INFLUENCE OF TEACHER-RELATED FACTORS ON LEARNERS' ACADEMIC PERFORMANCE IN CHEMISTRY IN PUBLIC SECONDARY SCHOOLS IN CHESUMEI SUB-COUNTY, NANDI COUNTY, KENYA

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DECLARATION

This research project is my original work and has not been presented to any other university.

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ABBREVIATIONS AND ACRONYMS

ADHD: Attention Deficit Hyperactivity Disorder

CPE: Certificate of Primary Education

DV: Dependent Variable

EVT: Expectancy Value Theory

GMT: Ground Mindset Theory

IV: Independent Variable

K.C.S.E: Kenya Certificate of Secondary Education

K.I.C.D: Kenya Institute of Curriculum Development

KISE: Kenya Institute of Special Education

MoE: Ministry of Education

NACOSTI: National Commission for Science, Technology and Innovation

OECD: Organization for Economic Co-operation and Development

PhD: Doctor of Philosophy

SMASSE: Strengthening of Mathematics and Science in Secondary Education

SCT: Social Cognitive Theory

SPSS: Statistical Package for the Social Sciences

STEM: Science, Technology, Engineering, and Mathematics

TPAD: Teacher Professional, Appraisal and Development

TPD: Teacher Professional Development

UNESCO: The United Nations Educational, Scientific and Cultural Organization

ABSTRACT

Chemistry is an emerging subject that occupies an important part in the societal wellbeing. Its knowledge forms a foundation of livelong skills. However, despite of its importance the performance of chemistry in high school has been below expectations. This research aimed at investigating the how the factors related to teachers influence on the performance of learners' performance in chemistry in government secondary schools in Chesumei Sub-County, Nandi County. The objectives of the research were; to determine the teacher qualification's influence on learner's performance; to establish the influence of teachers' experience on teaching; to establish the influence of teachers' teaching methods on academic performance, and to analyze influence of teacher professional development on academic performance in Chemistry in public secondary schools in Chesumei sub-county. The research adopted explanatory sequential design in the study. Questionnaires administered to chemistry teachers and students to collect data. Qualitative data was obtained through semi-structured interviews with randomly selected teachers and students, allowing for in-depth exploration of their experiences, perspectives, and insights into the relationship between teacher-related factors and academic performance. The analysis of was through descriptive statistics which included percentages, frequencies, mean and standard deviation and inferential statistics. Results were as follows; teacher qualifications had a significant positive influence on student academic performance in chemistry ($\beta=0.413$, $p=0.000$). Teaching methods have a significant positive influence on student academic performance in chemistry ($\beta=0.141$, $p=0.001$). Teacher experience has a significant positive influence on students' academic performance in chemistry ($\beta=0.190$, $p=0.022$). Teacher professional development has a significant positive influence on student academic performance in chemistry ($\beta=0.222$, $p=0.000$). The study concluded that teacher qualifications, teaching methods, teacher experience and teacher professional development enhance learners' academic performance in chemistry in government secondary schools in the sub county of Chesumei. The study recommended the adoption of mixed teaching methods in schools to record high academic performance in Chemistry. Chemistry teachers in schools should bench mark in other schools which do well in the chemistry subject and attend in-service training regularly. The study was beneficial to policymakers as it guided in policy formulation on teacher development.

CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapter presents the study's background, problem statement, research purpose, objectives, significance, limitations, delimitations, and importance. The chapter also has definitions of key terms.

1.1 Background of the Study

Globally, quality teaching is important in boosting students' academic success has been widely recognized. Studies by the Organization for Economic Co-operation and Development (OECD) observes the teacher quality and student learning outcomes are strongly linked across various countries (OECD, 2019). Effective teaching practices, such as sound pedagogical knowledge, strategic instructional approaches, and strong classroom management skills, have been shown to correlate positively with students' academic achievement (Magoma, 2019). On the other hand, poor teacher preparation has been identified as one of the factors contributing to educational disparities and lower levels of student performance as observed by Darling-Hammond (2000).

The relationship between teacher-related factors and student performance has attracted considerable research attention worldwide, with numerous studies examining different aspects of this intricate connection (Darling-Hammond, 2000). Education is important in for societal progress globally (Ampiah & Ofori-Attah, 2017). Several factors influence a teacher’s ability to enhance students' academic outcomes, including qualifications, teaching experience, and the level of administrative support available (Tehseen & Hadi, 2015). Successful teaching and learning processes is affected by human and physical facilities and

resources, the adequacy of teaching staff, and the existence of a supportive academic environment (Kilonzo, 2017). Additionally, factors such as classroom size and the relevance of the curriculum play important roles.

Teacher-related variables such as teaching methods, professional experience, and academic qualifications have a notable impact on student academic performance (Chung et al., 2015). These factors can either foster or hinder students' academic progress. Recognizing that learners have diverse ways of understanding and absorbing information, teachers are encouraged to adopt teaching methods that nurture students' potential (Magoma, 2019).

In Africa, parallel patterns are evident regarding aftermath of factors related to teachers on Chemistry performance. Ampiah and Ofori-Attah (2017) found that teacher qualifications, experience, and instructional methods significantly impact students' success in science subjects. Similarly, research by Akpan et al. (2018) identified a positive relationship between teacher competence and students' chemistry examination outcomes. Nevertheless, persistent challenges, including shortages of qualified teachers, insufficient training, and limited educational resources, remain major obstacles to improving education quality in many African nations.

In Kenya, concerns regarding the impact of teacher-related factors on student performance have continued to grow. Despite efforts by the government to strengthen teacher training and support systems, educational disparities endure, particularly in rural schools, where issues such as difficulties in teacher recruitment, retention, and professional development are more pronounced. Moreover, factors like overcrowded classrooms, scarcity of instructional materials, and socio-economic inequalities have worsened the challenges faced

by students in post-primary schools in Chesumei Sub-County.

1.2 Statement of the Problem

The students' performance in chemistry in public high schools in Chesumei Sub-County is shaped by a range of teacher-related factors. Although teachers play a pivotal role in fostering students' comprehension and interest in the subject, there is still limited understanding of the particular teacher-related elements that notably affect learners' achievement in chemistry. This lack of clarity impedes the creation of targeted strategies and interventions to strengthen teaching practices and boost student outcomes in chemistry education. This research sought to investigate the relationship of teacher-related aspects such as professional development, instructional methods, teaching experience, qualifications, and motivation on the academic performance of learners in chemistry across in school run by the government. By filling this knowledge gap, the study's findings offered critical insights for educators, policymakers, and other stakeholders to design evidence-based approaches aimed at enhancing teaching effectiveness and improving students' academic success in chemistry.

1.3 Purpose of study

The study investigated the teacher-related factors' influence on the leaners' academic performance in Chemistry within Public Secondary Schools in Chesumei Sub-County, Nandi County.

1.4 Objectives of the Study

The study sought to:

i. To assess the influence of teacher qualifications on learners' academic performance in chemistry within public secondary schools in Chesumei Sub-County.

ii. To evaluate the influence of teaching methods on learners' academic performance in chemistry in public secondary schools in Chesumei Sub-County.

iii. To determine the influence of teacher experience on learners' academic performance in chemistry in public secondary schools in Chesumei Sub-County.

iv. To examine the influence of teacher professional development and continuous learning on the academic performance of learners in chemistry within public secondary schools in Chesumei Sub-County.

1.5 Research Questions

i. How does teacher qualification's influence academic performance in Chemistry of students in public secondary schools in Chesumei Sub-County?

ii. How does teachers' teaching methods influence academic performance in Chemistry of students in public secondary schools in Chesumei Sub-County?

iii. How does teacher experience's influence the teaching of Chemistry in public secondary schools in Chesumei Sub-County?

iv. How does teacher professional development's influence academic performance in Chemistry of students in public secondary schools in Chesumei Sub-County?

1.6 Significance of the Study

The study produced valuable insights that enhanced understanding of the problem under investigation. This understanding supported the researcher's efforts to provide relevant recommendations to stakeholders, grounded in the

collected data, thereby addressing curriculum-related challenges faced by teachers. Additionally, the findings were expected to assist policymakers in shaping policy development, improving teacher training, and addressing institutional challenges.

1.7 Limitations

Limitations included:

The study's scope was limited by the sample size and the specific demographics of the selected schools and participants. Consequently, the findings could not be considered representative of all public secondary schools or generalized to other educational contexts. The data collection relied on self-reported information, which may have introduced bias, meaning that responses might not accurately reflect participants' true experiences or perspectives. Access to critical data, such as teacher qualifications, professional experience, and student academic records, was restricted due to privacy issues or administrative limitations, which may have affected the overall depth and completeness of the analysis.

1.8 Delimitation

The study specifically examined teacher-related factors and their impact on students' academic performance in chemistry, deliberately excluding other subjects or influences that might also affect learning outcomes. It did not account for differences in educational practices or contextual factors across other regions or types of schools. The research concentrated exclusively on chemistry teachers and students and was limited to Chesumei Sub County.

1.9. Assumptions of the study

The study posited a causal link between teacher-related factors and students' academic achievement in chemistry. It suggested that differences in teaching

approaches, interactions between teachers and students, subject matter expertise, and classroom management techniques could have a direct effect on learners' performance in the subject.

It was also assumed that respondents participated willingly and provided truthful information regarding teacher-related factors and student academic outcomes. Additionally, respondents were informed about the various evolving teacher-related factors and their influence on students' academic performance in chemistry.

1.10 Definition of Significant Terms

Chemistry Education:

This refers to the teaching and learning process of chemistry, encompassing the exploration of chemical principles, theories, concepts, and practical uses. The goal of chemistry education is to build students' understanding of the molecular basis of the natural world and to foster skills in scientific investigation, critical thinking, and problem-solving.

Influence:

This denotes the impact that factors related to teachers have on students' academic achievement in chemistry. The influence can be either positive or negative and may differ in strength depending on the particular factors and circumstances involved.

Learners' Academic Performance:

This describes the level of success demonstrated by students in their academic work, especially in chemistry. Academic performance is typically evaluated

through indicators like test results, assignment submissions, and participation in class activities.

Teacher-Related Factors:

These include the various characteristics, behaviors, and practices of teachers that can affect students' academic outcomes. Such factors may involve subject matter expertise, instructional strategies, classroom management skills, relationships with students, enthusiasm, and ongoing professional development efforts.

Teacher Professional Development:

This refers to the continuous learning activities that teachers undertake to enhance their teaching competencies and subject knowledge. These activities may include attending workshops, enrolling in courses, participating in seminars, and joining professional conferences.

Teacher Qualifications:

These are the academic degrees, certifications, and professional credentials a teacher holds, along with their accumulated teaching experience. Generally, higher qualifications are linked to greater teaching effectiveness.

Teacher Experience:

This pertains to the length of time a teacher has been actively engaged in teaching, particularly in chemistry or related disciplines. It includes both overall years spent in the teaching profession and the specific years focused on teaching chemistry at the secondary education level.

1.11 Organization of the Study

The research project was structured into five primary chapters to effectively address the research objectives and present the findings. Chapter One introduced

the research problem, objectives, and significance, encompassing the background, purpose, and scope of the study. Chapter Two reviewed existing literature related to academic performance in chemistry, focusing on teacher-related factors and their impact on student outcomes, and included relevant theoretical frameworks. A conceptual framework was also developed to depict the relationships between teacher-related variables and student academic achievement. Chapter Three outlined the methodology in detail, among other aspects. Chapter Four presented the study's findings based on the collected and analyzed data, along with their interpretation and discussion. Chapter Five offered a summary of the findings, conclusions, and recommendations.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Introduction

This chapter reviewed relevant literature pertaining to academic performance in chemistry, teacher-related factors, and their influence on student academic performance in chemistry, incorporating relevant theoretical frameworks.

2.1 Concept of Teacher Related Factors

Research established that multiple factors predict achievement of students in classroom, and teacher-related factors are one of them. In the instructional procedure, teacher is indispensable, and as such, the teacher's quality with respect to teaching experience, content delivery and subject mastery can be the determinant of learning outcomes in general.

2.2 Teacher Qualifications and Learners' Academic Performance

Globally, teacher qualifications are recognized as a critical determinant of student success. Research by Darling-Hammond (2000) in the United States highlights that student taught by well-qualified teachers, particularly those with advanced degrees in their subject areas, consistently outperform peers taught by less qualified instructors. This trend was evident in numerous countries, where the level of teacher education and training directly correlates with student achievement (OECD, 2005). Regionally, in sub-Saharan Africa, a study by Mupa and Chinooneka (2015) revealed that teacher qualifications significantly impact student performance, especially in subjects like chemistry that require specialized knowledge. In Kenya, a study by Wambugu and Changeiywo (2008) found that students performed better in physics when taught by teachers with

higher qualifications and extensive training, a finding that is likely applicable to chemistry education in Chesumei Sub-County.

In Rwanda, Ngabonziza and Oniye (2024) on teachers' qualifications and established that the concept had been given a high priority in the academic sector. Teacher qualifications are considered among key determinant of good quality academic performance. In Hargeisa district in Somalia, Yasin (2021) conducted a study on teacher qualifications and academic performance. The study revealed that teacher qualifications are a key determinant of academic success among students. In Nigeria, Obeka (2024) examined teacher's qualification and the achievement of students in English.

2.3 Teaching Methods and Learners' Academic Performance

The teaching methods employed by educators play a significant role in shaping student outcomes. Globally, research by Hattie (2008) identified that active and student-centered learning approaches significantly enhance academic performance across various subjects, including chemistry. In Africa, a study by Oloyede (2010) in Nigeria emphasized the effectiveness of interactive teaching methods, such as inquiry-based learning, in improving students' understanding of scientific concepts. In Kenya, Kinyua, Kithinji, and Muchiri (2015) demonstrated that the use of cooperative learning strategies in teaching chemistry led to improved student engagement and better performance in secondary schools, highlighting the importance of adopting effective teaching methods in Chesumei Sub-County.

Teaching methods that teachers adopt have an impact on teaching outcomes. It is important for teachers to adopt teaching methods that are appropriate (Ganyaupfu, 2023). According to Rowan et al. (2017), academic performance

that is poor is attributed to teaching methods that are poor. In all academic set-ups, the teaching methods adopted by instructors should be subject dependent and should be custom-designed in a manner that helps to give the best out of the students. In Chesumei Sub County, few studies exist that have been conducted on teaching methods and students' academic performance which was the focus of the current study.

2.4 Teacher Experience and Learners' Academic Performance

Teacher experience is a well-documented factor influencing student achievement globally. A meta-analysis by Kini and Podolsky (2016) showed that experienced teachers are generally more effective, particularly in delivering complex subjects like chemistry, due to their refined classroom management skills and adaptive teaching practices. In sub-Saharan Africa, research by Ampofo and Osei-Owusu (2015) in Ghana found that experienced teachers were better at addressing students' diverse learning needs, leading to higher academic performance.

Teacher experience is a requirement for improvement in student's performance. Instructors enhance student's insights in academics in their respective subjects. Teachers who are experienced tend to improve the performance of their students (Mulera et al., 2017). Experienced teachers are able to deal with problems that teachers face in classrooms and therefore it has a great potential of enhancement of students' academic performance (Fuller & Kapakasa, 2021). Teachers who are more experienced are able to creatively use their experience to enhance students' performance subject-wise irrespective of differences in backgrounds (Kumwenda, 2024).

In Uganda, the ministry of education has given priority to teachers with high experience levels. Experience is associated with how the students are able to perform in their respective schools (Bwenvu et al., 2020). In Chesumei Sub County, this study sought to interrogate relationship between the teachers' experience and learners' academic performance.

2.5 Teacher Professional Development and Learners' Academic Performance

Teacher professional development is essential for maintaining high teaching standards globally (Desimone, 2019). In Africa, Hardman et al. (2011) highlighted the need for continuous professional development in enhancing teaching quality, particularly in science subjects across various countries. Teacher professional development comprises of activities such as attending conferences, furthering studies in institutions of higher learning (Postholm, 2022). Educational programmes put in place that teachers attend given them an opportunity to share and enhance their teaching schools (Avalos, 2021). In service training programmes are of great benefit to improvement in students' performance (Sancar et al., 2021).

School leadership that prioritizes teacher professional development courses enhances the performance of students in schools (Van Veen et al., 2022). In Kenya, a study by Muola and Mwana (2013) found that teachers who participated in regular professional development programs were more effective in teaching, resulting in better student performance in subjects like chemistry. This suggests that promoting ongoing professional development for chemistry teachers in Chesumei Sub-County could significantly improve learners' academic performance. In Chesumei, Sub County, students' academic

performance is not good. It was important to determine the influence of teacher professional development on students' academic performance which was the focus of the current study.

2.6 Theoretical Framework

The research adopted pedagogical content knowledge theory Shulman (1987). According to Shulman, the teacher's knowledge is a combination of contents that are not only specific as well as pedagogical. Teachers are supposed to know and be able to transform their basic knowledge into pedagogical content knowledge. The theory presents teacher related factors that affect students' academic performance. These factors include; classroom management knowledge, teaching principles and possessing knowledge about students. In summary, this theoretical framework integrates these theories to examine how various teacher-related factors-such as qualifications, teaching methods, motivation, and classroom environment-affect students' academic performance in chemistry. By applying this theory, researchers can gain a comprehensive understanding of the ways in which teacher-related factors influence student outcomes in this critical subject.

2.7 Conceptual Framework

The conceptual framework was as under;

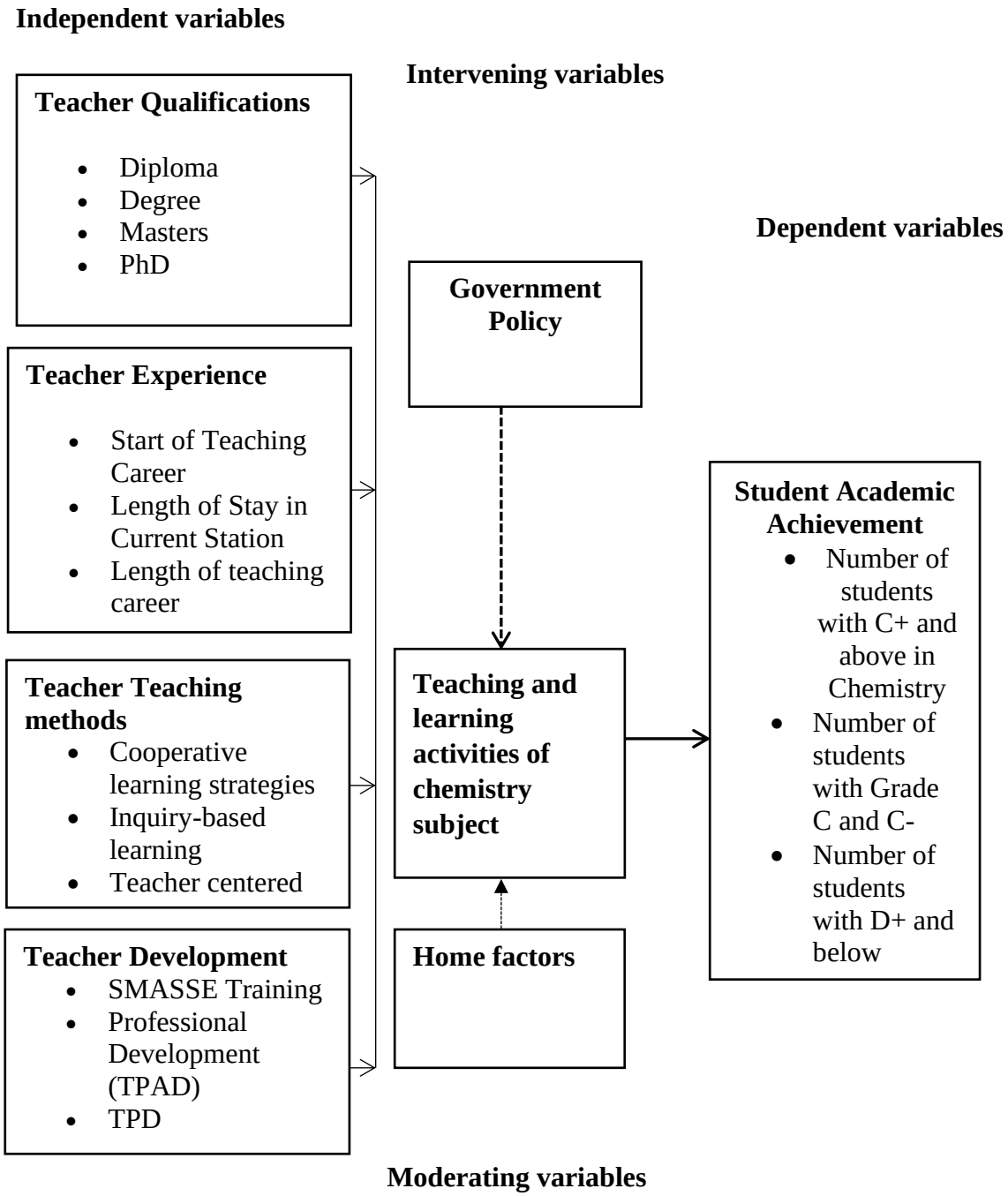


Figure 2.1: Conceptual Framework

Figure 2.1. represents the conceptual framework of the study which illustratee the relationships between the IVs (teacher qualifications, teacher experience, teaching method, and teacher development) and the DVs (learners' performance in Chemistry) within the context of public secondary schools. Teacher-related factors encompass various aspects of teachers' characteristics, behaviors, and practices that can influence students' academic performance. This included teacher subject knowledge, teaching approaches, teacher professional development, classroom management techniques, teacher-student relationships and enthusiasm.

Teacher Development activities seek to improve delivery of teaching skills and imparting of knowledge. This can include workshops, seminars, courses, and conferences (Fuller & Kapakasa, 2021). Teacher Qualification is the academic and professional credentials that a teacher possesses, including degrees, certifications, and years of teaching experience (Postholm, 2022). Higher qualifications are often associated with better teaching effectiveness. On the other hand, teacher experience refers to the duration of time a teacher has spent actively teaching in the field of chemistry or related subjects (Magoma, 2019).

Additionally, it acknowledges the presence of extraneous variables, such as school motivational programs, which may influence student performance but are beyond the control of the researcher.

Higher levels of teacher qualifications, experience, teacher development, and teaching methods are hypothesized to correlate positively with improved student performance in Chemistry examinations or assessments. Additionally, the framework acknowledges the potential influence of extraneous variables such as

home factors on student performance, although these variables are not directly examined in this study.

2.8 Summary of Literature Review

Literature has revealed that personal factors, behavior, and environmental factors interact to provide insights into how teachers' attributes influence learning outcomes. Further, it is clear individuals place certain expectations for success and value on the assigned tasks that influence one's achievement-based characteristics. Kogos et al (2023) observes that SMASSE training for the chemistry teachers contributed greatly to the teachers of chemistry in government secondary schools in Nandi East Sub-County, Nandi County, Kenya. However, despite the significant changes the study by Kogos recommended other interventions with a focus on students' chemistry achievement.

Jelimo (2019) asserted that chemistry teachers need motivate girls in developing a positive attitude towards chemistry. Further, Jelimo (2019) observed that the chemistry teachers should be aware of the best methods of teaching that motivate girls develop positive attitude in chemistry. Other scholars have also advised the government and stakeholders in Education to ensure access to sufficient and relevant teaching and learning materials so as to encourage students to perform better in Chemistry (Jepketer et al., 2015). Finally, literature reviewed showed that among other gaps a methodological gap existed as in some of the studies reviewed the justification for research design adopted had not been provided. Also, few studies existed on the subject in Uasin Gishu County and hence a knowledge existed which this study sought to address.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

Chapter presents research design, target population, sampling, data collection instruments, and the data analysis' plan.

3.1 Research Design

The study adopted explanatory sequential design (ESD). It is a type of research design which allows the collection and analysis of data that is quantitative first and then qualitative data is then collected (Gupta & Gupta, 2022). When quantitative and qualitative data is collected it is able to allow exploration of a research question in a manner that is thorough (Patel & Patel, 2019). Explanatory sequential design was adopted because it helps a researcher answer research questions that are complex which cannot be solved using either qualitative or quantitative research (Saharan, *et al*., 2020).

3.2 Target Population

The target population was 18694 respondents who comprised of 46 head of departments, 102 chemistry teachers, 18500 secondary school students enrolled in chemistry classes, as their academic outcomes, perceptions of their teachers, and motivation are critical to understanding the study's focus, 46 principals, were also involved, given their role in shaping the teaching environment and influencing educational practices as shown in Table 3.1.

Table 3.1: Target population

	Category	Target population
1.	Principals	46
2.	Heads of department	46
3.	Chemistry Teachers	102
4.	Students	18500
Total		**18694**

3.3 Sample Size and Sampling Procedure

Utilizing probability sampling methods, such as stratified random sampling, the study aims to select representative samples of teachers and students from the target population. By employing appropriate sampling techniques and calculating sample sizes based on statistical formulas, researchers can ensure valid and generalizable findings (Krejcie & Morgan, 1970). The determination of sample size involves estimating the number of participants needed to achieve sufficient statistical power and representativeness in the study. There are several determinants of sample size, including the desired confidence level, error margin, dynamics of the population, and objectives (Israel, 1992). Yamane formula was used to arrive at the sample size.

$$n = \frac{N}{1+N(e)2} \quad \text{(i)}$$

n = required sample size

N = population size

e= margin of sampling error (0.05)

In this study, the calculated sample size was n=$\frac{18500}{1+18500(0.05)2}$ =392 respondents as shown below;

Table 3.2: Sample size

S/NO	Category	Sample size	
1.	Principals	46	Census
2.	Heads of Department	46	Census
3.	Chemistry Teachers	102	Census
4.	Students	18500	392
Total		**18694**	**586**

3.4 Instruments

The research instruments included a structured survey questionnaire for teachers, for students, semi-structured interview guides for teachers and students, and classroom observation guides. These instruments were designed to gather comprehensive data on teacher characteristics, instructional practices, student-teacher relationships, and student achievement in chemistry. The structured survey questionnaire for teachers was designed to collect quantitative data on various aspects of teachers' characteristics, instructional practices, and perceptions. The survey integrates Likert-scale, as well as open-ended questions covering the following domains: questions about teachers' age, gender, teaching experience, educational qualifications, and professional development activities. Items assessing teachers' pedagogical approaches, use of instructional resources, classroom management techniques, and assessment methods in teaching chemistry; Questions exploring teachers' perceptions of their relationships with students, include communication, supportiveness, and rapport.

Open-ended questions soliciting teachers' views on the challenges they face in teaching chemistry and their needs for professional development and support. The student questionnaire was designed to collect quantitative data on students' perceptions, experiences, and academic outcomes in chemistry. The questionnaire included items covering the following areas: Questions about students' age, gender, grade level, and academic performance in chemistry. Items assessing students' perceptions of teaching quality, classroom environment, engagement in chemistry learning, and support received from teachers. Questions exploring students' motivation to learn chemistry, interest in the subject, and future career aspirations related to chemistry. Items measuring students' self-reported grades, test scores, and perceived academic progress in chemistry. Semi-structured interview guides were developed for conducting in-depth interviews with teachers and students.

3.5 Validity and Reliability

3.5.1 Instrument Validity

Validity is a significant research aspect that helps to ensure study's results represent the intended constructs in an accurate manner (DeVon et al., 2007). Further the research adopted confirmatory factor analysis (CFA) which was used in reduction of data into summary variables. This is a type of research design that is mostly used in social science research (Sullivan & Artino, 2013).

3.5.2 Instrument Reliability

Reliability is crucial in ensuring that research instruments consistently measure the same constructs over time (Sullivan & Artino, 2013). The study adopted Cronbach alpha co-efficient that was used to test internal consistency reliability.

By assessing internal consistency reliability using cronbach's alpha co-efficient, this study aimed to ensure the reliability of research findings, enhancing the validity and credibility of conclusions regarding the teacher-related factors' effect on the leaners' performance in chemistry. Reliability rest results were as follows;

Table 3.3: Reliability Test Results

Variable	**Number of Items**	**Cronbach alpha**	**Comments**
Teacher qualifications	10	0.779	Reliable
Teaching methods	10	0.751	Reliable
Teacher experience	10	0.723	Reliable
Teacher professional development and continuous learning	6	0.722	Reliable

The Cronbach's alpha coefficients for teacher qualifications, teaching methods, teacher experience and teacher professional development and continuous learning exceeded 0.7 which implied that they are reliable. Trustworthiness of interview schedules was done by use of credibility, confirmability, transferability and dependability. Credibility was done through validation by participants or members. Transferability was achieved through thick description of the findings from multiple data collection methods. In order to ensure dependability, is was done through data collection techniques as well as procedures that are rigorous and happen to documented in a manner that is well. Confirmatory of data that is qualitative was ensured through data checking and

rechecking through-out data collection as well as analysis. This was done to make sure that the findings could be repeatable by other people.

3.6 Data Collection Procedure

A systematic data collection procedure is implemented. Initially, the research objective was clearly defined: to determine how teacher qualifications, teaching methods, motivation, professional development, and teacher-student interactions impact students' chemistry performance. Key teacher-related factors such as certifications, years of experience, instructional approaches, use of technology, job satisfaction, enthusiasm, and professional development activities are identified.

Data collection instruments were developed, including surveys and questionnaires for teachers, which facilitated gathering information on; their qualifications, teaching methods, and professional attitudes. For example, questions might be asked about the teacher's highest educational qualification, their frequency of technology use in the classroom, and their participation in professional development workshops. Additionally, student performance data was collected from school records, focusing on chemistry exam scores and overall grades. Stratified random sampling was employed to guarantee diverse representation. Ethical approval was sought from school administrations, ensuring consent from teachers and, where necessary with assurances of confidentiality.

A pilot study to test the instrument's reliability and validity was done. Following this, revisions were made based on feedback. Data collection proceeded with the distribution and collection of surveys from teachers, gathering of students' chemistry scores from school records, and scheduling of interviews with selected

teachers. Classroom observations were conducted using a structured checklist to document teaching practices and teacher-student interactions. All collected data was systematically entered into statistical software, ensuring accuracy through data-cleaning processes. Descriptive statistics summarized the collected data, while inferential statistics, such as regression analysis, determines the impact between variables. The findings, supported by both quantitative data and qualitative insights from interviews and observations, were then reported, providing actionable recommendations for improving chemistry education in the schools.

3.7 Data Analysis Techniques

Descriptive statistics was used for quantitative data collected in summarizing findings on the subject matter. Additionally, inferential statistical techniques helped to show associations between study variables. For qualitative data, thematic analysis technique was used to analyze it and it was used to identify patterns, themes, and insights related to the subject matter. Transcripts were coded, categorized, and organized into themes, allowing for a deeper understanding of participants' experiences and perspectives. By employing a rigorous data analysis approach that integrates quantitative and qualitative methods, along with test-retest reliability analysis, this study aimed to provide robust insights into the teacher-related factors' effect on the leaners' performance in chemistry.

3.8 Ethical Considerations

Ethical considerations are central in conducting research, especially those with human participants. Several ethical principles guided the research process where the researcher sought relevant permit to conduct the research from NACOSTI.

Additionally, clearance and authorization from the County Commissioner's Office (Nandi County) and the County Education Office was sought. Respondents were required to agree before participation in the study. The researcher-maintained confidentiality strictly to protect the privacy of participants. Data gathered was kept confidential and only accessible to authorized researchers. Personal identifiers were removed or obscured to ensure that individual participants cannot be identified in any research outputs or publications.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND DISCUSSION

4.0 Introduction

This chapter covers data analysis, interpretation and discussion on teacher-related factors' effect on the leaners' performance academically in chemistry as per the research objectives. The results on the specific objectives are presented in this chapter, interpretation and discussion provided as well.

4.1 Response rate

The results of the response rate were presented in Table 4.1.

Table 4.1: Response rate

Questionnaires issued	Questionnaires returned	Response rate
540	464	85.9

In this research 540 questionnaires administered to the respondents, 464 questionnaires were filled and returned which is a response rate of 85.9% which was excellent and adequate for further analysis. According to Mishra and Alok (2022), the response rate which is good for data analysis and making references is the one that is above 60%.

4.2 Background information of Respondents

The study used two sets of questionnaires, questionnaires for teachers and students. Using the first set of questionnaires, the study sought to determine the age category of chemistry teachers and heads of department, gender of the

chemistry teachers, highest level of academic qualification, current position in the school, duration in the school and category of the school. Findings on distribution of respondents by age category are presented in Table 4.2;

Table 4.2: Distribution of respondents by age category and gender

Item (Age)	**Frequency**	**Percent**
Less than or equal to 30	11	8.3
31-40	32	24.2
41-50	80	60.6
50 and above	9	6.8
Gender		
Male	86	65.2
Female	46	34.8

Majority of the respondents 60.6% were aged between 41 and 50 years, 24.2% between 31 and 40 years, 8.3% less than or equal to 30 while 6.8% and 50 years and above as shown in table 4.2. The study further sought to determine the distribution of the respondents based on gender and the findings presented in Table 4.2. Findings revealed that 65.2% of the respondents were male while 34.8% were female. This implied that the respondents of both genders participated in the study and hence diversity of opinions were enhanced which contributed to improvement in the quality of the study. The study also sought to determine the distribution of respondents based on the highest level of academic qualification and results presented in Table 4.3.

Table 4.3: Distribution of respondents by academic qualification & current position in the school

Item	Frequency	Percent
Diploma in education	24	18.2
B. ED	67	50.8
M.ED	40	30.3
Doctorate	1	0.8
Current position in the school		
Head of department	41	31.1
Chemistry Teacher	91	68.9

Out of the total respondents, majority of the respondents 50.8% had a bachelor's degree in education, 30.3% are holders of master of education degrees, 18.2% diploma in education while 0.8% are holders of Doctor of Philosophy degrees. This implies that all the respondents had the requisite knowledge needed on teacher-related factors' effect on the learners' academic performance.

Findings on the respondent's current position in the school revealed that 31.1% were heads of science department while 68.9% were chemistry teachers. Therefore, majority of the respondents were chemistry teachers and therefore were in a position to give a true picture of the performance of their students in chemistry in the schools.

Table 4.4: Distribution of respondents by duration & category of the school

Item	Frequency	Percent
Less than 4 years	73	55.3
4-6 years	46	34.8
More than 6 years	13	9.8
Category of the school	**Frequency**	**Percent**
National boys	1	0.8
National girls	1	0.8
Extra county school-girls	1	0.8
Extra county school-boys	1	0.8
County boys	2	1.6
County girls	3	6.5
Sub-County mixed day schools	37	80.4

Table 4.4 also presents findings on the duration in the school. As presented in Table 4.4, 55.3% had stayed in their stations for a period of less than 4 years, 34.8% had been in the schools between 4 and 6 years and 9.8% had stayed in the schools for more than 6 years. Most teachers had stayed in their schools long enough and therefore had the know-how about the teacher-related factors' effect on the leaners' academic performance in chemistry. The study also sought the categories of the schools and the results are presented in Table 4.4. The results presented in Table 4.4 show that, 0.8% of the schools was national boys' school,

0.8% were national girls' school, 0.8% extra county girls' school, 0.8% extra county boys' school, 1.6% county boys' school, 6.5% county girls' school and 80.4% sub-county mixed day schools. The second set of questionnaires which was meant for students, the study sought to understand the students' current grade level and responses in regard to chemistry performance and the results were presented in Table 4.5.

Table 4.5: Current grade level and Students' interest in Chemistry

Current grade level	**Frequency**	**Percent**
Form 1	9	2.7
Form 2	47	14.2
Form 3	74	22.3
Form 4	202	60.8
Students' interest in Chemistry		
Statements	**Frequency**	**Percent**
Very interested	66	19.9
Interested	83	25.0
Neutral	9	2.7
Not very interested	64	19.3
Not interested at all	110	33.1
Total	**332**	**100.0**

Out of the total respondents, 60.8% were form 4 students, 22.3% were form 3, 14.2% form 2 and 2.7% form 1. The study wanted the students to rate their interest in chemistry and the results are presented in Table 4.5. Out of the total respondents, 19.9% of the students were very interested in chemistry, 25.0% interested, 2.7% neutral, 19.3% not very interested while 33.1% were not interested in chemistry at all. Therefore, majority of the respondents didn't seem interested in chemistry. Table 4.6 presents results of the average hours per week the students spent studying chemistry outside chemistry lessons.

Table 4.6: Hours per week the students spent studying chemistry

Statements	**Frequency**	**Percent**
Less than 1 hour	122	36.7
1-3 hours	136	41.0
4-6 hours	28	8.4
More than 6 hours	46	13.9
Students' relationship with chemistry teacher		
Very positive	77	23.2
Positive	111	33.4
Neutral	27	8.1
Negative	83	25.0
Very negative	34	10.2

On average, majority of the respondents 41.0% spent between 1 and 3 hours to study chemistry outside chemistry lessons, 36.7% less than 1 hour, 8.4% between 4 and 6 hours and 13.9% more than 6 hours. Most of the respondents spent between 1 and 3 hours studying chemistry outside chemistry lessons. On the relationship with the chemistry teacher in regards to chemistry subject, findings are also presented in Table 4.6. Out of the total respondents, 33.4% stated that they had a positive relationship with chemistry teacher, 23.2% very positive, 8.1% neutral, 25.0% negative and 10.2% very negative. Most of the respondents had a positive relationship with their chemistry teacher. The study wanted to know how comfortable the respondents felt asking questions or seeking help in chemistry from their chemistry teacher and the results presented in Table 4.7.

Table 4.7: Students' comfortability in asking questions

Statements	**Frequency**	**Percent**
Very willing	74	22.3
Willing	101	30.4
Neutral	47	14.2
Unwilling	82	24.7
Very unwilling	28	8.4
Total	**332**	**100.0**

The results revealed that 22.3% were very willing to ask questions or seek help in chemistry from their chemistry teacher, 30.4% comfortable, 14.2% neutral,

24.7% uncomfortable and 8.4% very uncomfortable. Most of the respondents were comfortable asking questions or seeking help in chemistry from their chemistry teacher. In Table 4.8 The study wanted to know how the students typically prepared for chemistry assessment (tests/exams) and the results were presented in Table 4.8.

Table 4.8: Students preparation for chemistry assessments & challenges students face in understanding chemistry concepts

Statements	**Frequency**	**Percent**
Reviewing notes	178	53.6
Doing problem solving practice	82	24.7
Group study sessions	36	10.8
Seeking help from teachers	36	10.8
Others (please specify)	0	0.0
Challenges students face in understanding chemistry concepts		
The language of chemistry	119	35.8
Lack of motivation	213	64.2

Out of the total respondents, 53.6% reviewed notes as they prepare for chemistry assessments, 24.7% did problem solving practice, 10.8% participated in group study sessions and 10.8% sought help from teachers. Most of the students revised notes when preparing for chemistry assessments. Results on the challenges that

the respondents face in understanding chemistry concepts and results were also presented in Table 4.8. The study established that majority of the respondents 64.2% lacked motivation while 35.8% had a challenge with the language of chemistry all which affected their understanding of chemistry concepts.

4.3 Teacher Qualifications on Learners' Academic Performance in Chemistry

In the likert scale, (strongly disagree and disagree) are grouped together as disagree, while (strongly agree and agree) are grouped as agree while neutral is not grouped. The mean and standard deviation for each statement is presented in this section. Findings were presented in Table 4.9.

Table 4.9: Descriptive statistics on Teacher qualifications

Statements		S.D	D	N	A	S.A	Mean	Std. Deviation
Teacher qualification is an integral determiner of students' performance in chemistry in this school since the depth subject delivery is wide.	F	17	21	8	36	50	2.3864	1.44965
	%	12.9	15.9	6.1	27.3	37.9		
The mastery of subject content depends on the level of qualification of the teacher.	F	21	11	9	48	43	2.3864	1.42308

	%	15.9	8.3	6.8	36.4	32.6		
Teacher's qualification in chemistry influences the capacity of undertaking practical which are key component of the performance in this subject.	F	11	21	15	41	44	2.3485	1.31338
	%	8.3	15.9	11.4	31.1	33.3		
Teachers' level of qualification has no influence on academic performance in chemistry since diploma teachers have always excelled in teaching chemistry compared to those with higher qualifications.	F	57	39	9	11	16	2.1667	1.38237
	%	43.2	29.5	6.8	8.3	12.1		
The performance of chemistry is more student determined than dependent on teacher qualifications.	F	36	46	12	23	18	2.5758	1.40404

Chemistry performance is more related to teacher lesson preparation than qualification since mastery content and delivery are not solely dependent on the latter.	%	27.3	32.6	9.1	17.4	13.6		
	F	53	37	13	16	13	2.2348	1.35275
The performance of chemistry in this school has always been influenced by team teaching, strategic revision and teacher motivation without much consideration of individual teacher qualification.	%	40.2	28.0	9.8	12.1	9.8		
	F	63	49	10	7	3	1.7727	.96180
Parental involvement has been a major boost to chemistry performance in this school coupled with high teacher	%	47.7	37.1	7.6	5.3	2.3		
	F	9	9	16	49	49	2.0909	1.17515

qualifications enhanced by regular training, seminars and workshops.								
	%	6.8	6.8	12.1	37.1	37.1		
It is important to acknowledge the fact that chemistry performance has been on an upward trajectory in this school based on teachers' dedication, qualification and intrinsic motivation of learners.	F	23	51	16	19	23	2.7576	1.37103
	%	17.4	38.6	12.1	14.4	17.4		
Chemistry performance in our school in owed to the school culture that is keen on student discipline, weekend practical, inter-class contests and chemistry week.	F	29	28	15	31	29	3.0227	1.49025
	%	22.0	21.1	11.4	23.5	22.0		
Composite Mean							**2.3743**	

Table 4.9 presents results reveal that; 65.2% (27.3%+37.9% =65.2%) of the respondents agreed that teacher qualification is an integral determiner of students' performance in chemistry in this school since the depth subject delivery is wide while 28.8% (12.9%+15.9%=28.8%) disagreed with the statement while 6.1% were neutral. Most of the respondents agreed that teacher qualification is an integral determiner of students' performance in chemistry in this school since the depth subject delivery is wide as supported by a mean score of 2.3864 and a standard deviation of 1.44965.

The study is in agreement with that of Darling-Hammond (2000) that teacher qualification is an integral determiner of students' performance in chemistry. On whether the mastery of subject content depends on the level of qualification of the teacher, 69% agreed while 24.2% disagreed with the statement while 6.8% were neutral. Majority agreed that the mastery of subject content depends on the level of qualification of the teacher as supported by a mean score of 2.3864 and a standard deviation of 1.42308. Findings resemble that of Mupa and Chinooneka (2015) that the mastery of subject content depends on the level of qualification of the teacher.

Results in Table 4.9 show that 64.4% agreed that teacher's qualification in chemistry influences the capacity of undertaking practical which are key component of the performance in this subject while 24.2% disagreed with the statement and 11.4% were neutral. Most respondents agreed that teacher's qualification in chemistry influences the capacity of undertaking practical which are key component of the performance in this subject as supported by a mean score of 2.3485 and a standard deviation of 1.31338. Findings resemble that of Wambugu and Changeiywo (2008) that teacher's qualification in chemistry

influences the capacity of undertaking practical which are key component of the performance in chemistry.

In regards to whether teachers' level of qualification has no influence on academic performance in chemistry since diploma teachers have always excelled in teaching chemistry compared to those with higher qualifications, 72.7% disagreed while 20.4% agreed with the statement and 6.8% were neutral. Many respondents disagreed that teachers' level of qualification has no influence on academic performance in chemistry since diploma teachers have always excelled in teaching chemistry compared to those with higher qualifications as supported by a mean score of 2.1667 and a standard deviation of 1.38237. Findings are in-tandem with that of Kimani, Kara, and Njagi (2013) that teachers' level of qualification has an influence on academic performance in chemistry since diploma teachers have always excelled in teaching chemistry compared to those with higher qualifications.

The results in Table 4.9 reveal that 59.9% disagreed that the performance of chemistry is more student determined than dependent on teacher qualifications while 31% agreed with the statement and 9.1% were neutral. Most respondents disagreed that the performance of chemistry is more student determined than dependent on teacher qualifications as supported by a mean score of 2.2348 and a standard deviation of 1.35275. Findings resemble that of Raychaudhuri et al. (2020) who opined that performance of chemistry is not more student determined than dependent on teacher qualifications.

On whether the performance of chemistry in this school has always been influenced by team teaching, strategic revision and teacher motivation without much consideration of individual teacher qualification, the results revealed that

84.8% disagreed while 7.6% agreed and 7.6% were neutral. Many respondents disagreed that the performance of chemistry in this school has always been influenced by team teaching, strategic revision and teacher motivation without much consideration of individual teacher qualification, as supported by a mean score of 1.7727 and a standard deviation of 0.96180.

The study is in agreement with that of Haider and Hussain (2014) that the performance of chemistry in this school has not always been influenced by team teaching, strategic revision and teacher motivation without much consideration of individual teacher qualification. In regards to whether parental involvement has been a major boost to chemistry performance in this school coupled with high teacher qualifications enhanced by regular training, seminars and workshops, 74.2% agreed with the statement while 13.6% disagreed and 12.1% were neutral. Many respondents agreed that parental involvement has been a major boost to chemistry performance in this school coupled with high teacher qualifications enhanced by regular training, seminars and workshops as supported by a mean score of 2.0909 and a standard deviation of 1.17515.

The study agrees with that of Delelis (2019) that parental involvement has been a major boost to chemistry performance in this school coupled with high teacher qualifications enhanced by regular training, seminars and workshops. On whether chemistry performance has been on an upward trajectory in this school based on teachers' dedication, qualification and intrinsic motivation of learners, majority of the respondents, 56% disagreed with the statement while 3.8% agreed and 12.1% were neutral. Most of the respondents disagreed with the statement that it is important to acknowledge the fact that chemistry performance has been on an upward trajectory in this school based on teachers' dedication,

qualification and intrinsic motivation of learners, as supported by a mean score of 2.7576 and a standard deviation of 1.37103. The study agrees with that of Abdullah et al. (2022) that chemistry performance has not always been on an upward trajectory in this school based on teachers' dedication, qualification and intrinsic motivation of learners.

On whether chemistry performance in the respondent's school is owed to the school culture that is keen on student discipline, weekend practical, inter-class contests and chemistry week, 45.5% agreed with the statement while 43.1% disagreed while 11.4% were neutral. It was therefore important to acknowledge the fact that chemistry performance has been on an upward trajectory in this school based on teachers' dedication, qualification and intrinsic motivation of learners, as supported by a mean score of 3.0227 and a standard deviation of 1.49025. Findings resemble that of Adu, and Olatundun (2017) that chemistry performance had not been on an upward trajectory in this school based on teachers' dedication, qualification and intrinsic motivation of learners.

On whether teacher qualification is an integral determiner of students' performance in chemistry in this school since the depth subject delivery is wide, 65.2% agreed with the statement while 28.8% disagreed and 6.1% were neutral. Teacher qualification was an integral determiner of students' performance in chemistry in this school since the depth subject delivery is wide, as supported by a mean score of 2.3864 and a standard deviation of 1.44965. Findings resemble that of Asikhia (2010) that teacher qualification is an integral determiner of students' performance in chemistry in this school since the depth subject delivery is wide. The composite mean was 2.3743 which implies that teacher qualifications have an influence on learners' academic performance in chemistry

within public secondary schools in Chesumei Sub-County.**4.4 Teacher Experience on Learners' Academic Performance in Chemistry**

The findings were presented in Table 4.10.

Table 4.10: Descriptive statistics on teacher experience.

Statements		**S.D**	**D**	**N**	**A**	**S.A**	**Mean**	**Std. deviation**
Teacher's experience is key in determining performance in Chemistry since teachers are able to apply from previous performances.	F	15	22	11	45	39	2.4621	1.36703
	%	11.4	16.7	8.3	34.1	29.5		
Chemistry performance in our school is a factor of the long experiences held by teachers teaching it.	F	11	27	10	47	37	2.4545	1.31558

	%	8.3	20.5	7.6	35.6	28.0		
Teacher's experience in handling candidate classes has seen this school do well in chemistry over the years.	F	7	21	14	41	49	2.2121	1.24808
	%	5.3	15.9	10.6	31.1	37.1		
Other schools come to benchmark from us on teaching chemistry since our school has been consistently doing well for many years as a result of the experienced teachers that we have in the department.	F	17	51	17	20	27	2.9167	1.37058
	%	12.9	38.6	12.9	15.2	20.9		

The performance of chemistry is more student determined than dependent on teacher's experience since many schools with more experienced teachers have been poorly performing in the subject.	F	54	39	13	12	14	2.1894	1.34296
	%	40.9	29.5	9.8	9.1	10.6		
Chemistry performance is more related to teacher lesson preparation than experience since a poorly prepared teacher may not deliver well during the lessons.	F	36	46	15	21	14	2.4773	1.32772
	%	27.3	34.8	11.4	15.9	10.6		

The performance of chemistry in this school has always been influenced by team teaching, strategic revision and teacher motivation without much consideration of individual teacher experience.	F	15	26	16	36	39	2.4773	1.30452
	%	11.4	19.7	12.1	29.5	27.3		
Parental involvement has been a major boost to chemistry performance in this school coupled with long teaching experience of teachers enhanced by regular training,	F	16	15	20	34	47	2.5833	1.37058

seminars and workshops.								
	%	12.1	11.4	15.2	25.8	35.6		
It is important to acknowledge the fact that chemistry performance has been on an upward trajectory in this school based on teachers' dedication, experience and intrinsic motivation of learners.	F	32	55	12	19	14	2.4545	1.29216
	%	24.2	41.7	9.1	14.4	10.6		
Chemistry performance in our school in owed to the school culture that is keen on student discipline, weekend	F	21	49	11	20	31	2.6288	1.40558

practical's, inter-class contests and chemistry week without much ado on teachers' experience.							
	%	23.5	37.1	8.3	15.2	15.9	
Composite mean							**2.2379**

As per Table 4.10, results reveal that 63.6% of the respondents agreed that teacher's experience is key in determining performance in Chemistry since teachers are able to apply from previous performances while 28.1% disagreed with the statement while 8.3% were neutral. Teacher's experience was therefore key in determining performance in Chemistry since teachers are able to apply from previous performances, as supported by a mean score of 2.4621 and a standard deviation of 1.36703. Findings resemble that of Hattie (2008) that teacher's experience is key in determining performance in Chemistry since teachers are able to apply from previous performances.

In regards to whether chemistry performance in the school is a factor of the long experiences held by teachers teaching it, 63.6% agreed while 28.8% disagreed with the statement and 7.6% were neutral. Chemistry performance in the school was a factor of the long experiences held by teachers teaching it, as supported by a mean score of 2.4545 and a standard deviation of 1.31558. Findings

resemble that of Oloyede (2010) that chemistry performance in the school is a factor of the long experiences held by teachers teaching it.

In relation to whether teacher's experience in handling candidate classes has seen this school do well in chemistry over the years, 68.2% agreed while 21.2% disagreed with the statement and 10.6% were neutral. Teacher's experience in handling candidate classes had seen this school do well in chemistry over the years, as supported by a mean score of 2.2121 and a standard deviation of 1.24808. The study agrees with that of Kinyua et al. (2015) that teacher's experience in handling candidate classes has seen this school do well in chemistry over the years.

On whether other schools come to benchmark from us on teaching chemistry since our school has been consistently doing well for many years as a result of the experienced teachers that we have in the department, 51.5% disagreed while 36.1% agreed and 12.9% were neutral. The other schools did not come to benchmark from us on teaching chemistry since our school has been consistently doing well for many years as a result of the experienced teachers that we have in the department, as supported by a mean score of 2.9167 and a standard deviation of 1.37058. Findings resemble that of Ganyaupfu (2013) that other schools do not come to benchmark from us on teaching chemistry since our school has been consistently doing well for many years as a result of the experienced teachers that we have in the department.

The study also sought to determine whether the performance of chemistry is more student determined than dependent on teacher's experience since many schools with more experienced teachers have been poorly performing in the subject, 70.4% disagreed while 19.7% agreed and 9.8% were neutral. The

performance of chemistry was not more student determined than dependent on teacher's experience since many schools with more experienced teachers have been poorly performing in the subject, as supported by a mean score of 2.1894 and a standard deviation of 1.34296. The study results resemble that of Carpenter (2016) that that the performance of chemistry is not more student determined than dependent on teacher's experience since many schools with more experienced teachers have been poorly performing in the subject.

In relation to whether chemistry performance is more related to teacher lesson preparation than experience since a poorly prepared teacher may not deliver well during the lessons, 62.1% disagreed while 26.5% agreed and 11.4% were neutral. Chemistry performance was not more related to teacher lesson preparation than experience since a poorly prepared teacher may not deliver well during the lessons, as supported by a mean score of 2.4773 and a standard deviation of 1.32772. Findings resemble that of Yakovleva and Yakovlev (2014) that chemistry performance is not more related to teacher lesson preparation than experience since a poorly prepared teacher may not deliver well during the lessons.

On whether the performance of chemistry in this school has always been influenced by team teaching, strategic revision and teacher motivation without much consideration of individual teacher experience, 56.8% agreed while 31.1% disagreed and 12.1% were neutral. This implies that majority of the respondents agreed that the performance of chemistry in this school has always been influenced by team teaching, strategic revision and teacher motivation without much consideration of individual teacher experience, as supported by a mean score of 2.4773 and a standard deviation of 1.30452. The study agrees with that

of Bourner (2017) that the performance of chemistry in this school has always been influenced by team teaching, strategic revision and teacher motivation without much consideration of individual teacher experience.

In relation to whether parental involvement has been a major boost to chemistry performance in this school coupled with long teaching experience of teachers enhanced by regular training, seminars and workshops, 61.4% agreed while 23.5% disagreed and 15.2% were neutral. Parental involvement had not been a major boost to chemistry performance in this school coupled with long teaching experience of teachers enhanced by regular training, seminars and workshops, as supported by a mean score of 2.5833 and a standard deviation of 1.37058. Findings are in-tandem with that of Samwel-Mwasalwiba (2020) that parental involvement has been a major boost to chemistry performance in this school coupled with long teaching experience of teachers enhanced by regular training, seminars and workshops.

On whether chemistry performance has been on an upward trajectory in this school based on teachers' dedication, experience and intrinsic motivation of learners, 65.9% disagreed while 25.0% agreed and 9.1% were neutral. Chemistry performance had not been on an upward trajectory in this school based on teachers' dedication, experience and intrinsic motivation of learners, as supported by a mean score of 2.4545 and a standard deviation of 1.29216. Findings resemble that of Dorgu (2015) that chemistry performance had been on an upward trajectory in this school based on teachers' dedication, experience and intrinsic motivation of learners.

In relation to whether chemistry performance in the school was owed to the school culture that is keen on student discipline, weekend practical's, inter-class

contests and chemistry week without much ado on teachers' experience, 60.6% disagreed while 31.1% agreed and 8.3% were neutral. Chemistry performance in the school was not owed to the school culture that is keen on student discipline, weekend practical's, inter-class contests and chemistry week without much ado on teachers' experience, as supported by a mean score of 2.6288 and a standard deviation of 1.40558.

Findings resemble that of Bonner (2019) that chemistry performance in the school is owed to the school culture that is keen on student discipline, weekend practical's, inter-class contests and chemistry week with much ado on teachers' experience. The composite mean was 2.2379 which imply that teaching methods have an influence on learners' academic performance in chemistry. From the students, the study sought to determine the teaching methods the students found most effective for learning chemistry and results presented in Table 4.11.

Table 4.11: Teaching methods the students found most effective for learning chemistry

Statements	Frequency	Percent
Lectures	117	35.2
Group activities	152	45.8
Laboratory experiments	45	13.6
Multimedia presentations	18	5.4
Others (please specify)	0	0.0
Total	332	100.0

Out of the total respondents, 45.1% stated that group activities were the most effective for learning chemistry, 35.2% lectures, 13.6% laboratory experiments and 5.4% laboratory experiments. The study wanted to know which teaching style affected students' academic performance in chemistry and results presented in Table 4.12.

Table 4.12: Teaching style and students' academic performance in chemistry

Statements	**Frequency**	**Percent**
It improves performance in chemistry	219	66.0
It does not improve performance in chemistry	113	34.0
Teacher supportiveness and its influence on performance in chemistry		
It improves performance in chemistry	293	88.3
It does not improve performance in chemistry	39	11.7
Total	**332**	**100.0**

Majority of the respondents (66.0%) revealed that teaching style improves performance in chemistry while 34.0% were of a contrary opinion that it does not contribute to improvement in performance in chemistry. On teacher supportiveness, the findings were presented in Table 4.12. Majority of the respondents, 88.3% revealed that teacher supportiveness improves performance

in chemistry while 11.7% revealed that it does to enhance performance in chemistry.

The study sought to determine whether suggestions from students existed on how teaching of chemistry could be improved in the school and results were presented in Table 4.13.

Table 4.13: Suggestions on how to improve teaching of chemistry in the school

Statements	**Frequency**	**Percent**
Yes	296	89.2
No	36	10.8
Students' suggestions on how teaching of chemistry could be improved in the school		
Use of interactive visuals	104	31.3
Help students develop chemical imagination	92	27.7
Use the 5 E approach	95	28.6
Relate chemistry to everyday life	41	12.3

A total of 89.2% revealed that there existed suggestions on how teaching of chemistry could be improved in the school while 10.8% said no. Their existed suggestions on how teaching of chemistry could be improved in the schools. The respondents were asked to enumerate ways that students' academic performance

in chemistry can be enhanced and results were presented in Table 4.13. Out of the total respondents, 31.3% revealed that academic performance in chemistry can be enhanced by use of interactive visuals, 27.7% through helping students develop chemical imagination, 28.6% use of the 5E approach while 12.3% through relating chemistry to everyday life. Majority of the respondents revealed that the academic performance in chemistry can be enhanced by use of interactive visuals. The study by Bourner (2017) also established that academic performance in chemistry can be enhanced by use of interactive visuals. Majority of the respondents interviewed revealed that

"The teachers were well qualified with the least having diploma in education while the majority have a bachelors' degree in education but we have some who have masters' degree in education and others have enrolled for doctorate programme in education. The respondents."

4.5 Teaching Methods on Learners' Academic Performance in Chemistry
Findings were presented in Table 4.14.

Table 4.14: Descriptive statistics on Teaching Methods

Statements		**S.D**	**D**	**N**	**A**	**S.A**	**Mean**	**Std. Deviation**
The lecture method alone is not sufficient to achieve high academic performance in	F	23	35	13	27	34	2.4545	1.29216

Chemistry; a variety of teaching methods is necessary.								
	%	17.4	26.5	9.8	20.5	25.8		
Regular use of problem-solving exercises in Chemistry lessons improves students' critical thinking and academic performance.	F	19	24	17	36	36	2.8939	1.48405
	%	14.4	18.2	12.9	27.3	27.3		
Incorporating real-life examples in Chemistry teaching makes the subject more relatable and improves academic outcomes.	F	16	20	14	36	46	2.6515	1.41952
	%	12.1	15.2	10.6	27.3	34.8		

Differentiated instruction that caters to students' varying abilities leads to better academic performance in Chemistry.	F	20	15	16	43	38	2.4242	1.40946
	%	15.2	11.4	12.1	32.6	28.8		
The use of practical/laboratory sessions in teaching Chemistry significantly improves students' academic performance.	F	19	23	9	47	34	2.5152	1.40601
	%	14.4	17.4	6.8	35.6	25.8		
Group discussions during Chemistry lessons enhance students'	F	19	20	13	44	36	2.9545	1.46649

understanding and positively impact their academic performance.								
	%	14.4	15.2	9.8	33.3	27.3		
ICT/multimedia tools used in teaching Chemistry contribute to better academic performance among students.	F	16	16	18	36	46	2.5000	1.44887
	%	12.1	12.1	13.6	27.3	34.8		
The frequency of assessments and feedback in Chemistry influences students' performance by keeping them engaged and aware of their progress.	F	12	15	8	43	54	2.3939	1.38563
	%	9.1	11.4	6.1	32.6	40.9		

The use of strategic revision techniques, such as summary notes and past paper reviews, has a positive effect on students' performance in Chemistry.	F	19	15	23	36	39	2.1515	1.31628
	%	14.4	11.4	17.4	27.3	29.5		
A teacher's preparedness and lesson planning are more critical to students' academic performance in Chemistry than the specific teaching method used.	F	10	19	12	37	54	2.3258	1.23867
	%	7.6	14.4	9.1	28.0	40.9		
Composite mean							**2.5265**	

As per Table 4.14, results reveal that 46.3% of the respondents agreed that the lecture method alone is not sufficient to achieve high academic performance in

Chemistry; a variety of teaching methods is necessary while 43.9% disagreed and while 9.8% were neutral. The lecture method alone was not sufficient to achieve high academic performance in Chemistry; a variety of teaching methods is necessary, as supported by a mean score of 2.4545 and a standard deviation of 1.29216. Findings resemble that of Kini and Podolsky (2016) that lecture method alone is not sufficient to achieve high academic performance in Chemistry; a variety of teaching methods is necessary.

On whether regular use of problem-solving exercises in Chemistry lessons improves students' critical thinking and academic performance, 54.6% agreed while 32.6% disagreed and 12.9% were neutral. Regular use of problem-solving exercises in Chemistry lessons improves students' critical thinking and academic performance, as supported by a mean score of 2.8989 and a standard deviation of 1.48405. The study is in-agreement with that of Ampofo and Osei-Owusu (2015) that regular use of problem-solving exercises in Chemistry lessons improves students' critical thinking and academic performance.

On whether incorporating real-life examples in Chemistry teaching makes the subject more relatable and improves academic outcomes, 62.1% agreed while 27.3% disagreed and 10.6% were neutral. Incorporating real-life examples in Chemistry teaching makes the subject more relatable and improves academic outcomes, as supported by a mean score of 2.6515 and a standard deviation of 1.41952.

Findings of this study are similar to that of Ladd and Sorensen (2017) that incorporating real-life examples in Chemistry teaching makes the subject more relatable and improves academic outcomes. In regards to whether differentiated instruction that caters to students' varying abilities leads to better academic

performance in Chemistry, 61.4% agreed while 26.6% disagreed and 12.1% were neutral. Differentiated instruction that caters to students' varying abilities leads to better academic performance in Chemistry, as supported by a mean score of 2.4242 and a standard deviation of 1.40946. Findings resemble that of Mulholland and Berliner (2022) that differentiated instruction that caters to students' varying abilities leads to better academic performance in Chemistry.

On whether the use of practical/laboratory sessions in teaching Chemistry significantly improves students' academic performance, 61.4% agreed while 31.8 disagreed and 6.8% were neutral. The use of practical/laboratory sessions in teaching Chemistry significantly improves students' academic performance, by a mean score of 2.5152 and a standard deviation of 1.40601. The study sought to determine whether group discussions during Chemistry lessons enhance students' understanding by positively impact their academic performance, 60.6% agreed while 29.6% disagreed and 9.8% were undecided.

This implies that majority of the respondents agreed that group discussions during Chemistry lessons enhance students' understanding and positively impact their academic performance, as supported by a mean score of 2.9545 and a standard deviation of 1.46649. Findings resemble that of Podolsky et al. (2019) that group discussions during Chemistry lessons enhance students' understanding and positively impact their academic performance.

In regards to whether ICT/multimedia tools used in teaching Chemistry contribute to better academic performance among students, 62.1% agreed while 24.2% disagreed and 13.6% were neutral. ICT/multimedia tools were used in teaching Chemistry contribute to better academic performance among students, as supported by a mean score of 2.5000 and a standard deviation of 1.44887. Out

of the total respondents, 73.5% agreed that the frequency of assessments and feedback in Chemistry influences students' performance by keeping them engaged and aware of their progress while 20.5% disagreed and 6.1% were neutral. Frequency of assessments and feedback in Chemistry influences students' performance by keeping them engaged and aware of their progress, as supported by a mean score of 2.3939 and a standard deviation of 1.38563. Findings resemble that of Kheirzadeh and Sistani (2018) that frequency of assessments and feedback in Chemistry influences students' performance by keeping them engaged and aware of their progress.

On whether the use of strategic revision techniques, such as summary notes and past paper reviews, has a positive effect on students' performance in Chemistry, 56.8% agreed while 25.8% disagreed and 17.4% were neutral. The use of strategic revision techniques, such as summary notes and past paper reviews, had a positive effect on students' performance in Chemistry, as supported by a mean score of 2.1515 and a standard deviation of 1.31628. Findings resemble that of Wolters and Daugherty (2017) that the use of strategic revision techniques, such as summary notes and past paper reviews, has a positive effect on students' performance in Chemistry. On whether teacher's preparedness and lesson planning are more critical to students' academic performance in Chemistry than the specific teaching method used, 68.9% agreed while 22% disagreed and 9.1% were neutral. Teacher's preparedness and lesson planning were more critical to students' academic performance in Chemistry than the specific teaching method used, as supported by a mean score of 2.3258 and a standard deviation of 1.23867. The study agrees with that of Kini and Podolsky (2016) that teacher's preparedness and lesson planning are more critical to students' academic

performance in Chemistry than the specific teaching method used. The composite mean was 2.5265 which implies that teacher experience has an influence on learners' academic performance in chemistry within public secondary schools in Chesumei Sub-County. Majority of the respondents interviewed revealed that;

"Chemistry teachers had great experience as majority of the teachers had more than three years teaching experience with remarkable students' performance in chemistry. In most of the schools, all the chemistry teachers had the experience required for better students' performance in the chemistry subject."

4.6 Teacher Professional Development and Continuous Learning on the Academic Performance of Learners in Chemistry

Findings were presented in Table 4.15.

Table 4.15: Descriptive statistics on Teacher Professional Development

Statements		S.D	D	N	A	S.A	Mean	Std. Deviation
Teacher professional development has seen improvement in chemistry performance in this school.	F	7	29	23	52	21	2.6136	1.15016

	%	5.3	22.0	17.4	39.4	15.9		
Chemistry performance in our school is a factor of teachers attending capacity building sessions jointly with teachers from other schools.	F	35	56	13	20	8	2.3182	1.19361
	%	26.5	42.4	9.8	15.2	6.1		
The school administration facilitates workshops for chemistry teachers in this school; something that has seen improved performance in the subject.	F	12	34	15	44	27	2.6970	1.30143
	%	9.1	25.8	11.4	33.3	20.5		

Chemistry teachers in this school bench mark in other schools which do well in the subject and this has improved the performance of the subject in the recent years.	F	19	26	15	34	38	2.6818	1.41593
	%	14.4	19.7	11.4	25.8	28.8		
Retooling of teachers is necessary in boosting the performance of chemistry in any school since there are many emerging issues in the subject specifically and the curriculum generally.	F	11	14	15	54	38	2.1667	1.29689

	%	8.3	10.6	11.4	40.9	28.8		
Chemistry teachers who attend seminars and in-service training enable students to perform well in the subject.	F	15	20	20	54	23	2.8636	1.30631
	%	11.4	15.2	15.2	40.9	17.4		
Composite mean							**2.5568**	

As per Table 4.15, results reveal that 55.3% of the respondents agreed that teacher professional development has seen improvement in chemistry performance in this school while 27.3% disagreed and 17.4% were neutral. Teacher professional development had improved chemistry performance in this school, as supported by a mean score of 2.6136 and a standard deviation of 1.15016. The study agrees with that of Hardman et al. (2011) that teacher professional development has seen improvement in chemistry performance in this school.

On whether chemistry performance in the school is a factor of teachers attending capacity building sessions jointly with teachers from other schools, 68.9% disagreed while 21.3% agreed and 9.8% were neutral. Chemistry performance in the school was not a factor of teachers attending capacity building sessions

jointly with teachers from other schools, as supported by a mean score of 2.3182 and a standard deviation of 1.19361. Findings resemble that of Desimone (2019) that chemistry performance in the school is not a factor of teachers attending capacity building sessions jointly with teachers from other schools.

In relation to whether the school administration facilitates workshops for chemistry teachers in this school; something that has seen improved performance in the subject, 53.8% agreed while 34.9% disagreed and 11.4% were neutral. School administration facilitates workshops for chemistry teachers in this school; something that has seen improved performance in the subject, as supported by a mean score of 2.6970 and a standard deviation of 1.30143. Findings resemble that of Mwania and Muola (2013) that school administration facilitates workshops for chemistry teachers in this school; something that has seen improved performance in the subject.

Out of the total respondents, 54.6% agreed that chemistry teachers in this school bench mark in other schools which do well in the subject and this has improved the performance of the subject in the recent years while 34.1% disagreed and 11.4% were neutral. Chemistry teachers in this school bench mark in other schools which do well in the subject and this has improved the performance of the subject in the recent years, as supported by a mean score of 2.6818 and a standard deviation of 1.41593. Findings resemble that of Yoon et al. (2017) that chemistry teachers in this school bench mark in other schools which do well in the subject and this has improved the performance of the subject in the recent years.

On whether retooling of teachers is necessary in boosting the performance of chemistry in any school since there are many emerging issues in the subject

specifically and the curriculum generally, 69.7% agreed while 18.9% disagreed and 11.4% were neutral. Retooling of teachers was necessary in boosting the performance of chemistry in any school since there are many emerging issues in the subject specifically and the curriculum generally, as supported by a mean score of 2.1667 and a standard deviation of 1.29689. The study agrees with that of Osei-Owusu (2022) that retooling of teachers is necessary in boosting the performance of chemistry in any school since there are many emerging issues in the subject specifically and the curriculum generally.

On whether chemistry teachers who attend seminars and in-service training enable students to perform well in the subject, 58.3% agreed while 26.6% disagreed and 15.2% were neutral. Chemistry teachers who attend seminars and in-service training enable students to perform well in the subject, as supported by a mean score of 2.8636 and a standard deviation of 1.30631. Findings resemble that of Wallace (2019) that chemistry teachers who attend seminars and in-service training enable students to perform well in the subject. The composite mean was 2.5568 which implies that teacher professional development has a positive influence on learners' academic performance in chemistry within public secondary schools in Chesumei Sub-County. The respondents were asked how they supported the professional development of chemistry teachers in their school. Majority of the respondents opined that;

> *"Teachers' professional development can be enhanced through promotion of teacher collaboration, providing teachers with on-going support, investing in high quality teacher educators, building instructional leadership at all levels of the education system and use of information and communication technology (ICT) to provide access to*

content, professional development as well as professional learning communities."

4.7 Student academic performance

The study also sought to determine the student academic performance and the results were presented in Figure 4.1.

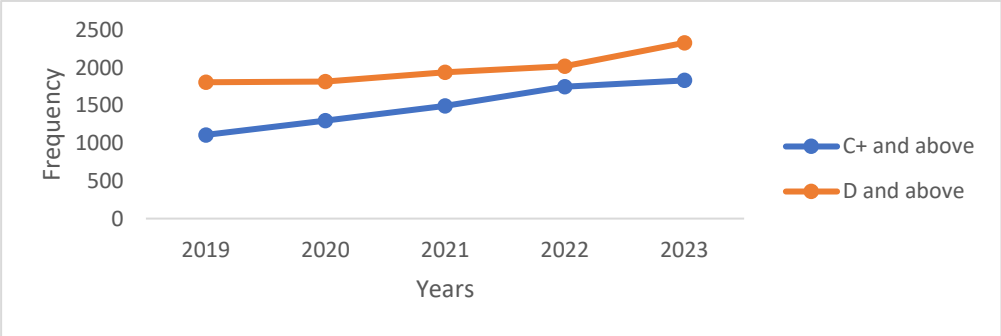


Figure 4.1: Students' academic achievement

As per table 4.1, the results reveal that the number of students who scores D and above was 1810 students in 2019 and the number was on a positive trajectory through-out the remaining years. The highest was in 2023 which stood at 1855. For those who scored C+ and above, the number increased among the years under-consideration, with the lowest being 1111 in 2019 and the highest being 2023.

4.8 Regression analysis

Regression assumptions were tested before regression analysis was done. The regression assumptions tested included linearity, normality, auto-correlation, multi-collinearity and homoscedasticity. In order to test linearity assumption, the assumption was tested using a scatter plot and the results were presented in figure 4.2;

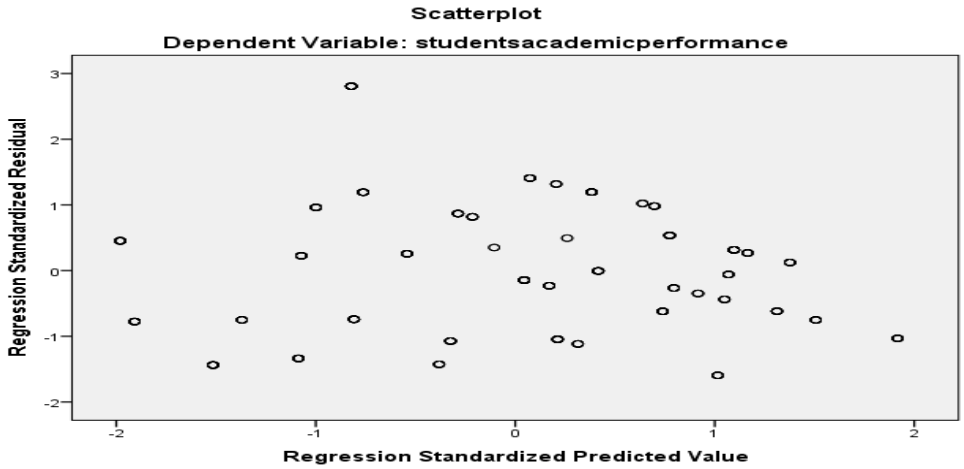


Figure 4.2: Linearity Assumption Test

As per figure 4.2, the residuals were distributed in a manner that is random. This implies that the residuals were linearly distributed. The study had adopted a histogram to test normality of residuals and the results were presented in figure 4.3.

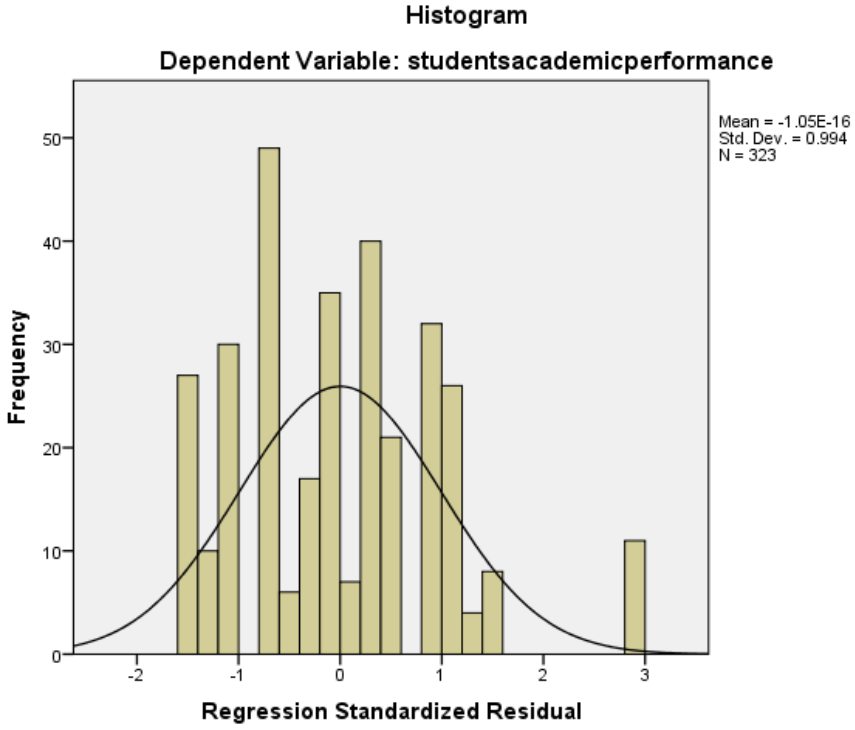


Figure 4.3: Normality Test

The histogram, as shown above had a bell shape and more of the values were located around the center while the rest around the tails. The implication of more of the values being located at the center was that the residuals were normally distributed. Durbin-Watson d test was used to test auto-correlation assumption as shown in Table 4.16.

Table 4.16: Auto-correlation Test

Model	Durbin-Watson
1	2.008

The results revealed that the d statistic value was 2.008 which fall in between 1.5 and 2.5. This implies that the autocorrelation assumption was met. Another assumption tested in the study was test of multi-collinearity and the results were presented in Table 4.17.

Table 4.17: Test of Multi-collinearity

Model		Collinearity statistics	
		Tolerance	VIF
1	(Constant)		
	Teacher qualifications	.565	1.771
	Teacher experience	.819	1.221
	Teaching methods	.697	1.435

Teacher professional development	.519	1.928

If the VIF is more than 10, it means that no multi-collinearity problems exist in a study. In this study, VIF value was less than 10 and therefore there were no serious multi-collinearity problems that were detected in the study. In order to test homoscedasticity assumption, a scatter plot was adopted and the results were presented in figure 4.4.

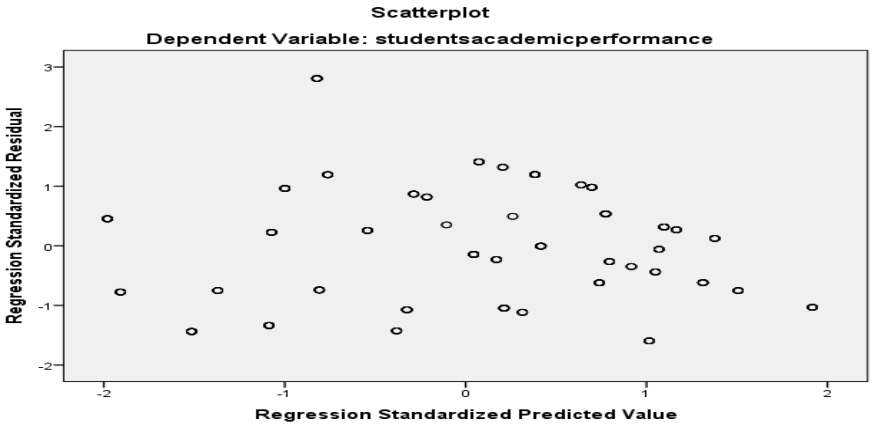


Figure 4.4: Homoscedasticity assumption Test

As depicted in figure 4.4, the residuals were distributed without any pattern and therefore they were not distributed in a triangular form. This meant that the assumption was upheld. After testing the assumptions, regression analysis was done and the results presented below included model summary, ANOVA and regression co-efficients results;

Table 4.18: Model summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**

1	.643	0.518	0.504	2.48617

a. Predictors: (Constant), Teacher qualifications, Teacher experience, Teaching methods, Teacher Professional development

In Table 4.18, the adjusted r squared value was 0.504 which implies that Teacher qualifications, Teacher experience, teaching methods, teacher professional development explain 50.4% change in students' academic performance in chemistry. The model fitness was tested using ANOVA and results presented in Table 4.20.

Table 4.19: ANOVA

Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	736.760	4	252.254	23.520	.000[b]
	Residual	752.650	141	117.414		
	Total	1589.411	145			

a. Dependent Variable: Students' academic Performance

b. Predictors: (Constant), Teacher qualifications, Teacher experience,

Teaching methods Teacher Professional development

The value of the F test is F (4, 141) = 23.520, $p<0.05$. This implies that the model was fit to predict students' academic performance in chemistry. The results further implied that teacher qualifications, teacher experience, teaching methods and teacher professional development can significantly predict

students' academic performance in chemistry. Regression co-efficients were presented in Table 4.20.

Table 4.20: Regression co-efficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.056	2.120		1.813	.000
	Teacher qualifications	.413	.051	.607	7.336	.000
	Teacher's experience	.190	.085	.173	3.180	.022
	Teaching methods	.141	.081	.135	2.666	.001
	teacher professional development's	.222	.089	.201	1.621	.000

Regression model for the study was as follows;

$Y=4.056+0.413X_1+0.190X_2+0.141X_3+0.222X_4$

Where;

Y= Students academic performance

X_1= Teacher qualifications

X_2= Teachers experience

X_3= Teaching methods

X_4= Teacher professional developments

Results presented in Table 4.20 reveal that teacher qualifications have a significant positive influence on student academic performance in chemistry (β=0.413, p=0.000). This implies that an improvement in teacher qualifications by one unit improves students' academic performance in chemistry by 0.413 units, when all the other factors are held constant. The results are similar to that of Darling-Hammond (2000) that teacher qualifications have a significant positive influence on student academic performance in chemistry. Teacher experience has a significant positive influence on students' academic performance in chemistry (β=0.190, p=0.022). This implies that an increase in teachers experience by one-unit increases improves students' academic performance in chemistry by 0.190 units, when teacher qualifications, teaching methods and teacher professional development is held constant.

Findings resemble that of Hattie (2008) that teacher experience enhances students' academic performance. Teaching methods has a significant positive influence on students' academic performance in chemistry (β=0.141, p=0.001). This implies that an improvement in teaching methods by one unit contributes to improvement in students' academic performance in chemistry by 0.141 when teacher qualifications, teacher experience and teacher professional development is held constant.

Findings are in-tandem with that of Kini and Podolsky (2016) that teaching methods contributes to improvement in students' academic performance. Teacher professional development has a significant positive influence on students' academic performance in chemistry (β=0.222, p=0.000). This implies that an improvement in teacher professional development by one unit contributes to improvement in students' academic performance in chemistry by 0.222 when teacher qualifications, teacher experience and teaching methods are held constant. The study agrees with that of Hardman et al. (2011) that teacher professional development contributes to improvement in students' academic performance.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter comprises of summary of findings, conclusions and recommendations.

5.2 Summary of Findings

This section covers summary of findings per each specific objective.

5.2.1 Teacher Qualifications on Learners' Academic Performance

Findings from the research indicated that qualification of instructors played a major role in determining students' performance in chemistry, as reflected by a mean score of 2.3864 and a standard deviation of 1.44965. The depth of subject delivery was broader among more qualified teachers. Mastery of chemistry content was associated with the teacher's level of qualification. Additionally, teachers' qualifications impacted their ability to conduct practical sessions, which are crucial to students’ success in chemistry. However, it was noted that teachers' qualification levels did not consistently affect academic achievement in chemistry, as diploma-holding teachers often outperformed those with higher academic credentials.

Overall, students' performance in chemistry appeared to be more influenced by individual student factors than by teachers' qualifications. The performance of chemistry in the school had always been influenced by team teaching, strategic revision and teacher motivation without much consideration of individual teacher qualification. Parental involvement had been a major boost to chemistry

performance in this school coupled with high teacher qualifications enhanced by regular training, seminars and workshops. Chemistry performance had not been on an upward trajectory in this school based on teachers' dedication, qualification and intrinsic motivation of learners. It was not important to acknowledge the fact that chemistry performance has been on an upward trajectory in this school based on teachers' dedication, qualification and intrinsic motivation of learners.

Teacher qualification was an integral determiner of students' performance in chemistry in this school since the depth subject delivery is wide. The findings indicated that most respondents agreed that a teacher's experience plays a crucial role in determining chemistry performance, as experienced teachers can draw from prior teaching outcomes. The school's success in chemistry is largely attributed to the extensive experience of its teachers. The teachers' expertise in managing candidate classes has contributed to the school's consistent strong performance in chemistry over time. Other schools have not sought to benchmark against us in chemistry instruction, as our sustained success over the years is due to the wealth of experience among the teachers in the department. The performance of chemistry was not more student determined than dependent on teacher's experience since many schools with more experienced teachers have been poorly performing in the subject.

Chemistry performance was more related to teacher lesson preparation than experience since a poorly prepared teacher may not deliver well during the lessons. The performance of chemistry in this school has always been influenced by team teaching, strategic revision and teacher motivation without much consideration of individual teacher experience. Parental involvement has been a

major boost to chemistry performance in schools coupled with long teaching experience enhanced by regular training, seminars and workshops.

Chemistry performance had been on an upward trajectory in this school based on teachers' dedication, experience and intrinsic motivation of learners. Chemistry performance in the school was owed to the school culture that is keen on student discipline, weekend practical's, inter-class contests and chemistry week without much ado on teachers' experience. Regression results revealed that teaching methods have a significant positive influence on student academic performance in chemistry (β=0.141, p=0.001).

5.2.2 Teaching Methods on Learners' Academic Performance

The findings indicated that most respondents believed the lecture method alone is inadequate for achieving high academic performance in Chemistry, and a diverse range of teaching methods is essential. Regular inclusion of problem-solving exercises in Chemistry lessons enhances students' critical thinking and academic performance. A majority of respondents felt that incorporating real-life examples into Chemistry teaching makes the subject more relevant and improves academic results. Differentiated instruction, which addresses students' different learning abilities, leads to better academic outcomes in Chemistry. The integration of practical and laboratory sessions in Chemistry teaching notably boosts students' academic performance.

Additionally, the use of ICT and multimedia tools in Chemistry instruction contributes to improved academic performance among students. Frequency of assessments and feedback in Chemistry influences students' performance by keeping them engaged and aware of their progress. The use of strategic revision techniques, such as summary notes and past paper reviews, has a positive effect

on students' performance in Chemistry. Teacher's preparedness and lesson planning are more critical to students' academic performance in Chemistry than the specific teaching method used. Regression results revealed that teacher experience significantly positively influences students' academic performance in chemistry (β=0.190, p=0.022).

5.2.4 Teacher Professional Development and Continuous Learning on the Academic Performance

The study found that most respondents believed that teacher professional development has contributed to the improved performance of chemistry in the school. However, the performance in chemistry was not influenced by teachers participating in capacity-building sessions with educators from other schools. The school administration organizes workshops specifically for the chemistry teachers, which has contributed to the subject's improvement.

Further, chemistry teachers in the school benchmark against those in high-performing schools, which has also helped boost performance in recent years. Ongoing teacher retooling is essential for enhancing chemistry performance, given the many emerging challenges in the subject and the broader curriculum. Teachers who participate in seminars and in-service training have been shown to help students achieve better results in chemistry. Regression analysis indicated that teacher professional development positively and significantly impacts students' academic performance in chemistry (β=0.222, p=0.000).

5.3 Conclusions

In conclusion teacher qualifications play crucial role in enhancing academic performance of the learners in chemistry within government run high schools in Chesumei Sub-County. Teacher qualification as a factor played a great role in

students' success in chemistry, as it ensures a comprehensive delivery of the subject content. The teacher's level of qualification directly impacts their mastery of the subject and ability to teach complex concepts. Additionally, a teacher’s qualification in chemistry affects their ability to conduct practical’s, which are a vital component of chemistry education.

The students’ performance in chemistry was influenced by qualifications of the teachers, as well as other factors like team teaching, strategic revision, teacher motivation, and the consideration of individual qualifications. Parental involvement has also contributed positively to chemistry performance, alongside the ongoing professional development of teachers through regular training, seminars, and workshops. The improvement in chemistry performance is attributed to the dedication of teachers, their qualifications, and the intrinsic motivation of the students. Teacher qualifications remain a key determinant of chemistry performance due to their role in delivering a wide-ranging and in-depth curriculum.

The study further concluded that teacher’s experience is key in determining performance in Chemistry since teachers are able to apply from previous performances. Chemistry performance is a factor of the long experiences held by teachers teaching it. Teacher’s experience in handling candidate classes contributes to improvement in performance in chemistry. Performance of chemistry depends on students’ determination and teacher’s experience. Performance of chemistry in schools is influenced by team teaching, strategic revision, teacher motivation and individual teacher experience. Parental involvement is a major boost to chemistry performance in schools coupled with

long teaching experience of teachers enhanced by regular training, seminars and workshops.

On teaching methods, it was concluded that teaching methods had a great impact influence on academic performance of the learners in chemistry in public secondary schools in the study area. The study further concluded that the lecture method alone is not sufficient to achieve high academic performance in Chemistry; a variety of teaching methods is necessary. Regular use of problem-solving exercises in Chemistry lessons improves students' critical thinking and academic performance. Incorporating real-life examples in Chemistry teaching makes the subject more relatable and improves academic outcomes. Differentiated instruction that caters to students' varying abilities leads to better academic performance in Chemistry.

The use of practical/laboratory sessions in teaching Chemistry significantly improves students' academic performance. ICT/multimedia tools used in teaching Chemistry contribute to better academic performance among students. Frequency of assessments and feedback in Chemistry influences students' performance by keeping them engaged and aware of their progress. The use of strategic revision techniques, such as summary notes and past paper reviews, has a positive effect on students' performance in Chemistry. Teacher’s preparedness and lesson planning are more critical to students' academic performance in Chemistry than the specific teaching method used.

On teacher professional development, the study concluded that teacher professional development and continuous learning has a significant role on the academic performance of learners in chemistry within public secondary schools in Chesumei Sub-County. The study further concluded that chemistry teachers

in schools bench mark in other schools which do well in the subject and this has improved the performance of the subject in the recent years. Retooling of teachers is necessary in boosting the performance of chemistry in any school since there are many emerging issues in the subject specifically and the curriculum generally. Chemistry teachers who attend seminars and in-service training enable students to perform well in the subject.

5.4 Recommendations

This section outlines recommendations for policy and practice. The study suggests that teacher qualifications should remain a key factor in teacher recruitment, as they are linked to improved academic performance in chemistry within public secondary schools. Teachers should have a strong grasp of chemistry content to effectively enhance student outcomes in the subject. In order to foster improvement in academic performance, strategies such as team teaching, strategic revision, teacher motivation, and consideration of individual teacher qualifications should be prioritized.

Additionally, parental involvement, along with regular professional development through training, seminars, and workshops, should be implemented to strengthen chemistry performance. Teachers should be committed and capable of inspiring students to foster improvements in chemistry performance. Regarding teacher experience, the study recommends that chemistry teachers should engage in benchmarking practices with schools that excel in chemistry and regularly participate in in-service training. Schools aiming to improve their chemistry performance should focus on team teaching, strategic revision, teacher motivation, and the experience of individual teachers.

On teaching methods, the study recommended that a variety of teaching methods should be adopted for schools to record high academic performance in Chemistry. Problem-solving exercises in Chemistry lessons should be regularly used to improve students' critical thinking and academic performance. Real-life examples should be incorporated in Chemistry teaching as it makes the subject more relatable and it improves academic outcomes. Differentiated instruction that caters to students' varying abilities should be adopted as it leads to better academic performance in Chemistry.

The use of practical/laboratory sessions in teaching Chemistry should continue to be used as to contribute to improvement in students' academic performance. ICT/multimedia tools should be used in teaching Chemistry and assessments should be done frequently in Chemistry as it keeps students engaged and aware of their progress. Strategic revision techniques, such as summary notes and past paper reviews should continue to be used as they have a positive effect on students' performance in Chemistry. Teachers should prepare well and have lesson plans as they are more critical to students' academic performance in Chemistry.

On teacher professional development, the study recommended that chemistry teachers in schools should bench mark in other schools which do well in the subject. Retooling of teachers is needed to boost the performance of chemistry in any school since there are many emerging issues in the subject specifically and the curriculum generally. Chemistry teachers should attend seminars and in-service training to enable students to perform well in the subject.

5.5 Suggestions for Further studies

The teacher-related factors examined in this study include teacher qualifications, teaching methods, teacher experience, and teacher professional development through continuous learning. The study suggests that future research should explore other teacher-related factors on learners' performance in chemistry in government sponsored high schools in Chesumei Sub-County, using different indicators than those considered in the current study. Additionally, further research could examine other factors that affect learners' academic performance in chemistry in public secondary schools in the region, beyond teacher-related variables. A similar investigation could also be conducted in private secondary schools in Chesumei Sub-County.

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APPENDICES

APPENDIX I: INTRODUCTION LETTER

EVANS KIPRONO C. TARUS
KOITALEEL SAMOEI UNIVERSITY COLLEGE
UNIVERSITY OF NAIROBI
P.O. BOX 5-30307
MOSORIOT
To Respondent
Dear Sir/Madam,

RE: INVITATION TO PARTICIPATE IN RESEARCH STUDY ON THE INFLUENCE OF TEACHER-RELATED FACTORS ON ACADEMIC PERFORMANCE IN CHEMISTRY

I hope this letter finds you well. My name is Evans Kiprono C. Tarus, and a Master of Education (Curriculum Studies) student at Koitalel Samoei University College, University of Nairobi. I am currently conducting a research study titled "Influence of Teacher-Related Factors on Academic Performance in Chemistry in public secondary schools in Chesumei Sub-County"

The purpose of this study is to investigate the various teacher-related factors that may influence academic performance in chemistry among secondary school students in Chesumei Sub-County. Your valuable insights are crucial to the success of this research. Your participation in this study will involve completing a questionnaire that seeks to gather information on your observations and experiences regarding teacher-related factors and their impact on students' academic performance in chemistry. Your responses will remain confidential and will only be used for research purposes.

Your cooperation is greatly appreciated and will contribute to the advancement of knowledge in the field of education. If you agree to participate, please indicate your consent by completing the attached questionnaire and returning it to me. If you have any questions or require further clarification about the study, please do not hesitate to contact me. The information you provide will solely be for the purposes of the study.

Sincerely,



EVANS KIPRONO C. TARUS

APPENDIX II: TEACHERS QUESTIONNAIRE
SECTION A: DEMOGRAPHIC DATA

1. Age category

≤ 30 years ☐ 31 -40 years ☐ 41-50 years ☐ ≥ 50 years ☐

2. Gender

Male ☐ Female ☐

3. What is your highest level of academic qualification?

Diploma in Education ☐ B. ED ☐ M. ED ☐ Doctorate ☐

4. Current position in the school

Head of Department ☐ Chemistry Teacher ☐

5. For how long have you been in the school?

Less than 4 years ☐ 4-6 years ☐ More than 6 years ☐

6. Category of school?

National boys ☐ National girls ☐ Extra County boys ☐ Extra County girls ☐ County school boys ☐ county girls ☐ Sub County mixed day ☐

SECTION B: INFLUENCE OF TEACHER QUALIFICATION ON ACADEMIC PERFORMANCE IN CHEMISTRY OF STUDENTS IN PUBLIC SECONDARY SCHOOLS IN CHESUMEI SUB-COUNTY

Please rate the following statements concerning the influence of teacher qualification on academic performance in Chemistry of students in public secondary schools in Chesumei sub-county by putting a tick (√) in appropriate column in the table below based on a scale of 1-5 rated as follows;**5-Strongly agree; 4-Agree; 3-Neutral; 2-Disagree; 1-Strongly Disagree**.

Statements	**1(SD)**	**2(D)**	**3(N)**	**4(A)**	**5(SA)**
Teacher qualification is an integral determiner of students' performance in chemistry in this school since the depth subject delivery is wide.					
The mastery of subject content depends on the level of qualification of the teacher					
Teacher's qualification in chemistry influences the capacity of undertaking practical which are key component of the performance in this subject					
Teachers' level of qualification has no influence on academic performance in chemistry since diploma teachers have always excelled in teaching chemistry					

compared to those with higher qualifications.					
The performance of chemistry is more student determined than dependent on teacher qualifications.					
Chemistry performance is more related to teacher lesson preparation than qualification since mastery content and delivery are not solely dependent on the latter.					
The performance of chemistry in this school has always been influenced by team teaching, strategic revision and teacher motivation without much consideration of individual teacher qualification.					
Parental involvement has been a major boost to chemistry performance in this school coupled with high teacher qualifications enhanced by regular training, seminars and workshops.					
It is important to acknowledge the fact that chemistry performance has been on an upward trajectory in this school based on					

teachers' dedication, qualification and intrinsic motivation of learners.					
Chemistry performance in our school in owed to the school culture that is keen on student discipline, weekend practical, inter-class contests and chemistry week.					

SECTION C: INFLUENCE OF TEACHERS' EXPERIENCE ON THE TEACHING OF CHEMISTRY IN PUBLIC SECONDARY SCHOOLS IN CHESUMEI SUB-COUNTY

Please rate the following statements concerning the influence of teachers' experience on the teaching of Chemistry in public secondary schools in Chesumei sub-county

by putting a tick (√) in appropriate column in the table below based on a scale of 1-5 rated as follows;**5-Strongly agree; 4-Agree; 3-Neutral; 2-Disagree; 1-Strongly Disagree**.

Statements	**1(SD)**	**2(D)**	**3(N)**	**4(A)**	**5(SA)**
Teacher's experience is key in determining performance in Chemistry since teachers are able to apply from previous performances					
Chemistry performance in our school is a factor of the long					

experiences held by teachers teaching it.					
Teacher's experience in handling candidate classes has seen this school do well in chemistry over the years.					
Other schools come to benchmark from us on teaching chemistry since our school has been consistently doing well for many years as a result of the experienced teachers that we have in the department.					
The performance of chemistry is more student determined than dependent on teacher's experience since many schools with more experienced teachers have been poorly performing in the subject.					
Chemistry performance is more related to teacher lesson preparation than experience since a poorly prepared teacher may not deliver well during the lessons.					
The performance of chemistry in this school has always been					

influenced by team teaching, strategic revision and teacher motivation without much consideration of individual teacher experience.					
Parental involvement has been a major boost to chemistry performance in this school coupled with long teaching experience of teachers enhanced by regular training, seminars and workshops.					
It is important to acknowledge the fact that chemistry performance has been on an upward trajectory in this school based on teachers' dedication, experience and intrinsic motivation of learners.					
Chemistry performance in our school in owed to the school culture that is keen on student discipline, weekend practicals, inter-class contests and chemistry week without much ado on teachers' experience.					

SECTION D: INFLUENCE OF TEACHING METHODS ON ACADEMIC PERFORMANCE IN CHEMISTRY OF STUDENTS IN PUBLIC SECONDARY SCHOOLS IN CHESUMEI SUB-COUNTY

Please rate the following statements concerning the influence of teaching methods on academic performance in Chemistry of students in public secondary schools in Chesumei sub-county by putting a tick (√) in appropriate column in the table below based on a scale of 1-5 rated as follows;**5-Strongly agree; 4-Agree; 3-Neutral; 2-Disagree; 1-Strongly Disagree**.

Statements	**1(SD)**	**2(D)**	**3(N)**	**4(A)**	**5(SA)**
The lecture method alone is not sufficient to achieve high academic performance in Chemistry; a variety of teaching methods is necessary.					
Regular use of problem-solving exercises in Chemistry lessons improves students' critical thinking and academic performance.					
Incorporating real-life examples in Chemistry teaching makes the subject more relatable and improves academic outcomes.					
Differentiated instruction that caters to students' varying abilities leads to					

better academic performance in Chemistry.					
The use of practical/laboratory sessions in teaching Chemistry significantly improves students' academic performance.					
Group discussions during Chemistry lessons enhance students' understanding and positively impact their academic performance.					
ICT/multimedia tools used in teaching Chemistry contribute to better academic performance among students.					
The frequency of assessments and feedback in Chemistry influences students' performance by keeping them engaged and aware of their progress.					
The use of strategic revision techniques, such as summary notes and past paper reviews, has a positive effect on students' performance in Chemistry.					
A teacher's preparedness and lesson planning are more critical to students'					

academic performance in Chemistry than the specific teaching method used.					

SECTION E: INFLUENCE OF TEACHER PROFESSIONAL DEVELOPMENT ON ACADEMIC PERFORMANCE IN CHEMISTRY OF STUDENTS IN PUBLIC SECONDARY SCHOOLS IN CHESUMEI SUB-COUNTY

Please rate the following statements concerning the influence of teacher development on academic performance in Chemistry of students in public secondary schools in Chesumei sub-county by putting a tick (√) in appropriate column in the table below based on a scale of 1-5 rated as follows;**5-Strongly agree; 4-Agree; 3-Neutral; 2-Disagree; 1-Strongly Disagree**.

Statements	**1(SD)**	**2(D)**	**3(N)**	**4(A)**	**5(SA)**
Teacher professional development has seen improvement in chemistry performance in this school					
Chemistry performance in our school is a factor of teachers attending capacity building sessions jointly with teachers from other schools					
The school administration facilitates workshops for chemistry teachers in this school; something that has seen improved performance in the subject.					
Chemistry teachers in this school bench mark in other schools which					

do well in the subject and this has improved the performance of the subject in the recent years					
Retooling of teachers is necessary in boosting the performance of chemistry in any school since there are many emerging issues in the subject specifically and the curriculum generally					
Chemistry who attends seminars and in-service training enable students to perform well in the subject.					

Thank you for your participation and valuable input. Your feedback is greatly appreciated.

Sincerely,

Evans Kiprono C. Tarus - Researcher

Master of Education (Curriculum studies)

Koitaleel Samoei University College, University of Nairobi

APPENDIX III: STUDENT QUESTIONNAIRE

Dear Student,

Thank you for agreeing to participate in this study examining the influence of teacher-related factors on academic performance in chemistry in public secondary schools in Chesumei Sub-County. Your feedback is crucial in understanding the learning experience and improving educational practices.

Please take a few moments to complete the following questionnaire. Your responses will be kept confidential and used for research purposes only.

1. What is your current grade level?
   - Form 1 □
   - Form 2 □
   - Form 3 □
   - Form 4 □
2. How would you rate your interest in chemistry?
   - Very interested □
   - Interested □
   - Neutral □
   - Not very interested □
   - Not interested at all □
3. On average, how many hours per week do you spend studying chemistry outside chemistry lessons?
   - Less than 1 hour □
   - 1-3 hours □
   - 4-6 hours □
   - More than 6 hours □

4. How would you describe your relationship with your chemistry teacher in regards to chemistry subject?
    - Very positive □
    - Positive □
    - Neutral □
    - Negative □
    - Very negative □
5. What teaching methods do you find most effective for learning chemistry? (Select all that apply)
    - Lectures □
    - Group activities □
    - Laboratory experiments □
    - Multimedia presentations □
    - Other (please specify)

    _____
6. How comfortable do you feel asking questions or seeking help in chemistry from your chemistry teacher?
    - Very willing □
    - Willing □
    - Neutral □
    - Unwilling □
    - Very un □

7. How do you typically prepare for chemistry assessments (tests/exams)?
    - Reviewing notes □
    - Doing practice problems □
    - Group study sessions □
    - Seeking help from teacher or peers □
    - Other (please specify) _____
8. What challenges do you face in understanding chemistry concepts?

    _____

    _____
9. In your opinion, how do teacher-related factors (e.g., teaching style, supportiveness) affect your academic performance in chemistry?

    _____

    _____
10. Do you have any suggestions or feedback you would like to provide to improve the teaching of chemistry in your school? If Yes, enumerate

    _____

Thank you for taking the time to complete this questionnaire. Your input is highly valued and will contribute to the enhancement of chemistry education.

Sincerely,

Evans Kiprono C. Tarus - Researcher

Master of Education (Curriculum Studies)

Koitaleel Samoei University College, University of Nairobi

APPENDIX IV: PRINCIPAL INTERVIEW GUIDE

Introduction:

Thank you for participating in this interview, which aims to explore the influence of teacher-related factors on academic performance in chemistry in public secondary schools in Chesumei Sub-County. Your insights as a principal are invaluable in understanding the dynamics within your school environment.

Confidentiality:

All information shared during this interview will be treated with strict confidentiality and used solely for research purposes. Your cooperation is greatly appreciated.

Interview Questions:

1. Can you provide an overview of the current status of chemistry teacher's education in terms of qualification (Diploma, Degree, Masters) in your school?
2. How would you describe the experience level of the chemistry teachers in your school (Length of stay)?
3. In your opinion, what are the key teacher-related factors that influence students' academic performance in chemistry?
4. How do you support the professional development of chemistry teachers in your school?
5. What strategies does your school employ to ensure effective teaching and learning in chemistry (lecture, group activities, lab experiments)?
6. How do you assess the effectiveness of chemistry teaching in your school?
7. What challenges, if any, do you encounter in ensuring optimal teaching and learning experiences in chemistry?

8. How do you address any issues or concerns raised by students or parents regarding chemistry education in your school?
9. Can you describe any initiatives or programs implemented in your school to enhance students' interest and engagement in chemistry?
10. How do you collaborate with chemistry teachers to continuously improve the quality of chemistry education in your school? (Bench marking, capacity building, appraisal)
11. From your perspective, what role does parental involvement play in supporting students' learning in chemistry?
12. Are there any additional insights or recommendations you would like to share regarding the influence of teacher-related factors on academic performance in chemistry?

Thank you for your valuable insights and participation in this interview. Your input will contribute significantly to the ongoing efforts to enhance chemistry education in public secondary schools in Chesumei Sub-County. If you have any further comments or suggestions, please feel free to share them.

Evans Kiprono C. Tarus - Researcher

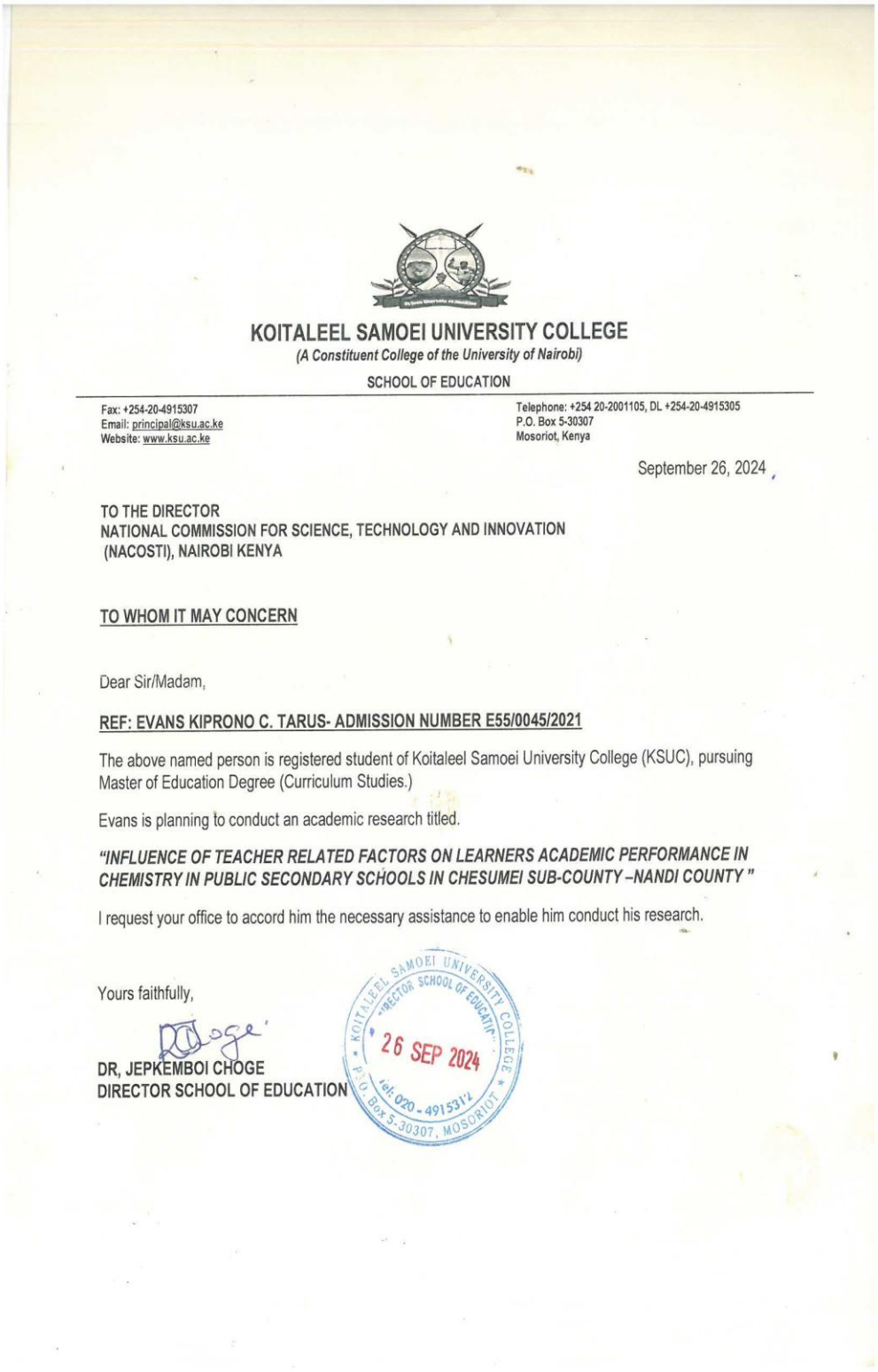
Master of Education (Curriculum Studies)

Koitaleel Samoei University College, University of Nairobi

APPENDIX V: DATA ENTRY SHEET

	2019	**2020**	**2021**	**2022**	**2023**
Number of students with C+ and above in Chemistry					
Number of students with Grade C and C-					
Number of students with Grade D and below					

APPENDIX VI: RESEARCH AUTHORIZATION



KOITALEEL SAMOEI UNIVERSITY COLLEGE
(A Constituent College of the University of Nairobi)
SCHOOL OF EDUCATION

Fax: +254-20-4915307
Email: principal@ksu.ac.ke
Website: www.ksu.ac.ke

Telephone: +254 20-2001105, DL +254-20-4915305
P.O. Box 5-30307
Mosoriot, Kenya

September 26, 2024

TO THE DIRECTOR
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION
(NACOSTI), NAIROBI KENYA

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

REF: EVANS KIPRONO C. TARUS- ADMISSION NUMBER E55/0045/2021

The above named person is registered student of Koitaleel Samoei University College (KSUC), pursuing Master of Education Degree (Curriculum Studies.)

Evans is planning to conduct an academic research titled.

"INFLUENCE OF TEACHER RELATED FACTORS ON LEARNERS ACADEMIC PERFORMANCE IN CHEMISTRY IN PUBLIC SECONDARY SCHOOLS IN CHESUMEI SUB-COUNTY –NANDI COUNTY "

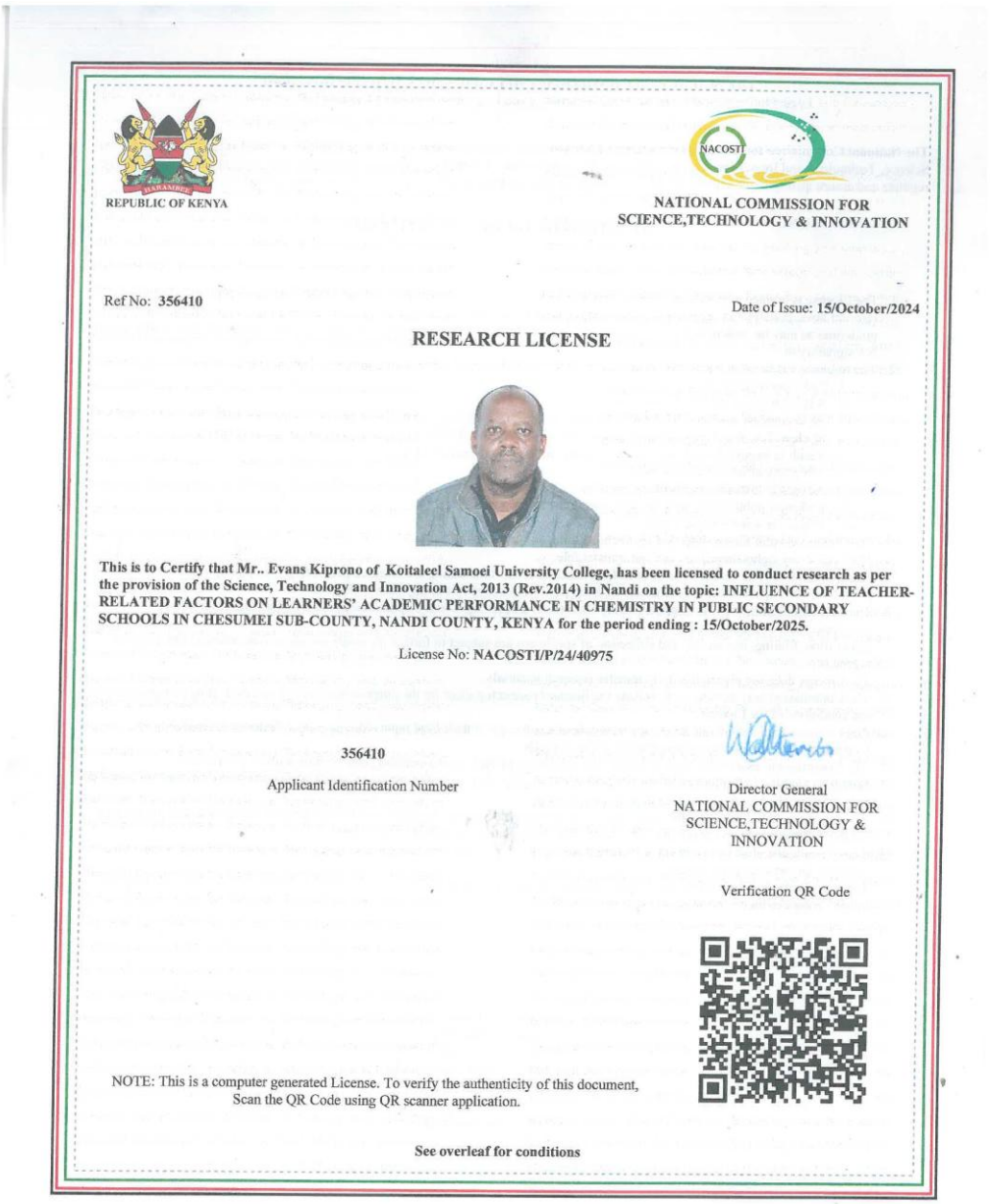
I request your office to accord him the necessary assistance to enable him conduct his research.

Yours faithfully,

DR, JEPKEMBOI CHOGE
DIRECTOR SCHOOL OF EDUCATION

KOITALEEL SAMOEI UNIVERSITY COLLEGE
DIRECTOR SCHOOL OF EDUCATION
26 SEP 2024
Tel: 020 - 4915312
P.O. Box 5-30307, MOSORIOT

APPENDIX VII: RESEARCH PERMIT



REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **356410**

Date of Issue: **15/October/2024**

RESEARCH LICENSE

This is to Certify that Mr.. Evans Kiprono of Koitaleel Samoei University College, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nandi on the topic: INFLUENCE OF TEACHER-RELATED FACTORS ON LEARNERS' ACADEMIC PERFORMANCE IN CHEMISTRY IN PUBLIC SECONDARY SCHOOLS IN CHESUMEI SUB-COUNTY, NANDI COUNTY, KENYA for the period ending : 15/October/2025.

License No: **NACOSTI/P/24/40975**

356410

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 VIII: AUTHORIZATION LETTER FROM COUNTY COMMISIONER



OFFICE OF THE PRESIDENT
MINISTRY OF INTERIOR AND NATIONAL ADMINISTRATION

Tel: 053 5252621, 5252003, Kapsabet
Fax No. 053 – 5252503
E-mail:
nandicountycommissioner@gmail.com
When replying, please quote

Ref: No. NC.EDU. 4/3 VOL.II/(114)

County Commissioner's Office,
Nandi County
P.O. Box 30,
KAPSABET.

17th October, 2024

Evans Kiprono
Koitaleel Samoei University College
P.O. Box 5 - 30307
MOSORIOT.

RE: RESEARCH AUTHORIZATION

This is in reference to letter No. NACOSTI/P/24/40975 dated 15th October, 2024 from the Director General, National Commission for Science, Technology and Innovation on the above subject matter.

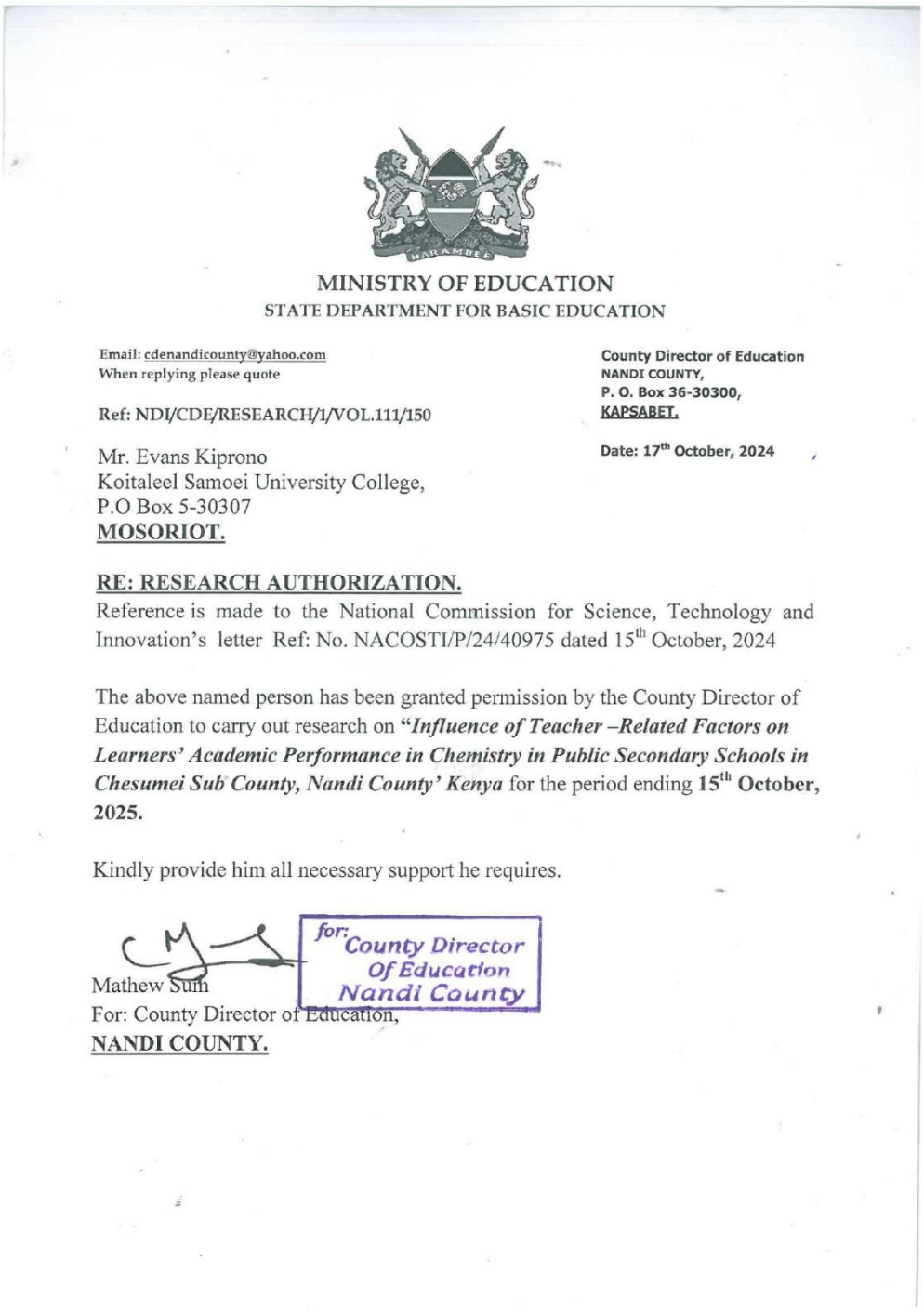
You are hereby authorized to conduct research on **"Influence of Teacher-related factors on learners' academic performance in Chemistry in public Secondary Schools in Chesumei Sub County, Nandi County"** for the period ending **15th October, 2025.**

Wishing you all the best.

COUNTY COMMISSIONER NANDI 17 OCT 2024 P.O BOX 30-30300, KAPSABET

CAROLINE M. NZWILI,
COUNTY COMMISSIONER,
NANDI.

APPENDIX IX: AUTHORIZATION LETTER FROM COUNTY DIRECTOR OF EDUCATION



MINISTRY OF EDUCATION
STATE DEPARTMENT FOR BASIC EDUCATION

Email: cdenandicounty@yahoo.com
When replying please quote

Ref: NDI/CDE/RESEARCH/1/VOL.111/150

County Director of Education
NANDI COUNTY,
P. O. Box 36-30300,
KAPSABET.

Date: 17th October, 2024

Mr. Evans Kiprono
Koitaleel Samoei University College,
P.O Box 5-30307
MOSORIOT.

RE: RESEARCH AUTHORIZATION.

Reference is made to the National Commission for Science, Technology and Innovation's letter Ref: No. NACOSTI/P/24/40975 dated 15th October, 2024

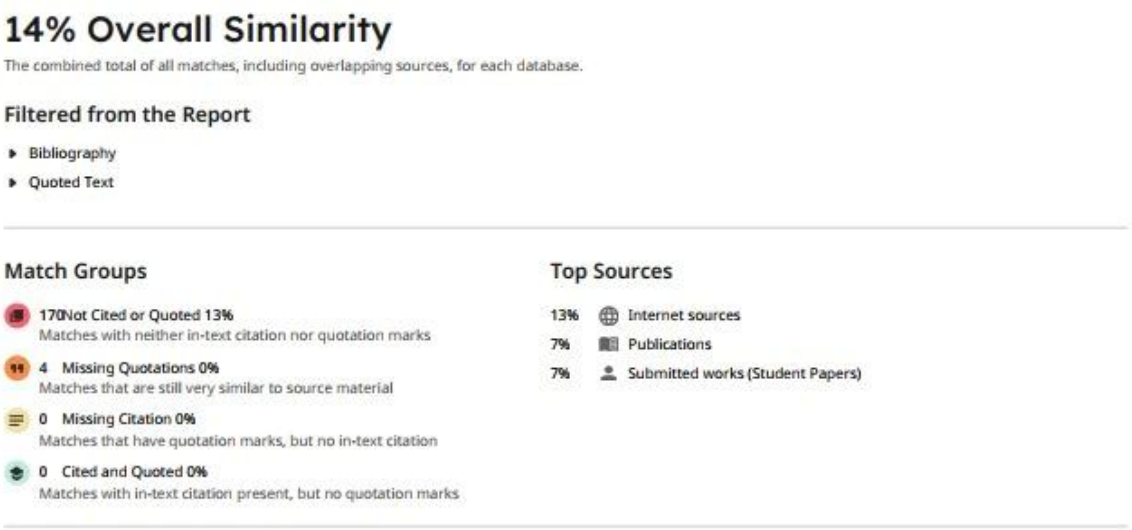
The above named person has been granted permission by the County Director of Education to carry out research on ***"Influence of Teacher –Related Factors on Learners' Academic Performance in Chemistry in Public Secondary Schools in Chesumei Sub County, Nandi County' Kenya*** for the period ending **15th October, 2025.**

Kindly provide him all necessary support he requires.

for: County Director Of Education Nandi County

Mathew Sum
For: County Director of Education,
NANDI COUNTY.

APPENDIX X: TURNIT REPORT



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