Curriculum Development.

Marzano, R., Waters, T., & McNulty, B. (2005). *School leadership that works*.

Mbiti, D.M., (2009). *Foundation of school administration*. Oxford: Oxford University Press.

Mbiti, I., Muralidharan, K., Romero, M., Schipper, Y., Manda, C., & Rajani, R. (2019). Inputs, incentives, and complementarities in education: Experimental evidence from Tanzania. *The Quarterly Journal of Economics, 134(*3), 1627- 1673.

McGhee, M. W., & Lew, C. (2007). Leadership and writing: How principals' knowledge, beliefs, and interventions affect writing instruction in elementary and secondary schools. *Educational Administration Quarterly, 43*(3), 358-380.

McGregor, D. (1960). *The human side of enterprise*, New York, McGraw Hill,

McMillan, J. H. & Schumacher, S. (2006). *Research in education evidence – based inquiry* (6th ed), Boston. Pearson Education.

McNally, G. (1992), Headteacher effectiveness: Reading the caribou bones. *Canadian School Executive, 12*(4), 3-7.

Mechlin, K., & Oliver, D. (1982). *Project for promoting science among elementary school headteachers*, Washington, DC: National Science Teacher Association

Merriam, S. (1998). *Qualitative research and case study applications in education,* San Francisco, CA: Jossey-Bass.

Miles, M., & Huberman, A. (1994). *Qualitative data analysis: An expanded sourcebook* Thousand Oaks, CA: Sage Publications.

Miller, R. (1995). *Your leadership style: A management development module for educational leaders*. Research for Better Schools, Inc., Philadelphia, PA. (ERIC Document Reproduction. Service No. ED 243 232).

Muijs, D., Aubrey, C., Harris, A., & Briggs, M. (2004) 'How do they manage? A review of the research on leadership in early childhood.' *Journal of Early Childhood Research. 2*(2) 157-169.

Mullins, N. C. (1971). *The art of theory: Construction and use*. New York: Harper & Row.

Mumbe, O. G (1995). *Leadership and teacher job satisfaction of primary schools* in Busia sub-district of Uganda: Unpublished Masters Dissertation. Kampala: Makerere University

Munck, M. (2007). Science pedagogy, teacher attitudes, and student success. *Journal of Elementary Science Education, 19*(2), 13-34.

Muse, P. G. (2004) *Leadership: Theory and practice* (3 rd. ed). London: Sage Publication Ltd.

Mworia, R.N. (1993). *Performance in KCPE–A case study of Central Imenti Division, in Meru Distric*t, MED Thesis Kenyatta University

National Research Council (NRC) (1996). *national science education standards.* Washington, D.C.: National Academy Press.

Ndaipa, C. J. (2016). Leadership styles adopted by head teachers and the influence on staff performance in primary schools of Chimoio cluster in Mozambique. *Research Highlights in Education and Science*, 89.

Newman, M., & Mohr, N. (2001). Cracking the mathematics and science barrier: Principles for headteachers. *NASSP Bulletin, 85*(623), 43-52.

Nsubuga, K. K. Y. (2008). *Analysis of leadership styles and school performance of Primary schools in Uganda.* Submitted in fulfilment of the requirements for the degree doctor education in the faculty of education at the Nelson Mandela Metropolitan University.Pp 16-18.

Odike M. N. & Igwe N., N. (2016). A survey of principals' leadership styles associated with teachers' job performance in public and missionary schools in Enugu state Nigeria. *Journal of Education, Society and Behavioural Science,* 17 (2) 1-21

Olembo J. O. Wanga P, E. & Karagu, N. M. (Eds,) (1992). *Management in education* (1st Ed.) Nairobi. Educational Research and Publications (EARAP)

Orodho, A. J. (2003). *Essential of Educational and Social Sciences Research Methods* Masola Publishers.

Orodho, A. J. (2004). *Statistics made user friendly for education and social science research.* Kenya. Masola Publishers

Orodho, A.J. (1996.. *Factors determining achievement in science subjects at secondary school level in Kenya.* A PhD Thesis, Kenyatta University.

Osei, E. (2014) *The influence of Headteachers leadership role on science instruction*. (Masters thesis). University of Education, Winneba

Pajares, M. (1992). Teachers' beliefs and educational research: Cleaning up messy construct. *Review of Educati0na1 Research, 62*(3), 307-332.

Parku, R. (2012) *The influence of Headteachers leadership role on availability and provision of teaching resources*. (Masters thesis) University of Education, Winneba

Patton, M. Q. (2002). *Qualitative research and evaluation methods*. (3rd ed.). Thousand Oaks, CA: SAGE Publications.

Patton. Q. (1990). *Qualitative evaluation and research methods*. Newbury Park, CA: SAGE Publications.

Population and Housing Census. (2021)

Printy, S. M. (2008). Leadership for teacher learning: A community of practice perspective. *Educational Administration Quarterly, 44*(2), 187-226.

Rhoton, J. (2001). School science reform: An overview and implications for the secondary school headteacher. *NASSP Bulletin, 85*(623), 10-23.

Rhoton, J., Field, M., & Prather, P. (1992). An alternative to the JHS school science specialist. *Journal of Elementary Science Education, 4*(1), 14-25.

Rigano, D., & Ritchie, S. (2003). Implementing change within a school science department: Progressive and dissonant voices. *Research in Science Education, 33*(3), 299-317.

Ritchie, S., Mackay, G., & Rigano, D. (2006). Individual and collective leadership in school science departments. *Research in Science Education, 36*(3), 141-161.

Robinson, V. M., Lloyd, C. A., & Rowe, K. J. (2008). The impact of leadership on student outcomes: An analysis of the differential effects of leadership types. *Educational Administration Quarterly, 44*, 635-674.

Ross, J., & Gray, P. (2006). School leadership and student achievement: The mediating effects of teacher beliefs. *Canadian Journal of Education, 29*(3), 798-822.

Ross, J., & Gray, P. (2006). Transformational leadership and teacher commitment to organizational values: The mediating effect of collective teacher efficacy. *School Effectiveness and School Improvement, 17*(2), 179-199.

Rossman, G. B., & Rallis, S. F. (2003). *Learning in the field: An introduction to, qualitative research*. Thousand Oaks, CA: SAGE Publications.

Rowan, B., & Miller, R. (2007). Organisational strategies for promoting instructional change: Implementation dynamics in schools working with comprehensive

school reform providers. *American Educational Research Journal, 44*(2), 252297.

Sashkin, M. (2004). Transformational leadership approaches: A Review and synthesis. In J. Antonakis, A.T. Cianciolo & R. J. Sternberg (Eds.), *The nature of leadership*, (pp. 171-196). Thousand Oaks, CA: Sage.

Saunders, M. N. (2012). Choosing research participants. Qualitative organizational research: *Core methods and current challenges*, 35-52

Schroeder, C., Scott, T., Tolson, H., Huang, T., & Lee, Y. (2007). A meta-analysis of national research: Effects of teaching strategies on student achievement in science in the United States. *Journal of Research in Science Teaching, 44*(10), 1436-1460.

Sergiovanni, et al (1987). *The principal ship: A reflective practice perspective.* Boston: Allyn and Bacon Longwood Division.

Sheikh, A.G. (2001). *Leadership styles as viewed by secondary school head teachers of Lahore City*. Institute of leadership and management Lahore Affiliated with Hamdard University, Karachi Pakistan. Master's thesis in education

Sheppard, B. (1996). Exploring the transformational nature of instructional leadership, *Alberta Journal of Educational Research, 42*(4), 325—440.

Smith, W. F., & Andrews, R. L. (1989). Instructional leadership: *How headteachers make a difference.* Alexandria, VA: Association for Supervision and Curriculum Development.

Snider, V., & Roehl, R. (2007). Teacher beliefs about pedagogy and related issues. *Psychology in the School, 44*(8), 873-886.

Southerland, S., Sinatra, G., & Matthews, M. (2001). Belief, knowledge, and science education. *Educational Psychology Review, 13*(14), 325 — 351.

Sparks. (2007). *Leading for results: Transforming teaching, learning, and relationships in schools*. Thousand Oaks, CA: Corwin Press, Inc.

Spillane, J. (2005). Primary school leadership practice: How the subject matters. *School Leadership and Management, 25*(4), 383-397.

Spillane, J. P., Halverson, R., & Drummond, J. (2001). Investigating school leadership practice: A distributed perspective. *Educational Researcher, 30*(3), 23-28.

Stronge, J. H. (1988). A position in transition? *Headteacher, 67*(5), 32-33.

Stronge, J. H. (1993). Defining the headteachership: Instructional leader of middle manager. *NASSP Bulletin, 77*(553), 1-7.

Supovitz, J. A., & Turner, H. M. (2000). The effects of professional development on science teaching practices and classroom culture. *Journal of Research in Science Teaching, 37*(9), 963-980.

Tetty-Enyo, A., (1997). *Critical issues in school management.* Paper Presented at the Teacher Management and Support. Anglophone and Francophone Seminar, CCEA, London.

Tsai, K. C. (2017). Development of the teacher leadership style scale. Social Behavior and Personality: an international journal, 45(3), 477-490.

Tyack, D. B., & Hansot, E. (1982). *Managers of virtue: Public school leadership in America, 1820—1980*. New York: JHS Books.

Ubben, G., & Hughes, L. (1997). *The principal: Creative leadership for effective schools.* Needham Heights, MA: Allyn& Bacon.

Wanzare, Z., & Da Costa, J. (2001). Rethinking instructional leadership roles of the school headteacher: Challenges and prospects. *Journal of Educational Thought, 35*(3), 269-295.

Waters, T., Marzano, R., & McNulty, B. (2004). Leadership that sparks learning. *Educational Leadership, 81*(7), 48-51.

Wilkinson, D., & Birmingham, P. (2003). *Using research instruments: A guide for researchers*. New York: Routledge Pres

Wilmore, E. (2002). *Principal leadership*. Thousand Oaks, CA; Corwin Press, Inc

Wise, K. (1996). Strategies for teaching science: What works? *Clearing House, 69*(6), 337-338.

Yore, L., Henriques, L, Crawford, B., Smith, L.K., Zwiep, S., & Tillotson, J (2008), Selecting and using inquiry approaches to teach science: The influence of context in elementary, middle, and secondary schools. In E. Abrams, S. Southerland & P. Silva (Eds.), *Inquiry in the classroom: Realities and opportunities,* (pp. 39-87). Charlotte, NC: Information Age Publishing.

Yulk, G. (2005). *Leadership in organization*. New York: Prentice Hall.

Yulk, G. (2007). Leadership in organizations (6th Ed). New Jersey: Pearson-Prentice

Zeldin, A. L., Britner, L. S., & Parjares, F. (2008). *Journal of Research in Science Teaching, 45*(9), 1036-1058.

Zemelman, S., Daniels, H., & Hyde, A. (2005). Best practice: *Today's standards for teaching and learning in America 's schools*. Portsmouth, NH: Heineman.

APPENDIX A

QUESIONNAIRES FOR MUNICIPAL EDUCATION DIRECTORATE

Please tick [√] where appropriate or fill in the required information on the spaces provided

1. What type of leadership style is exhibited by the headteachers?
   A. Autocratic [] B. Democratic [ ] C. Others…….
2. Does the headteacher influence changes in teachers' instructional practices?
   A. Yes [ ] B. No[] C. Sometimes [ ]
3. Do the headteacher interact with the teachers in the school?
   A. Yes [ ] B. No[] C. Sometimes [ ]
4. Does the headteacher makes sure that all members understand him/her?
   A. Always [ ]
   B. Sometimes [ ] C. Never [ ]
5. Does the headteacher gets staff approval in important matters before implementing them
   A. Always [ ]
   B. Sometimes [ ] C. Never [ ]
6. Does the headteacher puts suggestions met by the staff into operations
   A. Always [ ]
   B. Sometimes [ ] C. Never [ ]
7. Does the Headteacher gives encouragement, support and appreciation to group members
   A. Always [ ] B. Sometimes [ ] C. Never [ ]

8. Does the headteacher makes every member enjoy working with the others in the group

   A. Yes [ ] B. No [ ] C. Sometimes [ ]

9. Does the headteacher assigns staff members particular tasks

   A. Always [ ] B. Sometimes [ ] C. Never [ ]

10. Does the headteacher mobilizes and utilize the potential resources and creativity of members for accomplishing group goals.

    A. Always [ ] B. Sometimes [ ] C. Never [ ]

APPENDIX B

INTERVIEW QUESTIONS FOR SCIENCE TEACHERS

1. What kind of instructional approach/ strategy do you use in teaching science?
2. Why do you intend to use the approach mentioned in (1) above?
3. Tell me do you have adequate resources to teach science?
4. Does your headteacher provide these resources for you or you provide them by yourself?
5. Tell me what is improvisation? Do you improvise TLMs?
6. How do you teach practical lessons in science? Do you teach them separate or you teach them together with the theory?
7. Tell me does your headteacher do regular supervision on science lessons?
8. How do you explain science concept to your pupil?
9. Which aspect of science do you find it difficult in teaching?
10. Tell me what have you done on this difficulty in (9) above?

APPENDIX C

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?

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. Who 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?