INFLUENCE OF PRINCIPALS' INSTRUCTIONAL SUPERVISION PRACTICES ON STUDENTS' ACADEMIC PERFORMANCE IN CHEMISTRY IN PUBLIC SECONDARY SCHOOLS IN MACHAKOS COUNTY, KENYA

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A Thesis Submitted in Partial Fulfillment of the Requirement for the Award of the Doctor of Philosophy Degree in Educational Administration, Department of Education Management and Curriculum Studies, Machakos University

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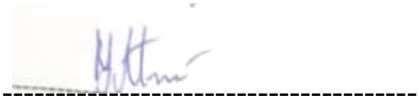
DECLARATION

This thesis is my original work and has not been presented for the award of a degree in an y other university.



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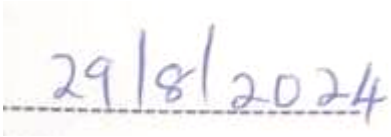

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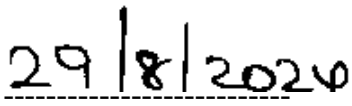

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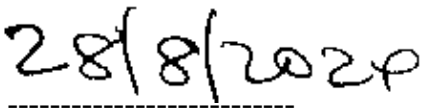

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DEDICATION

This work is dedicated with a lot of love, respect and appreciation to my husband Francis Mutua and our children Felix, Joyce and Mark.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS AND ACRONYMS

CDE: County Director of Education

DQAS: Directorate of Quality Assurance and Standards

HOD: Head of Department

KCPE: Kenya Certificate of Primary Education

KCSE: Kenya Certificate of Secondary Education

KEMI: Kenya Education Management Institute

KESI: Kenya Education Staff Institute

KESSP: Kenya Education Sector Support Programme

KICD: Kenya Institute of Curriculum Development

KNEC: Kenya National Examinations Council

KNBS: Kenya National Bureau of Statistics

KSSHA: Kenya Secondary School Heads' Association

LCD: Liquid-Crystal Display

MBWA: Management by Walking Around

MCIDP: Machakos County Integrated Development Plan

M.Ed: Master of Education

MOE: Ministry of Education

MOEST: Ministry of Education Science and Technology

NACOSTI: National Commission of Science, Technology and Innovation

PhD: Doctor of Philosophy

QASO : Quality Assurance and Standards Officer

ROK: Republic of Kenya

SMASSE: Strengthening Mathematics and Sciences in Secondary Education

SSSC: Senior Secondary School Certificate

TSC: Teachers' Service Commission

VIF: Variance Inflation Factors

ABSTRACT

Principals as instructional supervisors in schools are responsible for overseeing the teaching and learning process. As instructional supervisors, principals focus directly on functions that are related to teaching and learning in secondary schools. The purpose of this study was to assess the influence of principals' instructional supervision practices on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. The study's objectives were to: evaluate the relationship between the principals' management of teachers' of chemistry professional records and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya; evaluate the influence of monitoring students' academic progress by the principal on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya; analyze the influence of classroom visitation by the principal on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya and investigate the influence of principals' management of teachers' of chemistry professional development on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. The study was guided by Transformational Leadership Theory developed by James MacGregor Burns in (1978). Convergent Parallel Mixed Methods Research Design was employed to enhance simultaneous collection of quantitative and qualitative data. The target population was 365 principals and 545 teachers of chemistry in public secondary schools in Machakos County. Simple random sampling was used in sampling 73 principals and 109 teachers of chemistry. Data was collected using questionnaires, interview schedules and document analyses. Content validity was used for this study. Cronbach's Alpha Coefficient was used to test questionnaires reliability. The interview's guide reliability was determined through dependability. Quantitative data was analyzed using descriptive and inferential statistics with the help of SPSS Computer Programme version 26 and presented in frequencies, mean, standard deviation and percentages. Qualitative data from open-ended questions was analyzed using content analysis. Data was presented in tables and charts. All ethical considerations were strictly adhered to. Using Pearson moment correlation coefficient, the study established that all variables significantly influence students' academic performance in chemistry: professional records (r =.774, p <.001), monitoring students' academic progress (r = .796, p <.001), class visitation (r = .474, p <.001) and management of teachers of chemistry professional development (r = .670, p <.001). Monitoring students' academic progress had the strongest relationship with students' academic performance in chemistry while class visitation had the weakest relationship. The study concludes that there is a statistically significant relationship between: management of teachers' of chemistry professional records by the principal and student's academic performance in chemistry; monitoring of students' academic progress by the principal and students' academic performance in chemistry; the principals' class visitations and students' academic performance in chemistry, and assessment of teachers of chemistry professional development by the principal and students' academic performance in chemistry. Based on the findings, the study recommended: Formulation of a clear policy that stipulates instructional supervisory roles of principals as a means for improving teaching effectiveness and students' academic performance in chemistry, the principals to ensure that there is delegation of some of the instructional supervisory roles to their deputies, well organized and funded professional development programs so as to ensure that teachers of chemistry adapt to the changing education environment brought about by advancement in technology.

CHAPTER ONE
INTRODUCTION

1.1 Introduction

This chapter focuses on the background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, hypotheses and significance of the study. The chapter also covers scope of the study, limitation and delimitation of the study, basic assumptions of the study, theoretical and conceptual frameworks and definition of key terms.

1.2 Background to the Study

Odo (2012) describes science as a process through which man obtains verifiable knowledge of the physical world and utilizes the knowledge to solve human problems. Science is the systematic investigation of nature with a view to understudy and harness them to serve human needs (Okoro, 2013). According to Odo and Igwe (2016), science is human activity which should be learnt by all for knowledge, reasonable existence and active participation in solving the socio-economic problems of the society. Science has globally been recognized as a major instrument of economic development and social transformation. As a result, every nation has continued to pursue science knowledge in order to remain relevant in a globalized world economy (Olubu, 2015).

One of the science subjects students choose in secondary schools is chemistry. Chemistry is defined as the study of matter and its properties, the changes that matter undergoes, and the energy associated with those changes (Silberberg, 2006). Gilbert, Kirss, Foster and Davies (2009) posit that modern life is difficult to imagine without aspirin, plastics and other countless synthetic materials, computers and numerous technological innovations that have been made possible by understanding matter at

atomic and molecular levels through the study of chemistry. Gilbert et al. (2009) further note that chemistry provides an understanding of many natural events and has led to the synthesis of new forms of matters that has greatly affected both the way we live and the planet on which we live in.

Chemistry is the central drive of a sustainable global economic development, playing major roles in: food for example nutrient enriched cereals and milk; in clothing for example dyed polymer fibers; in housing, in medicine and in transportation. Chemistry is a discipline that contributes to uplifting peoples living standards through technological advancement, provision of health and other social amenities. It is vital in equipping students with general knowledge and skills required for industrial applications (Malala, Onderi and Ajowi, 2021). Therefore, chemistry education must be every country's gateway to technical and industrial growth (Hanson, 2017).

Wenzare (2012) describes instructional supervision as all the activities that are directed specifically at the improvement of the teaching/ learning process in the school and occurs through formal context of supportive teacher/supervisor interactions. According to Glanz and Zepeda (2016), the school principal as an instructional supervisor is expected to lead the staff in order to produce high student achievement. Instructional supervision of teachers is critical as it promotes efficiency leading to timely and guided curriculum delivery (Yunita, 2015). An instructional supervisor is therefore an administrator who sets goals, manages curriculum and develops learning climate to improve students' outcomes.

Principals as instructional supervisors in secondary schools are responsible for overseeing the teaching and learning process. As instructional supervisors, principals focus directly on functions that are related to teaching and learning in secondary schools (Hallinger and Murphy 2012). According to Marzano (2017), the principals as instructional supervisors have to: supervise day-to-day classroom activities; make unannounced visits to classrooms; evaluate teachers' performance in lesson delivery; check student's learning activities; and classroom management strategies and students' participation approaches. Ekundayo (2010) notes that instructional supervision by the principal involves regularly visiting classrooms to observe his/her teachers teach as an objective way to evaluate knowledge and skills of individual teachers. Marvel and Morton (2016) identified the principal as the single-most influential person in a school. The principal is the person responsible for all activities that occur in and around the school building. It is the principals' management practices that set the tone of the school, the climate for teaching, the level of professionalism, the morale of teachers and the degree of concern for what students may or may not become (Marvel and Morton, 2006).

Tyagi (2010) notes that instructional supervision in India has helped improve the process of teaching and learning as well as the professional development of teachers. The Indian government has emphasized a lot on provision of instructional supervision for teachers. In the United States of America, principals practice their instructional leadership styles to enable teachers to be in a position to carry out their roles well in the classroom (Hallinger and Murphy, 2012). In the United Arab Emirates Al-Hosani (2015) observed that the principal oversees what occurs at school, for example promoting educational activities, conducting classroom visitation and supervising

teaching methodology. Instructional leadership practices focus on staff teaching, learning and building teacher capacity and commitment for the achievement of all students, providing practical assistance in developing faculty knowledge and instructional skills, and creating school conditions for teacher potential to meet the needs of all students (Hallinger, Hosseingholizadeh, Hashemi and Kouhsari, 2018).

Professional records are the requirements that assist teachers' during the instruction process. They are used to guide the direction that the teaching and learning process will take. Teachers who are committed to duties have full knowledge of the subject content to teach and get lesson plan ready before teaching (David, 2017). According to Mecgley (2015), the principal as an instructional supervisor should ensure that lesson plans for teachers are well planned and updated. Schemes of work is a teacher's plan of work derived from the syllabus showing what is to be covered within a specific period of time. It gives a suggested allocation of time for each section of the syllabus (Orenaiya, Adenowo, Aroyeun and Odusonga, 2014). Thus, the preparation and instructional supervision of professional documents influences the quality of education standards (Mburu, 2017).

Management of the curriculum, classroom visitations, monitoring and evaluating students' academic performance, continuous teacher development are major supervisory functions for school principals (Federal Republic of Nigeria, 2014). According to Wambui (2015), classroom visitation, management of the teachers' professional records, syllabus coverage, and provision of staff development sessions for teachers by the principal significantly influence students' performance. This is further supported by

Winands (2011) who states that principals are in charge of lesson management, teachers' growth and they are supposed to organize advanced training for their teachers.

Supervision in Kenyan public secondary schools is delegated to the Ministry of Education in order to promote education for the people of Kenya. This legal provision empowers the Cabinet secretary for Education to engage the Directorate of Quality Assurance and Standards (DQAS) to plan school visitation by Quality Assurance and Standards Officers (QASOs) to carry out general supervision, hence ensuring high educational standards are maintained (Republic of Kenya, 2015). In Kenya, secondary school principals' are leaders and are in charge of all that takes place in school. They are charged with ensuring that educational strategies are put in place to support effective teaching and learning in their institutions. The main responsibility of the principals in Kenya is to uphold academic excellence of their students by focusing on teaching and learning in terms of measurable students' and teachers' performance. The principals have the overall duty of influencing all the activities taking place in school, towards the set goals through proper supervision of all the learning activities (Mutinda, 2016).

Makau, Tanui and Ronoh (2016) conducted a study comparing instructional leadership of principals' in high and low performing secondary schools on the three science subjects (Chemistry, Biology and Physics) in Makueni County. The study findings show a strong relationship between instructional supervision and academic achievement. Available statistics show that students' achievement in the sciences has remained low nationally and at the county level in Machakos (Kenya National Examination Council, 2021). A study by Njeri (2022) shows that poor performance in

chemistry in Wajir County can be attributed to teaching methods, lack of teacher motivation incentives like professional development and negative attitude of the students towards the subject.

The national KCSE percentage scores in the sciences presented in Table 1.1 show a worrying trend of observable decline in academic performance in the sciences at the national level from 2016-2020 with chemistry being the most affected subject. For five consecutive years, performance in chemistry as per the percentages displayed is way below compared to the other science subjects. This trend is worrying as students might be locked out from pursuing chemistry related career paths due to the dismal performance.

Table 1.1: National KCSE Percentage Scores in Sciences (2016-2020)

Year	Physics	Chemistry	Biology
2016	28.33	18.13	26.15
2017	30.07	19.71	26.82
2018	31.62	20.31	27.13
2019	32.71	20.70	26.14
2020	31.62	21.13	27.53
Average	30.87	20.00	26.75

Source: Kenya National Examination Council (2021)

Literature from reviewed studies has indicated performance in KCSE can be influenced by the principals' instructional supervision practices. In Machakos County, students' academic performance in the subject has constantly remained low in the period of 2016-2020 as compared to physics and biology. Table 1.2 shows details of students' academic performance in Machakos County in the sciences.

Table 1.2: Machakos County KCSE Percentage Scores in Sciences (2016-2020)

Year	Physics	Chemistry	Biology
2016	31.31	19.12	27.15
2017	32.47	20.46	28.14
2018	32.62	23.60	28.62
2019	32.71	20.06	28.89
2020	30.52	20.04	27.70
Average	31.9320.66	28.10	

Source: Machakos County Director of Education (2021)

Tables 1.1 and 1.2 respectively provide information on national and Machakos County candidates' performance in KCSE in the science subjects for the period from 2016 to 2020. According to information presented in Tables 1.1 and 1.2, the national and Machakos County performance in sciences has been consistently below the national averages, with chemistry being the least performed of the three sciences at all levels. This trend is worrying as students should pass well in chemistry to pursue science oriented careers such as medicine, engineering, pharmacy, nursing, among others. Thus, alot still needs to be done to improve students' overall performance in chemistry all over the nation. It is against this background that this study wishes to assess influence of principals' instructional supervision practices on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. Poor academic achievement raises concern on the significance of principals' instructional supervisory effectiveness in secondary schools. This has necessitated a research to explore if the principals' instructional supervision practices may be responsible for students' dismal performance in chemistry as one of the sciences.

1.3 Statement of the Problem

Studies have indicated that instructional supervision is a key process which aid secondary school principals to achieve acceptable standards of academic performance in national examinations. Instructional supervision is essential as it helps principals to effectively manage their schools to academic excellence by ensuring that both teachers and students are observed regularly, lessons are planned early and helping teachers in their professional development. The overall goal of instructional supervision is improved students' academic performance. However, the national KCSE percentage scores in the sciences as presented in Table 1.1 show a worrying trend of observable decline in academic performance in Chemistry from 2016-2020. If instructional supervision is carried out effectively, the principal would be able to establish gaps in the teaching and learning of chemistry and aid in avoiding the declining academic performance which would reverse the trend reflected in National KCSE percentage scores in the sciences, as shown in Table 1.1.

A study by Gachure (2013) in Kipiriri Sub-County, Kenya revealed many gaps in the supervisory roles of the principals and suggested further studies in other sub-counties in Kenya. Further, most studies done have not provided the link between principals' instructional supervision and students' academic performance in chemistry. The current study filled this knowledge gap by investigating principals' instructional supervision in public secondary schools in Machakos County as poor academic performance in chemistry is a serious impediment to socio-economic development of the nation.

1.4 Purpose of the Study

The main purpose of this study was to investigate principals' instructional supervisory practices and establish how it impacts students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

1.5 Objectives of the Study

The study addressed the following four research objectives:

i. To evaluate the relationship between the principals' management of teachers' of chemistry professional records and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.
ii. To evaluate the influence of monitoring students' academic progress by the principal on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.
iii. To analyze the influence of classroom visitation by the principal on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.
iv. To investigate the influence of principals' management of teachers' of chemistry professional development on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

1.6 Hypotheses of the Study

The following four null hypotheses guided the study:

$H_0$1: There is no statistically significant effect of management of teachers' of chemistry professional records by the principal and performance in chemistry in public secondary schools in Machakos County, Kenya.

$H_0$2: There is no statistically significant effect of monitoring students' academic progress by the principal and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

$H_0$3: There is no statistically significant effect of the principals' class visitations and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

$H_0$4: There is no statistically significant effect of assessment of teacher of chemistry professional development by the principal and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

1.7 Significance of the Study

Policy makers, in particular Kenya Education Management Institute (KEMI), Quality Assurance and Standards Officers (QASO), the Kenya Secondary School Heads' Association (KSSHA), Kenya Institute of Curriculum Development (KICD) will use the findings in incorporating instructional supervision in their in-service training programs to enable school principals to be effective instructional supervisors.

The Kenya Education Management Institute (KEMI) and Quality Assurance Officers may use the findings to formulate teacher education management programmes and in-service training for principals and teachers, hence improving teaching and learning. The findings may also assist the Quality Assurance Officers to improve instructional supervision in secondary schools thus boosting the students' academic performance. The findings may benefit principals to re-examine their instructional supervision practices and make adjustments to their styles which in turn can improve the students' academic performance.

The study findings might also benefit teachers since they are actively involved in the teaching process. This is because the findings would help them to understand their role as education stakeholders in ensuring that students improve their performance. The findings may also help teachers to improve on their teaching skills as the supervision by the principals enables them to identify their strengths and weaknesses and by working on their weaknesses, they improve their professional competence and performance.

Finally the findings might be beneficial to secondary school students in Machakos County as improved instructional supervision by the principals will contribute to better academic performance. The students will also be keen to set targets for their performance as a result of consistent monitoring of their academic achievements. Researchers will possibly benefit from the findings in that it will add to the existing knowledge in principals' instructional supervision practices that can lead to an effective teaching and learning process. This will further improve the quality of education through better academic performance strategies.

1.8 Limitations of the Study

The following limitations were encountered during the study:

i. The respondents at first withheld crucial data fearing that they might be probed. To overcome this limitation, the researcher assured them that the data collected was to be used for research only and their responses would be confidential.

ii. Meeting the principals was difficult due to their busy schedules. This was overcame by early booking of appointments and adjustment of time for data collection where necessary.

iii. The study used three research instruments which are questionnaires, interview guides and document analysis leaving out other research instruments, but it was felt that the triangulation in data collection overcame this challenge in total.

1.9 Delimitations of the Study

The scope of this study was as follows:

i. The study only concentrated on the influence of principals instructional supervision practices on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

ii. Private secondary schools in the county were excluded from the study as these schools operate in environment different from those of the public schools. The difference in recruitment also affects the school administration and performance of the students and teachers since the qualification requirements might not necessarily be equal. In addition, private schools are business enterprises while public schools are non-profit making institutions. Therefore, the supervisory role of principals might vary significantly.

iii. The research target population was drawn from principals and teachers of chemistry in public secondary schools in Machakos County. Due to this fact, the results of the study were not generalized to the other teachers in the schools. Teachers influence students' academic achievement by their good instructional skills developed through effective instructional supervision. The teachers are also in a position to share information relating to the principals supervisory roles in their schools and suggest ways for improvement.

iv. Further there are also other factors that might influence academic performance of the students like entry behaviour, availability of learning resources, teachers'

experience and teachers' qualifications. This study only concentrated on four factors.

v. The study focused on student's academic performance in chemistry in KCSE only.

1.10 Assumptions of the Study

In this study, three assumptions were made. They are: all the targeted schools cover chemistry syllabus on time; teachers arrange demonstrations and practical work for students; and, all the respondents would provide factual information that would be useful in making practical recommendations.

1.11 Theoretical Framework

The study was anchored on the Transformational Leadership Theory. This theory was developed by James MacGregor Burns in 1978. Burns defined transformational leadership as a theory that suggests that people interact with one another to bring about strong relationships that will lead to trust and consequently improve motivation in leaders and followers. Followers are transformed by being inspired through positive changes created by the supervisors. The transformational leader should work to increase the optimism, enthusiasm and attention of the followers (Al-Jaroudi, 2010). Bolden (2008) stated that transformational leadership concentrates on what leaders achieve as well as on their personal characteristics and their relationship with the members of the organization. It is about bringing important changes by taking members beyond their individual interest to the interest of the organization. When people in the organization have been transformed, it results in the total transformation of the organization.

According to Ghadi, Fernando and Caputi (2013), transformational leadership involves four dimensions. Firstly, idealized leaders influence refers to a leader's ability to increase level of loyalty, dedication and identification without focusing on the self-interest. Gomes (2014) states that the followers also acknowledge extraordinary capabilities, persistence, and determination in their leader. Secondly, inspirational motivation which refers to a leader's ability to create a vision that has great impact on the subordinates making them to play a crucial role within the organization. McCleskey (2014) points out that inspirational motivation makes use of behaviour to motivate and inspire employees by offering a shared meaning and a challenge to the followers. Thirdly, intellectual stimulation refers to the ability of the leader to make employees more aware, innovative and creative. Finally, empowerment, which is accomplished by giving, subordinates the authority to make decisions and respond directly to customer requests and problems.

DuBrin (2013) contended that transformational leaders have certain characteristics. They encourage individuals to set high goals for themselves and team members to take pride in the team. They also try to communicate high-performances expectations to the individual employees and say things that make group members feel proud of being members of the success. Transformational leaders show confidence in individuals' abilities to meet the expected outstanding performance and say positive things about the team. They also have a great task of encouraging individuals to live up to their potential and always emphasize how the team differ from others. Transformational leaders suggest training to improve individual ability to carry out the job and that will make them talk optimistically about the future of the team.

Leithwood (2006) noted that amongst others, one of the dimensions of transformational leadership is the ability to enhance academic achievements which is the focus of this study. A transformational leader contributes to this factor by aligning the objectives and goals of all stakeholders in the organisation (Bass and Riggio, 1996). Tschannen-Moran (2011) noted that a principal can influence performance through direct supervision of classroom practices. Given that a principal play a key role in the delivery of quality instruction, they should embrace the qualities of a transformational leader who is willing to work harder than expected and in so doing the teachers will feel trust, admiration, loyalty and respect for their leader and this will be reciprocated through improved students' academic performance.

Principals are working on transforming their institutions as they foresee the benefit of moving them from low performances to acceptable performances or from acceptable performances to high performance (Finnigan and Stewart, 2009). Leithwood (2006) noted that amongst others, one of the dimensions of transformational leadership has an indirect positive influence on learners' academic achievement. This is the case because a transformational school principal keeps staff motivated and makes them remain courageous to make sure that their learners achieve their set targets in the subjects they teach. The rationale for using Transformational Leadership Theory in this study was that it advocates for the leader and followers to engage in a mutual process of raising one another to higher levels of morality and motivation. Therefore, this theory is relevant in explaining the importance of promoting a forum for professional discourse where principals as instructional supervisors bring change in attitudes, skills, and knowledge among teachers and students.

1.12 Conceptual Framework

The study was conceptualized on the premise that principals' instructional supervision practices lead to improved teaching and learning for improved students' academic performance in chemistry. This is presented in Figure 1.1.

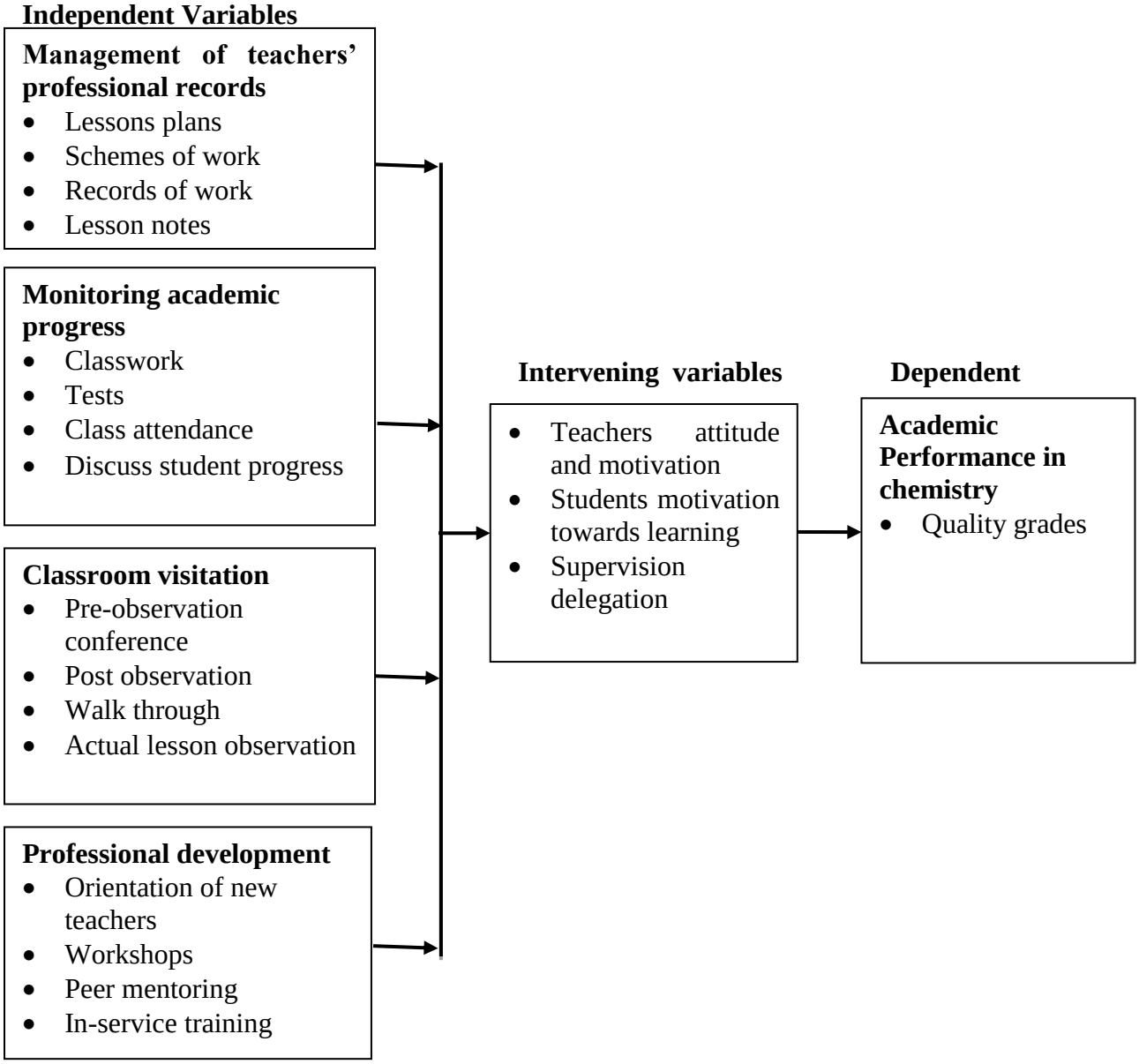


Fig. 1.1: Principals' Instructional Supervision Practices and Performance in Chemistry.

Source: Researcher (2022)

Figure 1.1 presents the interconnection between independent and dependent variables in view of the intervening variables. The independent variables of this study are management of teachers' professional records, monitoring academic progress, classroom visitation and professional development. Depending on teachers' attitude and motivation, students' motivation towards learning and supervision delegation which are intervening variables, these principals instruction supervision roles impacts on academic performance in chemistry which is measured in terms of quality of grades.

The conceptual framework in this study is based on the concept that principals' instructional supervisory roles influence students' academic performance in chemistry. Instruction supervision is one of the important roles of the principals in public secondary schools. The principals as school supervisors oversee teachers' instructional practices in such a manner that they improve teachers' classroom instruction to the extent that students' academic performance in chemistry improve. Principals also have a duty to check lesson plans, schemes of work, records of work covered, lesson notes and other professional documents.

Monitoring academic progress is very vital and principals can meet with teachers to discuss students' progress or use test and other performance measures to assess the students' academic performance. When principals interact with teachers through class visitation to observe teaching process, learning is improved because problems and weaknesses facing students and teachers are identified and addressed. Engagement in pre-observation conferences and post-observation conferences with principals is instrumental in mentoring and development of a working relationship with the teachers.

The principal and the teacher connect and establish a relationship of mutual trust and respect and the final outcome is a plan for further improvement.

Principals also support teachers towards their professional development through orientation of new teachers, school-level workshops, and peer mentoring. Where the principals carry out their instructional roles well, the students register good performance. Hence, good and quality grades. When principals fail to perform their instructional supervisory roles well the result is poor performance reflected in poor grades. Therefore, students' performance in chemistry is dependent on principals' instructional supervisory roles. The intervening variables which include teachers' attitude and motivation towards work, students' motivation towards learning and delegation of supervision duties have an influence on academic performances in chemistry.

1.13 Definition of Significant Terms

Academic performance: knowledge gained through an education system over a specific period of time and it is evaluated through examinations and marks awarded by a teacher or a national examination body like KNEC.

Classroom observation: a planned session between a teacher and the principal for principal to take note of strengths and challenges faced by the teacher in instructional process with a view to improve the teaching process.

Classroom visitation: formal planned meeting between principals and teachers in which the principal records data during the teaching process and the teacher is provided with feedback on the whole exercise.

Instructional supervision practices: an internal mechanism adopted by principals for school self-evaluation, geared towards helping to improve the teaching /learning activities.

Management: involves supervising administrative duties with an aim of creating a conducive environment that can empower workers to work productively and efficiently to achieve the goals of the organization.

Monitoring: close surveillance of both student academic results and the effectiveness of classroom measures and practices.

Monitoring students' academic performance: discipline which is instrumental in helping teachers effectively to utilize student performance information to continually evaluate the effectiveness of their teaching and make more informed instructional decisions.

Poor performance: consistent failure of students' to achieve acceptable level of academic performance in national examinations.

Private school: school maintained by private individuals, religious organizations, or corporations, funded at least in part by fees or tuition and not the government.

Professional documents: the official documents that a teacher must have to carry out teaching such as schemes of work, lesson plans, records of work covered, students' progress records, class attendance registers and lesson notes.

Professional development: the activities and programmes formal or informal that have been designed to develop skills, knowledge and competences for quality curriculum delivery among teachers

Public school: school that is established and made operational using funds from the government and community.

Sciences: biology, chemistry and physics as taught in secondary schools in Kenya.

Secondary school: schooling offered after primary school and before other higher educational institutions and pupils who have graduated from primary schools are at liberty to join in order to further their education.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter focuses on literature from other scholars on the influence of instructional supervision on performance. Specifically it highlights the influence of management of teachers' professional records, monitoring of students' academic progress, class visitations, and the management of teachers' professional development. The chapter also covers summary and knowledge gap.

2.2 Student Academic Performance

Students' academic performance is influenced by factors such as the intellectual capabilities, personality, motivation, skills, interests, study habits, self-esteem and teacher-student relationship (Lamas, 2015). Teacher-related factors like understanding the subject, communication skills, coming late to class or absenteeism also significantly impact students' academic performance (Alani and Hawas, 2021). A study by Siachifuwe (2017) shows that students' poor academic performance in schools was as a result of lack of teacher motivation from school management, lack of teaching and learning aids, ill preparedness of teachers, non-marking of learner's exercises and lack of punctuality on the part of teachers.

School attendance is an important factor that influences the academic performance of students (Sekiwu, Ssempala and Frances, 2020). Oghuvbu (2010) observes that through regular school attendance, students have unlimited access to educational support for their overall academic success. School attendance is reinforced through continuous teacher guidance and maintaining a daily students attendance record which is regularly

reviewed by the principal (Black, Seder and Kekahio, 2014; Bagaya, 2019). According to Ozcan (2021), a strong principal defines the priority issues in teaching and learning, has strong communication skills, participates in in-service training activities, motivates the teachers towards innovation and organizes activities aimed at improved students' academic performance.

2.3 The Concept of Instructional Supervision

Instructional supervision is a task of improving instruction through regular monitoring and in-service education of teachers as well as providing professional guidance, direction, leadership and assistance for professional development in order to improve the quality of instructional delivery (Clark 2015). According to Akinfolarin (2017), supervision is the process of overseeing the work of teachers with the aim of assisting them to solve their instructional problems so that students can benefit maximally from classroom activities. He further argues that quality learning depends largely on effective supervision. Babalola and Hafsatu (2016) point out that the measure of effective supervision is the improvement of students' academic achievement.

Instructional supervision is defined as the act of checking, watching and observing the activities of teachers in teaching and learning process (Ndambuki, Kasivu and Mwanza, 2020). On the other hand, Namunga (2017) defines instructional supervision as a process of inspecting both what the teachers are teaching and what the students' are learning in order to enhance teaching practices, hence contributing to improved student learning. Namunga (2017) further highlights that by skillfully analyzing performance and appropriate data, administrators can provide meaningful feedback and direction to teachers that can have a profound effect on teaching that occurs in each classroom.

School principals in high performing schools check schemes of work, lesson books, attendance registers, class attendance records, records of work covered and clock-in/clock out books more frequently than those in average and low performing schools (Reche, Bundi and Riungu, 2012).

Supervisors assist in improving classroom instruction because teachers are more competent and efficient and students are motivated to work harder in order to achieve the required standard (Muasa, Ogola and Nzioki, 2021). Supervision therefore entails checking what is taking place in class to ensure that teachers are teaching properly and at the same time provide close direction and motivation in a school to enhance teaching and learning. Instructional supervision assists the principals to create conditions under which teachers work well to achieve the goals set for them. Instructional supervision helps to improve the teaching carried out while ensuring that the students are benefiting from the teaching and learning process. By identifying the weakness of the teachers, improvement is realized, thus helping teachers to rediscover their shortcomings and enhance their teaching and learning strategies. Therefore the principals' role should be formulation and implementation of schemes of work, delivering of instructional resources, advising and assisting teachers in instructional programmes and even helping in conducting and coordinating staff (Okumbe, 2013).

In Kenya, principals are chief executive officers of all that takes place in school. They are charged with ensuring that educational guidelines are put in place to support effective teaching and learning in schools. The main duty of principals in Kenya is to uphold academic excellence of their students by focusing on teaching and learning in terms of measurable students' and teachers' performance. The school principals have

the overall duty of influencing all the activities taking place in school towards the set goals through proper supervision of all the learning activities (Mutinda, 2016). Consequently, poor quality instructional supervision by principals has largely contributed to gaps in teachers' competence in curriculum instruction, whereas effective instructional supervision leads to good performance by students (Kieti, Maithya and Mulwa, (2017).

2.4 Influence of Principals' Management of Teachers' Professional Records and Students' Academic Performance

Omoifo and Urevbu (2007) indicated that a teacher requires teaching documents which every serious and devoted teacher should know, has the ability to develop and apply in the teaching and learning process. KICD (2017) defines professional records as vital documents which make teaching and learning more effective as they are used by the teacher in the preparation, implementation and evaluation of teaching and learning process. According to Muasa, Ogola and Nzioki (2021), these professional records are: assignments, schemes of works, teachers' class attendance registers, students class registers, clocking in and out times printouts, lesson plans, lesson attendance register, lesson notes and students' notes. Musungu and Nasongo (2008) in their study established that principals in high performing schools on a regular basis checked lesson plans, schemes of work, teacher attendance and class registers.

Every committed teacher must take up some measures before teaching which include: reading approved syllabus description of subjects, selecting content areas that need to be covered and prior time planning in order to cover syllabus on time. The preparation of official document influences the quality of education standards. In learning

institutions where tutors prepared their documents well without being coerced by the authority or head masters, they post good performance (Norviewu-Mortty, 2012).

Teachers need to prepare professional documents in advance as they are the ones they use to interact with learners effectively. According to a study by Birech (2011), there is a close link between learner's academic achievement and professional document scrutiny by supervisors as it leads to improvement in academic achievement. The head teachers have the responsibilities to seeing to it that teachers have adequately prepared their professional records before they engage learners in instruction process. Teacher preparation is critical to the planning of classwork and it has a net effect on the pupils' academic performance (Nzomo, Onsumu and Obiero, 2008). For teachers to improve on the performance in instructional process, the preparation of professional documents and keeping of updated records is paramount.

Teachers use professional documents in the preparation, implementation and assessment of teaching and learning process. These are very important documents that a teacher should have to assess his/her value to the students and make the teaching and learning process effective. Professional documents include schemes of work, lessons plan, and records of work, progress reports and Individualized Education Program (IEP).

Heidari (2014) conducted a study to find out teachers' perceptions on use of lesson plans in secondary schools in Iran. The findings revealed that due to the importance attached to the lesson plans, there is a need to hold specialized workshops which may provide necessary information which can be used for developing better lesson or course plans. The finding of the study revealed that English teachers' agreed with use of lesson

plan and no one disagrees with lesson plan as they considered it as beneficial. The study recommended to expand and analyze the data by teachers of other fields especially science and mathematics teachers. The current study will fill this research gap by analyzing data of chemistry teachers.

Sule, Eyiene and Egbai (2015) investigated the effectiveness of teachers through the appraisal of their lesson notes by the principals in public secondary schools in Nigeria. The study revealed a significant positive relationship between the checking teachers' lesson notes and their effectiveness. If not well supervised, the teachers' effectiveness in instruction would outrightly be affected. The ripple effect would be felt in the students' academic performance as the teachers may fail to professionally use their documents to better the students' performance. The study recommended teachers' content notes to be checked frequently as this would help to improve their effectiveness in secondary schools. The current study will address the frequency of monitoring lesson plans which is missing in this study.

Ampofo, Onyango and Ogola (2019) investigated the influence of school heads' direct supervision on teacher role performance in Public Senior High Schools in Ghana. The study pointed out that teacher's schemes of work and lesson plans are vital instructional documents clearly that define the structure and content of a course and aid in effective instructional delivery. The findings from the study show that school heads pay less attention to the preparation of schemes of work. The school heads also paid less attention and were not regularly involved in vetting of lesson plans and this affects effective instructional delivery by the teachers. This study concentrated on schemes of

work and lesson plans and left out other equally important teacher professional records which are covered in the current study.

Abdinoor (2013) examined socio-economic, cultural and school-based factors affecting the performance of KCSE in Isiolo County. The study established that teachers do not prepare professional documents particularly lesson plans. This was linked to the declining performance of academic standards in the county. Findings further revealed that there was inability by principals to ensure adequate preparation of professional documents. The study found that the principals' frequency of inspection is inadequate which may have contributed to the dismal KCSE performance. QASO frequency of inspection was also inadequate due to various factors like limited number of personnel, schools in the district being located far apart and poor road network. The study recommended that teachers prepare the requisite professional documents and frequently supervise them. The study addressed overall performance in KCSE and not specifically students' academic performance in chemistry which is done in the current study.

Ndungu, Gathu and Bomett (2015) investigated the influence of monitoring and evaluation on effective teaching and learning in secondary schools in Githunguri district. They found out that there was no assessment of teachers teaching in classrooms, teachers' preparation of lesson plans and a scheme of work is not ensured in the majority of secondary schools in Githunguri District. The study indicated that teachers who prepared lesson plans were more effective than those who did not. The study recommends that it is mandatory for teachers to prepare lesson plans and schemes of work and the principal should ensure that these professional documents are prepared and used for effective teaching and learning process. The current study will investigate

instructional supervision skills of principals in relation to managing teachers professional records as part of their responsibilities aimed at ensuring performance improvement in public secondary schools.

Mburu (2017) studied influence of head teachers' instructional supervision practices on pupils' performance in the Kenyan Certificate of Primary Education (KCPE) examination in Murang'a South-Sub County, Kenya. Among the conclusions of the study was that preparation of professional document influences the quality of education and schools where teachers prepare professional documents post good performance in national exam that those that do not perform poorly in national examinations. The study dealt with primary schools and not secondary schools which is covered in the current study.

Omogi's (2019) study on influence of head teachers' instructional supervision practices on pupils' performance at KCPE in Mbita Sub-County, Kenya revealed that head teachers fail to regularly check the teachers schemes of work, record of work, lesson plans and lesson notes, and this impacts pupils academic performance. The study findings also reveal that there was poor relationship between teachers and head teachers due to the negative attitude by teachers towards instructional supervision. The study recommends head teachers to delegate more duties to their deputies and HOD so as to have adequate time to supervise lesson plans, lesson notes and records of work. The current study sought to reveal whether principals allocate adequate time for management of teachers of chemistry professional records.

Wabuko (2016) investigated influence of head teachers' instructional supervision practices on teachers' job performance in public primary schools in Lang'ata Sub-County, Nairobi, Kenya. The study findings revealed that head teachers who consistently checked teachers' professional records had an opportunity to have a foresight of teachers' delivery and it significantly influences both teachers and pupils' performance in public primary schools. The study recommends that the Ministry of Education (MOE) should emphasize on regular monitoring of teachers professional records by head teachers. The current study seeks to highlight the influence of frequently monitoring teachers' professional records on academic performance of students in public secondary schools.

Lokupo, Areba, and Asitiba (2020) examined principals' influence on supervision strategies on teachers' use of professional records for effective curriculum implementation in public secondary schools in West Pokot County, Kenya. The findings clearly show that supervision of teachers' use of professional records influence effective curriculum implementation. Majority of the respondents agreed that principals are not keen in supervising teachers' professional records. The study also established that in most schools, professional records were not well updated and most teachers neglected preparing and using the records in curriculum implementation. The study recommends up to date professional records and principals to be in touch with all the curriculum implementation guidelines and adequately supervise them to the fullest. The current study sought to find out how the principals check teachers professional records and their view point on how it influences students' academic performance in chemistry.

Wairimu (2017) studied teachers' perception on endorsing of professional records in primary schools in Nakuru North District, Kenya. Results from the study established that majority of the head teachers endorsed and helped the teachers to prepare professional documents and then they endorse them. Most of the teachers agreed that preparation of professional documents helped them improve their teaching and pupils' learning capabilities. The study suggested that studies on perceptions of teachers on instructional supervision should be undertaken in other parts of the country. This is covered in the current study which has targeted Machakos County.

2.5 Influence of Principals' Monitoring of Students' Academic Progress

Mulwa (2008) describes monitoring as a routine process of collecting and managing project data that gives feedback as pertains to the progress of the project. Monitoring is therefore an activity that involves continuous and systematic checking and observing of programmes or projects. Monitoring and evaluation is done in the education sector to monitor programmes like quality of education. The principal is responsible for monitoring and evaluation at the school level to ensure effective teaching and learning is going on (Willms, 2000). According to Lezotte (2010), monitoring of teaching and learning entails close examination of both learner academic results as well as the effectiveness of classroom procedures.

Progress monitoring is a practice that assists teachers in using students' data to continually assess the effectiveness of their teaching by determining if students are benefiting from the teaching, as well as determining if teachers are making informed decisions about instructions (Harper-Young and Harper-Young, 2018). Monitoring of learning is conducted through assessment of test scores and projects developed by

students. Monitoring of teaching is through self-reflection of teachers themselves and their supervisors through teacher evaluation. Assessment results of test scores are used in planning of individual learner instruction as well as in informing decision making and planning for the entire school. According to Mathew and Poehner, (2014) secondary boards should acknowledge the need to carry out continuous assessments that feed back into teaching. Data realized from school and classroom practices in monitoring is used to modify the teaching of the teachers so as improve student performance.

Monitoring of students' progress by the principal reflects the work which has been evaluated by the teachers in the class. Sattar (2017) investigated the importance of the classroom monitoring on students' performance in Bangladeshi. Findings showed that majority of the teachers believed that monitoring as a strategy can help to make the lesson easy. The teachers acknowledged that the schools should provide training programmes for classroom monitoring which will help them to enhance learning. Motivation as monitoring tools was identified as effective in encouraging students to learn, keep them focused, overcome their faults and assist them to point out their mistakes through observing their errors. Poor performing students who were monitored closely by the principals and teachers develop a strong sense of belonging in the classroom as their participation skills improve. To conduct the survey, 12 teachers and 30 students were randomly chosen and this was a small number of participants. The current study sampled 73 principals and 109 teachers of chemistry who provided useful insights on the influence of monitoring students' academic progress.

Nunes et al. (2018) sought to identify importance of student monitoring in academic learning in Brazil. The findings show that in the years prior to the start of the monitoring Pharmacology subject had high levels of failure. However there is significant change first year after the monitoring of the subject. The study observed the reduction in the percentage of failure in the subject as compared to the previous year, when there was no monitoring activity. One student, who had failed the subject for five consecutive years was identified and given special attention and approach. The study findings reveals that the student was motivated and achieved the approval he so longed for. The current study addressed perception of the principals and chemistry teachers towards monitoring of students' academic performance which is missing in this study.

Moyosore (2015) conducted a study on the effect of formative assessment on students' achievement in secondary school mathematics in Seyin Local Government of Oyo State, Nigeria. Findings revealed that formative assessment has a strong significant difference in the mean achievement score of Mathematics students that are exposed to it. This is because the teacher is able to give necessary correctives measure to improve the understanding of students on the contents of the subject in order to improve their academic performance. The study recommended that all school heads should emphasize the use of formative assessment by all teachers and they should allow, encourage and provide motivations for them to attend seminars, workshops, conference and in-services training to acquire necessary skills to constructing formative tests. The study only concentrated on mathematics subject and not chemistry subject which is covered in the current study.

Kwasi (2021) carried out a study on impact of school monitoring on the academic performance of pupils in public junior high schools in the Akuapem North Municipality of Ghana. The findings of the study show that monitoring student's academic progress had a strong correlation with their academic performance. However, the study discovered that as a result of lack of regular assessment, teachers are unable to provide students with consistent and timely feedback on their performance. In highly effective schools, teachers administer frequent test, hence the current study seeks not only to reveal the frequency of tests but other forms of monitoring students' academic progress like class work and students attendance.

Mugabe, Ogina, Adeyemo, and Mampane (2018) examined how the school administration monitored content delivery in public primary schools in Uganda. Findings showed that that school heads were monitoring the activities of teachers and students to ensure that primary schools record better academic performance. The study recommended the government through the ministry of education to come up with a monitoring framework of uniform design and that is user-friendly indicating clearly what to monitor, how to monitor, the performance indicators, how data should be collected, analyzed and reported and how to utilize the monitoring reports. The current study conducted aimed at trying to find out how principals understand and exercise their mandate in undertaking their ascribed roles of monitoring students' academic progress.

Kipkorir (2015) examined classroom assessment practices used by mathematics teachers in secondary schools teachers in Nandi Central Sub-County. The findings constituted of discourse, observation, students 'self-assessment and peer assessment

were the common classroom assessment practices reported. Assessment information was mainly used to give students grades or marks, diagnose students' learning problems and to assign them to different programs or tasks. The findings indicate that it is important for teachers to acquire knowledge in using a variety of assessment options such as self assessment, observation, and portfolio. In this study, there was no evidence of how math teachers' frequently use the recommended classroom assessment practices and how it influences student performance. This was done in the current study.

Etshiano and Okello (2020) sought to establish effect of continuous monitoring on students achievement in Migori Sub-County. The study established that continuous assessment results to improved performance in mathematics. Majority of the respondents pointed out that, since Mathematics is a practice subject the more one does it the better they are likely to perform. The findings of the study established that frequent assessment reduces anxiety leading to high achievement in KCSE. The current study will address chemistry subject missing in the above study. Due to financial constraints, the study used closed ended questionnaires. The current study used both questionnaire and interview schedule to collect data.

The study by Samoei (2014) explored instructional supervisory role of principals and its influence on students' academic achievement in public secondary schools in Nandi north district Nandi County Kenya. The study findings indicated that monitoring of students' academic performance by the principals was very effective on influencing students' academic achievement. The study revealed that testing policy in schools boost students' academic achievement whereby students are tested regularly and their scores discussed with them. Hence, the frequent interaction between the teachers and the

learners results in students' improved academic achievements. The correlation between principals' instructional supervision and students' academic achievement in chemistry was observed in the current study.

Muiruri, (2019) studied the influence of school management practices on students' performance in Kenya Certificate of Secondary Education examination in Kirinyaga County, Kenya. The study respondents agreed that monitoring influenced the academic performance of students in the county. This study established that regular internal assessments in the school and discussions of the overall school performance were the main practices associated with monitoring in the schools. The current study addressed other aspects of monitoring students' academic progress that are missing in this study.

2.6 Influence of Principals' Classroom Visitations

Glickman, Gordon and Ross-Gordon (2013), describes classroom visit as a collegial and integrative meeting between supervisors and teachers with the sole aim of improving instructions. Glickman et al. (2010) further notes that classroom visits provide principals and teachers with opportunity to come into face-to-face contact in actual teaching-learning situations. Olembo, Wanga and Karagu (1992) asserted that supervision concerns strategies of effective and good administration of personnel and their aspects of administration that are in line with the goal of the administration. Kimeu (2010) asserted that head teachers should be involved in the teaching process by being present in classes more often which encourages assessing of teachers and later plan meetings to discuss matters of supervision. Class visitations help the principals to have a first-hand information of what takes place in the classroom, enabling them to monitor, support and advice on learning and teaching.

Alimi and Akinfolarin (2012) asserted that teaching is efficient if a teacher has the potential to gain the outlined aims. The head teachers should assess whether the teacher utilizes teaching techniques which helps him/her to attain the planned lessons purpose. When classroom observation is done and its feedback given, it becomes integral in improving teaching and learning, hence improved performance. Many teachers express their anxiety and worry when observation it comes to its application. This is due to the differences depending on the context it is carried and most teachers are unaccustomed to being observed and mentioning of checking of schemes, lesson plans, student notes, observation and visitation provokes their uneasiness, nervousness, and tension amongst both in-service and pre-service teachers in the pretext that their professional competence is going to be questioned or judged (Malunda et al, 2016). According to Ngunjiri (2012), classroom visit aims to encourage teachers to be keen on their work and in the course of supervision teachers are motivated to develop problem solving skills.

Harbison and Hanushek (2018) conducted a study on Educational performance of poor in the rural North East Brazil. Secondary data collected for a period of seven years was used for the study. Findings showed that there was a significant relationship between classroom visitation by the principals and secondary schools students' academic performance. Noguera (2018) examined the role of classroom observation in pre-service English teachers' understanding of the teaching profession in Spain. Findings showed that an extended classroom observation encounter allowed the student teachers' beliefs to evolve and their identities as English teachers to develop. Classroom management and motivation were also key skills learned from the observations, and regarded as

relevant in leading pupils to engage with the lesson. The current study covered both pre-observation and post observation which is missing in this study.

Usman and Talat (2018) investigated the relationship between supervision practices and teachers' and students' academic performance in Lahore, Pakistan. The study revealed that there is a significant effect of classroom visitation by the school principals on students' academic performance. This research was confined to the classroom visitation practices of primary school principals in Lahore, Pakistan. The current study highlighted the impact of classroom visitation by principals in public secondary schools in Machakos County, opening new horizons of knowledge in this domain of knowledge.

Barrogo (2020) explored teachers' perception of standardized classroom observation tool in the City of Meycauayan. The study findings show that during the post conferences, teachers can freely express their opinions and in this way, the school heads could understand more the experiences of the teacher inside the classroom. Most of the teachers indicated that the feedback that they received during post conferences was enough for them to reflect their classroom teaching techniques and strategies. The findings further reveal that majority of the teachers agreed that classroom observation led them to the improvement of teaching and learning. The study recommends school head to be trained on how to effectively administer the best supervisory observations and advice. The current study highlighted ways in which principals carry out classroom visitation as this is a key determinant to the success of teaching and learning of chemistry.

Ngemunang and Lyonga (2018) studied influence of instructional supervision on teachers' performances in Primary Schools in Konye Sub-Division in Cameroon. The

study findings reveals that classroom visits by head teachers, enables monitoring of classroom activities such as; checking class records, guides teaching and enables intervention which can positively influence teachers work performances. The study concluded that head teachers' instructional supervision practices impacts teachers' performances positively through classroom visits. The study only covered classroom visits and checking of professional records. The current study covered additional instructional supervision practices which impacts students' academic performance in chemistry.

Garba, Waweru and Kaugi (2019) did a study on the principals' classroom visitation and its influence on teachers' pedagogical practices in public secondary schools at Bauchi State, Nigeria. The findings from the study show that the majority of the principals and teachers agree that principals do not hold a conference with them to make arrangements before observing their lessons. Failure to hold pre-observation conferences with their teachers is likely cause of teachers developing a negative attitude toward principals' supervision and also their performance may be affected. Further findings from this study reveals that on the actual lesson observation the principals do not record notes during lesson observation and they do not provide teachers with feedback on supervision conducted. The study recommends that the Ministry of Education Bauchi had to develop a comprehensive programme for in-service training and retraining for principals on classroom visitation techniques. The current study addressed pre-observation and post-observation conference as principals should endeavor to provide chemistry teachers with the feedback of class observation as it identifies areas that need improvement.

Agusiobo and Okonkwo (2018) examined the influence of classroom supervision on teachers' effectiveness in secondary schools in Enugu State. The result obtained showed that classroom supervision is very important and the supervisors have to increase the frequency of classroom observations. The findings suggest that classroom supervision not only improves the capacity of teachers, but also deals with the perennial poor academic performances of students in secondary schools. The current study sought the views from the respondents on the influence of classroom observation on students' academic performance in chemistry subject.

Yosief, Okemasisi and Mesmer (2022) study sought to explore the extent to which head-teachers' classroom visitation influences students' performance in Keren Sub-zone public junior schools. The findings of the study show that head-teachers carry out classroom visitation and this is why performance in these schools was better compared to low-performing schools where there is very low classroom visitation. This indicates that poor instructional supervision influences students' academic performance because teachers and students lack proper guidance and support from their leader. The study recommends the head-teachers to improve their classroom visitation because conducting instructional supervision by only managing professional documents without observing how teachers teach in the classrooms did not assist teachers in improving their teaching methods and students' performance. The current study investigated the frequency at which principals carry out classroom and laboratory visitations in public secondary schools in Kenya during chemistry lessons.

Ngunjiri (2012) conducted a study on influence of head teachers' instructional supervision strategies on pupils' performance in Rumuruti Division, Kenya. The results

of the study showed; frequency of head teacher's classroom visitation influenced pupil performance, head teacher's visitation when the teacher is teaching significantly influenced pupil performance and there was a significant effect on performance due to the frequency of head teacher's checking of teachers' records of work. The study recommended a similar study to be replicated on the processes and challenges of checking of teachers and students record books from a wider study population to validate the findings. The current study aims to determine the influence of classroom visitation, checking teachers' records, monitoring students' academic progress and influence of teachers' professional development.

Ondieki and Orodho (2015) study on school-based factors influencing the performance of pupils in public primary schools in Ekerenyo Division, Nyamira County, Kenya. Findings revealed that classroom observation of lessons is a valuable means to obtain actual information and experience of the classroom atmosphere. During lesson observation sessions in both lower and upper classes, the study identified three teaching and learning strategies used in delivery of content, that is, explanation, question and answer and description. The current study seeks to establish if the principals discuss with the chemistry teachers after classroom visitation on how to improve the instructional practices which is missing in this study.

Kuviyo, Nduku and Kanga (2022) sought to study relationship between principals' instructional supervision practices and effective teaching and learning process in public secondary schools in Kajiado North sub-county, Kenya. The study revealed that principals in the study make efforts to observe classrooms activities though not frequently. Classroom visitation is very crucial as it helps the principals in identifying

some of the classroom activities affecting teaching and learning process. The study recommended that the ministry of education sets up a leadership institute that is responsible for training principals on instructional supervision practices and put up a standardized measure of effective instructional supervision. The study instructed the principals to carry out regular classroom visits and make effort to discuss results of supervision with the teachers concerned with the aim of improving their instructional practices. The current study established how regularly principals visits classroom and their view on how visitation impacts academic performance in chemistry.

Muasa, Ogola, and Nzioki (2021) examined the influence of principal class visitations practices on students' academic performance in KCSE in Public Secondary schools in Mashuru Sub-County. The findings of these studies established that the principal's class visitation was below par and this had negative effect on students' academic performance. The study recommends TSC to appoint and deploy principals who are trained in instructional supervision as they are informed on the importance of classroom visitation and the role it plays in improving students' academic performance. The current study established the frequency of classroom visitations by principals in Machakos County during chemistry lessons.

Aloo (2018) explored the influence of principals' supervision practices on students' performance in KCSE in Kisumu central sub-county, Kenya. The study findings indicate that majority of the respondents preferred daily class room visitation as it can boost school's performance in KCSE. The study recommends that principals should enhance classroom visitation as instructional supervisory tool for the realization of their

mandates. The current study investigated pre-observation, observation and post-observation which is missing in this study.

Kamotho, Adhiambo and Mailu (2019) carried out an investigation on principal's classroom observation its impact on teachers' job performance in Kangundo Sub-County, Machakos County, Kenya. The findings from the study indicate that the principal did not make regular visit to classroom to observe teaching and learning. The study findings also revealed that after classroom observation principals did not discuss results in view of improving the instructional practices. The study recommends that the principals should carry out regular classroom visits to ensure chemistry teacher's content delivery is in line with the recommended syllabus. Principal should also carry out post-observation conference with the chemistry teachers concerned to improve their instructional practices. The current study covered Machakos County which is not addressed in this study.

2.7 Influence of Teachers' Professional Development

Teacher professional development includes all the activities in which teachers engage during the course of a career which are designed to enhance their work. Teacher professional development results to improved education quality and student's achievement (Whitworth and Chiu, 2015). Principals who practice instructional leadership are characterized by participating in professional development that is designed to strengthen performance outcomes (King, 2002). The policy framework on teacher continuing professional development in Kenya emphases on effective teacher development and gives a guideline on the aspect of capacity building of teachers. Enhanced professional development of the workforce in education, training and

research is a policy that the government has adopted in order to strengthen human resource in the education sector (RoK, 2019). According to Sessional Paper No. 1 of 2005 on Education, education and training in Kenya must incorporate the importance of learning through ones' lifetime as being essential to effective social and economic development (RoK, 2019).

Osamwonyi, (2016) recommends that professional development should include seminars, workshops, conferences, exhibitions and processes that improve teachers and professional development in institutions from initial employment stage to retirement. Therefore, it becomes important that every attention be devoted to teacher in-service (retraining) education to promote professional development and growth. This view emphasizes importance of teacher retraining as an indicator for professional development in learning institutions. According to Muthaura (2010), teachers need to be trained in order to have the ability to facilitate learning effectively to help learners deduce their future skills for learning. The teacher development programmes should enable them to be culturally competent, talented, innovative, creative problem-solvers, skilled and critical thinkers. Training institutions need to understand that teachers whose competency levels are low will have difficulty in harnessing learners' competency and skills needed for survival which may finally result into low academic performance level.

Prasertcharoensuk, Somprach and Ngang (2015) investigated the influence of teacher competency on students' academic achievement in Malaysia. Findings established that teacher competency has significant effect on students' learning achievement. Students learning achievement was high in schools where teachers had attained higher levels of

curriculum and knowledge management. Self-development can be achieved through attending training, seminar or workshop as significant effect on students' learning achievement. The study recommended for a budget to be set aside for staff - development program and networking with other school teachers for the purposes of sharing knowledge and self-development. The current study will seek to unravel the strategies and measures that principals have put in place to ensure that there is teacher development in their respective schools.

Istiqomah, Suyatno and Maryani (2019) assessed the effect of teacher competencies on student learning outcomes at Muhammadiyah Bambanglipuro Vocational High School, Indonesia. The findings of this research recommend the importance of teacher competencies development programs, both by the government and schools, because increasing teacher competencies will increase the student learning achievement. Teacher competencies have a positive and significant impact on student learning outcomes and they must be used to improve teacher professionalism and considered when formulating policies and programs for teacher professional development. The current study sought to get more in-depth information on teacher competency aspect and how the principal and teachers perceive it.

Tantawy (2020) conducted a study investigating teachers' perceptions of the influence of professional development on teachers' performance and career progression in Dubai. The participants in this study cite a number of professional and personal qualities they have gained as a result of professional development among which are a sense of self-efficacy, motivation, classroom management skills, developed content knowledge, confidence, and enhanced teaching methodologies. This study had only three participant

who are not representative of the target population. The current study selected participants using scientific methods to ensure that study findings can be generalized to the target population.

Kweku and Baffoe (2018) studied influence of head teachers' instructional supervisory practices on teacher motivation in public primary schools in Mfantseman Municipality Ghana. The study established that teachers in public primary schools were highly motivated. It was established that the teachers had a very high motivation in relation to opportunities for professional growth. The study recommended establishment of in-service training programmes for the head teachers to equip them with the appropriate knowledge and skills to effectively practice the instructional supervisory duties that are most likely to increase teacher motivation. This study was conducted in primary schools unlike the current study which was conducted in public secondary schools where the principals and teachers will be sampled.

Akpem, Tetteh and Adom (2021) carried out a study on the influence of teacher professional development on teaching and learning in public technical institutes in the Upper West Region, Ghana. The study findings show teachers' are able to access teacher professional development programmes ranging from in-service training workshops, educational seminars/conferences, coaching or mentoring to peer networks. The study established that there is a significant positive relationship between teachers' participation in professional development and teaching and learning leading to improved students' academic performance. The study investigated teachers' professional development in public technical institutes and not public secondary schools which is covered in this study.

Aina and Olanipekun (2015) studied influence of teachers' credentials on students' academic achievement in Nigeria. Findings established that subject matter knowledge, academic qualification, professional development and teaching experience are crucial and significantly related with students' academic achievement. Fostering teacher's continuous professional development is imperative and positively correlated with students' academic achievement. The study identifies a qualified teacher as crucial in any educational system and recommends every teacher to be academically and professionally qualified. The current study sought to establish if there is continuous teachers' professional development in secondary schools and reveal how principals ensure science teachers keep up with the current trends in education.

Yvette and Smith (2015) studied mentoring in teachers' professional development in South Africa. The findings revealed that a formal mentorship program was not part of the professional development strategy which had an effect on teachers' and students' performance. Mentorship program is essential for teachers' professional development as the mentor identifies the areas where both the teachers and the learners needed more support. The current study tackled the role of the principal as a mentor and establish if they offer school-based mentorship programs that are contextualized to the teachers of chemistry as well as the learners.

Switbert (2013) examined effects of teacher's professional development on students' performance in Secondary schools in Dar es Salaam, Tanzania. Findings established that implementation of teachers' training and development programs affect students' performance in Tanzania. Findings also established that the teachers training and development policies were not implemented or not available at all in majority of the

schools studied. The study recommended all stakeholders to invest and enforce training of teachers which will have positive results in the academic performance of learners. The overall goal is quality education for their development and the society at large. The study is relevant to the current study as it deals with teacher professional development and its influence on students' academic performance.

Mduma and Mkulu (2021) did a study on the influence of teachers' professional development practices on job performance in public secondary schools in Nyamagana District, Mwanza, Tanzania. The findings indicate that most of the teachers had undergone in-service training in their respective public secondary school in Mwanza as a part of development practice that impacted teachers' job performance. Findings from the study show that majority of teachers acknowledged that in-service training equipped them with knowledge and skills that influenced their job performance. The study recommended Ministry of Education, Science and Technology to set up a budget for in-service trainings, workshops and seminars for teachers. Additionally principals should disseminate timely information regarding national, regional and local in-service training for the teachers as well as make sure that teachers attend such important programs. The current study investigated the availability of funds to facilitate teachers' professional development and whether teachers of chemistry are urged or encouraged to attend relevant workshops and seminars.

Kariuki (2019) assessed effect of teacher professional development on students' academic achievement in Kirinyaga County, Kenya. The major form of in service training was workshops. The teachers participated in collaborative activities like sharing and assisting each other, lesson observation and team teaching. These collaborative

activities had a statistically significant effect on KCPE achievement. The study also established that head teachers supported teacher professional development by providing information, teaching/learning resources and releasing teachers. The study findings indicate that public primary school teachers viewed professional development as important in helping improve subject mean score. The current study explored the views of their counterparts in public secondary schools teachers on how they relate subject's mean score improvement to participation in professional development activities.

Watene, Choge and Kodak (2020) conducted a study on influence of teachers' professional development on performance in Kenya Certificate of Secondary Education in public secondary schools in Nyandarua County, Kenya. This study found out that there exists an association between students' academic achievements and teachers' professional development. The study concludes that school principals should embrace different ways of improving teachers' professional development as this is critical in improving students' academic achievement. The study recommends principals to promote their chemistry teacher's professional development by sponsoring attendance of professional development seminars and provide continuous in-house professional development activities, by inviting professional speakers. The current study addressed the role played by principals in relation to professional development of their teachers of chemistry.

Simiyu (2021) sought to investigate teacher-led professional development and its influence on English language teachers' classroom practices in Bungoma County, Kenya. The study findings show that English teachers used different strategies to chart the path to their own professional development. Principals encouraged teacher-led

professional development by allowing their schools to be research sites, allowing the study participants to engage in experiment lessons, selecting and allowing teachers to participate in the program and to use school resources. The findings from the study ascertained that teacher-led professional development enhanced the classroom practices of English teachers in significant ways: first, it encouraged collaboration in planning and teaching; secondly, it provided a way to study how students learn or don't learn; Thirdly, collaboration improved subject matter knowledge through observing a colleague in the classroom; Fourthly, by collaborating with a colleague, teachers were able to increase their reserve of teaching strategies enhancing learners' experiences in the lessons. These findings show that a teacher who engages in leading improvement in their practice is likely to go beyond improvement in classroom practice. The study recommended that policies for the institutionalization of professional development be put in place and practicing teachers be equipped to chart their own path of improvement in classroom practice. The current study addressed the strategies adopted by principals in Machakos County in implementing teachers of chemistry development programs in the school for enhanced learners' experience.

2.8 Summary and Knowledge Gap

The reviewed studies provided a careful examination of related literature on principals' instructional supervision notably managing chemistry teachers' professional records, monitoring students' academic progress, classroom visitations and influence of teachers of chemistry professional development. Numerous studies reviewed indicate that instructional supervision is related to students' academic performance. However, the reviewed literature has revealed pertinent knowledge gaps that have formed the focus of the present study. The reviewed studies have covered variables that are related to

principal's instructional supervision but there is limited study that included the students' academic achievement in chemistry subject. The fact that none of the studies sampled principals and teachers of chemistry from Machakos County, a gap was created for this study. The current study used two different sets of respondents, namely principals and teachers of chemistry in the county in order to reduce biases in the study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section outlines how the study was conducted. It covers: research design; location of the study; the target population; sample size and sampling techniques research instruments; pilot study; instrument validity and instrument reliability; data collection and data analysis techniques; and ethical and logistical issues.

3.2 Research Design

In order to answer the research questions, a Convergent Parallel Mixed Methods Research Design was employed. According to Creswell and Creswell (2017), in a Convergent Parallel Mixed Methods Research Design, quantitative and qualitative data collections occur at the same time and are then compared after the completion of the study. The purpose of convergent parallel design mixed methods is to provide a comprehensive analysis of the research problem by converges or mergers of quantitative and qualitative data and try to look for relationship or contradiction between the two sources of data (Razali et al., 2019).

Convergent Parallel Mixed Method design is preferred to the other mixed method designs for its suitability and strengths in collecting, analyzing and integrating quantitative and qualitative research simultaneously in a single study as advanced by Creswell (2014). In addition, convergent parallel mixed methods design enable the combination of both quantitative and qualitative research in order to provide a better understanding of a research problem as compared to using one research approach . Figure 3.1 presents a summary on how the design was applied in this study.

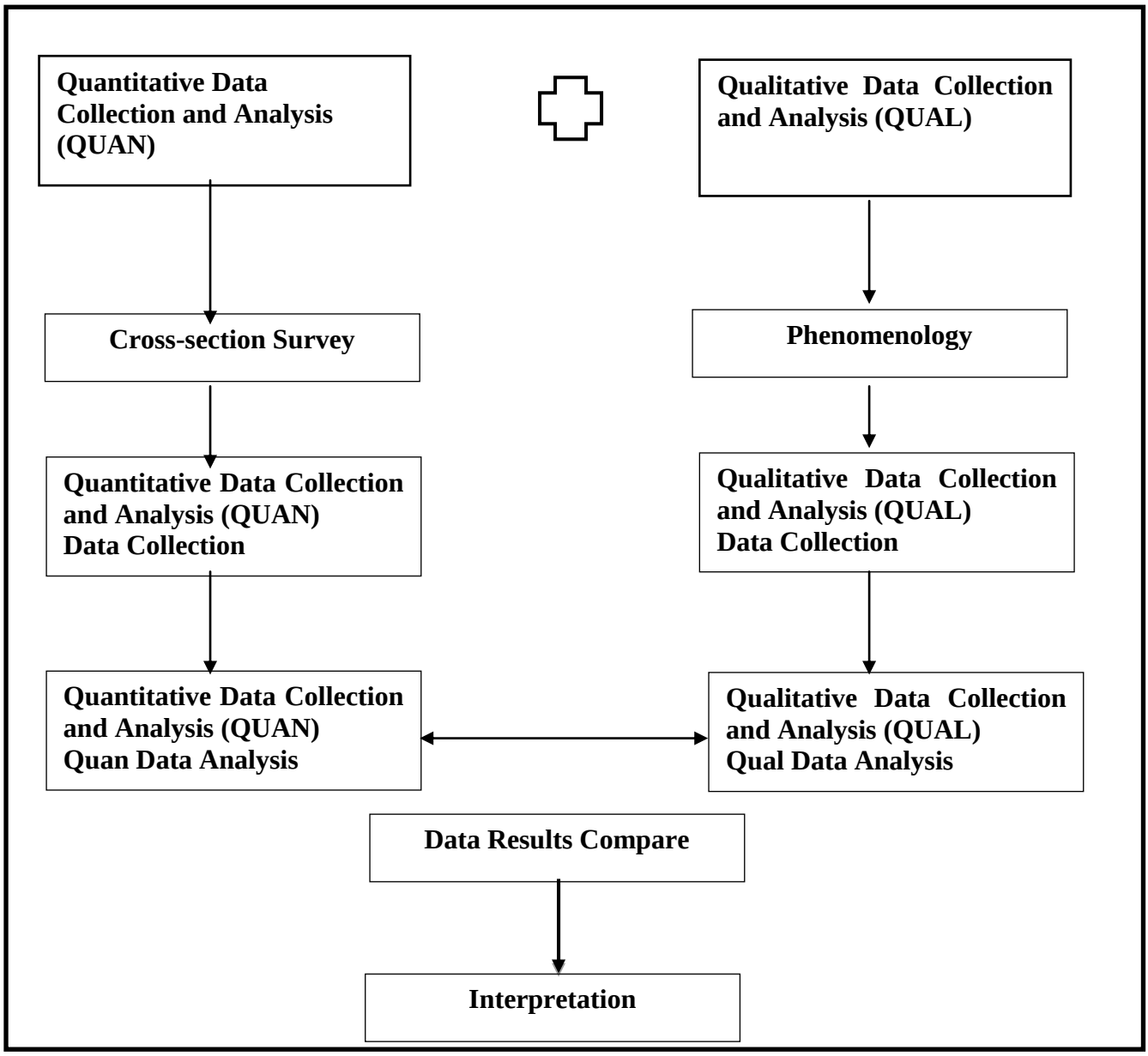


Figure 3.1: Convergent Parallel Mixed Method Design

According to Demir and Pismek (2018), a researcher using this design aims to triangulate the methods by directly comparing the quantitative statistical results and qualitative findings for the purpose of corroboration and validation. Therefore, in the research process, two datasets were obtained, analyzed separately, compared and interpreted. The research process in this study is given in Figure 3.1. Under this

Convergent Parallel Strategy (QUANT+QUAL), quantitative approach, a cross-sectional survey strategy was used to collect data that described, explored and helped the researcher to understand the issue at hand. According to Mills and Gay (2016) a cross-sectional survey is the one in which data is collected from selected individuals and is effective in providing a snapshot of the current behaviors, attitudes and beliefs in a population. Adaptable statistical data analysis methods such as frequencies, percentages among others were used (Irwin and Stafford, 2016).

Phenomenological research can broaden our understanding of the complex phenomena involved in learning, behaviour, and communication (Neubauer, Witkop and Varpio, 2019). Phenomenological strategy is a qualitative approach which was used to explore the meaning of individual perspectives of principals' instruction supervision and performance in the sciences. In-depth interviews were conducted to establish principals' perspectives on influence of their instruction supervision on students' performance in chemistry. Phenomenology design is preferred because of its approach to describe the essence of a phenomenon by exploring it from the perspective of those who have experienced it (Teherani, et al., 2015). The research approach provides evidence for a conclusion through convergence and corroboration of the findings, and can result in well-validated and substantiated findings.

3.3 Location of the Study

The study was carried out in Machakos County. The County has an approximate population of 1,421,932 with a population density of 235 persons per km^2 (KNBS, 2019). The County borders Nairobi and Kiambu counties to the West, Embu to the North, Kitui to the East, Makueni to the South, Kajiado to the South-West, and

Murang`a and Kirinyaga to the North West. The County covers an area of 6042.7 Km^2 stretching from latitude 1°16'1.23"S and longitudes 37°19'12.64"E (MCIDP, 2015). The academic performance trends of Machakos County for the last five years as shown in Table 1.2 Machakos County KCSE percentage scores in sciences (2016-2020), indicates that the county has been posting scores slightly below the average KCSE percentage scores in chemistry. Therefore, the research intended to establish whether instructional supervisory practices by principals influence students' academic performance in chemistry.

3.4 Target Population

According to Machakos County Director of Education (CDE), there are 365 public secondary schools in the area with a total of 545 teachers of chemistry who are employed by the TSC on permanent and pensionable terms. The study therefore targeted all the 365 principals of the public secondary schools and the 545 teachers of chemistry.

3.5 Sampling Technique and Sample Size

3.5.1 Sampling Technique

School principals and teachers of chemistry from Machakos County' public secondary schools participated in this study. Sampling approaches including stratified and simple random sampling were employed in the investigation in order to generate a representative sample. Stratified sampling was utilized to sample public secondary schools. Simple random sampling with stratification was considered suitable as it aids in ensuring that the means of the sampled groups are more representative of the overall population (Fraenkel and Wallen, 2010). Simple random sampling is a technique that

gives every subject in a population equal probability of inclusion in the sample (Taherdoost, 2016).

3.5.2 Sample Size

The selection of sampling methods and determination of sample size is an essential factor of any scientific research as there should be a balance between the sample sizes. Larger sample sizes increase the precision of the research, but also relatively small sample sizes are precise as the strength of samples comes from selecting samples accurately, rather than their size (Mooi, Sarstedt and Mooi- Reci, 2018). Kothari and Garg (2019) asserted that the sample size should be large enough to give a confidence interval of desired width. They further state that one approach of determining the size of the sample is using the cost of additional information against the expected value of the additional information. Mugenda and Mugenda (2003) posit that a sample size of 10% to 30% is acceptable. In support, Kothari (2013) opines that a representative sample size should be in the range of 10% to 20% of the target population. Therefore, the study sampled 20% of the 365 principals and 20% of the 545 teachers of chemistry respectively. Hence, 73 principals and 109 teachers of chemistry were sampled for the study using simple random sampling. The total sample size of the study was therefore 182 respondents. Information on population and sample size is presented in Table 3.1.

Table 3.1: Sampling Matrix

Category	Target population	Sampling technique	Actual Sample	Percentage (%)
Principals	365	Simple random sampling	73	20.0
Teachers	545	Simple random sampling	109	20.0
Total	**910**		**182**	

3.6 Research Instruments

The research instruments used included questionnaires, interview guide and document analysis.

3.6.1 Questionnaires

The study used open-ended questions to enable the respondents provide their views without adapting to pre-conceived answers. Closed-ended questions was also used whereby a list of answers were provided from which the respondent selects the one that closely represent their views. This ensured that data was systematically collected and easily analyzed. The researcher therefore designed a questionnaire with both open ended and close ended questions. The research used questionnaire as they enabled her to obtain a large quantity of data inexpensively from a wide range of participants spread extensively in a geographic space. But also questionnaires give enough time to the respondents to think about the questions and to give well thought out answers (Kothari, 2014).

The questionnaire was designed for teachers of chemistry and was divided into six sections. Section A covered the background information of the respondents while Section B covered principals management of professional records and students'

academic performance: Section C covered monitoring of students' academic progress. In addition, Section D covered classroom visitations and students' academic performance. Section E covered teachers' professional development and students' academic performance. Finally, Section F covered school performance.

Structured questions were presented on a Likert scale. The Likert scale, commonly used in business research was used because it allowed participants to respond with degrees of agreement or disagreement (Clark and Watson, 2019). The advantage of closed questions is that it is easier and quicker for respondents to answer. Furthermore, the answers of different respondents are easier to compare code and statistically analyse. There are also fewer irrelevant or confused answers while replication of answers is easier.

3.6.2 Interview Schedule

Oral questions were formulated in advance and administered in a face to face interview between the interviewer and the principals. According to Basit (2010), compared to a questionnaire, a structured interview is more likely to elicit a response to each question. The interview guide was suitable because it made the respondents to open up and give enough information for the current study. The personal interview collected information on background information of the principals, influence of checking teachers' professional records, monitoring students' academic progress, classroom visitations, and influence of teachers' professional development on academic performance in chemistry.

3.6.3 Document Analysis Guide

KCSE results in the sciences for the past six years, teachers' notes and principals' supervisory report books were analysed. The subjects' analysis enabled the researcher to establish principals' instructional supervision practices.

3.7 Data Collection Procedures

Data was collected using three types of tools which are questionnaires, interview schedule and document analysis guide. Three stages were adopted in collecting data.

(i) Pre-field Logistics Phase

This stage ensured that the research instruments, which included questionnaires, interview schedules and document analysis guide were accurate and straightforward. Research permit was obtained from the National Commission of Science, Technology and Innovation (NACOSTI) upon approval of the proposal. The researcher then reported to the County Education Office to get authority to proceed with data collection.

(ii) Fieldwork Logistics Phase

The researcher conducted a pre-visit to the schools to get consent from the principals to collect the data in the schools and also book an appointment on when to conduct the interviews. The data was collected using questionnaires and interview schedules, which was administered to teachers of chemistry and principals respectively in each selected school. Finally, document analysis was conducted on the KCSE results beginning from 2016 to 2021 in the selected schools. Every respondent sampled for the study was allocated adequate time to obtain appropriate answers to the questions.

(iii) Post-field Logistics Phase

In preparation for analysis, the data gathered in the field was organized, labeled, and transcribed at this stage.

3.8 Pilot Study

Piloting the questionnaire helps in clarifying of the questions and instructions and identifies sensitive questions that respondents are reluctant to answer (Arain, Campbell, Cooper and Lancaster, 2010). A pilot research was conducted for reliability and validity of the research instruments in public schools in Makueni County. Three public secondary schools in Makueni County were randomly selected for piloting. The pilot study enabled the researcher to identify errors in the questionnaires and interview schedule. The findings from the pilot study were instrumental in enhancing the reliability of the research instruments.

3.8.1 Validity of Research Instruments

Content validity is the degree to which elements of an assessment instrument are relevant to and representative of the targeted construct for a particular assessment purpose (Yusoff, 2019). Ngeno (2022), defines content validity as the extent to which an instrument represents area or aspect being measured. Content validity was used for this study. Two steps were taken to ensure validity. Firstly, wherever possible, research questions from prior studies were used to improve the validity of the questionnaire and interview schedule. Secondly the instruments were reviewed by the University supervisors to ensure that validity is met. The validity tests were undertaken so as to assess the structure, length, and appropriateness of the questions used.

3.8.2 Reliability of Research Instruments

The reliability of a measuring instrument is the degree of consistency with which it measures whatever it is measuring (Ary, Jacobs, and Sorensen, 2010). According to Beins (2009), if estimation is reliable, rehashed estimations on a similar individual

should bring about comparable results each time. Data collected during pilot test as tested for relevance and consistency of results in order to minimize errors. Cronbach Alpha Coefficient was used because it assesses the internal consistence of the research instrument items. The alpha coefficient ranges in value from zero to one and the closer Cronbach alpha coefficient is to 1 the greater the internal consistency of the items in the scale (Zikmund, Babin, Carr and Griffin, 2013). Cronbach Alpha Coefficient value of 0.7 was used as the cutoff point.

Using SPSS, The Cronbach's alpha test was performed and the findings are shown in Table 3.2

Table 3.2: Reliability Statistics for all Items

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.993	.994	41

The average reliability figures in Table 3.2 reveal that the Cronbach's Alpha Coefficient was 0.994, which is greater than 0.7 which was the threshold set for the study. This indicates a high level of internal consistency.

The interview guides' reliability were determined through dependability. Dependability focuses on finding out whether various researchers using qualitative instruments yield similar results (Creswell, 2014). In this study, the researcher tested whether the same interview guide yield similar information when administered by a different researcher and repeated over a period of time. The researcher using systematic random sampling technique identified and interviewed 109 teachers and after one week ask a trained research assistant to interview the same teachers using the same interview guide. According to Gay, Mills and Airasian (2009), test-retest reliability provides evidence

that scores obtained on a test at one time are the same or close when the same test is re-administered some other time. In this study, the test-retest approach was used to realize the reliability of the questionnaire and the interview schedule. In the test-retest approach, the questionnaire was administered twice to the same group of respondents within a period of two weeks.

3.9 Data Analysis Techniques

After data cleaning, the data was coded. Both descriptive and inferential statistics analyses were generated. Coding of the data was done using SPSS computer programme version 26. Descriptive statistics representing various research items was generated in frequencies, mean, standard deviation and variance and summarized by use of tables and graphs with a statistical discussion of the results given. Responses from the interview guidelines were recorded on tape, then presented in form of narratives. Data from the interviewees was transcribed first, then thematically analysed and emerging patterns highlighted. Inferential statistics included correlation and regression.

3.9.1. Regression Modeling

To draw conclusions on the objectives of the study, statistical models were fitted for the specification function showing the relationship between instruction supervision and students' performance in chemistry. Bivariate regression models were fitted to determine the relationship between each independent variable and students' performance in chemistry. Bivariate models consider the relationship between two variables at a time without considering the combined joint relationships. The study used the following multiple regression models to establish the relationship between instruction supervision and students' performance in chemistry.

$Y = \beta_0 + \beta_1 X_1 + \varepsilon Y = \beta_0 + \beta_1 X_1 + \varepsilon$ ……Equation (1)

$Y = \beta_0 + \beta_2 X_2 + \varepsilon Y = \beta_0 + \beta_2 X_2 + \varepsilon$ ……Equation (2)

$Y = \beta_0 + \beta_3 X_3 + \varepsilon Y = \beta_0 + \beta_3 X_3 + \varepsilon$ ……Equation (3)

$Y = \beta_0 + \beta_4 X_4 + \varepsilon Y = \beta_0 + \beta_4 X_4 + \varepsilon$ ……Equation (4)

To test the combined influence of instruction supervision (management of teachers' professional records, monitoring of students' academic progress, class visitation, assessment of teachers' professional development) on the dependent variables, a multiple regression model was fitted. The model sought to estimate the joint influence of the independent variables on students' perform ……Equation (5) regression model is given by the equation below:

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$

Where: $\beta_1, \beta_2, \beta_3$ and β_4 are the regression coefficients of the predictors in the model.

Y - Students' performance in chemistry

β_0 - The intercept of the equation (Constant term

X_1 - Manage checking teachers of chemistry professional records

X_2 - Monitoring students' academic progress

X_3 - Classroom visitations

X_4 - Professional development

ε - The error term

3.9.2 Multicollinearity

Multicollinearity was tested using Variance Inflation Factors (VIF) values. VIF explains how much amount multicollinearity (correlation between predictors) exists in a regression analysis. Correlation coefficient (r) ranging from 0.10 to 0.29 illustrates

weak correlation, 0.30 to 0.49 is considered medium and whereas 0.50 to 1.0 is considered strong (Wong and Hiew, 2005). According to Kim (2019), if the variance inflation factor and tolerance are greater than 5 to 10 and lower than 0.1 to 0.2, respectively (R2 = 0.8 to 0.9), multicollinearity exists.

3.10 Ethical and Logistical Considerations

Ethical considerations are essential for any research. Such issues include proper conduct of the researcher during the research process, avoidance of plagiarism and fraud, confidentiality and privacy of the information obtained from the respondents, avoidance of physical and psychological harm to the respondents, obtaining voluntary and informed consent from the respondents and dissemination of the findings, these values were strictly adhered to. Prior arrangements were made with the schools to confirm the dates for data collection. An informed consent was also be sought from all the respondents so that the respondents participate voluntarily. The information collected was treated with confidentially and was for the purpose of the study only.

Logistical consideration involved seeking written permission to conduct the research from the relevant authorities. This included research authorization permit from Machakos University Graduate School, the Ministry of higher education, the Commission of University Education, and the respective public secondary schools where the research will done. A Research permit was requested from the National Commission for Science, Technology and Innovation (NACOSTI).

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND DISCUSSION OF THE FINDINGS

4.1 Introduction

The aim of this study was to investigate principals' instructional supervisory practices and establish how it impacts students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. Four objectives guided the study, namely:

i. To evaluate the relationship between the principals' management of teachers' of chemistry professional records and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.
ii. To evaluate the influence of monitoring students' academic progress by the principal on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.
iii. To analyze the influence of classroom visitation by the principal on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.
iv. To investigate the influence of principals' management of teachers' of chemistry professional development on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

This chapter begins with presentation of the return rate of questionnaires and demographic information of the respondents. This is followed by the presentation of the study outcomes and analysis of the findings according to the study objectives.

4.2 Questionnaires Return Rate

A total of 910 participants, including 365 principals and 545 teachers of chemistry from Machakos County were intended to take part in the research. The participants came from 365 public secondary schools in Machakos County. Simple random sampling technique was used to choose 73 (20%) principals and 109 (20%) teachers of chemistry for the study. The principals' interview guide was administered to 73 principals. The questionnaires were administered to 109 teachers of chemistry. This information is presented in Table 4.1.

Table 4.1: Respondents' Questionnaires Return Rate

Respondents	Questionnaires Administered	Questionnaires returned	Return rate
Teachers of chemistry	109	86	79%
Total	**109**	**86**	**79%**

Source: Survey Data (2023)

According to information presented in Table 4.1., questionnaires return rate from the study participants was 79% which is in line with research literature which holds that a return rate of 50% and above is the acceptable response rate. Mills and Gay (2016) , posit that a response rate of above 50% increases the confidence with which you speak about your findings as generalizable to the population from which the sample was developed.

For the interview schedules, the response rate from principals was 100% as presented in Table 4.2.

Table 4.2: Respondents' Interview Schedule Return Rate

Respondents	Number of participants	Number interviewed	Return rate
Principals	73	73	100%
Total	**73**	**73**	**100%**

Source: Survey Data (2023)

Table 4.2 indicates that all principals from the 73 sampled schools participated in the study as the researcher made appointment dates and personally conducted the interviews with the respondents.

4.3 Respondents' Demographic Information

This section will present the personal information of the respondents. This information was extracted from data in the data collection tools.

4.3.1. Highest Academic Qualification

The study sought to determine the highest level of educational attainments of the two respondent groups. A summary of respondents highest academic qualifications are reported in Table 4.3.

Table 4.3: Highest Academic Qualification of Principals and Teachers of Chemistry

Academic Qualification	Principals		Teachers of Chemistry	
	Frequency	Percentage	Frequency	Percentage
PhD	1	1.37%	0	0%
Master's Degree	28	38.36%	8	9.3%
B/Ed Degree	44	60.27%	78	90.7%
Diploma	0	0%	0	0%
Total	**73**	**100%**	**86**	**100%**

Source: Survey Data (2023)

Table 4.3 reveals that majority of public secondary school principals, that is 44 in numbers (60.27%) and teachers of chemistry totaling 78 (90.7%) had a Bachelor of Education degree as their highest level of academic qualification, while 28 (38.36%) principals and eight (9.3%) teachers of chemistry had Master of Education (Med) degrees. Only one (1.37%) of the principals had Doctor of Philosophy (PhD) level of education. Therefore, the results indicate that majority of the respondents for this study had either bachelors or master's degree as the highest level of academic qualification. As stated in TSC circulars that are sent to all TSC County Directors and principals, TSC does not appoint teachers who do not have the required level of professional training (TSC, 2018/2019 Circular No.4/2019). The finding of this study is also in line with TSC policy guidelines on promoting teachers to administrative positions which points out that a teacher must have attained a minimum qualification of a bachelor's degree (TSC, 2015). This clearly shows that the respondents were knowledgeable in the context of the study since they had a strong educational foundation.

4.3.2. Years of Service as Principals and Teachers of Chemistry

To establish the experience the respondents had in discharging their respective responsibilities, the study sought to establish the years of service the respondents had in their current positions. The results are illustrated in Figure 4.1.

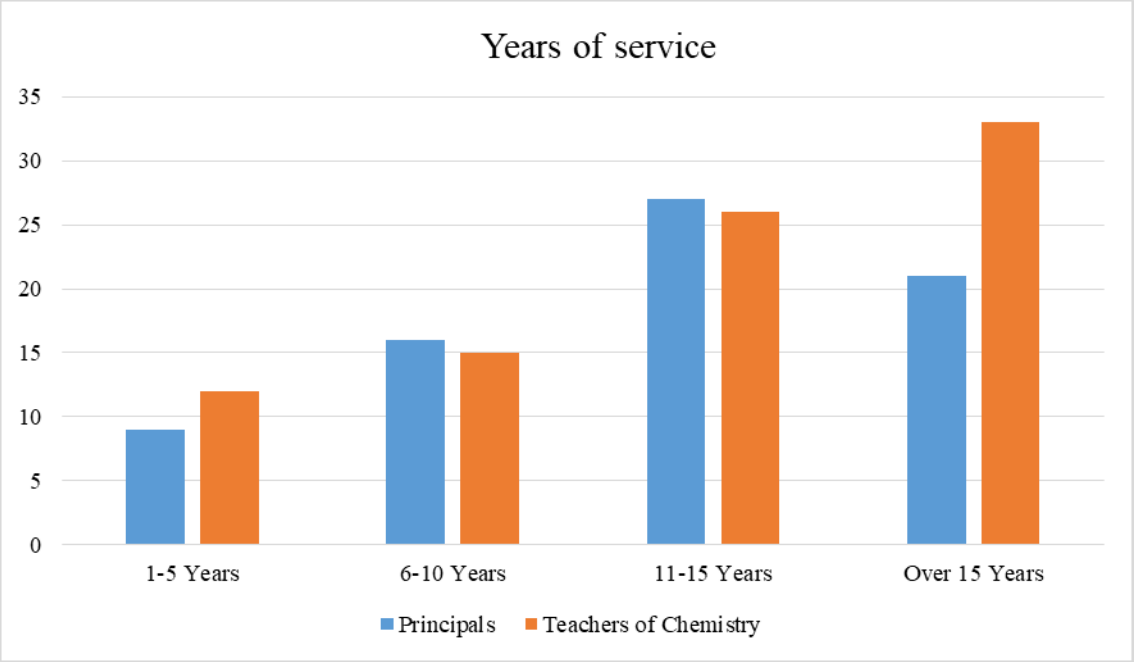


Figure 4.1 Principals and Teachers of Chemistry Years of Service

Source: Survey Data (2023)

From Figure 4.1, it is clear that majority of the respondents, that is 27 (36.99%) of the principals had served as principals for between 11 and 15 years: 21 (28.77%) had over 15 years; 16 (21.92%) had between 6 and 10 years; and nine (12.33%) had between 1 and 5 years respectively. On the other hand, the majority of the teachers of chemistry, that is 33 (38.37%) had teaching experience in public secondary schools of over 15 years; 26 (30.23%) had between 11 and 15 years; 15 (17.44%) had between 6 and 10 years; while 12 (13.95%) had between 1 and 5 years respectively.

According to Glickman, Gordon and Ross-Gordon (2010), principals need to have prerequisite of conceptual and interrelation skills in order to guide the teachers in their schemes of work, record of work and lesson plans. Therefore, a principal who has many years of working experience would be able to acquire superior knowledge, skills and attitudes that would enable them to discharge their instructional supervision roles in

an effective manner. The findings of the present study is consistent with Zachariah's (2022) study that revealed that majority of the principals had a significant amount of professional experience and were likely to have adopted appropriate instruction supervision strategies. The findings also imply that over the years, teachers of chemistry had adequately been exposed to instructional supervision practices long enough to enable them to appreciate its contribution to teaching and learning process.

4.3.3 Trainings Attended by Teachers of Chemistry

The study sought to determine whether teachers of chemistry attend seminars, workshops, in-house training or any other training. The findings are outlined in Figure 4.2

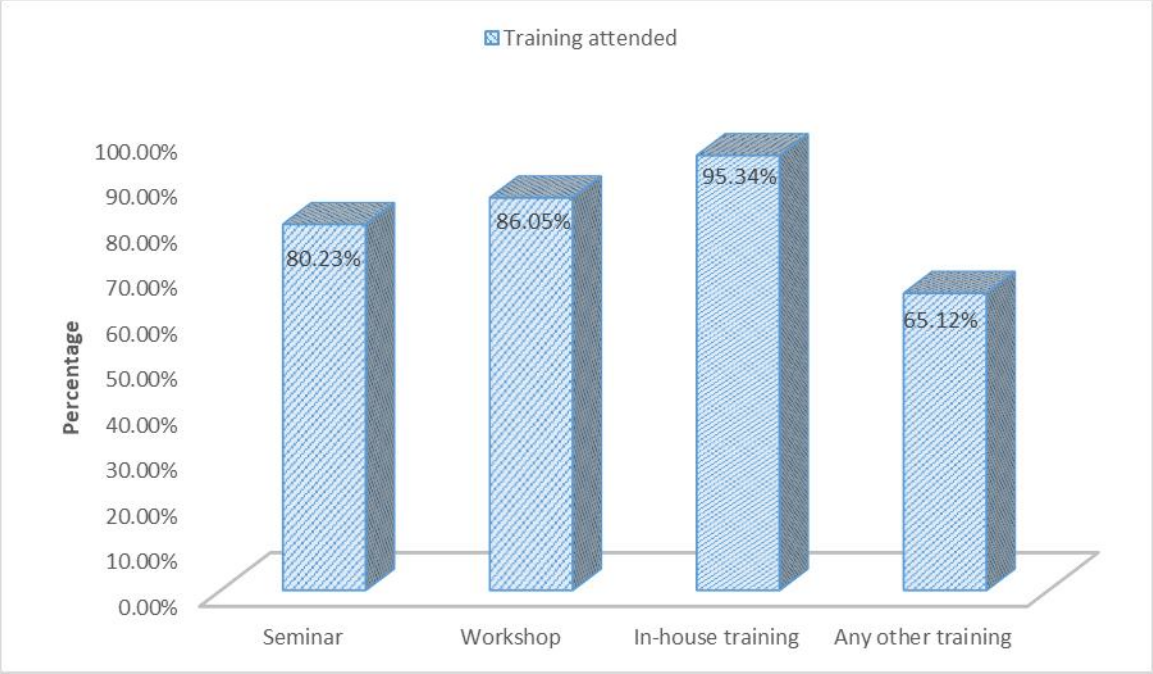


Figure 4.2 Trainings Attended by Teachers of Chemistry (N=86)

Source: Survey Data (2023)

The findings show that majority of the respondents had undergone some form of training during their period of service. From Figure 4.2, majority, that is 82 (95.34%) of

the teachers of chemistry had in-service training followed by workshop 74 (86.05%), seminar 69 (80.23%) and any other training opportunities 56 (65.12%). This is essential as continuous training equips teachers with additional knowledge and helps them keep up with emerging trends in teaching and how they can be implemented in their own classrooms. This is in line with Fisher (2013) who pointed out that it is important to teach new skills to teachers because they may not be able to deal with a generation that is learning more outside the classroom environment.

4.4 Principals Management of Teachers of Chemistry Professional Records and Academic Performance

The first objective sought to determine the relationship between the principals management of teachers' professional records and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. A summary of KCSE performance for Machakos County from 2016 to 2022 is presented in Appendix VII.

4.4.1 Professional Records

The teachers of chemistry in this study were requested to respond to the frequency at which principal checks the list of professional records which are: Schemes of work, records of work, lesson plans, lesson notes and students attendance register. Table 4.4 provides the information on instructional supervision tasks performed by principals.

Table 4.4 Teachers of chemistry view on tasks supposed to be performed by principals in instructional supervision (N=86)

Professional Records	W (%)	F (%)	M (%)	O (%)	N (%)
1. Schemes of work	2(2.33)	10(11.63)	24(27.91)	43(50)	7(8.14)
2. Records of work	45(52.33)	19(22.09)	9(10.47)	8(9.3)	5(5.81)
3. Lesson plans	66(76.74)	11(12.79)	6(6.98)	1(1.16)	2(2.33)
4. Lesson notes	0(0)	3(3.49)	8(9.3)	54(62.79)	21(24.42)
5. Students attendance Register	39(45.35)	33(38.37)	13(15.12)	1(1.16)	0(0)

NB: Weekly (W); Fortnightly (F); Monthly (M); Once a term (O); and Never (N)

4.3.1.1 Scheme of Work

The information presented in Table 4.4 indicates that 43 (50%) of the respondents verified that principals check teachers of chemistry scheme of work once per term. On the other hand, 24 (27.91%) of the teachers of chemistry indicated that principals checked schemes of work at every start of the month. Very few, that is, 10 (11.63%) and two (2.33%) of the respondents indicated that principals check schemes of work on a fortnight and week basis respectively. Seven (8.14%) highlighted that the principals never check the schemes of work. The results established that majority of the principals check teachers' scheme of work at every beginning of the term in public secondary schools in Machakos County. In line with these findings, a study by Adrum (2020) revealed that schemes of work are checked by principals on termly basis. The results also concurred with a study carried out by Jugessur (2023), which established that at every term a new scheme of work is made with an aim of serving the following

purposes: guide to the teachers; organisational convenience and keeping records of what is taught and what ought to be taught.

4.3.1.2 Records of Work

The information on Table 4.4 reveals that majority, that is 45 (52.33%) of the teachers of chemistry agreed that principals checked teachers' records of work on weekly basis. On the other hand 19 (22.09%) of the respondents indicated principals checked teachers of chemistry records of work fortnightly; nine (10.47%) monthly; and lastly that eight (9.3%) checked once a term. On the contrary five (5.81%) indicated that principals never check records of work. A study by Mwangi (2012) supported these findings by indicating that principals often check records of work which is among key instructional supervisory roles in their schools. The results are also in congruence with Lyonga's (2018) study that established that principals frequently checked teacher's records of work as it has a positive influence on teachers' work performances and yield high students' success rates. This is in contrast to a study by Kipngetich (2016) which shows that in Narok South, Kenya, there is a lot of laxity as teachers' records of work are rarely checked. The study by Kipngetich (2016) recommends that principals should ensure that they check teachers' professional documents by coming up with innovative strategies that ensure that teachers submit records on weekly basis so as to revamp instructional supervision in their schools.

4.3.1.3 Lesson Plans

The information on Table 4.4 clearly shows that 66 (76.74%) of the teachers of chemistry indicated that principals checked teachers' lesson plans weekly. However, 11(12.79%) of the teachers pointed out that principals check the lesson plans

fortnightly; 6(6.98%) monthly; while one (1.16%) checked once a term. To the contrary, two (2.33%) revealed that principals never check the lesson plans of teachers of chemistry. From these findings, the study established that principals have embraced their instructional supervision activities of checking lesson plans regularly in public secondary schools. According to Wabuko (2016), checking of lesson plans informs on whether all concepts within the subject areas have been captured and enables the principal to intervene where subjects have not been adequately covered. A lesson plan ensures that classroom instruction aligns with curriculum goals and objectives and therefore enables students to demonstrate their successful learning during unit or curricular assessment (Jugessur, 2023). A study by Kioko (2021) corroborates the findings of the present study by establishing that the lesson plan review is the most dominant instructional supervision approach practiced by principals of public secondary schools in Machakos County.

4.3.1.4 Lesson Notes

Results in Table 4.4 indicate that to a large extent 54 (62.79%) principals checked lesson notes once in a term in their schools. While three (3.49%) indicated that principals checked lesson plans weekly and eight (9.3%) monthly. The results however reveal that a significant number of the principals 21 (24.42%) never checked teachers of chemistry lesson plans. Findings from the present study were in agreement with the results of a study by Malunda, Onen, Musaazi and Oonyu (2016) which revealed that a scrutiny of the teachers' lesson notes showed that only a handful of them had signatures or school stamps to show that they had been reviewed by the principals. This is despite the requirement by the ministry of education for teachers to submit lesson notes to the principal at the beginning of every term for review. On the other hand, Mburu (2016)

study show that principals regularly monitor the preparation of lesson plans by teachers to ensure that lesson objectives are suitable to the academic attainment of students. Straessle (2014) posited that a lesson plan is an important aspect of a teacher's job that directly impacts what and how students learn the necessary material. Sule, Arop and Alade (2012) study recommended regular supervision which must include inspection of lesson notes organized by government to enhance teachers' job performance. Similarly, Sule, Ameh and Egbai (2015) recommends teachers' lesson notes to be checked regularly as there is significant positive relationship between instructional supervisory practice of checking of teachers' lesson notes and teachers' role effectiveness.

4.3.1.5 Students' Attendance Register

In relation to findings concerning students' attendance, Table 4.4 shows that 39 (45.35%) and 33 (38.37%) of teachers of chemistry agree that principals check students' attendance register weekly and fortnightly respectively. The table further shows that 13 (15.12%) and one (1.16%) of the teachers of chemistry opined that principals check students' attendance register monthly and once a semester respectively. The findings are in agreement with a study done by Njogu (2020) which asserted that principals often checked the students' attendance register. Kataka, Kipkenei and Olango (2023) concurs with this research outcome as they discovered that majority of principals checked students' attendance register and this had a positive impact on students' academic performance. The findings are also consistent with Nyaisuti, Ursulla and Khatete (2020) who established that the majority of the principals regularly checked students' attendance registers and it greatly influenced students' performance at KCSE. According to a study by Wanjiru (2017), schools where principals evaluated schemes of work, lesson notes and class attendance registers and provided effective feedback

apparently registered good academic performance compared to schools where this was not carried out.

4.4.2 Influence of Checking of Teachers of Chemistry Professional Records

Influence of checking of teachers of chemistry professional records was evaluated by use of the questionnaire. The questionnaire was in the form of a five point Likert Scale, where 1-Strongly agree, 2-Agree, 3-Not sure, 4-Disagree, 5-Strongly disagree. The information is shown in Table 4.5.

Table 4.5: Influence of Checking of Teachers of Chemistry Professional Records (N=86)

Statement	**1 (%)**	**2 (%)**	**3 (%)**	**4 (%)**	**5 (%)**	**Mean**	**SD**
1. Time allotted for chemistry curriculum instruction is adequate	43 (50)	32 (37.2)	6 (7)	3 (3.5)	2 (2.3)	1.71	.919
2. Principal checks teacher's records of work from time to time	52 (60.5)	24 (27.9)	5 (5.8)	4 (4.7)	1 (1.2)	1.58	.887
3. Principal ensures teachers cover chemistry syllabus	36 (41.9)	40 (46.5)	2 (2.3)	5 (5.8)	3 (3.5)	1.83	.984
4. Principal checks whether teachers adhere to the timetable	40 (46.5)	39 (45.3)	0 (0.0)	7 (8.1)	0 (0.0)	1.70	.841
Average score						**1.71**	**.908**

Source: Survey Data (2023)

The aggregate mean score of 1.71 and standard deviation .908 from Table 4.5 indicate that the respondents agreed that principals are concerned with monitoring teachers of chemistry professional records to a great extent. The analysed data shows that majority of the respondents 43 (50%) and 32 (37.2%) agreed that the time allotted for chemistry

curriculum instruction is adequate. Also, majority of the respondents, that is 52 (60.5%) strongly agree that the principal checks teachers' records of work from time to time. They perceived that the principal ensures teachers cover the chemistry syllabus and adheres to the timetable. This is consistent with a study by Murithi (2015) on the role of principals in promoting students' academic performance in secondary schools in Tigania West Sub-County, Kenya which revealed that principals of the high performing schools indicated that they always ensured that teachers fill records of work covered. This could account for the difference between the high performing schools and the low performing ones. This is also in line with a study by Mulatya, Okoth and Mugambi (2021) which indicated that a good percentage of principals monitor syllabus coverage for all classes and ensure that learners are given assessment test as per the agreed timetable. The principals specified that instructional supervision practice of checking of teachers' professional documents was well carried out in schools with most of its allied items with a mean above 4.0 scores, giving an average mean of 4.17 and standard deviation of 0.96.

The findings differ with a study by Mukaniyonsenga, Iyamuremye, Iyamuremye, Nsabayezu and Niyonzima (2023) in Rwanda that identified insufficient time allocated to chemistry on timetable as an obstacle to curriculum coverage. In contrast to the study findings, a study by Wanyama (2018) on school administrators' contribution to students' academic performance in secondary schools in Emuhaya and Vihiga Sub-Counties, Kenya, established that principals contributed very little in checking teachers' professional records. This is despite the fact that continuous instructional supervision ensures that teachers adhere to set norms and standards of behavior with regard to implementation of curriculum.

4.4.3 Monitoring Syllabus Coverage

Respondents were asked if the principal check syllabus coverage. The outcomes are revealed in Figure 4.3.

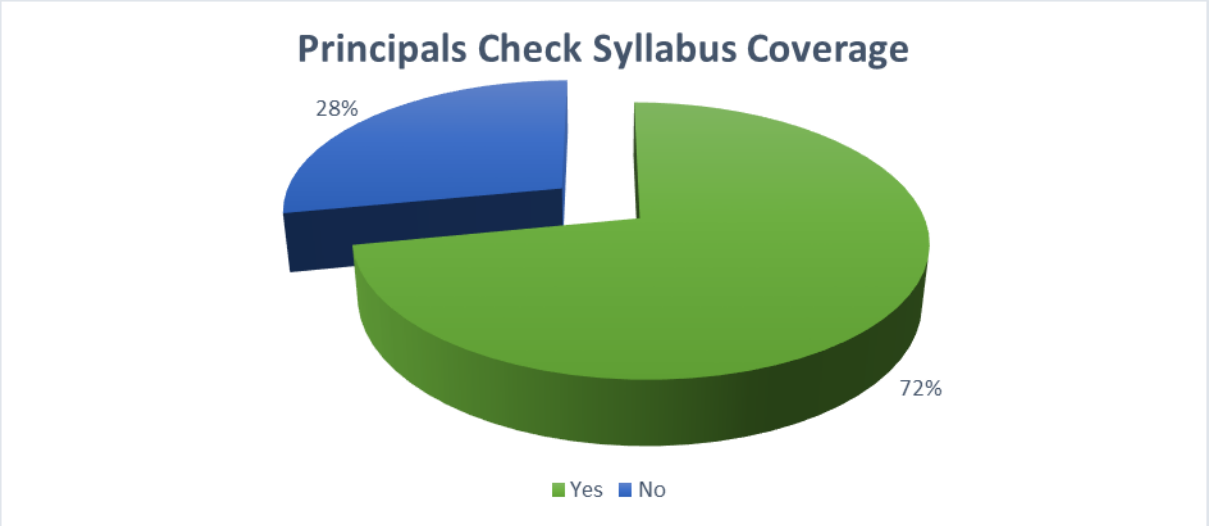


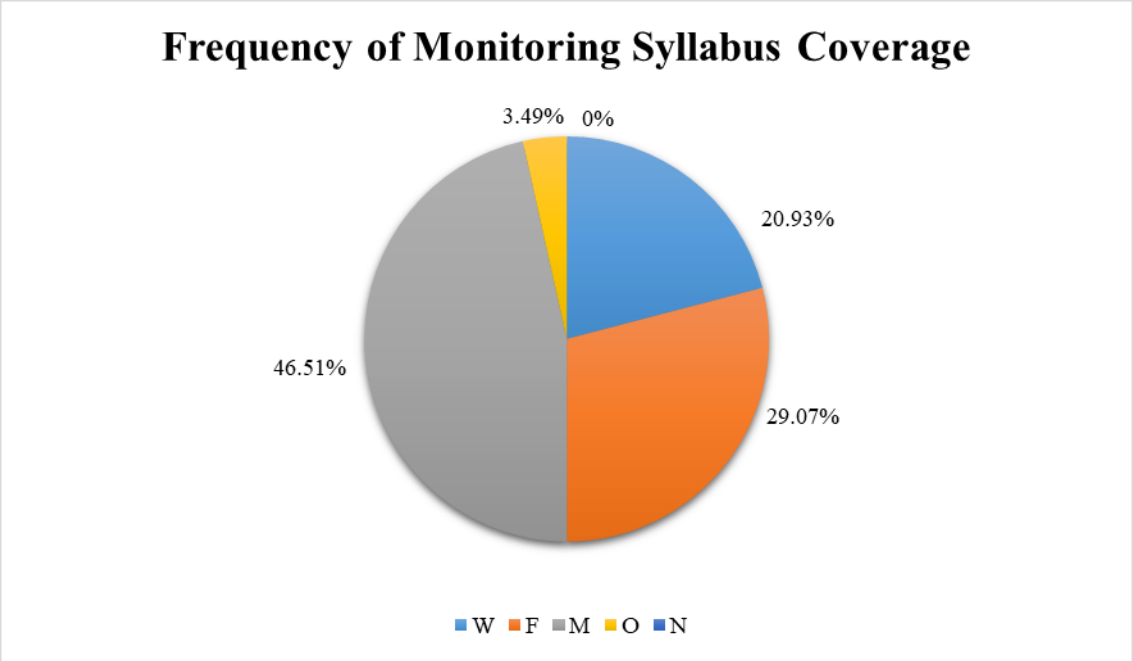
Figure 4.3: Principals Check Syllabus Coverage

Source: Survey Data (2023)

Analysed information from Figure 4.3 established that 62 (72%) of the respondents concurred that principals monitor syllabus coverage while 24 (28%) of the respondents indicated that principals never monitor syllabus coverage. Timely syllabus coverage is critical to learners as it plays a major role to performance in Kenya Certificate of Secondary Examination (KCSE). Tokatlı and Keşli (2009) opined that a carefully planned, clearly written, comprehensive syllabus is one of the most important and valuable resources which can be provided to learners. In line with the study findings Otieno (2022), observed that principals conduct face-to-face meeting with teachers to review syllabus progress. The study findings are also supported by Mulwa and Mutia (2016), who established that there is constant communication between teachers and

principals to ensure that there is timely syllabus coverage. The study by Mulwa and Mutia (2016) concluded that there is a significant correlation between principals regularly visiting teachers and timely syllabus coverage. According to a study by Amadalo, Shikuku and Wasike (2012), it is evident that schools' coverage of the syllabus correlates positively with performance in the national KCSE examinations.

The respondents were further probed to indicate how often the principal checks on syllabus coverage. The Likert Scale yielded the results as tabulated in Figure 4.4.



NB: Weekly (W); Fortnightly (F); Monthly (M); Once per term (O); and Never (N)

Figure 4.4: Frequency of Monitoring Syllabus Coverage (N=86)

Source: Survey Data (2023)

Information presented in Figure 4.4 indicates that on the statement 'How often the principal checks syllabus coverage 18 (20.93%) weekly, 25 (29.93%) fortnightly, 40 (46.51%) monthly, while three (3.49%) once per term. Indeed, the study found out that

due to the regular monitoring of syllabus coverage most of the public schools completed the syllabus within the stipulated school calendar. The findings confirmed the findings of Nyagosia (2011) that revealed that the principals were strongly providing instructional leadership by supervising teachers to ensure they complete syllabus on time. This also agrees with Tomno (2014) who observed that principals regularly pick students notes so as to countercheck with schemes of work and records of work to monitor the extend of the syllabus covered.

However, according to the research findings, in some of the schools there were cases of uncovered syllabus attributed to factors like: failure by teachers to attend to all lessons; lateness and absenteeism of both learners and teachers; late preparation and submission of required professional records; a heavy workload in schools; lack of teaching, learning and revision materials; unplanned co-curriculum activities and sporting activities which come in within the term; poor time management by both teachers and learners; poor teacher motivation; poor health problems of some teachers and learners; transfers in the course of the year; failure to follow set timetable; and high student to teacher ratio. Oyula (2018) study findings show that a syllabus is either not covered or only covered to a small extent. The study further noted that sometimes the teachers would tend to rush through the syllabus when the examinations are just about to begin, leaving the learners with a hard time internalizing the hurried syllabus and the ultimate result being low grades in national examinations.

4.4.4 Influence of Principal Management of Teachers' Professional Documents on Students' Performance in Chemistry

An analysis of the responses based on the principal management of teachers' professional documents and its influence on students' academic performance in chemistry is shown in Figure 4.5.

Figure 4.5. Influence of Principal Management of Teachers' Professional Documents on Students' Performance in Chemistry

Source: Survey Data (2023)

From the summary shown on Figure 4.5, 73 (85%) teachers of chemistry agreed that principals management of teachers' professional documents had influence on students' performance in chemistry, while 13 (15%) disagreed. The findings revealed that efficient and sufficient management of teachers of chemistry professional records had a significant impact on students' performance in the subject. The respondents indicated that regular supervision of professional records creates the avenue for seriousness to learners and enhances discipline. They further indicated that when principals frequently

check records, it creates an environment whereby teachers prepare their professional records on time without being coerced, leading to improved students' performance in KCSE.

To get further information on the principals' management of teachers of chemistry professional records, an in-depth face-to-face interview was conducted. Majority of the principals indicated that regular checking of professional records was deeply entrenched in their day to day management activities as it had great impact on the overall performance of their students in national examinations.

One of the interviewed principals explained that:

> *It is my duty to monitor teachers of chemistry professional records on a regular basis as this supervisory approach ensures that there is frequent interaction between me and the teachers leading to good academic performance.*

Similarly, another principal highlighted that:

> *I frequently check lesson plans, records of work, and schemes of work among other professional teachers' records as it is a policy requirement by my employer the TSC. It also enables me to have an insight of what the teachers are doing and this serves as an indispensable tool for early syllabus coverage and improved learning outcomes.*

These views by the principals established that majority of the principals frequently monitor teachers of chemistry professional records in compliance with existing educational policies. Akinfolarin, Babalola, and Aladetan (2017) conducted a study on academic supervision as a correlate of students' academic performance. Their study findings noted that supervision of teachers' professional records positively correlate with students' academic performance. Denge (2019) examined the extent to which

checking professional documents by principals influence students' performance. The study findings indicated that when teachers know they are supervised, they tend to do their work more diligently, thus improving performance in KCSE. The findings are also supported by Muasa, Ogola, and Nzioki (2021) who established that the principals' management practice of teacher professional records influence students' KCSE academic performance as well as quality and standards of education in public secondary schools. Similarly, a study by Mwangi (2012) uncovered the fact that management of professional records by school administrators should be seen as a vital component in the running of the school activities. Mwangi further recommends that every teacher should maintain professional records like a lesson plan, scheme of work, records of work done, students' progress records, and attendance register.

4.5 Monitoring Students' Academic Progress and Students' Academic Performance

The second objective of this study was to determine the influence of monitoring students' academic progress by the principal on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

4.5.1 The Frequency at which the Principal Monitors Students' Academic Progress

The study sought to investigate the frequency at which the principal monitors students' academic progress. Table 4.6 lists the responses teachers of chemistry provided on this issue.

Table 4.6: The frequency at which the Principal Monitors Students' Academic Progress (N=86)

Statement	W (%)	F (%)	M (%)	O (%)	N (%)
1. Classwork	8 (9.3)	11 (12.79)	7 (8.14)	42 (48.84)	18 (20.93)
2. Completed assignments	2 (2.33)	13 (15.12)	25 (29.07)	37 (43.02)	9 (10.47)
3. Evaluation records	1 (1.16)	3 (3.49)	32 (37.21)	50 (58.14)	0 (0)
4. Students attendance and punctuality	38 (44.19)	36 (41.86)	8 (9.3)	4 (4.65)	0 (0)
5. Discuss students' progress	4 (4.65)	7 (8.14)	53 (61.63)	20 (23.26)	2 (2.33)
6. Peer assessment	5 (5.81)	12 (13.95)	3 (3.49)	2 (2.33)	64 (74.42)
7. Formative Assessment	3 (3.49)	10 (11.63)	9 (10.47)	17 (19.77)	47 (54.65)
8. Presentations	1 (1.16)	6 (6.98)	3 (3.49)	13 (15.12)	63 (73.26)

NB: Weekly (W); Fortnightly (F); Monthly (M); Once per term (O); and Never (N)

Source: Survey Data (2023)

4.5.1.1 Classwork

As tabulated in table 4.6 majority of the respondents, that is 42 (48.84%) indicated that principal monitors students' classwork once per term, 11 (12.79%) fortnightly, eight (9.3%) weekly, seven (8.14%) monthly. However, 18(20.93) of the respondent were of the opinion that principals were non-committal on monitoring classwork. Garba and Abdullahi's (2022) study findings revealed that both principals and teachers agreed that

students' classwork was not reviewed regularly in their schools. The result revealed that some principals in public secondary schools had neglected their instructional supervision duty of monitoring students' class work to verify progression of teaching. Kinyua (2013) observed that classwork is closely monitored by teachers and not the principals. In contrast to the findings, a study by Murithi (2015) revealed that principals from high performing schools make frequent and formal class visits to check students' classwork during prep times and free lessons. A study by Rezende (2017) established that regular monitoring of classwork contributes to significant improvement in students' final grades, better engagement and an effective transformation of classroom routine. As indicated by Nunes et al. (2018), monitoring is a learning space for student as it intensifies the cooperation between teachers and students in their academic activities. Idowu and Omotola (2020) opines that monitoring involves checking at a regular interval in order to find out how a programme is progressing and developing. Thus, the principals should be unrelenting in regular monitoring of classwork in their respective schools.

4.5.1.2 Monitoring Students Completed Assignments

From the information provided in Table 4.6, it is apparent that 37 (43.02%) of the teachers of chemistry are of the view that principals monitor students completed assignment once per term; 25 (29.07%) monthly, 13 (15.12%) fortnightly and two (2.33%) weekly. On the other hand, the information in Table 4.8 shows that nine (10.47%) of the teachers of chemistry indicated that the principals never monitor students' completed assignments. The findings are in line with Mbae (2016) who observed that principals do not carry out instructional supervision very often as they are overwhelmed by other administrative responsibilities. To underscore the importance of

monitoring completed assignments, Sharma and Rajesh (2018) notes that feedback from assignments helps teachers in analysing the levels of successful learning among students, as well as the pedagogical effectiveness of self-instructional material. Assignments play an important role as they convey students' individual levels of learning achievements, which in turn can help them iron out the negative aspects of the learning process while cementing the more positive aspects. According to Darling-Hammond, Flook, Cook-Harvey, Barron and Osher (2019), the use of curriculum embedded assessments strengthens teaching by providing teachers with models of good curriculum and assessment practice, allowing teachers to see and evaluate student learning in ways that can inform instructional supervision decisions. Thus, such assessments can build students' capacity to assess and guide their own learning through ownership in the learning process.

4.5.1.3 Evaluation Records

The information on Table 4.6 shows that 50 (58.14%) of the principals check evaluation records once per term, 32 (37.21%) monthly, three (3.49%) fortnightly and one (1.165) weekly. These findings tends to be in agreement with Chappelear and Price (2012) who noted that teachers expected their principals to engage in discussing academic performance results with them frequently. Expressing a related view, Jeptarus (2014) found that principals in Kenyan secondary schools regularly discuss the progress of students with individual teachers in addition to checking assessment records. Similarly, Samoei (2014) observed that principals frequently supervise testing of students through the heads of departments and check the spreadsheets to monitor each student's performance so as to discuss the results with the relevant teachers. The findings however negate Garba (2020) who established that the principals do not normally check

students' evaluation records. The study findings implied that majority of principals had neglected their instructional supervisory role of examining how students were progressing academically in public secondary schools. In the same vein, Garba and Abdullahi (2022) and Hussen (2015) studies found that monitoring students' progress by principals of secondary schools was irregular and rarely organized as principals did not check students' assessment records regularly. Bambrick-Santayo (2010) asserts that in most of the high performing secondary schools, principals and teachers always make use of students' assessment records information to determine the school development.

4.5.1.4 Students' Class Attendance and Punctuality

The results in Table 4.6 show that 38 (44.19%) of teachers of chemistry agreed that principals checked students' attendance weekly. While 36 (41.86%) of the teachers of chemistry indicated that principals monitors students' attendance fortnightly, eight (9.3%) monthly and four (4.65%) once per term. These findings are supported by the research findings of Mbuso (2015) in South Africa that revealed that principals in public secondary schools monitor academic progress of students in their schools through weekly review of teacher files and verification of lesson attendance. Supporting these findings, a study by Garba and Abdullahi (2022) show that principals checked students' attendance usually every week. These findings implied that principals in public secondary schools checked students' attendance in order to monitor teaching and learning progress.

4.5.1.5 Monitoring Students' Progress

From the study findings in Table 4.6, 53 (61.63%) of the teachers of chemistry indicated that principals discuss students' progress monthly, 20 (23.26%) once per term,

seven (8.14%) fortnightly and four (4.65%) weekly. While two (2.33%) of the teachers of chemistry indicated that the principals never engage in discussing students' progress. This finding agrees with Otieno's (2022) assertion that principal's regularly monitors student progress records. The study findings also aligns with earlier findings by Cheboi (2016) who established that principals monitor students' academic progress by regularly picking students notes to countercheck with schemes of work and records of work so as to monitor the extend of the syllabus covered. It also corroborates Al-Hosani (2015) whose study found the majority of teachers indicating that principals discussed the academic progress of students with relevant teachers. In contrast, the findings by Ndungu, Gathu and Bomett (2015) revealed that evaluation of students' progress by principals in every subject is not done regularly. They further noted that progress records for students are not even maintained. The current study findings also contradicts Garba (2020) who reported that the principals indicated that they do not hold formal discussions with individual teachers about the progress of their students. This is despite the fact that through talking with teachers about students' progress, the principals are able to acquire first-hand information on students' performance in their respective schools. Similarly studies by Hussen (2015) and Wanzare (2012) revealed that monitoring students' progress by principals of secondary schools was irregular and rarely organized as the principals always seemed busy with administrative work to the detriment of the students' academic progress.

4.5.1.6 Peer Assessment

Table 4.6 shows that regarding peer assessment, 64 (74.42%) of the teachers of chemistry were of the view that principals are never involved in peer assessment. Table 4.8 indicates further that 12 (13.95%) of the teachers of chemistry are of the view that

principals are involved in peer assessment fortnightly, five (5.81%) weekly, three (3.49%) monthly and two (2.33%) once per term. The findings clearly reveal that majority of the principals have not embraced peer assessment a part of their instructional supervision roles. A study by Nyaga (2020) confirmed that peer assessment was a commonly used classroom assessment tool among secondary school teachers. The study further revealed that peer assessment makes students autonomous which is useful in assisting them to think more and become analytical. Ndoye (2017) observes that peer assessment can positively affect student learning by helping them develop their reflective and critical thinking skills, as well as their self-confidence as learners. Similarly, Singerin (2021) study results revealed that the implementation of the collaboration-based academic supervision model with the peer assessment approach was able to increase pedagogic competence moderated by the principal's motivation. Renata, Wardiah and Kristiawan (2018) posit that, it is time for instructional supervisors to pay attention to the application of peer assessment to be developed and applied, so that the implementation of instructional supervision does not only function as a tool to measure student learning achievement, but also to improve the learning process and quality.

4.5.1.7 Formative Assessment

Table 4.6 indicates that three (3.49%) of teachers of chemistry agree that principals monitor formative assessment weekly, 10 (11.63%) fortnightly, nine (10.475) monthly and 17 (19.77%) once per term. However, a significant number of the teachers of chemistry numbering 47 (54.65%) were of the view that principals were never involved in formative assessment. The current study results seem to be supported by Yasar (2016) whose findings suggested that science teachers do get adequate levels of

education on purposes to use formative assessment approaches. Therefore, they do not possess a deep perception and understanding of formative assessment approaches. Similarly, Şaşmaz-Ören, Ormancı & Evrekli (2014) study findings suggested that science teachers have moderate levels of self-sufficiency related to formative assessment approaches. This finding also supports Chumo (2020) who reported that teachers do not plan for formative assessment in physics to the required standard and that this has a significant influence on students' performance in KCSE in physics in public secondary schools. According to Al Kadri, Al-Moamary, Magzoub, Roberts and Vleuten (2011), formative assessments provoke authentic and multidimensional learning. Andersson (2015) asserts that formative assessment is a strategy of instruction, where assessment is used with a main purpose of supporting learning and a function of using the information from the assessment to adjust teaching to better meet the needs of the students.

4.5.1.8 Presentations

As seen in Table 4.6, according to the teachers of chemistry, one (1.16%) stated that principals monitor presentations weekly, six (6.98%) fortnightly, three (3.49%) monthly and 13(15.12%) once per term. A majority of the teachers of chemistry 63 (73.26%) felt that principals never monitor presentations. This means that majority of the principals never pay attention to presentations. Archibong (2012) cites that presentation involves a prearranged series of events to a group for their view and it stimulates teachers' growth and group discussion. Xu, Chen, Wang and Suhadolc (2021) opines that presentation skills are essential for employability and academic study because they lead students to enter into debate and sustained reasoning.

4.4.2 Monitoring Students' Academic Progress

This sub-section used descriptive statistics specifically percentages, means and standard deviation to indicate the respondents degree of agreement on the listed statements on monitoring students' academic progress. Items that were crafted to measure this variable were on a 5-point Likert Scale and described as; 1-Strongly agree, 2-Agree, 3-Not sure, 4-Disagree, 5-Strongly disagree. Table 4.7 shows the findings.

Table 4.7 Monitoring Students' Academic Progress (N=86)

Statement	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean	SD
1. Monitoring creates an overview of the quality of education in the school	43 (50.0)	32 (37.2)	4 (4.7)	5 (5.8)	2 (2.3)	1.73	.963
2. Monitoring helps identify some of the teaching and learning challenges encountered in school	64 (74.4)	12 (14.0)	3 (3.5)	6 (7.0)	1 (1.2)	1.47	.942
3. Monitoring helps to diagnose the shortcomings in implementation of the curriculum	57 (66.3)	20 (23.3)	2 (2.3)	4 (4.7)	3 (3.5)	1.56	1.001
4. Supervision of students' assignments and projects helps teachers gauge their understanding	28 (32.6)	37 (43.0)	7 (8.1)	8 (9.3)	6 (7.0)	2.15	1.183
5. Frequent testing of students and feedback given make them have positive attitudes towards tests	33 (38.4)	30 (34.9)	4 (4.7)	10 (11.6)	9 (10.5)	2.21	1.347
6. Monitoring alerts teachers on their instructional pace and hence syllabus coverage	35 (40.7)	41 (47.7)	0 (0.0)	9 (10.5)	1 (1.2)	1.84	.956
7. Checking students' attendance register helps to know those who miss lessons and why	62 (72.1)	23 (26.7)	0 (0.0)	1 (1.2)	0 (0.0)	1.30	.533
Average score						**1.75**	**.989**

Source: Survey Data (2023)

Table 4.7 shows that the respondents strongly agreed to five statements as indicated by means that lie between (M =1.30 - 1.84) and agreed to two statements as indicated by a mean that lies between (M =2.15 - 2.21). Respondents strongly agreed that monitoring creates an overview of the quality of education in the school (M = 1.73, SD = .963). Respondents strongly agreed that monitoring helps identify some of teaching and learning challenges encountered in school (M = 1.47, SD = .942). Respondents strongly agreed to the statement that monitoring helps to diagnose the shortcomings in implementation of the curriculum (M = 1.56, SD = 1.001). Respondents strongly agreed to another statement which asked them if monitoring alerts teachers on their instructional pace and hence syllabus coverage (M = 1.84, SD = .956). Respondents also strongly agreed that checking students' attendance register helps to know those who miss lessons and why (M = 1.30, SD = .533). On the other hand, respondents agreed to the statement that supervision of students' assignments and projects help teachers gauge their understanding (M = 2.15, SD = 1.183). Respondents also agreed that frequent testing of students and feedback given make them have positive attitudes towards tests (M = 2.21, SD = 1.347). An average mean score of 1.75 was recorded indicating that respondents strongly agreed to the issues raised as having an impact on students' academic progress.

This result is in line with the findings of Mngomezulu and Bhengu (2015) that monitoring helps school principals to discover the needs of the learners and difficulties encountered by the teachers as they dispense knowledge. A study by Pulukadang (2018) in Indonesia established that, monitoring of students' academic progress allows the principal to clearly identify areas that need improvement and provide professional support to the teachers. This finding also supports earlier findings by Karani, Bichanga

and Kamau (2014) who reported that monitoring generates daily feedback on student achievement and potential problems and how to solve them; evaluate the effectiveness of the various practices used and suggest improvements; evaluate how these practices serve to realize their common goals and provide a course for improving teaching and learning. Further this finding also confirms Mestry (2017) who avers that the role of principals is to ensure processes for effective teaching and learning are in place by monitoring teachers and learners' progress and obtain feedback on performance of every learner through the outcome of continuous assessment programmes. Ampofo, Onyango, and Ogola (2019) assert that principals should be more careful in monitoring learners' assessment records and assignments.

The study findings are supported by Kinyua's (2013) findings that monitoring and evaluation leads to effective teaching and learning in all schools as it helps improve and diagnose weak areas in the curriculum by enhancing curriculum delivery, improving performance and teaching techniques adopted by teachers. These findings also tend to agree with the findings of Kling, McCorkle, Miller and Reardon (2010) who postulated that students may appreciate the opportunity of more frequent tests as it provides them with a much easier opportunity to improve after a failure in a test than when the first test is a major one. Frequent tests lead to possible reduction of anxiety which may be appreciated and reflected in the student evaluations. This is further supported by the findings of Öncül (2017) who observed that frequent tests assist in improving students' retentions skills and help teachers monitor students' learning and help students see their own progress.

The study findings resonate with Kilwake (2023) who established that through monitoring, the principal can help teachers align their teaching time and skills accordingly so as to cover the syllabus on time and improve student performance. The findings are further supported by Mwangi (2015) who asserts that monitoring is very essential as it leads to good time management by the teachers leading to timely syllabus coverage and eventually improved student's performance in examination as students are tested generally from any topic in the syllabus. Mutia (2016) posits that timely syllabus coverage has a direct influence on good performance as it creates enough revision time for examinations both students and teachers.

Oghuvbu (2010) asserts that through regular school attendance, learners get to access consistent educational support for their academic attainment. The study findings agree with Bagaya (2019) who posit that it is legitimate for school teachers to maintain a daily student attendance record that is regularly reviewed by the principal. The findings further agree with Mokhtari, Nikzad, Mokhtari, Sabour and Hosseini (2021) who pointed out that class attendance and learning have received a lot of attention as there is a well-established positive relationship between class attendance and academic grades. The findings are also in line with those reported by Ikenga and Ogbaga (2021) that students attend school regularly so as to acquire the necessary knowledge incidental for them to perform well academically especially in external examinations. In contrast, Kagochi, Kimosop and Mbugua (2019) findings indicate that although the class attendance registers were in place in secondary schools, they were rarely regularly checked to follow up on the cases of lesson absenteeism among learners.

4.6 Classroom Visitations and Students‘ Academic Performance

The third objective was to examine the influence of classroom visitation by the principal on students’ academic performance in chemistry in public secondary schools in Machakos County, Kenya.

4.6.1 Tasks Supposed to be Performed by Principals in Instructional Supervision

The participants’ descriptive scores on the frequency at which the principal carry out the listed activities were analysed in order to obtain the frequencies and percentages. The results were presented as shown in Table 4.8.

Table 4.8 Classroom Observation (N=86)

Statement	W (%)	F (%)	M (%)	O (%)	N (%)
1. Walk through classes and laboratories	3(3.49)	5(5.81)	11(12.79)	42(48.84)	25(29.07)
2. Pre-observation conference	1(1.16)	4(4.65)	23(26.74)	39(45.35)	19(22.09)
3. Post observation conference	1(1.16)	6(6.98)	25(29.07)	44(51.16)	10(11.63)
4. Observing teaching and learning activities	13(15.12)	12(13.95)	34(39.53)	25(29.07)	2(2.33)

NB: Weekly (W); Fortnightly (F); Monthly (M); Once per term (O); and Never (N)

Source: Survey Data (2023)

The information on Table 4.8 shows that 42 (48.84%) of the teachers of chemistry noted that principals walk through classes and laboratories once per term; 11 (12.79%) monthly, five (5.81%) fortnightly and three (3.49%) weekly. While 25 (29.07%) were of the view that principal never walk through classes and laboratories. The findings

reveal that the majority of the respondents, that is 39 (45.35%) were of the view that principals were involved in pre-observation conference once per term, 23 (26.74%) monthly, four (4.65%) fortnightly and one (1.16%) weekly. A significant number of respondents 19 (22.09%) were of the view that the principals are never involved in pre-observation conference. Additionally, 44 (51.16%) of the teachers of chemistry indicated that principals carry out post observation conference once per term, 25 (29.07%) monthly, six (6.98%) fortnightly and one (1.16%) weekly. Moreover, 10 (11.63%) of the respondents pointed out that principals while undertaking their administrative duties never carry out post observation conference. The analysed data further reveals that 34 (39.53%) of the respondents indicated that principals observe teaching and learning activities in their respective secondary schools on monthly basis, 25 (29.07%) once per term, 13 (15.12%) weekly and 12 (13.95%) fortnightly. On the other hand, two (2.33%) of the respondents indicated that principals never observed teaching and learning activities.

The study findings reveal that most of the respondents, that is 42 (48.84%) are of the view that the principals walk through classes and laboratories once per term. During an in-depth face-to-face interview, one of the principals had this to say:

> *Usually I do not visit the teachers when they are teaching as I am mostly engaged in other administrative duties. However, I have delegated the monitoring responsibility to my able deputy and HODs.*

Another Principal with a similar opinion with regards to walking through classes and laboratories had this to say:

> *Due to my workload as a principal, I rarely have adequate time to frequently visit classes and laboratories. However in special cases where some of the*

students are underperforming, I usually organise for impromptu class visitation so as to observe the teacher's lesson delivery method and later discuss the way forward with the concerned teacher.

The findings concur with Nyamwamu's (2010) study that the principals had many other duties in managing the school, which were of paramount importantance than class visitation. This further supports the results of Mwendia (2018) that found that classroom visitation was rarely practiced by principals. This is in contrast to another study by Sule, Eyiene, and Egbai (2015) that found that classroom visits are a basic management for instructional delivery. The principal prepares a monitoring schedule that shows how the teacher controls classroom, manages learning diversity, lesson presentation, content mastery by the teacher, student involvement and teaching methods used. This is in line with Mugambi (2015) who posits that a principal at high performing schools usually visits classes regularly. A study by Otieno, Otieno and Magoma (2021) found out that the principals visited and monitored teaching in the classrooms and the visitations had significantly improved learner's achievement in examinations. Majority of the teachers agreed that the principals monitored their lessons fortnightly and gave them feedback for improvement. The study recommended that principals should collaborate with the teachers to develop a comprehensive plan for classroom visitation in their schools indicating the procedures, instructional technology requirements, and objectives of the exercise. This is further supported by Ossai and Ichazu's (2023) study which indicated that principals observe teaching and learning activities in their schools through regular visitation of teachers in the classroom and having post classroom visitation discussion.

The current study finding supports the findings of Baffour-Awuah (2011) who found that most instructional supervisors in the study did not hold pre-observation conferences with their teachers. This finding in Ghana that supervisors do not involve teachers in pre-observation conference is not an isolated case. Omondi and Tikoko (2021) from Kenya observed that principals' instructional supervisory methods were mainly limited to observing teachers professional records and checking on learners' progress records while giving minimal attention to class visits, pre-observation conference and post observation conference. This finding also confirms Mavindu (2013), who observed that principals are occasionally involved in post observation conference as they have many responsibilities and hence lack sufficient time to monitor what goes on in the classroom.

In line with this finding, a study by Garba, Waweru and Kaugi (2019) also revealed that the post-observation conference was often neglected by many principals in public secondary schools as they failed to provide teachers with feedback on lesson observation. Majority of the chemistry teachers 34, representing 39.53% pointed out that principals observe teaching and learning activities on monthly basis. The study findings are also supported by a study by Mutinda (2016) which indicated that principals visit students in classrooms on monthly basis to observe teaching and learning activities.

The findings seem to be in agreement with studies by Donaldson and Woulfin (2018); Hunter and Rodriguez (2021) who posits that some principals in an attempt to cope with high observation loads, conduct fewer observations by shortening the time they spend observing or delegating the observation responsibility to others. The study findings are further supported by a study by Chenge and Syomwene (2016) that confirmed that

observation teaching and learning activities by principals was not frequent. The study results are also in tandem with those in a study conducted by Anyango (2020) that established that there is rare observation in schools as principals had not been frequently observing teaching and learning in class.

4.6.2 Functions Performed by the Principal when Observing Teachers in the Classroom during Teaching and Learning

The study sought to establish the frequency in which various functions are performed by the principal when observing teachers in the classroom during the teaching and learning process. This study therefore established pre-observation, observation and post observation practices carried out by the principals. The results are presented in Tables 4.9, 4.10 and 4.11 respectively. Items were crafted on a five point Likert scale where; *1-Strongly agree, 2-Agree, 3-Not sure, 4-Disagree, 5-Strongly disagree.*

The teachers of chemistry were asked about the principals' pre-observation practices. Table 4.9 shows the findings.

Table 4.9 Pre-Observation (N=86)

Statement	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean	SD
1. Principal establishes a positive relationship with the teachers and gives them time to share about their classroom practices	19 (22.1)	30 (34.9)	14 (16.3)	16 (18.6)	7 (8.1)	2.56	1.252
2. The principal is acquainted with the instructional methods the teacher plans to use during the lesson	16 (18.6)	33 (38.4)	13 (15.1)	18 (20.9)	6 (7.0)	2.59	1.211
3. The principal discusses with the teacher on how to address the various learning abilities amongst the students	11 (12.8)	28 (32.6)	17 (19.8)	20 (23.3)	10 (11.6)	2.88	1.241
4. The principal works with the teacher to identify data which will be collected to measure the specific focus areas in learning/teaching	3 (3.5)	7 (8.1)	9 (10.5)	43 (50.0)	24 (27.9)	3.91	1.013
Average score						**2.99**	**1.179**

Source: Survey Data (2023)

Results given in Table 4.9 show that majority of the respondents agreed to three statements as indicated by mean that lies between (M = 2.56 - 2.88) and disagree to one statement (mean response 3.91). The respondents agreed that the principal establishes a positive relationship with the teachers and gives them time to share about their classroom practices (M = 2.56, SD = 1.252). Respondents agreed that the principal is acquainted with the instructional methods the teacher plans to use during the lesson (M

= 2.59, SD = 1.211). Finally, the Respondents agreed that the principal discusses with the teacher on how to address the various learning abilities amongst the students (M = 2.88, SD = 1.241). However, the respondents disagreed to the statement that the principal works with the teacher to identify data which will be collected to measure the specific focus areas in learning/teaching (M = 3.91, SD = 1.013).

The findings are in agreement with Benigno (2016) who posit that effective instructional supervision can facilitate the development of an effective relationship between the teacher and the principal and that relationship can translate into quality instruction in the classroom. Benigno (2016) further asserts that lesson planning, assessment strategies, and the context of the classroom should be discussed during pre-observation conference. Through collaborative communication, the principal should encourage the teacher to differentiate instruction and address the multiple learners in the classroom. Hence, the direction of the lesson should be the result of a collaboration between the principal and the teacher and the end result is developing that necessary collegial relationship between the principal and the teacher. Glickman, Gordon and Ross-Gordon (2014) postulates that, during the pre-observation conference, the instructional supervisor and the teacher should expand their discussion concerning the role of the teacher in the activity so that both the supervisor and teacher are clear about what will transpire. According to Balyer, Karatas and Alci (2015), principals are considered omniscient in their understanding of effective teaching and learning practice.

The teachers of chemistry were asked about the principals' observation practices. Table 4.10 shows the findings.

Table 4.10 Observation (N=86)

Statement	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean	SD
1. The principal visits classes when teaching is in progress to observe the teaching and learning process	5 (5.8)	20 (23.3)	6 (7.0)	46 (53.5)	9 (10.5)	3.40	1.130
2. The principal assesses the teaching practices utilised by teachers and assists in improving results	8 (9.3)	15 (17.4)	11 (12.8)	35 (40.7)	17 (19.8)	3.44	1.252
3. The principal evaluates and records strengths and weakness of the teaching during observation	3 (3.5)	19 (22.1)	2 (2.3)	41 (47.7)	21 (24.4)	3.67	1.173
4. The principal ensures instructional time allocated for the lesson is adequate	30 (34.9)	38 (44.2)	1 (1.2)	13 (15.1)	4 (4.7)	2.10	1.179
Average score						**3.15**	**1.184**

Source: Survey Data (2023)

It is evident from Table 4.10 that majority of the respondents disagreed to three statements as indicated by means that lie between (M = 3.40 - 3.67) and agree to one statement (mean response 2.10). The respondents disagreed to the statement that the principal visits classes when teaching is in progress to observe the teaching and learning process (M = 3.40, SD = 1.130). Respondents disagreed that the principal assesses the teaching practices utilised by teachers and assists in improving results (M = 3.44, SD = 1.252). The Respondents disagreed that the principal evaluates and records strengths and weakness of the teaching during observation (M = 3.67, SD = 1.173). On the other

hand, the respondents agreed with the statement that the principal ensures instructional time allocated for the lesson is adequate (M = 2.10, SD = 1.179).

The study findings concur with Nyamwamu (2010), who confirmed that there is laxity among principals in carrying out frequent classroom assessment of teachers due to inadequate time and too many responsibilities of managing the schools making them not to observe teaching and learning process. The findings are in line with Onyoni (2013) who established that most of the principals do not orient teachers to new teaching methods and have little time to observe teachers in class. A study by Mwangi (2017) established that principals' instructional supervision activities like sitting in a class to supervise teaching were rarely carried out. Kariuki (2013) further supports the findings by indicating that majority of the principals never visit teachers in class to observe teacher's instructional methods. The findings negate Bore (2012) who observed that principals often visits classes as learning progress. The study results also negate Ngipuo (2015) who found out that principals frequently visit classrooms to observe students' discipline and check on the teaching/learning aids that teachers use. The current study established that classroom visits enabled principles to interact with teachers and assess whether sound instruction was being delivered.

Teachers of chemistry stated the post-observation practices of the principal and Table 4.11 presents the results.

Table 4.11 Post-Observation (N=86)

Statement	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean	SD
1. The principal evaluates and analyses the teaching methods before meeting with the concerned teacher	3 (3.5)	22 (25.6)	8 (9.3)	30 (34.9)	23 (26.7)	3.56	1.233
2. The principal discuss with the teacher on how to better improve their teaching	8 (9.3)	18 (20.9)	4 (4.7)	33 (38.4)	23 (26.7)	3.52	1.335
3. The principal accurately presents the data that is gathered to the teacher for self-reflection	10 (11.6)	26 (30.2)	1 (1.2)	28 (32.6)	21 (24.4)	3.28	1.420
4. The principal encourages the teacher to acquire new skills and keep up with current trends in education	25 (29.1)	31 (36.0)	0 (0.0)	19 (22.1)	11 (12.8)	2.53	1.436
Average score						**3.22**	**1.356**

Source: Survey Data (2023)

Information from Table 4.11 reveals that majority of the respondents disagreed to three statements as indicated by mean that lies between (M = 3.28 - 3.56) and agree to one statement (mean response 2.53). The respondents disagreed to the statement that the principal evaluates and analyses the teaching methods before meeting with the concerned teacher (M = 3.56, SD = 1.233). Respondents disagreed that the principal discusses with the teacher on how to better improve their teaching (M = 3.52, SD = 1.335). The Respondents disagreed that the principal accurately presents the data that is gathered to the teacher for self-reflection (M = 3.28, SD = 1.420). Finally, the

respondents agreed to the statement that the principal encourages the teacher to acquire new skills and keep up with current trends in education (M = 2.53, SD = 1.436).

The findings are supported by Onyoni (2013) who notes that most of the principals do not meet and discuss the observed lesson with teachers. The study findings support the findings of a study by Mwangi (2017) that established that principals do not effectively carry out their instructional supervision role of frequently observing teachers in class and giving feedback after classroom observation. In line with the study findings, Kariuki (2013) indicated that principals failed to give feedback after classroom observation, a clear indication that they were unable to trace learning skills problems which could significantly contribute to improved academic performance. In contrast to the study findings, Ngipuo (2015) findings reveal that frequent feedback to teachers regarding classroom performance gives principals control over academic activities. The findings also negates Mwendia (2018) study which revealed that after observation, principals hold discussion with the concerned teachers on improvement strategies. According to Benigno (2016), all documentation taken from the observation process should be made transparent and it should be made available for interpretation and discussion by the teacher and the supervisor.

The study findings revealed that the principal encourages the teacher to acquire new skills and keep up with current trends in education (M = 2.53, SD = 1.436). In line with this findings, Basilio (2021) posit that with the changes in the educational landscape brought about by technological advancements and the ensuing change in terms of workforce requirements in the market, the need to adapt the teaching-learning inputs

and processes has become apparent and teachers are expected to develop and transform attuned to the needs of the times.

4.6.3 Classroom Visitation

The study sought to further explore classroom visitation by principals. This element was significant for this study as it is one of the pointers to effective instructional supervision. Data was collected from teachers of chemistry on principals' classroom visitation using a Likert Scaled questionnaire. The views of the teachers of chemistry on classroom visitation by the principals are displayed in Table 4.12.

Table 4.12 Classroom Visitation (N=86)

Statement	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean	SD
1. The principal regularly conduct classroom and laboratory visits to ensure teacher content delivery is in line with recommended syllabus	4 (4.7)	21 (24.4)	3 (3.5)	35 (40.7)	23 (26.7)	3.60	1.249
2. The principal accompany teachers to the classrooms	2 (2.3)	19 (22.1)	6 (7.0)	32 (37.2)	27 (31.4)	3.73	1.192
3. The teachers in the school observe one another when teaching	1 (1.2)	6 (7.0)	5 (5.8)	29 (33.7)	45 (52.3)	4.29	.944
4. The principal checks on the teaching and learning aids used by the teacher	21 (24.4)	37 (43.0)	2 (2.3)	17 (19.8)	9 (10.5)	2.49	1.335
5. The principal ensure teachers observe instruction time by punctuality	18 (20.9)	31 (36.0)	0 (0.0)	26 (30.2)	11 (12.8)	2.78	1.409
6. After classroom observation, the principal discusses the results with the teachers with a view to improving the instructional practices	1 (1.2)	20 (23.3)	3 (3.5)	41 (47.7)	21 (24.4)	3.71	1.115
Average score						**3.43**	**1.207**

Key: 1-Strongly agree, 2-Agree, 3-Not sure, 4-Disagree, 5-Strongly disagree

Source: Survey Data (2023)

As tabulated in Table 4.12 participants were inquired to provide their opinion by agreeing or disagreeing using the Likert scale. Majority of the respondents disagreed to the statement that the principal regularly conduct classroom and laboratory visits to

ensure teacher content delivery is in line with recommended syllabus (M = 3.60, SD = 1.249). Respondents disagreed that the principal accompany teachers to the classrooms (M = 3.73, SD = 1.192). The Respondents strongly disagreed that the teachers in the school observe one another when teaching (M = 4.29, SD = .944). The Respondents disagreed that after classroom observation, the principal discusses the results with the teachers with a view to improving the instructional practices (M = 3.71, SD = 1.115). On the other hand, the respondents agreed that the principal checks on the teaching and learning aids used by the teacher (M = 2.49, SD = 1.335). Finally, the respondents agreed to the statement that the principal ensure teachers observe instruction time by punctuality (M = 2.78, SD = 1.409). With a mean of 3.43 and a standard deviation of 1.207, it can be concluded that majority of the principals' do not visit teachers of chemistry in classrooms and laboratories to observe their instructional practices.

The findings concurred with studies by Cheruiyot (2015) which showed that most principals do not observe teachers as they teach in class and they monitor the teaching learning progress by depending on the professional records monitored by him/her or delegated to the deputy principal to ensure the right curriculum is being implemented. This agrees with Magut (2018) who revealed that principals rarely visit classrooms to supervise teachers while teaching despite the fact that they are mandated to do so. In contrast, Maiso, (2019) observes that the principals conduct random visits to laboratories during lessons with the aim of improving teaching and learning process. Similarly, Cheboi (2014) established that principals maintain high instructional supervision presence in their respective schools through Management by Walking Around (MBWA) policy to meet teachers and students in laboratories, dormitories, classes, staffrooms and holding frequent staff briefs to give feedback. Studies by Ebele

and Olofu (2017) and Allida, Ollela, Ogwari, and Minka (2018) emphasized the need for more periodic and regular classroom supervision which should not be done only when there is a need. According to Chiedozie and Akinfolarin (2017), regular and timely instructional supervision of teachers not only minimizes instructional time wastage but also encourages timely discharge of teaching duties, thereby ensuring effective time management in the school.

Findings from the study revealed that respondents strongly disagreed that the teachers in the school observe one another when teaching (M = 4.29, SD = .944). According to a study by Hendry and Oliver (2012), most teachers believe that observing a colleague and receiving feedback are equally beneficial for improving their teaching. Tosriadi, Asib, Marmanto and Arifatul Azizah (2018) asserts that observing other teachers teach provides teachers with some insightful feedbacks related to professional and personal competence and stimulate a reflective review on the basis of others' performances. Tzotzou (2014) postulates that when teachers observe one another when teaching, it is an effective tool that they could utilize to build awareness of using a wide variety teaching techniques to run the class more effectively and exchange idea related to teaching method and materials.

The respondents agreed that the principal checks on the teaching and learning aids used by the teacher (M = 2.49, SD = 1.335). This finding is corroborated by a study by Sule, Eyiene and Egbai (2015) who posit that regular supervision of learning aids assists principals in coordinating, improving and maintaining high teaching and learning standards in schools as lessons are structured with an interesting beginning. These findings support the assertions of Grigsby and Vesey (2011) who state that principals as

instructional leaders are responsible for supervising the preparation and implementation of teaching and learning aids as they are responsible for the learners academic achievement. In contrast to the study findings, Ayeni (2012) study revealed that monitoring instruction aids was among the instructional supervisory roles that were least performed by principals.

The respondents agreed that the principal ensure teachers observe instruction time by punctuality (M = 2.78, SD = 1.409). In line with this finding, a study by Butakor and Boatey (2018) established that teachers are punctual to class when they are being supervised by the principals. The findings concur with the findings reported by Quah (2011) who revealed that principals have successfully implemented instructional time by observing teachers punctuality. In contrast to the findings, Chiedozie and Akinfolarin (2017) revealed that principals on their application of instructional supervision practices rarely observe punctuality of the teachers.

The study findings revealed that after classroom observation, the principal never discusses the results with the teachers with a view to improving the instructional practices (M = 3.71, SD = 1.115). In line with these findings, a study by Akinwale and Emetarom (2017) in Anambra State revealed that school principals are not involved in instructional supervision practices of regularly meeting with teachers where instructional challenges are discussed and feedback given to the teachers after classroom observation. The findings concur with the findings reported by Akporehe and Asiyai (2021) that principals may not be carrying out monitoring effectively as they never give feedback after classroom observation.

4.6.4 Class Observation Influence on Academic Performance in Chemistry

The study sought to establish the influence of class observation on academic performance in chemistry. The results are reported in Figure 4.6.

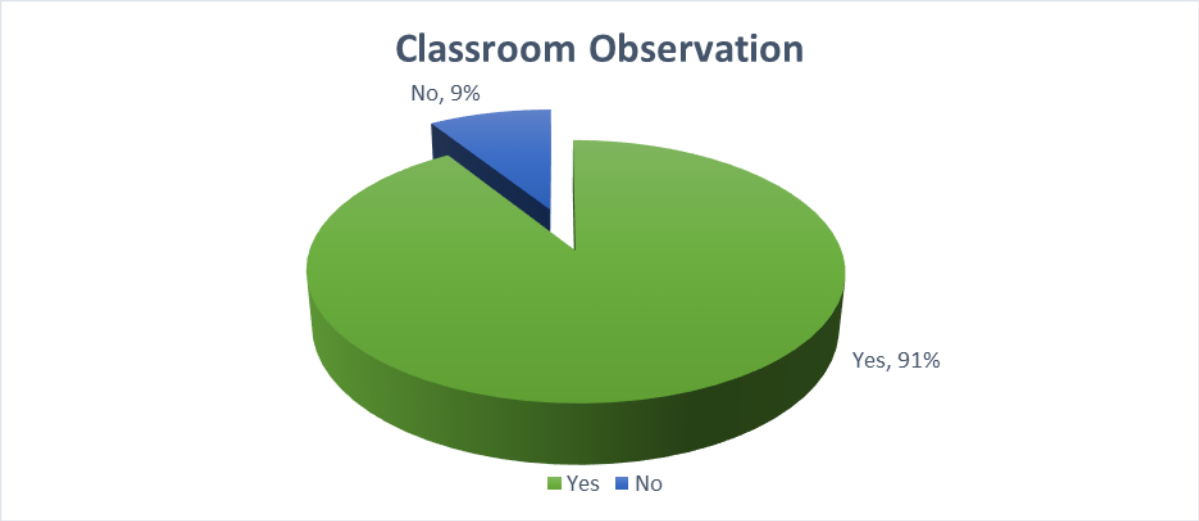


Figure 4.6 Class Observation Influence on Academic Performance in Chemistry (N=86)

Source: Survey Data (2023)

Figure 4.6 reveals that majority of the teachers of chemistry 78 (91%) reported that class observation has influence on academic performance in chemistry, while only eight (9%) of the teachers of chemistry reported that class observation had no influence on academic performance. The teachers of chemistry noted that classroom observation helps in measuring strengths and weaknesses as far as the needs of the learners are concerned leading to improved academic performance. They further reported that classroom observation enhances teacher's ability to improve the classroom instruction. Additionally, they noted that feedback from classroom observation assists in modifying and improving teaching behaviours which ultimately contributes to improved academic performance.

When asked about influence of classroom observation on academic performance in chemistry, one of the principals commented:

> *My visits to classrooms is not very regular due to my duties. However, I know that classroom visitation plays a very key role in academic performance of my students as it assists in guiding teachers on the appropriate teaching methods.*

This can be supported by the following statement from one of the principals:

> *Mostly, I have limited my instructional supervisory duties to monitoring professional documents. But, I also know that classroom observation is instrumental in overall academic performance of my students and that is why I have delegated classroom observation to my deputy and HODs so as to get timely feedback from them.*

Another principal noted that:

> *Through classroom observation I can see just where support is needed and I am able to build trust in teachers as I observe them working their magic in the classroom. This mutual working relationship assists in coming up with solutions on how to improve academic performance in our school.*

These findings are in agreement with Ceria (2021) who asserts that that teachers who are regularly observed are less likely to fall into slumps unnoticed as they know that principals are coming for observations regularly. They are thus mindful of their instructional practices. Ceria (2021) study results revealed that students who were observed when being taught by their teachers, all of their academic performances improved at a significant level. This is supported by Mudzanani and Makgato (2016) who reported that instructional leaders should be conscious of what is happening in the

classrooms by means of regular monitoring of teaching/learning processes to enhance the students' performance in the national examination. This conforms to Cheboi (2014) who posits that classroom observation and discussions after lessons can guide teachers to reflect on their own teaching practices, allowing them to develop particular skills and techniques which are beneficial to the overall student academic performance. This finding is also in line with Barrogo (2020) who mentioned that classroom observation is an integral part of teaching as it provides a positive critical framework for evaluating one's practice, improving skills, and developing strengths which are meant to improve the academic performance of students.

4.7 Teacher Professional Development and Student' Academic Performance

The third objective sought to assess the influence of principals' management of teacher professional development on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

4.7.1 Principals Recommend Teachers for Professional Development

The study sought to establish if the principals recommend teachers for professional development and the results are reported in Figure 4.7.

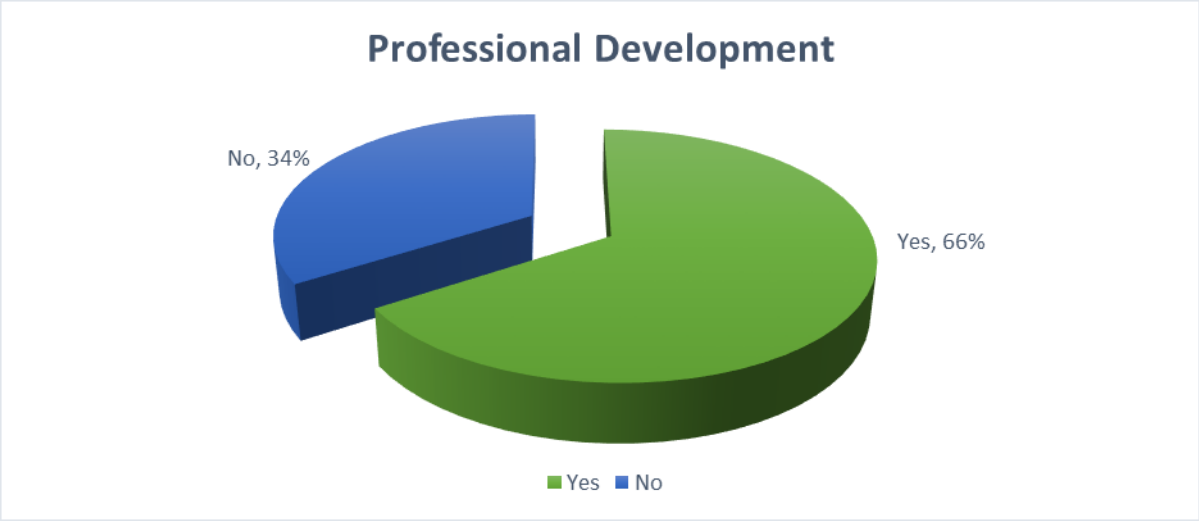


Figure 4.7 Principals Recommend Teachers for Professional Development (N=86)

Source: Survey Data (2023)

From the Figure 4.7, majority of the teachers of chemistry, that is 57 (66%) reported that the principal recommends teachers' for professional development, while only 29 representing 34% of the teachers of chemistry reported that the principal does not recommend teachers' for professional development. Further probe revealed that majority of the teachers of chemistry attended seminars and workshops with only a few indicating that they had pursued short courses. The study findings show that the principals have embraced professional development since it is clear that continuous improvement in teaching methods and skills is necessary in the teaching environment.

The current study concurs with Kirui and Osman (2012) who pointed out that the principals' management of professional development is extensively regarded as a critical source of competitive advantage in the ever changing demands of a school setting. These findings are in agreement with Omaali, Kalule, and Baguwemu (2019) who postulated that professional development is an essential element for the continued effective performance of teachers in a school and should be considered as both ongoing and recurring in their schools. In line with the study findings, Glickman, Gordon, and

Ross-Gordon (2017) postulated that in-service training courses in the form of workshops and seminars, as well as distributing relevant instructional literature, equip teachers with knowledge in the form of professional development. In concurrence, Darling-Hammond, Hyler, and Gardner (2017), established that successful instructional supervisors encourage teachers to attend workshops and seminars and provide them with current information on educational programmes in regards to teachers' professional development. In contrast, the findings of a study by Dechassa (2019) revealed that training programs organized at secondary schools were found ineffective with regard to focus towards achieving continuous professional growth of teachers.

4.7.2 Teacher Competency

The study also sought to establish the teacher competency. The results are shown in the Figure 4.8.

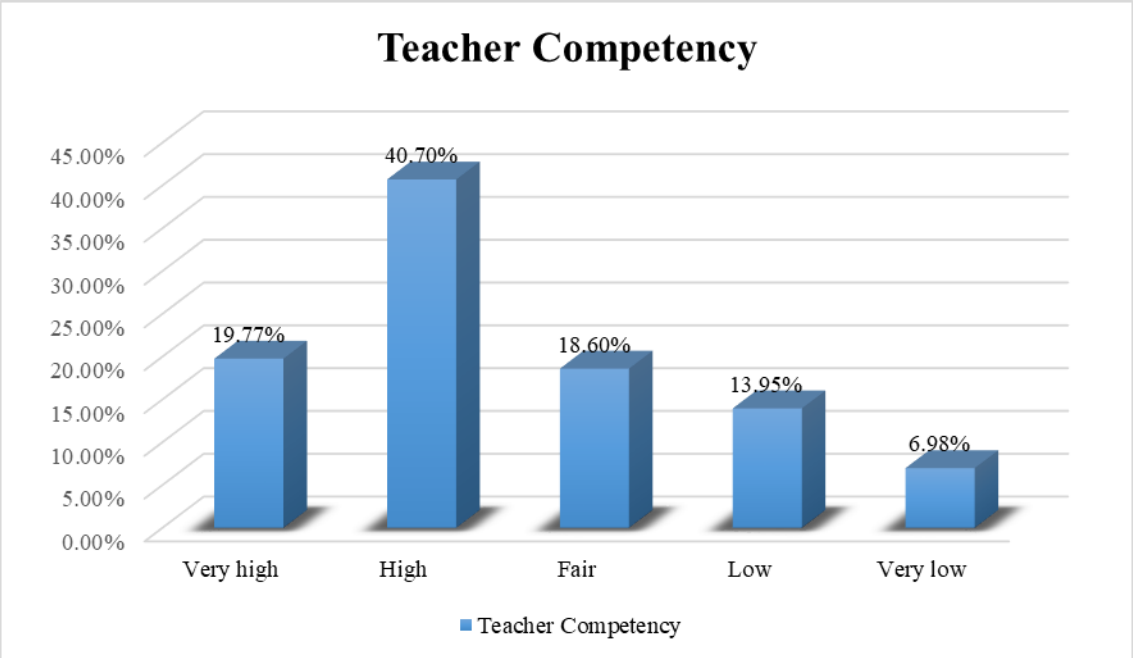


Figure 4.8 Teacher Competency (N=86)

Source: Survey Data (2023)

Information from Figure 4.8 shows that majority of teachers of chemistry, that is 35 (40.70%) reported that teachers' competency was high, while 17 (19.77) reported

teachers competency was very high, 16 (18.60%) fair, 12 (13.95%) and six (6.98) very low. The findings revealed that the teachers of chemistry have acquired a set of abilities and knowledge which they are able to utilize in the teaching-learning process. In line with the study findings Nbina (2012) observed that teacher competence needs to be high in order for meaningful teaching and learning to take place. Hence, the professional teacher of chemistry is expected to possess both professional (academic and pedagogical) and personal competence. Nolan and Hoover (2011) points out that continuous teacher professional competency through instructional supervision generally depicts teacher quality which is a key component of major educational reform programmes.

4.7.3 Teachers Professional Development

The teachers in the study were asked to respond to a number of statements regarding the teachers of chemistry professional development using a 5 point Likert rating scale. The results are shown in the Table 4.13.

Table 4.13 Teachers Professional Development (N=86)

Statement	**1 (%)**	**2 (%)**	**3 (%)**	**4 (%)**	**5 (%)**	**Mean**	**SD**
1. The principal implements staff development programmes in the school to improve classroom practices	17 (19.8)	34 (39.5)	6 (7.0)	19 (22.1)	10 (11.6)	2.66	1.334
2. The principal encourages teachers to attend courses to improve their professionalism and competencies	40 (46.5)	27 (31.4)	2 (2.3)	13 (15.1)	4 (4.7)	2.00	1.237
3. The principal ensures that	21	32	11	15	7		

all teachers participate in planning for staff development activities	(24.4)	(37.2)	(12.8)	(17.4)	(8.1)	2.48	1.262
4. The principal plans workshops and internal training to meet instructional needs of teachers	18 (20.9)	36 (41.9)	8 (9.3)	21 (24.4)	3 (3.5)	2.48	1.176
5. The principal ensures that HOD'S in the school hold meetings with teachers to share information from courses attended	7 (8.1)	11 (12.8)	6 (7.0)	39 (45.3)	23 (26.7)	3.70	1.228
6. The principal ensures that funds for staff professional development are allocated in the school annual budget	15 (17.4)	41 (47.7)	3 (3.5)	18 (20.9)	9 (10.5)	2.59	1.287
7. The principal sponsors teachers for in-service courses that are consistent with the school goals	26 (30.2)	38 (44.2)	1 (1.2)	16 (18.6)	5 (5.8)	2.26	1.238
8. The principal supports the use of skills acquired during in-service, seminars and workshop training in the classroom	43 (50.0)	21 (24.4)	3 (3.5)	13 (15.1)	6 (7.0)	2.05	1.336
9. The principal sets aside time for teachers to share ideas or information regarding professional development	5 (5.8)	17 (19.8)	7 (8.1)	36 (41.9)	21 (24.4)	3.59	1.221

Key: 1-Strongly agree, 2-Agree, 3-Not sure, 4-Disagree, 5-Strongly disagree

Source: Survey Data (2023)

Based on the results in Table 4.13, it is clear that the respondents agreed that the principal implements staff development programmes in the school to improve classroom practices (M=2.66, SD=1.334); the principal ensures that all teachers participate in planning for staff development activities (M=2.48, SD=1.262); the principal plans workshops and internal training to meet instructional needs of teachers (M=2.48, SD=1.176); the principal ensures that funds for staff professional development are allocated in the school annual budget (M=2.59, SD=1.287); the principal sponsors teachers for in-service courses that are consistent with the school goals (M=2.26, SD=1.238). The respondents strongly agreed that the principal encourages teachers to attend courses to improve their professionalism and competencies (M=2.00, SD=1.237); the principal supports the use of skills acquired during in-service, seminars and workshop training in the classroom (M=2.05, SD=1.336). The respondents disagreed that the principal ensures that Head of Departments (HOD'S) in the school hold meetings with teachers to share information from courses attended (M=3.70, SD=1.228); The principal sets aside time for teachers to share ideas or information regarding professional development (M=3.59, SD=1.221).

Mwakajitu and Lekule (2022) postulated that most of the organized professional development programmes are indispensable to all science teachers as they are expected to improve students' academic achievement. The study confirms findings by Omondi (2019) who posited that principals encourage teachers to participate in professional development through attending in-service courses. This study further established that principals' performance in instructional supervision enhanced teachers' professional development to a greater extent in preparing students for national examinations. Kamal, Yunus and Salomawati (2012), while concurring with the study reported that apart from

undertaking lesson observation to improve teaching, principals are expected to organize and implement programmes like in-service education and school-level workshops that will foster teacher professional development.

The findings of this study are supported by Onumah (2016) who establishment that support for continuous staff development is a major supervisory function of principals and they should always endeavor organize in-service activities in their respective schools. In line with the findings Ramano (2014) asserts that promoting teachers' professional development is the most prominent instructional supervision role of school principals as teachers gain new perspectives and expertise which elevates students' academic performance. The findings further support Muasya (2018) who observed that principals should ensure continued exposure of their teachers to relevant professional courses, workshops and seminars as this will translate to more effective teaching and learning, and therefore enhancing the academic performance of their students. In line with the study findings, Irungu, Kagema and Gachahi (2019) asserts that, there is need for principals to organize forums in their schools where those teachers who have undergone through professional development programmes can educate the other teachers, in order to ensure that all teachers implement the new knowledge that has been gained collaboratively.

In contrast to the findings studies by Hussen (2015) and Assefa (2014), revealed that principals do not organize for in-service programmes, conferences and seminars. The studies concluded that professional development programmes were least performed by principals. In the same vein, Garba (2020) assert that that many principals in public

secondary schools do not organize workshops and there were no records of planned or implemented teacher development programmes.

4.7.4 Teacher Professional Development Influence Academic Performance in Chemistry

The study further sought to establish if teacher professional development influences academic performance in chemistry and the results are displayed in Figure 4.9.

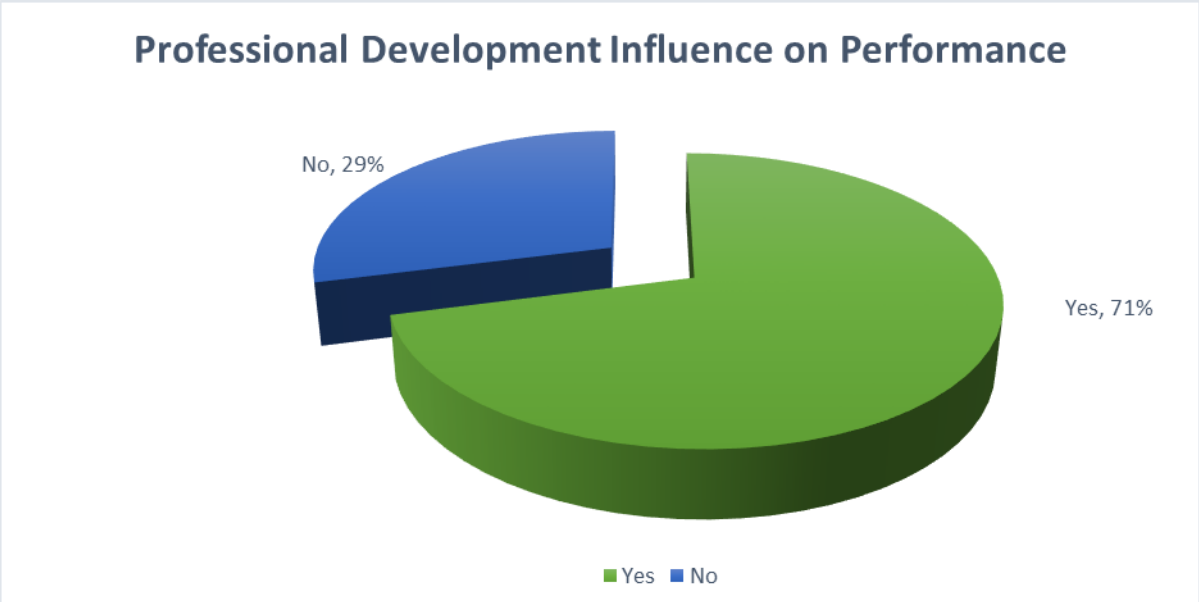


Figure 4.9 Teacher Professional Development Influence on Academic Performance in Chemistry (N=86)

Source: Survey Data (2023)

Information from Figure 4.9 reveals that majority of the respondents, that is 61 (71%) agree that teacher professional development influence academic performance in chemistry, while 25 (29%) disagree that teacher professional development influences academic performance in chemistry. The study established that high quality professional development translates into improved students' academic performance in

chemistry as it equips teachers with new knowledge and teaching skills. Teacher professional development produces superior teaching in classrooms, which translate into higher levels of student achievement.

During a face to face interview, one of the principal opined that:

> *I usually organize for in-service training for my teachers as this activity normally contributes to improve teachers' knowledge and skills, which translates to increased student learning and finally the results are evident in the students' performance in KCSE.*

The following were also some of the comments made by various principals:

Principal One:

> *I strongly believe that professional development helps teachers to acquire the instructional procedures and the scientifically researched-based strategies they need to help all students reach the articulated learning goals. This is why I have embraced professional development in my school to ensure that teachers acquire new knowledge that will assist in improving performance in my school.*

Principal Two:

> *I am usually faced with challenges of limited teachers' time to attend in-service training and limited financial resources to pay for this training. But since I know that profession development leads to increased student achievement, I usually organize for some of my teachers to attend workshops and seminars that are tailored to equip them with new skills.*

Principal Three:

> *Professional development is squarely focused on increasing teachers' knowledge and teaching skills that are key ingredients to improved students' performance in chemistry.*

Principal Four:

> *I create a supportive learning culture among all teachers in my school as this directly contributes to improved student performance and overall school effectiveness.*

This is substantiated by the findings of Watene, Choge and Kodak (2020) who concluded that principals support of staff professional development and students' academic achievements are correlated. Hence, principals should embrace ways of improving professional development by sponsoring attendance of professional development seminars that are in tandem with improving school's academic goals. This is further supported by Parish (2013) whose study results indicated that teachers who participated in professional development had increased student achievement compared to their counterparts who did not participate in professional development. A study conducted by Steyn (2011) concurs with the findings by indicating that teacher professional development has become increasingly important for students' academic improvement initiatives. In line with the study findings, Oguta and Getange (2019) research found out that teacher professional development had significant influence on students' academic achievement in secondary school education.

4.8 School Performance

4.8.1 Weekly Teaching Load

The study further sought to establish teachers of chemistry teaching load in a week and the results are displayed in Table 4.14.

Table 4.14 Teaching Load in a Week (N=86)

Teaching Load	F	%
1-5 lessons	0	0.0
6-10 lessons	1	1.16
11-15 lessons	7	8.14
15-20 lessons	32	37.21
Over 20 lessons	46	53.49

Source: Survey Data (2023)

The findings from the Table 4.14 reveal that majority 46 (53.19 %) of the teachers of chemistry had over 20 lessons in a week, while 32 (37.21%) indicated that they had 15-20 lessons in a week, seven (8.14) had 11-15 lessons and one (1.16%) had 6-10 lessons. In line with the study findings, Report of the Task Force on Secondary Schools Fees 2014, proposed that secondary school teachers should handle a minimum of 32 lessons in a week. In support of the findings, Karogo, Matei, Kipchirchir, Kawira, and Omunyang'oli (2019) noted that there was a notable improvement in the proportion of teachers' workload with teachers indicating to have more than 27 lessons per week. The study further postulates that the current policy of a minimum of 40 lessons per week is not realistic and the TSC should consider revising downwards to a maximum of 35 lessons per week to give teachers adequate time for lesson preparations.

4.8.2 Instructional Supervision Strategies that Principals should put in place to enhance Chemistry Results

The teachers of chemistry were probed further to give their opinion on other instructional supervision strategies that principals should put in place to enhance KCSE chemistry results. The respondents were of the view that human relations skill was key to the success of the instructional supervision exercise. In support of the findings,

Agbayahoun (2017) postulates that the main purpose of instructional supervision is to help teachers improve their instructional practices, but the attainment of this goal is dependent upon the human relations in instructional supervision and the resulting teacher attitude towards it.

The teachers of chemistry further indicated that while executing their daily duties, they needed to be motivated by the principal. In concurrence with the current study findings, Ghavifekr and Ibrahim (2014) revealed that principals' instructional supervisory practices related to the teachers' motivation and subsequently led to their job performance. Yukl (2010) supports the findings by postulating that an instructional supervisor must have the competency and ability to encourage and motivate teachers to work together in order to produce better students' academic results. In further support of the findings, Wanzare (2012) established that instructional supervisory practices significantly relate with motivation and principals are expected to provide the right motivation for staff through their instructional supervisory role. The findings further support Donkoh and Baffoe (2018) who established that the teachers had very high motivation in relation to interpersonal relationship, recognition of effort and opportunities for professional growth.

4.8.3 KCSE Performance in Machakos County

Document analysis from Machakos County Director of Education (CDE) Office (2016 to 2022) provided information on public secondary schools' on performance in Machakos County in sciences for the period. Therefore, data on KCSE performance in sciences among the sampled public secondary schools for 2016 - 2022 was collected for

analysis in this study. Schools performance in the sciences among the sampled schools for year 2016 – 2022 is presented in Table 4.15.

Table 4.15 K.C.S.E Mean Score per Year (N=86)

Year	Physics (mean grade)	Chemistry (mean grade)	Biology (mean grade)
2016	5.407	2.463	3.513
2017	3.896	2.455	3.156
2018	4.111	4.026	3.403
2019	5.151	3.572	3.217
2020	4.454	3.404	3.597
2021	3.392	2.901	4.219
2022	3.602	3.062	3.607

Source: Survey Data (2023)

Table 4.15 indicates that in physics, Machakos County had a mean score of 5.407, 3.896, 4.111, 5.151, 4.454, 3.392 and 3.602 in the years 2016, 2017, 2018, 2019, 2020, 2021 and 2022. In chemistry, secondary school had a mean score of 2.463, 2.455, 4.026, 3.572, 3.404, 2.901 and 3,062 in the years 2016, 2017, 2018, 2019, 2020, 2021 and 2022. While in biology, secondary school in the county had an average mean score of 3.513, 3.156, 3.403, 3.217, 3.597, 4.219 and 3.607 602 in the years 2016, 2017, 2018, 2019, 2020, 2021 and 2022. The analysed data clearly established that among the three sciences, chemistry is the least performed subject over the years except in 2018 and 2019 where physics had poor performance with a mean of 3.403 and 3.217 respectively. The study concurs with findings of Mutuku (2022) who established that the performance in KCSE in Machakos County implies that majority of the candidates cannot be admitted for the competitive premier degree courses as KCSE results show a decline in quality grades.

4.9 Testing the Hypotheses of the Study

In this section the four research hypotheses of the study were tested. These were formulated as follows:

4.9.1 Test of Hypothesis One

The first study objective sought to determine the relationship between the principals management of teachers' of chemistry professional records and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

This was guided by the following null hypothesis:

$H_0$1: There is no statistically significant effect between management of teachers' of chemistry professional records by the principal and performance in chemistry in public secondary schools in Machakos County, Kenya.

In order to establish the relationship between management of teachers of chemistry professional records by the principals and students performance, Pearson correlation coefficients were calculated and used to find if there is a relationship between the two variables. The correlational analysis results are shown in Table 4.16.

Table 4.16 Correlation Analysis of Professional Records and Students' Academic Performance

		Professional records	Students' performance
Professional records	Pearson Correlation	1	.774**
	Sig. (2-tailed)		.000
	N	86	86
Students' performance	Pearson Correlation	.774**	1
	Sig. (2-tailed)	.000	
	N	86	86

**. Correlation is significant at the 0.01 level (2-tailed).

Pearson product correlation of professional records and students' academic performance was found to be highly positive and statistically significant (r = .774, p <.001). This

show that an increase in management of teachers of chemistry professional records would significantly improve students' academic performance.

A Regression analysis was conducted to empirically investigate the extent management of teachers of chemistry professional records by the principal influence performance in chemistry in public secondary schools in Machakos County, Kenya. The findings from Table 4.17 in the regression analysis suggest that the regression model adequately captures the relationship between independent variables and the depended variable. The R-squared value of 0.976 indicates that 97.6 % of the variability in students' academic progress can be explained by management of teachers of chemistry professional records by the principal. This positive impact is observed across statistical variables related to student performance and academic progress. The findings suggest that the notable improvement in students' academic achievements within public secondary schools in Machakos County, Kenya can be primarily attributed to the effectiveness of management of teachers of chemistry professional records conducted by the principal. It's noteworthy that the observed variation is relatively modest. The regression analysis results are shown in Table 4.17.

Table 4.17 Model Summary for the Management of Teachers of Chemistry Professional Records.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.988[a]	0.976	0.976	0.149

a. Predictors: (Constant), Teachers Professional Records

The comprehensive significance of the model is detailed in Table 4.18 With an F-statistic of 75.780, the overall model demonstrates statistical significance. The findings suggest that the notable improvement in students' academic achievements has been attributed by the management of teachers of chemistry professional records by the principal. Table 4.18 shows the results.

Table 4.18 ANOVA for the Management of Teachers of Chemistry Professional Records.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.988	1	76.988	75.780	0.000[b]
	Residual	1.861	84	0.022		
	Total	78.849	85			

a. Dependent Variable: Students' Academic Performance

b. Predictors: (Constant), Teachers Professional Records

The impact of students' monitoring coefficients are presented in Table 4.19. The results show that students' academic performance and students' academic progress have a significant positive impact to the model since the p-value for the constant and gradient are less than 0.05. The findings imply that one positive unit change in the management of teachers of chemistry professional records by the principal leads to a notable improvement in students' academic achievements at the rate of 51.2%. This confirms the positive effect of managing teachers' professional records on students' academic performance.

The fitted equation is as shown below

$Y= -0.038+1.036X_1$

Table 4.19 Coefficients of the Impact of Management of Teachers of Chemistry Professional Records by the Principal.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.038	0.034		-1.123	0.264
	Teachers Professional Records	1.036	0.018	0.988	58.956	0.000

a. Dependent Variable: Students' Academic Performance

Therefore, the study rejects the null hypothesis that, there is no statistically significant effect between management of teachers' of chemistry professional records by the principal and performance in chemistry in public secondary schools in Machakos County, Kenya. This study concludes that there is a statistically significant relationship between management of teachers' of chemistry professional records by the principal and performance in chemistry in public secondary schools in Machakos County, Kenya.

4.9.2 Test of Hypothesis Two

The second study objective sought to determine the influence of monitoring students' academic progress by the principal on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

This was guided by the following null hypothesis:

$H_0 2$: There is no statistically significant effect between monitoring students' academic progress by the principal and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

In order to establish the relationship between monitoring students' academic performance in chemistry by the principals and students' performance, Pearson

correlation coefficients were calculated and used to find if there is a relationship between the two variables. The correlational analysis results are shown in Table 4.20.

Table 4.20 Correlation Analysis of Monitoring Students' Academic Progress and Students' Academic Performance

		Monitoring progress	Student's performance
Monitoring progress	Pearson Correlation	1	.796**
	Sig. (2-tailed)		.000
	N	86	86
Student's performance	Pearson Correlation	.796**	1
	Sig. (2-tailed)	.000	
	N	86	86

**. Correlation is significant at the 0.01 level (2-tailed).

Pearson product correlation of monitoring students' academic progress and students' academic performance was found to be highly positive and statistically significant (r = .796, p <.001). This show that an increase in monitoring students' academic progress would significantly improve students' academic performance.

A Regression analysis was conducted to empirically investigate the influence of monitoring students' academic progress by the principal on students' academic performance. The regression results in Table 4.21 indicate that the goodness of fit for the regression of independent variables and the impact of students' monitoring on their performance is satisfactory. An R squared of 0.697 indicates that 69.7% of the variations, diligent monitoring of students' academic progress by school principals has shown a positive impact on both the statistical variables of student performance and academic progress. From this it can thus be asserted that suggests that effective oversight contributes to improvements in students' academic achievements, particularly

in the field of chemistry, within public secondary schools in Machakos County, Kenya and that the variation is small. Table 4.21 shows the results.

Table 4.21 Model Summary for the Impact of Monitoring Students' Academic Progress

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.835	0.697	0.689	0.537

a. Predictors: (Constant), Students performance, Students' Academic Progress

The comprehensive significance of the model is detailed in Table 4.22. With an F-statistic of 95.303, the overall model demonstrates statistical significance. These results suggest that the strategy plays a crucial role in explaining the impact of monitoring students' academic progress on their performance.

Table 4.22 ANOVA for the Impact of Monitoring Students' Academic Progress

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.930	2	27.465	95.303	0.000b
	Residual	23.919	83	0.288		
	Total	78.849	85			

a. Dependent Variable: Students' Academic Performance

b. Predictors: (Constant), Students Performance, Students' Academic Progress

The impact of monitoring students' academic progress coefficients are presented in Table 4.23. The results show that students' performance and students' academic progress significantly to the model since the p-value for the constant and gradient are less than 0.05. The findings imply that one positive unit change in principal's monitoring on students' academic progress leads to a change in students' performance

at the rate of 70.5%. This confirms the positive effect of monitoring on students' academic progress on students' performance.

The fitted equation is as shown below

$Y= -0.\ 948 + 1.538 + 0.705X_1$

Table 4.23 Coefficients of Impact of Monitoring Students' Academic Progress.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.948	0.203		-4.680	.000
	Students' Academic Progress	0.705	0.170	0.334	4.158	.000
	Students' performance	1.538	0.215	0.576	7.159	.000

a. Dependent Variable: Students' Academic Performance

Therefore, the study rejects the null hypothesis that, there is no statistically significant effect between monitoring students' academic progress by the principal and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. This study concludes that there is a statistically significant relationship between monitoring students' academic progress by the principal and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

4.9.3 Test of Hypothesis Three

The third study objective sought to examine the influence of classroom visitation by the principal on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. This was guided by the following null hypothesis:

$H_0$3: There is no statistically significant effect between the principals' class visitations and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

In order to establish the relationship between principals class visitation and students' performance, Pearson correlation coefficients were calculated and used to find if there is a relationship between the two variables. The correlational analysis results are shown in Table 4.24.

Table 4.24 Correlation Analysis of Class Visitation and Students' Academic Performance

		Class visitation	Student performance
Class visitation	Pearson Correlation	1	.474**
	Sig. (2-tailed)		.000
	N	86	86
Student performance	Pearson Correlation	.474**	1
	Sig. (2-tailed)	.000	
	N	86	86

**. Correlation is significant at the 0.01 level (2-tailed).

Pearson product correlation of class visitation and students' academic performance was found to be positively low and statistically significant (r = .474, p <.001). Hence, $H_0$3 was rejected. This show that to some extent, an increase in class visitation would significantly improve students' academic performance.

A Regression analysis was conducted to empirically to investigate the Analysis for the influence of classroom visitation by the principal on students' academic performance. The findings from Table 4.25 in the regression analysis suggest that the regression model adequately captures the relationship between independent variables and the

influence of classroom visitation by the principal on students' academic performance. The R-squared value of 0.435 indicates that 43.5 % of the variability in students' academic progress can be explained by classroom visitation by the principal. This positive impact is observed across statistical variables related to student performance and academic progress. The findings suggest that the notable improvement in students' academic achievements within public secondary schools in Machakos County, Kenya can be primarily attributed to the effectiveness of classroom visitations conducted by the principal. It's noteworthy that the observed variation is relatively modest.

Table 4.25 Model Summary for the Impact of Classroom Visitation by the Principal.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.664	0.441	0.435	0.724

a. Predictors: (Constant), Classroom Visitations

The comprehensive significance of the model is detailed in Table 4.26. With an F-statistic of 66.320, the overall model demonstrates statistical significance. The findings suggest that the notable improvement in students' academic achievements within public secondary schools in Machakos County, Kenya can be primarily attributed to the effectiveness of classroom visitations conducted by the principal. Table 4.26 shows the results.

Table 4.26 ANOVA for the Impact of Classroom Visitation by the Principal.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34.787	1	34.787	66.320	0.000[b]
	Residual	44.061	84	0.525		
	Total	78.849	85			

a. Dependent Variable: Students' Academic Performance

b. Predictors: (Constant), Classroom Visitations

The impact of classroom visitations coefficients are presented in Table 4.27. The results show that students' performance and classroom visitations are significant to the model since the p-value for the constant and gradient are less than 0.05. The findings imply that one positive unit change in principals' classrooms visitations leads to a change in students' performance at the rate of 70.5%. This confirms the positive effect of classroom visitations on students' academic performance.

The fitted equation is as shown below

$Y= -0.114 + 0.512X_1$

Table 4.27 Coefficients of the impact of classroom visitation by the principal.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.114	0.240		-0.475	0.636
	Classroom Visitations	0.512	0.063	0.664	8.144	0.000

a. Dependent Variable: Students' Academic Performance

Therefore, the study rejects the null hypothesis that, there is no statistically significant effect between the principals' class visitations and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. This study concludes that there is a statistically significant relationship between the principals'

class visitations and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

4.9.4 Test of Hypothesis Four

The fourth study objective sought to assess the influence of principals' management of teachers' of chemistry professional development on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. This was guided by the following null hypothesis:

$H_0$4: There is no statistically significant effect between assessment of teachers of chemistry professional development by the principal and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

In order to establish the relationship between assessment of teachers of chemistry professional development by the principal and students' performance, Pearson correlation coefficients were calculated and used to find if there is a relationship between the two variables. The correlational analysis results are shown in Table 4.28.

Table 4.28 Correlation Analysis of Teachers of Chemistry Professional Development and Students' Academic Performance

		Professional development	Student performance
Professional development	Pearson Correlation	1	.670**
	Sig. (2-tailed)		.000
	N	86	86
Student performance	Pearson Correlation	.670**	1
	Sig. (2-tailed)	.000	
	N	86	86

**. Correlation is significant at the 0.01 level (2-tailed).

Pearson product correlation of principals' management of teachers' of chemistry professional development and students' academic performance was found to be moderately positive and statistically significant (r = .670, p <.001). This show that an increase in principals' management of teachers' of chemistry professional development would significantly improve students' academic performance.

Table 4.29 shows the regression analysis findings between principals' management of teachers of chemistry professional development and students' academic performance. From the Table 4.29, the value of R^2 was 0.449 inferring that 44.9% of the variations in students' academic performance was explained by principals' management of teachers of chemistry professional development. These findings showed existence of significant relationship between principals' management of teachers of chemistry professional development and students' academic performance in public secondary schools in Machakos County. This means that effective management of teachers of chemistry professional development significantly influences students' academic performance in chemistry. Table 4.29 shows the results.

Table 4.29. Model Summary for Management of Teachers of Chemistry Professional Development

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.670[a]	.449	.443	.269

a. Predictors: (Constant), Professional development

The comprehensive significance of the model is detailed in Table 4.30. With an F-statistic of 68.553, the overall model demonstrates statistical significance. The findings suggest that the notable improvement in students' academic performance within public secondary schools in Machakos County, Kenya can be primarily attributed to the

effectiveness of principals in managing teachers of chemistry professional development. Table 4.30 shows the results.

Table 4.30. ANOVA for the Management of Teachers of Chemistry Professional Development

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.959	1	4.959	68.553	.000[b]
	Residual	6.076	84	.072		
	Total	11.035	85			

a. Dependent Variable: Student academic performance
b. Predictors: (Constant), Professional development

The adopted regression model fitted was $Y= 0.669 + 0.181X_1$ with corresponding p-value of 0.00 which was less than 0.05. The implication was that there was a significant relationship between principals' management of teachers of chemistry professional development and students' academic performance in public secondary schools in Machakos County. Table 4.31 shows the results.

Table 4.31 Coefficients of the Impact of Management of Teachers of Chemistry Professional Development

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.669	.065		10.282	.000
	Professional development	.181	.022	.670	8.280	.000

a. Dependent Variable: Student academic performance

Therefore, the study rejects the null hypothesis that, there is no statistically significant effect between assessment of chemistry teacher professional development by the principal and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. This study concludes that there is a statistically significant relationship between assessment of chemistry teacher professional development by the

principal and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

4.10 Discussion of the Research Findings

Findings of the study are discussed as under the objectives of the study.

4.10.1 Principals' Management of Teachers' of Chemistry Professional Records and Students' Academic Performance in Chemistry

Findings of the study from the research study questions indicated that most principals and teachers of chemistry agreed that in executing instructional supervision roles, principals check schemes of work, records of work, lessons plans, lessons notes and students attendance register. The study findings revealed that principals effectively managed teachers of chemistry professional records leading to improved students' performance in KCSE. Pearson product correlation of professional records and students' academic performance was found to be highly positive and statistically significant (r = .774, p <.001). The R-squared value of 0.976 indicates that 97.6 % of the variability in students' academic progress can be explained by management of teachers of chemistry professional records by the principal. This led to the rejection of the null hypothesis and adoption of the alternative hypothesis that there is a statistically significant relationship between management of teachers' of chemistry professional records by the principal and chemistry performance in public secondary schools in Machakos County, Kenya.

These findings are supported by Muasa, Ogola and Nzioki (2021) who posit that it is the duty of the instructional supervisor, to check lesson notes and instructional materials, observe lesson delivery and identify the instructional challenges for learners to actualize good grades. The finding affirms findings of a study by Muthoni, Gitumu

and Mwaruvie (2020) that instructional supervisors value the importance preparation of lesson plans by teachers as it ensures teachers' readiness and timely curriculum delivery.

4.10.2 Monitoring Students' Academic Progress by the Principal and Students' Academic Performance in Chemistry

Majority of the principals and teachers of chemistry agreed that monitoring students' academic progress helps in identifying and diagnosing teaching and learning challenges encountered in public secondary schools. Pearson product correlation of monitoring students' academic progress and students' academic performance was found to be highly positive and statistically significant (r = .796, p <.001). This show that an increase in monitoring students' academic progress would significantly improve students' academic performance. An R squared value of 0.697 indicates that 69.7% of the variability in students' academic performance can be explained by principals monitoring students' academic progress. This led to the rejection of the null hypothesis and adoption of the alternative hypothesis that there is a statistically significant relationship between monitoring students' academic progress by the principal and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

The finding is supported by earlier finding by Garba and Abdullahi (2022) and Al- Hosani (2015) who revealed that monitoring students' academic progress in public secondary schools facilitates improvement in teaching and learning. The finding is supported by Wango (2014) who assert that the purpose of monitoring students' academic progress is to guarantee quality in teachers' instructions and students' learning process. The finding

is further supported by earlier findings by Mbuso (2015) and Jeptarus (2014) who revealed that principals' supervisory activities of monitoring progress of students were highly performed in public secondary schools and principals often discuss the progress of students with individual teachers in addition to checking assessment records and exercise books.

4.10.3 Principals' Class Visitations and Students' Academic Performance in Chemistry

The study established that the principals rarely find time to walk through classes and laboratories to observe ongoing teaching and learning. Despite the fact that principals have not fully embraced class visitation, the teachers of chemistry revealed that class visitation influence academic performance in chemistry. Pearson product correlation of class visitation and students' academic performance was found to be positively low and statistically significant (r = .474, p <.001). The R-squared value of 0.435 indicates that 43.5% of the variability in students' academic performance can be explained by classroom visitation by the principal. This led to the rejection of the null hypothesis and adoption of the alternative hypothesis that there is a statistically significant relationship between the principals' class visitations and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

This finding corroborates with the finding of Seni and Onyango (2021) who established that successful principals frequently visits classes and focus on making critical observations about learning and professional progress while providing direct and immediate feedback. The findings of this study were also in congruence with Ekpoh and Eze (2015) who revealed that frequent classroom visitations by principals leads to

better teacher work performance in terms of using teaching aids, teaching techniques, instructional ability, classroom discipline and communication effectiveness. The findings further support Malunda, Onen, Musaazi and Oonyu (2016) who opined that frequent class visitations ensures that the teaching-learning process was progressing as expected and this can improve educational quality, resulting in higher students' academic performance. According to a study by Ngui (2018), poor students' academic performance, is linked to principals who fail to monitor what was going on in classes and throughout the school.

4.10.4 The Principal Management of Teachers of Chemistry Professional Development and Students' Academic Performance in Chemistry

Findings of the study revealed that principals recommend teachers of chemistry for professional development leading to significant improvement in teachers' competency. Pearson product correlation of principals' management of teachers' of chemistry professional development and students' academic performance was found to be moderately positive and statistically significant (r = .670, p <.001). The value of R^2 was 0.449 inferring that 44.9% of the variations in students' academic performance was explained by principals' management of teachers of chemistry professional development. This led to the rejection of the null hypothesis and adoption of the alternative hypothesis that there is a statistically significant relationship between assessment of chemistry teacher professional development by the principal and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

The finding is in line with Yangambi (2021) who opined that professional development process enables teachers to gain a new understanding of teaching and learning methods for student learning as well as the ability to develop not only professionally, but also personally and socially. The finding is also in line with Golob (2012), who established that professional development of teachers is an important factor in performance of students in national examination. This finding aligns with that of Oluwole, Idikwu, Bawa, and Owobu (2017) that indicated that teachers' attendance to conference and workshop has significant influence on students' academic performance in secondary school.

4.11 Implications of the Findings

4.11.1 Implications of Findings to Principals

Principals should intensify instructional supervision activities of monitoring students' academic progress. They should ensure that instructional supervision is done continuously so as to improve the students' academic performance in their respective schools. The principals should frequently visit classrooms when teaching is ongoing so as to ensure that there is effective teaching and learning. They should create a supportive teaching environment and fully adopt classroom visitation as this can positively influence the schools output in terms of students' academic performance. Embracing instructional supervision ensures regular attendance by teachers and use of appropriate teaching methods. The principals should also embrace modern day trends in instructional supervision so as to influence teachers who are the backbone of improved teaching and learning outcomes. It is also essential for the principals to involve teachers in decision making in regards to how effectively implement instructional supervision practice so as to generate high morale and developing positive attitude towards

instructional supervision and this will lead to improved students' academic performance.

4.11.2 Implications of the Findings to Teachers of Chemistry

Teachers of chemistry should adopt classroom visitation by principals and acknowledge the visitation as a form of improving their performance and competence. Teachers should know that they are agents of change, thus they are tasked with the responsibility of changing their beliefs and attitudes towards instructional supervision and endeavor to improve their teaching skills.

4.11.3 Implications of the Findings to Parents

Parents should create adequate time in their busy schedules to discuss with their children about their academic performance. Parents should also attend academic meetings organized by schools and communicate frequently with teachers in order to know the academic performance of their children.

4.11.4 Implications of the Findings to the Government

The Ministry of Education should continuously endeavour to set enough funds to facilitate organizing of training workshops for principals in public secondary schools on modern strategies of monitoring students' academic progress. The Ministry of Education through TSC should come up with a training policy through which the newly recruited teachers will be mentored on the importance of adopting instructional supervision as they embark on their teaching duties.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents summary, conclusions and recommendations based on the study findings. The chapter also presents recommendations for further research.

The study sought to investigate principals' instructional supervisory practices and establish they impact students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. Four specific objectives were set out: The first objective aimed to determine the relationship between the principals' management of teachers' professional records and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. The second objective sought to determine the influence of monitoring students' academic progress by the principal on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. The third objective was to examine the influence of classroom visitation by the principal on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. Last but not least, the fourth objective was to assess the influence of principals' management of teacher professional development on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

The study used Convergent Parallel Mixed Methods Research Design. Using simple random sampling, the study sampled 73 principals and 109 teachers of chemistry. The study used interview schedule, document analysis guide and questionnaire with both open-ended and closed-ended questions to ensure that data was systematically collected

and easily analysed. To accomplish the objectives of the study and test the hypotheses, data was cleaned and coded and both descriptive and inferential statistics analyses generated using SPSS computer programme version 26.

5.2 An Overview of the Study's Results

5.2.1 Principals Management of Teachers of Chemistry Professional Records and Academic Performance

Objective one of the study sought to determine the relationship between the principals' management of teachers' professional records and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. The findings of the study revealed the frequency at which the principal checks the following listed professional records: schemes of work, records of work, lesson plans, lesson notes and students' attendance register. According to majority of the respondents, principals check teachers of chemistry scheme of work and lesson notes once per term. They also reported that principals checked students' attendance register, teachers' records of work, and lesson plans on weekly basis. The study established that to some extend, principals have embraced their instructional supervision duties of checking teachers' professional records in public secondary schools.

The findings of the study revealed that principals are concerned with monitoring teachers of chemistry professional records to a great extent (Mean 1.71, SD = .908) on a scale of 1 to 5. According to the study's results, the time allotted for chemistry curriculum instruction is adequate and the principal ensures teachers cover chemistry syllabus and adheres to the timetable. The study results established that due to the regular monitoring of syllabus coverage most of the public schools completed the

syllabus within the stipulated timeframe. The study findings revealed that principals' management of teachers' professional documents had influence on students' performance in chemistry.

5.2.2 Monitoring Students' Academic Progress

Objective two of the study sought to determine the influence of monitoring students' academic progress by the principal on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. The study established that principals monitor students' classwork, completed assignments and tests records once per term. The findings further reveal that principals monitor presentations and students' attendance on weekly basis. Majority of the respondents also revealed that that principals discuss students' progress monthly. On the other hand, the study results revealed that a significant number of the respondents are of the view that principals are never involved in peer assessment and formative assessment.

The results of the investigation established that monitoring of students' academic progress has the following four effects: Creates an overview of the quality of education in public secondary schools; helps in identification of teaching and learning challenges encountered in public secondary schools; helps to diagnose the short comings in implementation of the curriculum; alerts teachers on their instructional pace and hence assist to a great extend in syllabus coverage.

5.2.3 Classroom Visitations and Students 'Academic Performance

The third objective was to examine the influence of classroom visitation by the principal on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. The study established that principals carry out pre-

observation conference, hold post-observation conference, walk through classes and laboratories once per term. The findings further revealed that the principals observe teaching and learning activities in their respective secondary schools on monthly basis.

The findings reveal that principals establish a positive relationship with the teachers and give them time to share on their classroom practices. The study findings further show that the principal is acquainted with the instructional methods the teacher plans to use during the lesson and discusses with the teacher on how to address the various learning abilities amongst the students. Majority of the respondents reported that class observation has influence on academic performance in chemistry.

5.2.4 Teacher Professional Development and Student' Academic Performance

The fourth objective was to assess the influence of principals' management of teacher professional development on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. The study findings revealed that the principal implements staff development programmes in the school to improve classroom practices. Further, the findings revealed that the principal recommends teachers' for professional development. The teachers of chemistry attend seminars, workshops and short courses. The study established that through professional development, the teachers' of chemistry competency was high. According to the study, teacher professional development influence academic performance in chemistry.

5.3 Conclusions

Based on the findings of the study, the following conclusions are made:

1. Majority of the principals from public secondary schools in Machakos County check teachers professional records from time to time. The respondents agree that regular checking of professional records had great impact on students' performance in chemistry.
2. To some extend principals have embraced the instructional supervisory role of monitoring students' academic progress. However, the principals have not fully adopted peer assessment, formative assessments and presentations as part of their instructional supervision roles.
3. Majority of the principals rarely find time in their busy schedules to walk through classes and laboratories to observe instructional practices of teachers of chemistry and this impacts students' performance in chemistry.
4. The study indicated that teachers of chemistry attend in-house trainings, seminars and workshops to improve their teaching methods and skills. Thus the findings imply that principals have embraced professional development through implementing staff development programmes.

5.4 Recommendations

Based on the findings of the study, the following recommendations can be suggested:

1. The government, through the Ministry of Education needs to formulate clear policy that stipulates instructional supervisory roles of principals as a means for improving teaching effectiveness and students' academic performance in chemistry. Additionally, the Ministry of Education should regularly organize seminars and workshop in order to equip principals with skills on how to

effectively and efficiently carry out their instructional supervisory role. The government should ensure that principals are sensitized on instructional supervision which is aligned with 21st Century learning.

2. The principals should ensure that there is delegation of some of the instructional supervisory roles to their deputies. This will ensure that instructional supervisory activities in the schools are carried out seamlessly especially in cases where principals are overwhelmed by their administrative duties.
3. The principals need to visit classrooms more frequently so as to ensure that teaching and learning takes place seamlessly.
4. Professional development programmes should be well organised and funded, so as to ensure that teachers of chemistry adapt to the changing education environment brought about by advancement in technology.

5.5 Suggestions for Further Studies

Based on the findings of this study, further studies can be done in the following areas.

1. Since this research was carried out in secondary schools in Machakos County, a similar study should be replicated in other counties in Kenya in order to generalize the study's findings more broadly.
2. Again, since this research was carried out in public secondary schools, a similar research should be conducted in privately-owned secondary schools in Machakos County as well as in Kenya to establish whether similar results are obtainable.

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APPENDICES

Appendix I: Introduction Letter

Machakos University

School of Education,

P.O. Box 136-90100, Machakos

The Principal

School……

Dear Sir/Madam,

RE: REQUEST FOR COLLECTION OF DATA

I am a post graduate student from Machakos University pursuing a PhD in Educational Administration and I am in the process of conducting a research on "**Influence of Principal Instructional Supervision Practices on Students' Academic Performance in chemistry in Public Secondary Schools in Machakos County, Kenya."** I am therefore humbly requesting for your permission to gather the required information from you and the teachers. The questionnaires will be specifically meant for this study and therefore no name of the respondents will be required. The responses are strictly meant for this study and your identity and that of chemistry teachers will be treated with confidentiality. Your assistance and support on this matter will be highly appreciated.

Yours faithfully,

Marietta N. Mulinge
Phone No: 0712 925387

Appendix II: Questionnaire for the Teachers of Chemistry

This questionnaire is for the purpose of research only.

Please tick (✓) in appropriate bracket or fill in the information as your response to all the following questions. Do not write your name or the name of your school anywhere. The information will be completely confidential.

Section A: Demographic Information

1. What is your highest academic qualification?

Master's Degree ( ) B/Ed Degree ( )

Diploma ( ) Others (please specify)…….

2. For how long have you been a teacher in this school? ……..…… years

3. Have you ever attended any of the following training?

i. Seminar	Yes ( )	No ( )
ii. Workshop	Yes ( )	No ( )
iii. In-service training	Yes ( )	No ( )

4. Any other training, specify?.....

Section B: Principals Management of Teachers of Chemistry Professional Records and Academic Performance

5. The following tasks are supposed to be performed by principals in instructional supervision. Please show using a tick (√) the frequency at which the principal checks the listed professional records; Tick (W) if weekly, (F) if fortnightly, (M) if monthly, (O) if once per term and (N) if never

Professional records	W	F	M	O	N
i. Schemes of work					
ii. Records of work					
iii. Lesson plans					
iv. Lesson notes					
v. Students attendance register					

6. Kindly indicate your degree of agreement on the listed statements on influence of checking of chemistry teachers' professional records.

Key: 1-Strongly agree, 2-Agree, 3-Not sure, 4-Disagree, 5-Strongly disagree

No.	**Statements**	1	2	3	4	5
i.	The time allotted for chemistry curriculum instruction is adequate					
ii.	The principal checks teacher's records of work from time to time.					
iii.	The principal ensures teachers cover chemistry syllabus					
iv.	The principal checks where teachers adhere to the timetable					

7. Monitoring syllabus coverage

Does the principle check syllabus coverage? Yes ( ) No ( )

i. If yes, how often? (a) weekly ( ) (b) fortnightly ( ) (c) monthly ( ) (d) once per term ( ) (e) never ( )

ii. Do you have cases of uncovered syllabus? Yes ( ) No ( )

If yes give a possible reason

……..……

……...

……

8. Does the principal management of teachers' professional documents influence students' performance in chemistry? Yes ( ) No ( )

If yes, please explain

……..…

……..……..

……

Section C: Monitoring Students' Academic Progress and Students' Academic Performance

9. Please show using a tick (√) the frequency at which the principal monitors students' academic progress. Tick (W) if weekly, (F) if fortnightly, (M) if monthly, (O) if once per term and (N) if never

Monitoring students' academic progress	W	F	M	O	N
i. Class work					
ii. Completed assignments					
iii. Tests records					
iv. Students attendance and punctuality					
v. Discuss students' progress					
vi. Peer assessment					
vii. Formative assessment					
viii. Presentations					

10. Kindly indicate your degree of agreement on the listed statements on monitoring students' academic progress.

Key: 1-Strongly agree, 2-Agree, 3-Not sure, 4-Disagree, 5-Strongly disagree

No.	**Statements**	1	2	3	4	5
i.	Monitoring creates an overview of the quality of education in the school					
ii.	Monitoring helps identify some of teaching and					

	learning challenges encountered in school					
iii.	Monitoring helps to diagnose the short comings in implementation of the curriculum					
iv.	Supervision of students' assignments and projects help teachers gauge their understanding					
v.	Frequent testing of students and feedback given make them have positive attitudes towards tests					
vi.	Monitoring alerts teachers on their instructional pace and hence syllabus coverage					
vii.	Checking students' attendance register helps to know those who miss lessons and why					

Section D: Classroom Visitations and Students 'Academic Performance

11. The following tasks are supposed to be performed by principals in instructional supervision. Please show using a tick (√) the frequency at which the principal carry out the listed activities; Tick (W) if weekly, (F) if fortnightly, (M) if monthly, (O) if once per term and (N) if never

Classroom observation	W	F	M	O	N
i. Walk through classes and laboratories					
ii. Pre-observation conference					
iii. Post observation conference					
iv. Observing teaching and learning activities					

12. How frequently are the following functions performed by the principal in your school when observing teachers in the classroom during teaching and learning?

Key: 1-Strongly agree, 2-Agree, 3-Not sure, 4-Disagree, 5-Strongly disagree

Pre-observation	**1**	**2**	**3**	**4**	**5**
i. The principal establishes a positive relationship with the teachers and gives them time to share about their classroom practices.					
ii. The principal is acquainted with the instructional methods the teacher plans to use during the lesson.					
iii. The principal discusses with the teacher on how to address the various learning abilities amongst the students					
iv. The principal works with the teacher to identify data which will be collected to measure the specific focus areas in learning/teaching.					
Observation	**1**	**2**	**3**	**4**	**5**
i. The principal visits classes when teaching is in progress to observe the teaching and learning process.					
ii. The principal assesses the teaching practices utilised by teachers and assists in improving results.					
iii. The principal evaluates and records strengths and weakness of the teaching during observation					
iv. The principal ensures instructional time allocated for the lesson is adequate					
Post-observation	**1**	**2**	**3**	**4**	**5**
i. The principal evaluates and analyses the teaching methods before meeting with the concerned teacher					
ii. The principal discuss with the teacher on how to better improve their teaching					
iii. The principal accurately presents the data that is gathered to the teacher for self-reflection					
iv. The principal encourages the teacher to acquire new skills and keep up with current trends in education					

13. Kindly indicate your degree of agreement on the listed statements on classroom visitation in this school.

Key: 1-Strongly agree, 2-Agree, 3-Not sure, 4-Disagree, 5-Strongly disagree

No.	**Statements**	1	2	3	4	5
i.	The principal regularly conduct classroom and laboratory visits to ensure teacher content delivery is in line with recommended syllabus.					
ii.	The principal accompany teachers to the classrooms					
iii.	The teachers in the school observe one another when teaching.					
iv.	The principal checks on the teaching and learning aids used by the teacher					
v.	The principal ensure teachers observe instruction time by punctuality					
vi.	After classroom observation, the principal discuss the results with the teachers in view of improving the instructional practices					

14. Does class observation have influence on academic performance in chemistry?

Yes ( ) No ( )

If yes, elaborate briefly

.....

.....

Section E: Teacher Professional Development and Student' Academic Performance

15. Does the principal recommend teachers' for professional development?

Yes ( ) No ( )

16. If yes, which training?.....

Workshops ( ) Seminars ( ) Short courses ( )

Any other (Please specify) ……

17. How can you describe the teachers' competency?

Very high ( ) High ( ) Fair ( ) Low ( ) Very low ( )

18. Explain your answer …….

.....

19. In the Table below, please indicate your appropriate response to the statements given by ticking (√) in the correct box.

Key: 1-Strongly agree, 2-Agree, 3-Not sure, 4-Disagree, 5-Strongly disagree

No.	**Statements**	1	2	3	4	5
i.	The principal implements staff development programmes in the school to improve classroom practices					
ii.	The principal encourages teachers to attend courses to improve their professionalism and competencies					
iii.	The principal ensures that all teachers participate in planning for staff development activities.					
iv.	The principal plans workshops and internal training to meet instructional needs of teachers					
v.	The principal ensures that HOD'S in the school hold meetings with teachers to share information from courses attended					
vi.	The principal ensures that funds for staff professional development are allocated in the school annual budget					
vii.	The principal sponsors teachers for in-service courses that are consistent with the school goals					
viii.	The principal supports the use of skills acquired during in-service, seminars and workshop training in the classroom.					
ix.	The principal sets aside time for teachers to share ideas or information regarding professional development					

20. Does teacher professional development influence academic performance in chemistry? Elaborate briefly

.....

.....

SECTION F: School Performance

21. Kindly rate and comment on your school performance in sciences in the last six years.

Year	**Physics (mean grade)**	**Chemistry (mean grade)**	**Biology (mean grade)**
2016			
2017			
2018			
2019			
2020			
2021			

22. Please indicate your teaching load in a week

1-5 lessons ( ) 6-10 lessons ( ) 11-15 lessons ( ) 15-20 lessons ( )

Over 20 lessons ( )

23. In your opinion what other instructional supervision strategies should principals put in place to enhance chemistry results?

.....

.....

……..

Thank you for your participation in this study.

Appendix III: Interview Guide for the Principals

1. What is your highest professional qualification?

……

……..…

2. How many years have you served as a principal?.....

3. How often do you carry out the following instructional supervision practices in your school?

i. Checking teachers' professional records

……

ii. Monitoring students' academic progress

……

iii. Classroom visitations

……

iv. Teachers professional development

……

4. How do each of these activities influence academic performance in chemistry?

……

……

……

……

5. Have you ever attended any professional development course?

……

6. If yes which one(s)?

……

……

…….

7. What is the effectiveness of professional development on students' performance?

……

……

……

9. Kindly describe the schools' performance in chemistry in the past six years.

……

……

……

10. Kindly suggest measures that should be put in place to improve the teaching-learning process.

……

……

……

Thank you for your participation in this study.

Appendix IV: Budget

Item	No. of items	Unit cost (Ksh)	Total cost (Ksh)
Proposal development			
Internet			10,000
Copier papers	5 reams	900	4,500
Printer cartridge	1	4,930	4,930
Binding	6	200	1,200
Pre-test			
Printer cartridge	1	4,930	4,930
Photocopying questionnaires	75	12	900
Transport	10 days	1,000	10,000
Food and refreshments	10 days	1,000	10,000
Data collection			
Photocopying questionnaires	1224	12	14,688
Training research assistants	5 days	1,900	9,500
Transport	10 days	1,000	10,000
Food and refreshments	10 days	1,000	10,000
Data analysis and report writing			
Installing SPSS	1	1,000	1,000
Internet			10,000
Statistician			30,000
Copier papers	5 reams	900	4,500
Printer cartridge	1	4,930	4,930
Binding final defence copies	7	500	3,500
Final thesis binding	3	1,000	3,000
Sub-Total			147, 578
Contingency		15% of the total	22,137
Grand total			**169,715**

Appendix V: Time Plan

	Period								
Activity	June 2021	July-May 2022	July 2022	July-Aug. 2022	Sept-Nov. 2022	July-Oct. 2023	Dec. 2023-Feb 2024	March 2024	Aug, 2024
Identification of research title									
Proposal writing									
Submission of the proposal									
Proposal defense									
Pilot study									
Data collection									
Data analysis									
Project writing									
Submission of the project									

Appendix VI: Location of the Study

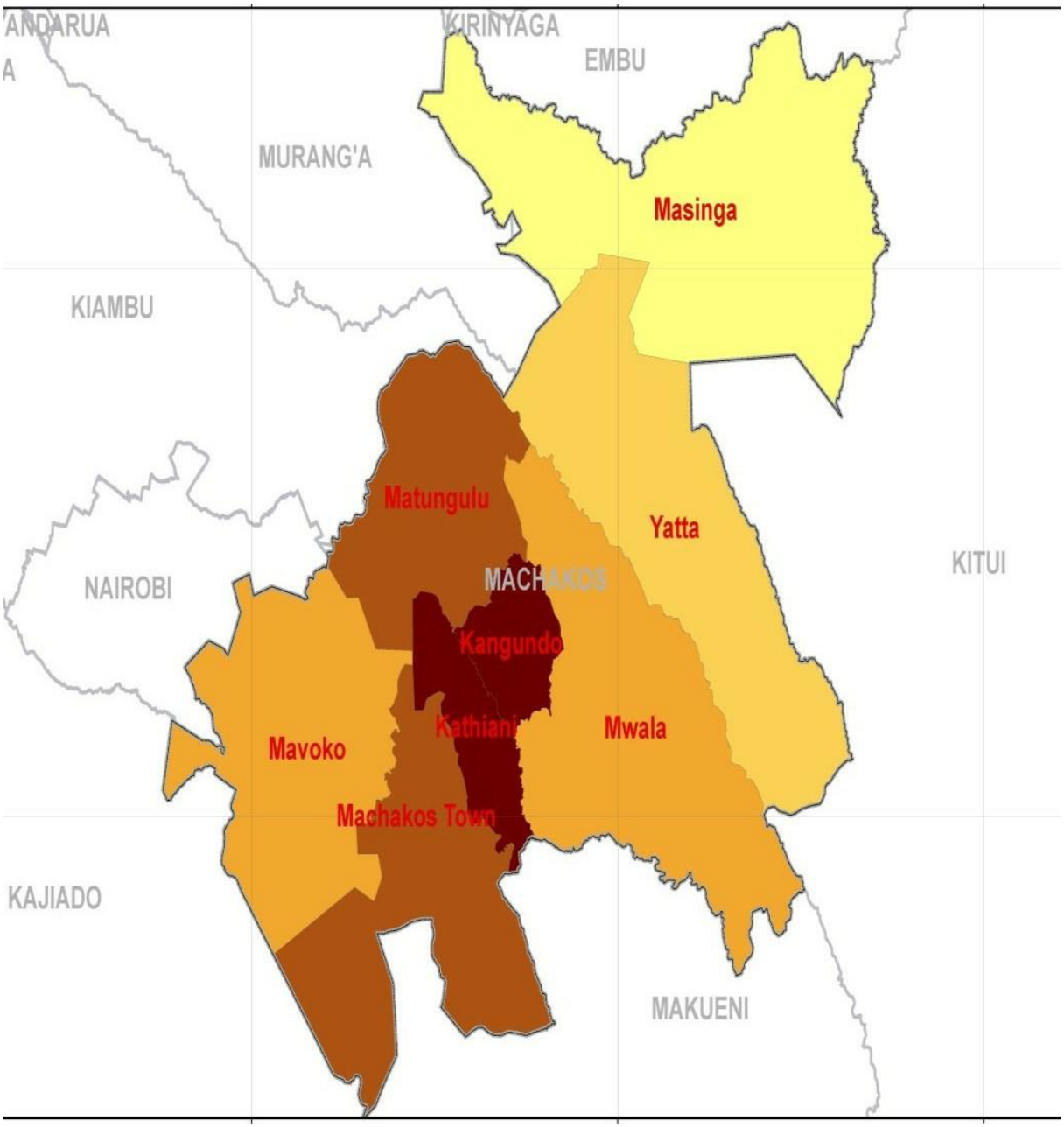

Figure 3.2: Map of Machakos County

Source: MCIDP (2015)

Appendix VII: Summary of KCSE Performance for Machakos County

Year	Physics (mean grade)	Chemistry (mean grade)	Biology (mean grade)
2016	5.407	2.463	3.513
2017	3.896	2.455	3.156
2018	4.111	4.026	3.403
2019	5.151	3.572	3.217
2020	4.454	3.404	3.597
2021	3.392	2.901	4.219
2022	3.602	3.062	3.607

Appendix VIII: Research License

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **834240**

Date of Issue: **25/July/2023**

RESEARCH LICENSE

This is to Certify that Ms.. MARIETTA NDINDA MULINGE of Machakos University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Machakos on the topic: PRINCIPALS' INSTRUCTIONAL SUPERVISION PRACTICES INFLUENCE ON STUDENTS' ACADEMIC PERFORMANCE IN CHEMISTRY IN PUBLIC SECONDARY SCHOOLS IN MACHAKOS COUNTY, KENYA for the period ending : 25/July/2024.

License No: **NACOSTI/P/23/27863**

834240

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY &
INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

See overleaf for conditions

Appendix IX: Research Authorization from County Director of Education

REPUBLIC OF KENYA

MINISTRY OF EDUCATION
State Department of Early Learning & Basic Education

Telegrams: "SCHOOLING"Machakos
Telephone: Machakos
Fax: Machakos
Email – cdemachakos@yahoo.com
When replying please quote

OFFICE OF THE
COUNTY DIRECTOR OF EDUCATION
EDUCATION
P. O. BOX 2666 – 90100
MACHAKOS

MKS/ED/CDE/R/4/VOL.4/296

Date: 8th August 2023

Ms. Marietta Ndinda Mulinge
Machakos University

RE: RESEARCH AUTHORIZATION

Reference is made to the letter from National Commission for Science, Technology and Innovation Ref: **NACOSTI/P/23/27863** dated **25th July , 2023** .You are hereby authorized to carry out your research on "**Principals' Instructional Supervision Practices Influence on students 'Academic Performance in chemistry in Public Secondary schools in Machakos County, Kenya"** for *a period ending* ***25th July, 2024.***

FOR COUNTY DIRECTOR OF EDUCATION – MACHAKOS
MINISTRY OF EDUCATION

AGESA ONZERE
FOR: COUNTY DIRECTOR OF EDUCATION
MACHAKOS.

SGS