INFLUENCE OF PRINCIPALS' TRANSFORMATIVE LEADERSHIP ON THE PERFORMANCE IN SCIENCE SUBJECTS IN GIRLS' PUBLIC SECONDARY SCHOOLS IN THARAKA NITHI COUNTY

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DECLARATION

I, the undersigned, declare that this Research Thesis is my own work and has not been presented for a degree at any other university.

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DEDICATION

To my dear parents, Joseph and Ann; to my sister, Naomi, and her husband, Bernard; and to my congregation, the Sisters of St. Joseph of Tarbes.

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ABSTRACT

This study examined the influence of principals' transformative leadership traits on the performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya. It was guided by the following specific objectives: to establish whether students' involvement in decision-making enhances their performance in science subjects; to ascertain whether principal-teacher role modeling influences performance in science subjects; to examine whether principal-teacher team building can enhance the performance in science subjects; and to find out the relationship between the provision of supportive learning resources and the performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya. The study was guided by transformational leadership theory. A concurrent triangulation design was adopted. The target population was girls' public secondary schools, the county director, principals, teachers, and students. The target population of the study was 1838, and the sample size was 452. Purposive sampling was adopted to include all 11 girls' public secondary schools, 11 out of 11 principals, and one County Director of education. Proportionate sampling was applied to collect data from 330 out of 1650 students, and simple random sampling was applied to collect data from 100 out of 165 teachers. The study used questionnaires to collect data from teachers and students. The collection of data from principals and the County Director of education was done through interview guides. Reliability of the instruments was tested using the test-retest technique and the scores 0.708 was obtained. Member checking technique was adopted to validate the qualitative instrument. Quantitative data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. The data from quantitative instruments was presented using frequencies and percentages on tables, graphs, and pie charts. Qualitative data was analyzed in themes, and the reporting was done in direct quotations and narratives. The findings revealed that principals' transformational leadership expressed in terms of students' involvement in decision-making, principal-teacher role modeling, principal-teacher team building, and the provision of supportive learning resources are important in influencing the performance of students in science subjects in girls' public secondary schools in Tharaka Nithi County. The study concluded that limited involvement of students in decision-making concerning the study of science subjects and insufficient resources to use in the study of science subjects, such as laboratory equipment, are the main hindrances to the study of science subjects in girls' public secondary schools. The study thus recommended that the principals enhance the involvement of students in the decisions that affect them concerning the study of science subjects as well as improve the provision of resources such as laboratory equipment that are needed in the study of science for enhanced academic performance in science subjects.

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ABBREVIATIONS AND ACRONYMS

KCSE	Kenya Certificate of Secondary Education
STEM	Science, Technology, Engineering and Mathematics
UNESCO	United Nations Educational Scientific and Cultural Organization
USA	United States of America

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Effective leadership is an important aspect of any organization as it helps in the accomplishment of the organization's goals and objectives. Effective leaders provide clarity of purpose, motivate, and guide the organization to realize its mission and goals (Gunawan, 2020).

As organizations strive to achieve their goals, they find it important to consider their leadership styles. It is vital to identify leadership methods capable of keeping abreast of development. Transformational leadership is the most well-known leadership approach (Venkatesh, 2023). It is considered one of the main leadership styles that influence organizations and individuals to achieve their set targets (Alqatawehn, 2018). Transformational leader’s help followers grow by aligning the objectives and goals of the individual followers, the group, and the larger organization. Effective leadership is an important aspect of any organization. Effective leaders provide clarity of purpose, motivate, and guide the followers to work towards the achievement of organizational goals and objectives (Gunawan, 2020).

As organizations strive to achieve their goals, they find it important to consider their leadership style, which makes it important to identify leadership methods capable of keeping abreast of development. As recommended by Ruman (2016), transformational leadership is the most well-known leadership approach that can allow organizations and individuals to achieve their set targets (Alqatawehn, 2018). Transformational leader’s help followers grow by aligning the objectives and goals of the individual followers and the group with the goals of the organization.

Chawla and Lenka (2015) argue that leadership is the most noticeable factor that drives significant transformations in teaching and learning. Transformational leaders in secondary schools are mainly responsible for leading the learners and teachers to achieve the best learning and teaching practices in an effort to help all the learners achieve the best possible outcomes. Performance in secondary schools, including the performance of girls in science subjects, highly depends on the influence of transformational leaders in schools.

For instance, a study by Burns (1978) points out that transformational leadership is seen when leaders and followers influence each other to advance to a higher level of morality and motivation. Through the strength of their vision and personality, transformational leaders are able to inspire their followers to change their expectations, perceptions, and motivation to work towards common goals. Accordingly, Bass (1985) expanded Burns' (1978) original ideas and contended that transformational leadership can be described based on the impact that it has on followers. Transformational leaders, according to Bass (1985), are trusted, respected, and admired by their followers. Bass further points out that transformational leaders have the ability to influence followers and motivate them to develop their moral values and change the behaviors of the organization. Transformational leaders tend to show four main characteristics: charisma, inspirational motivation, intellectual stimulation, and consideration of the needs of followers (Bass, 1985).

By the mid-eighties, the concept of transformational leadership had received significant attention from scholars, including those in education. For example, Hyseni and Hoxha (2021) and Bellibas and Liu (2018) mentioned that the leadership styles and practices followed by school leaders have a direct impact on

the motivation of teachers. The scholars argued that teachers' performance is directly linked to their motivation, which on one side affects their attitude at work and on the other side impacts the students' motivation to study and perform academically.

Secondary schools are one of the foundational elements in realizing Kenyan Vision 2030, where education in science, technology, engineering, and mathematics serves as a framework that can help meet the demands of this 21st century era. This can be accomplished through secondary schools with principals who support the effective achievement of the plans, visions, and goals of the schools (Shammari, 2020). The effective achievement of the desired visions and goals requires leaders who have special capabilities that enable them to face contemporary challenges and deal with them efficiently. Secondary schools are considered one of the most important institutions for influencing and changing the attitudes and behaviors of learners as they strive to achieve their visions and aspirations. This is why secondary schools need conscious leaders equipped with the characteristics of transformational leadership, such as inspirational motivation, intellectual stimulation, idealized influence, and individual considerations, to achieve their development plans.

With transformational leadership, schools are able to keep up with rapid developments while influencing the behavior of students and improving their abilities to perform in science subjects. This means that principals, as secondary school leaders, should be effective in guiding students to improve their performance in all subjects, including science. The 21st century is a period marked by scientific innovations and technology. Therefore, there is a need for principals who are early adopters of new ideas and constantly seek new ways to improve the performance of

all students in science subjects. As noted by Anaeto and Asiabaka (2016), the 21st century is a digitized period that calls for expansive growth and development in the scientific fields. Therefore, empowering the youth with science and technology not only fulfills their career prospects but also trains their mind systems to be able to address the challenges of life. This can be achieved through transformational leaders in schools who would ensure that the students have the opportunity to participate and effectively succeed in science subjects.

UNESCO (2021) stressed the importance of quality science education, contending that it enhances competencies to analyze, synthesize, and evaluate information in a critical manner in decision-making, planning, and solving day-to-day problems. Maranan (2017) defined science as the ability to apply information in a relevant context, analyze it, and then synthesize it from various points of view to eventually give a wholesome evaluation that determines the course of action to be taken. The cited studies (UNESCO, 2021; Maranan, 2017) seem to suggest that science education enables a grasp of the scientific method and enables the application of information based on evidence to a wide range of challenges that call for both individual and group action.

Education in science, technology, engineering, and mathematics (STEM) serves as a framework that can help meet the demands of the 21st century. STEM careers are considered innovative and inclusive. They enhance the social well-being of people and foster sustainable development (UNESCO, 2018). Though STEM subjects are crucial for development, the field is highly male-dominated, and girls are underperforming in science subjects. Women's participation in the science field has been a concern of many governments around the world (United Nations Development Program, 2019; UNESCO, 2011; Corporate Planning & Policy

Division, 2017). According to Corporate Planning & Policy Division (2017), it has been frequently reported that women step out of the study of science-related fields after university studies while men remain. Wiley (2016) mentioned that it is obvious that women are underrepresented in STEM-related industrial and academic leadership positions. This study by Wiley, however, did not establish if leadership in schools contributes to women's underrepresentation in STEM subjects, hence the need for the current study.

In 2000, the European countries had 40 percent of women in the natural sciences, and Japan had only 20 percent of women in the same field (UNESCO, 2011). In the same year, according to UNESCO, women's participation in science, education, and technology industries was as follows: Europe had 15 percent, the United States of America (USA) had 19 percent, and Japan had only 6 percent. In the USA, only a quarter of the workforce with a background in STEM was female (Breda & Ly, 2019). The study by Smith (2019) estimated that 90 percent of future jobs would require some form of information and communication technology (ICT) skills, and the fastest-growing job categories are related to STEM. The study by Smith (2019) clearly indicates there is a need for school principals to improve the performance of students in science subjects.

A study by Ikkatai (2021) in Japan showed that there is a disparity between the number of male and female students taking physics for university entrance exams in Japan. The percentage of female students studying physics at universities was lower by 15.4% in relation to other subjects. This was experienced even with the presence of the Japanese initiative called "Riko-Challenge," which is meant to provide information on STEM for girls in junior high school. The lower performance of girls in physics could be attributed to the limited involvement of the

principals in encouraging the participation and effective performance of all girls in science subjects. The existing data shows that globally there are few women in STEM careers, and it was not clear if the situation was different for the case of Kenya, which raised the need for the current study.

A study by Hallinger and Heck (2003) was conducted about leading educational change in Bangkok. Their study contends that transformative leadership influences the behaviors and attitudes of learners toward learning. Therefore, the principals, as transformational leaders, should encourage the learners to embrace science subjects and pay attention to the learners' specific needs and abilities. A transformational leader provides support, encouragement, and coaching to individual learners depending on their personal needs. According to Veysel (2014), the good academic performance of girls in science subjects can be realized when the principal employs transformative leadership skills. The study revealed that a school principal who adopts transformational leadership inspires and motivates the students by transforming their belief systems, attitudes, and values. This enhances commitment and eventually translates to positive academic performance among students.

Ullah (2020) conducted a study about girls' academic performance in science subjects in Islamabad, Pakistan. The study revealed that girls, as compared to boys, are not doing well in science subjects such as technology, engineering, and math (STEM). This study attributed the poor performance of girls in science subjects to the community's portrayal of the subjects as difficult and meant for boys. The study, however, did not mention how the principals' transformational leadership traits influence the performance of girls in science subjects, which is the gap that the current study, seeks to fill.

Gender disparities in terms of educational performance have also been observed in Zambia. Ullah (2020) mentioned that girls' performance in science subjects is not up to par, particularly in STEM education, not only at the primary and middle school levels but also at the secondary level. The study also found that performance is worse, especially in higher education. Thus, it can be argued that in Zambia, STEM education is deemed boys' territory.

The poor performance in science subjects for girls and the low enrollment rate in the science faculties at tertiary institutions are a threat to South Africa's development and economy (Mbalenhle, 2016). As a result, the government has made efforts to improve the science pass rates in secondary schools. Similar findings have been realized in Namibia, where the arts are considered appropriate for female students and STEM is deemed suitable for male students (Ullah, 2020). The study reveals that the performance of girls is very low in STEM fields, not only at the middle levels but almost at all educational levels. Girls fail in science subjects because these are considered masculine; the current study sought to find out if the same challenges are experienced in Kenya, particularly in girls' public secondary schools in Tharaka Nithi County.

In the context of Tanzania, findings show that girls have remained behind in STEM education at the secondary school and college level (Matete, 2022). Boys are outperforming girls in STEM subjects in high school and college-level tests, owing to the girls' perception of science as a male-dominated field. These studies (Mbalenhle, 2016; Ullah, 2020; and Matete, 2022) portray science subjects as meant for males, and they are silent on how the principals' transformational leadership traits influence the performance of girls in science subjects. As a result, the current study sought to find out the influence of principals' transformative leadership traits

on the performance in science subjects in girls' secondary schools in Tharaka Nithi County, Kenya.

Kenya faces similar challenges of gender disparity in science-oriented subjects. Omukoba (2018) noted that in Kenya, affirmative action was brought forth to balance the ratio between boys and girls in education. However, gender disparity in STEM disciplines still exists in educational institutions where female students perform poorly and are underrepresented in science disciplines. This could call for transformational leaders in schools who would ensure the effective participation and performance of girls in science subjects.

Koech (2017) attributed the poor performance of girls in science disciplines to the high costs involved in the process. This is a challenge for most poor parents, as they find it difficult to educate their children in STEM subjects. These gender disparities are a serious concern and necessitate the focus of transformational leadership in schools. Winston (2002) contended that a school principal, as a transformational leader, sets the school environment that improves the academic performance of the students. It is also the responsibility of transformational leaders in schools to ensure that the teaching staff, non-teaching staff, and students have a conducive environment that allows both boys and girls to study and excel in the science disciplines. It is the role of the principal to hold teachers accountable for their understanding of gender equity and to educate them in both the theory and practice of gender-sensitive education.

The performance of girls in science subjects in most secondary schools in Kenya has been of great concern. Nyongesa (2019), Kariuki (2021), and Ndege (2014) stress that in Kenya, the overall performance of girls in science subjects is not satisfactory. The studies contend that girls' academic performance in STEM

subjects is shaky and male students are outdoing girls in STEM subjects. This has been the case despite the government's effort to invest in education through the professional development of principals and teachers and the provision of teaching and learning resources in public schools (Asuga et al. 2015). This has posed the question of whether the transformational leadership of the principals in these schools has an influence on the performance of girls in science subjects. Hence the need for the current study.

1.2 Statement of the Problem

Education is instrumental in enhancing the growth and development of a nation. Thus, the UNESCO Agenda 2030 for Sustainable Development calls on all nations to foster equal participation of both male and female genders in developmental initiatives, including education. According to UNESCO, less than 30% of women globally pursue careers in science, technology, engineering, and mathematics (STEM). Though the study of science is becoming a global goal, science subjects and careers continue to be male-dominated. Girls are underrepresented, and their performance in science subjects has been dismal, which poses a great challenge to the objective of UNESCO (2021).

In Kenya, the performance of girls in science subjects has remained low, despite the government's efforts to improve the performance of principals and teachers through professional development (Asuga et al. 2015). Girls who attend girls' secondary schools in Tharaka Nithi County do poorly in science subjects (Muriungi, 2020). This has raised the question of whether principals' leadership has helped students to do better in scientific subjects. The reviewed literature did not provide substantial information regarding how the transformational leadership of the principals influence girls' performance in science subjects, especially in Tharaka

Nithi County. Therefore, this study sought to find out the influence of principals' transformative leadership traits on the performance in science subjects in girls' secondary schools in Tharaka Nithi County, Kenya.

1.3. General Objective

The main objectives of this study was to find out the influence of principals' transformative leadership on the performance in science subjects in girls' secondary schools in Tharaka Nithi County, Kenya.

1.3.1 Specific Objectives

This study will be guided by the following objectives.

1. To establish whether students' involvement in decision-making enhances their performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya.
2. To find out whether principal-teacher role modeling influences performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya.
3. To establish whether principal-teacher team building can enhance the performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya.
4. To find out the relationship between the provisions of supportive learning resources and the performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya.

1.4 Research Questions

The study will be guided by the following questions.

1. How does students' involvement in decision-making influence their performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya?
2. To what extent does principal–teacher role modeling influence the performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya?
3. What is the relationship between principal-teacher team building and the performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya?
4. What is the relationship between the provision of supportive learning resources and the performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya?

1.5 Purpose of the Study

The purpose of this study is to establish the influence of principals' transformative leadership on the performance in science subjects in girls' secondary schools in Tharaka Nithi County, Kenya. Establishing how principals' transformative leadership traits influence the performance of girls in science subjects will help school principals to significantly improve the performance of girls in science subjects.

1.6 Significance of the Study

Policy makers in the Ministry of Education will use the findings of the current study to encourage the school principals and the teachers in girls' secondary schools to adopt transformative leadership; as such an approach would enhance

girls' performance in science subjects in Kenyan schools. The findings of the study will challenge secondary school principals to adopt a transformative leadership style in order to improve the performance of girls in science subjects.

The findings will help parents and the community to understand the importance of supporting principals' transformative leadership with the aim of improving performance in science subjects in girls' secondary education. Students, particularly girls, will benefit from improved performance in science subjects if principals' transformative leadership in schools is enhanced. The researcher will gain knowledge concerning the how principals' transformative leadership influence the performance in science subjects in girls' secondary schools. The study will provide relevant data to other scholars who may be conducting studies related to leadership styles. The study will also add to the body of knowledge on leadership.

1.7 Scope and Delimitations

The study only focused on selected girls' boarding secondary schools in Tharaka Nithi County, Kenya. This was because girls' performance in science subjects has consistently been poor in the area. The target population was the principals, teachers, and students. Despite the fact that there are other factors that might influence the performance of girls in science subjects, the current study particularly looked at how principals' transformative leadership traits influence girls' performance in science subjects in terms of KCSE grades.

1.8 Theoretical Framework

This section described the Theory that guided the study. It captures both the strengths and weaknesses of the theory. It also captures the application of the theory to the current study.

1.8.1 Transformational leadership Theory

The transformational leadership theory, which was introduced by Bass (1995), stipulates that transformational leaders are those who transform their followers into becoming leaders themselves. Transformational leadership is a leadership style that inspires followers to make valuable and positive changes. In this type of leadership, the leader boosts the motivation, morale, and performance of the followers. This may enable the school principals to motivate and inspire teachers and students to achieve extraordinary academic performance in science subjects.

Transformational leaders go beyond incentives for performance to develop and encourage subordinates intellectually and creatively, as well as transform their own concerns into an essential part of the organization's mission. Ghuzyyil (2021) noted that transformative leaders inspire their subjects and creatively lead them to exploit their potential to the fullest. The theory enables school principals to influence the values, beliefs, and goals of their teachers and students towards science subjects. They act as mentors and advisors, pay attention to personal development, and make the working environment conducive through the provision of what is needed for the girls to effectively perform in science subjects. Transformative principals give the teachers a broader perspective; they challenge, respect, and involve both the teachers and students, which results in the effective performance of students, particularly girls in science subjects.

Bass (1995) described transformational leadership as having four dimensions, including idealized influence, inspirational motivation, intellectual stimulation, and individual consideration. Samina (2014) defined intellectual stimulation as the manner in which the leader enhances the interests of the members, makes them aware of the problems surrounding them, and motivates them

to analyze those problems from a new perspective. Mydin (2022) contended that the principal is supposed to help the teachers and students be creative in solving problems related to the science subjects. Idealized influence is where the principal is viewed as a role model who commands authority, respect, and trust. The principal instills life's virtues in the school's community. Martnez (2019) defined the term "inspirational motivation" as a situation in which the leader (principals) shares the organization's vision and goals in a clear and realistic manner so that they relate to the goals of the members (teachers and students). The leader also encourages the members to embrace the vision and the goals by supporting them and involving them in the decision-making process. Bellibas and Liu (2018) argued that individualized motivation is when the principal pays attention to the teachers' and students' specific needs and abilities. They offer support, encouragement, and coaching to teachers and students based on their specific needs concerning the study of science subjects. This would consequently lead to better performance by girls in science subjects.

1.8.1.1 Strength of Transformational Leadership Theory

Ngaithe (2016) avers that transformational leadership has the ability to instill life-giving virtues in the members of the organization. It leads the leaders to motivate the followers and to share the vision and goals of the organization in a clear and realistic way so that they relate to the goals of the members. Principals use transformational theory to encourage teachers and students, particularly girls, to embrace science subjects by providing support. The principal also pays attention to the teachers' and students' needs and abilities. This can encourage female students to embrace and effectively perform in science subjects since they have the support of the principal. When the principal employs transformative leadership styles, girls'

academic performance in science subjects can improve. The school principal inspires the teachers and students to achieve high expectations and have positive belief systems, attitudes, and values towards science subjects, which leads to effective performance by girls in science subjects.

1.8.1.2 Weaknesses of Transformational Leadership Theory

Despite its strengths, transformational leadership has some weaknesses. For example, it can lead to employee burnout in trying to achieve organizational goals. Teachers in school may experience burnout trying to improve the performance of girls in science subjects. In order to improve performance, the principal can subject the students to unhealthy practices such as studying until late at night or following tight timetables with or without breaks. Xiaoia (2006) asserted that because transformational leaders motivate their employees by modeling good behavior, they need to ensure that teachers witness the involvement of the principals in the school, which can be tiring and time-consuming on the part of the principals, especially in schools with a large population. It may be challenging for the principal to maintain open lines of communication with everyone in the school, including students.

1.8.1.3 Application of Transformational Leadership Theory

Transformational leadership theory is applicable to the current study because its tenets, such as intellectual stimulation, motivation of members, and individual consideration (Kipkoech, 2020), effectively explain the variables of the study. With the application of transformational leadership, teachers are likely to be inspired and work hard towards the success of all students in all subjects, including sciences. Teachers and students are likely to take on challenging tasks and achieve high goals and expectations. Girls in schools are likely to have a positive attitude towards science subjects, which has traditionally been perceived as difficult and reserved for

boys. They will also develop a positive attitude toward science-oriented careers such as engineering and medicine.

1.9 Conceptual Framework

A conceptual framework is a structure that the researcher believes can best explain the natural progression of the phenomenon to be studied (Camp, 2001). The conceptual framework in the current study is comprised of independent, dependent, and mediating variables. Figure 1 depicts the relationship among the variables in the study.

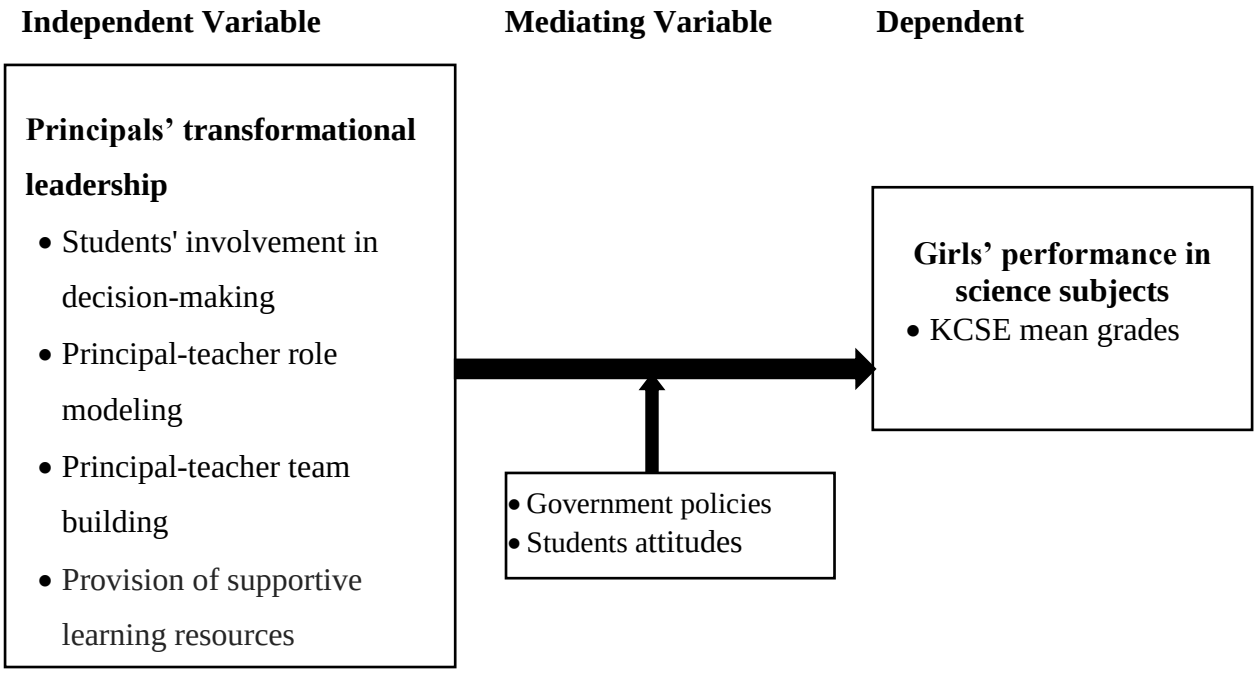


Figure1: ***Conceptual Framework Showing Relationship among Variables***

As illustrated in Figure 1, the independent variable in the current study include: students' involvement in decision-making, principal-teacher role modeling, principal-teacher team building, and the principals' provision of supportive learning resources. These variables will be investigated in relation to the performance of girls in science subjects, which will be measured in terms of KCSE mean grades. By involving students in the decision-making process, the principal creates an

opportunity for students to share ideas, learn from each other, and work toward a common goal, which is performance in science subjects.

Hyseni and Hoxha (2021) points out that principals need to encourage teamwork since it's important in enhancing responsibility, encourages creativity, deepens friendships, and builds community among teachers, which consequently helps in motivating learners to perform in science subjects. Teachers complement one another. Thorough team work, teachers share insights and propose new approaches and techniques for teaching science subjects that will enhance girls' performance. Teaching and learning resources provided by the principals are very important in the learning of science subjects (Bakhshialiabad & Bakhshi, 2015). Their availability makes lessons interesting, makes learning easy, and enables teachers to easily express concepts. Learning materials can significantly increase the performance of girls in science subjects. The conceptual framework also shows that government policies in the form of equipping the science laboratories and students' attitudes towards science subjects are the intervening variables that also influence students' performance in science subjects.

1.10 0perational Definition of key Terms

Girls' performance: This refers to the achievement of girls in terms of high mean grades in science subjects in the Kenya Certificate of Secondary Education.

Leadership: is a process of social influence that maximizes the efforts of others towards the achievement of a goal.

Transformative- this refers to the actions of the leader to bring positive change in the life of members of the school

Stem career- this refers to a job or profession in the fields of Science, Technology, Engineering and Mathematics

Public secondary schools: refers to secondary schools established and funded by the government.

Role modeling: is a way of teaching where the principal passes on knowledge, skills, and values to other members of the school by acting as an example.

Team building: This refers to the actions of the principal to enable teachers to work together effectively as a team, especially by means of activities and events designed to increase motivation and promote cooperation so as to improve students' achievement.

Transformational leadership: is a leadership style that can inspire positive changes in its followers.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature on the impact of principals' transformative leadership traits on science performance. The review of the literature is guided by the research objectives, covering studies done globally, continentally, regionally, nationally, and locally. The chapter goes on to summarize the research literature as well as the identified research gap that the study aims to fill.

2.2 Empirical Literature Review

This section is a review of empirical studies related to the current study. The studies are reviewed and presented in themes: students' involvement in decision-making, principal-teacher role modeling, principal-teacher team building, and provision of supportive learning resources.

2.2.1 Students' Involvement in Decision-making and their Performance

Students are key stakeholders and beneficiaries of educational outcomes, as well as determinants of examination results. It is therefore important to study the impact of their inclusion into the school key decision systems. Student participation in decision-making', according to Jeruto and Kiprop (2011), refers to the term used to encompass all aspects of school life and decision-making where students may make a contribution informally through individual negotiation as well as formally through purposely created structures and mechanisms. It thus refers to participation of students in collective decision-making at school or class level and to dialogue between students and other decision-makers including the school principal. Fajana (2002) mentioned that student participation in decision-making is often

confined to issues concerned with student welfare which improves their performance in schools.

In Miami-Dade County, Florida, Ronfeldt (2015) conducted a study aimed at teacher collaboration in instructional teams and student achievement. The study drew upon survey data. It was established that while different kinds of teachers and schools report different levels of collaboration quality, the average collaboration quality is related to student achievement. Teachers and principals that engage in quality collaboration have better achievement gains in math and reading. Academic achievement was found to improve at a high rate when students, teachers, and principals work together in schools. These findings support policy efforts to improve student achievement by encouraging student involvement and collaboration with teachers. The study by Ronfeldt only concentrated on the performance of students in math, but the current study will not be specific to the performance of learners in one subject.

A study by Salinitri (2019) conducted a study using mixed methods design in China and established that there are many factors that discourage female students from choosing science courses. One of the factors discovered was that the current science curriculum was designed and developed based on Western science, which focuses on masculinized values and pedagogies. This has been a big factor that denies female students from participating in any decision concerning the sciences. The study determined that there is a need for increased involvement of girls in science subjects in order to ensure female students have the same opportunities to reach their potential in STEM areas. The findings of this study provided insights about factors that lead to gender disparities in science programs including exclusion of girl students from participation in the school decision concerning Stem Subjects.

However, this study exposed a geographical gap since it was conducted in China, a country where the factors that affect girls' choices and performance in science may differ from those in Kenya, hence the need for the current study.

Elassy (2015) conducted a study about student involvement in the Egyptian education quality assurance system. This study used two qualitative methods to explore the extent and quality of student involvement: focus groups and interviews. It was established that students were not efficiently involved in the quality assurance system at the schools. The study revealed that students were not widely involved in committees regarding quality assurance. They are not invited to participate in writing the self-evaluation report or even reviewing it. Though the study provided an empirical insight into the extent and quality of student involvement in the Egyptian education system, it remained unclear whether girls participate in decisions that affect the selection and choice of subjects in schools, including the study of science subjects. The current study will fill this gap by establishing how students' participation in decision-making influences their academic performance, partially, the performance of girls in science subjects.

In Uganda, the involvement of students in the management of schools is considered essential for the effective performance of students. As a result, the government of Uganda, through the ministry of education, has encouraged schools to involve students in the affairs that affect them, which has been achieved through student council leadership. Hakiza (2017) studied student councils and discipline management in selected secondary schools in the Kamwenge District. The study adopted a cross-sectional research design with both qualitative and quantitative approaches to data collection and analysis. The study found that the leadership roles of the student council in secondary schools influenced the achievement of agreed-

upon goals in the school, including their goal to effectively succeed in academics. However, the student council's inability to disseminate information correctly resulted in misinformation, confusion, and frustration. The student council also ensured that students maintained silence while in class. It was revealed that student councils were involved in decision-making and were also recognized for seeking their views in decision-making, thus making a positive contribution to the management of discipline and academic success in schools. The researcher recommended that teachers in charge of students' councils should ensure that there is an effective flow of information between administration and students. This study, however, did not discuss the effective performance in science subjects, particularly for girls, hence the need for the current study.

Students are key stakeholders and beneficiaries of educational outcomes, as well as determinants of examination results. Thus, principals in Kenya have made efforts to involve students in the management of schools. Gatumu and Ciumweri (2016) investigated students' involvement in decision-making and their academic performance in the Embu West Sub-County of Kenya**.** The study used mixed methods design and data was collected from twelve public day secondary schools in Embu West Sub-County. The study sought the views of students on the effect of their involvement in decision-making on two different fronts: choice of subjects, choice of schools in which to enroll, and formulation of school rules and disciplinary measures for school rule violators. It was found that students' involvement in the key decisions of their educational process produces motivation, a sense of ownership, and therefore a higher inclination to abide by the set rules, a personal drive to meet the individual and collective goals, and an overall higher academic performance. It was thus recommended that students be involved at all

levels of decision-making. The study did not provide sufficient discussion on how the involvement of girls in decisions concerning the study of science subjects influences their performance, hence the need for the current study.

2.2.2 Principal-teacher role Modeling and its Influence on Students' Performance

Principals are key role models who can influence the attitudes, values, and behaviors of the teachers and so improve the performance of learners in a school. They can be role models for teachers so that they are inspired to keep growing through learning and improve the students' achievement. Zeinabadi (2014) conducted a study in Iran about **p**rincipal-teacher high-quality exchange indicators and student achievement. The researcher collected data from students and teachers, which was analyzed using correlation analysis and structural equation modeling. The findings revealed that high-quality exchanges and modeling between principals and teachers resulted in positive outcomes in the form of student achievement. This study extends the line of inquiry in public schools. It also contributes to school effectiveness literature by providing empirical evidence concerning the link between trust in the principal, a principal as a role model, procedural justice, organizational citizenship behavior, and student achievement. Thus, this study formed the basis for the current study, which looked at how principals, as role models to teachers, influence students' performance, particularly girls in science subjects.

A related study was conducted in Indonesia by Hikman and Sawan (2020) about the principal as a role model in personality and social competence. The study stressed that the principal, as a leader, must be a role model for teachers. The survey method was employed in this research, and the results showed that 95.5% of the teachers looked up to the principal as a role model for personality and social

competencies, which improved not only their performance but that of the learners as well. This study expressed a geographical gap in that it was done in Indonesia, but the current study covered this gap since it was conducted in Kenya.

Yuguda (2014) conducted a survey research in Nigeria aimed at assessing the general roles of secondary school principals in sustaining and managing the quality of education in schools. According to the findings of the study, regular checking, including both internal and external school supervision, improves instructional delivery and standard maintenance in the school system. The study further established that as the chief executive, the principal owes the school a duty to modify the attitude of the staff and motivate them through role modeling in order to enable them to put in their best effort at achieving educational goals. The principal, as a role model, influences the discipline of both academic and non-academic staff, which improves their performance and the academic achievement of the learners. The study was not clear on how principals as role models influence the performance of girls in science subjects, which raised the need for the current study.

Aboye and Tasisa (2017) conducted a study aimed at investigating leadership behaviors and their impact on teachers' job performance in secondary schools in Ethiopia. The study employed a descriptive survey. Out of 38 secondary schools, eight selected simple random sampling techniques. A questionnaire, an interview, and the review of documents were used to collect data from respondents. The findings indicated that principals of schools played a big role as role models for teachers to support them in their jobs. The study further found out that teachers' job performance was also found to be at a low level in the schools where principals were not effective role models and did not support the development of teachers, which consequently affected the academic achievement of the learners. The study

by Aboye and Tasisa, however, was silent on the learners' performance, particularly girls in science subjects, which raised the need for the current study.

Nyenyembe and Maslowski (2016) explored the relationship between leadership styles applied by school heads and teachers' job satisfaction in Tanzanian secondary schools. Using a questionnaire, data for the study was collected from 180 teachers in ten secondary schools in Songea District. The findings of this study revealed that teachers were more satisfied with their jobs when their school heads worked closely with them by mentoring them as well as paying attention to their personal well-being. The study further mentioned that teachers' satisfaction was reflected in the learners' better academic performance. Different from this study by Nyenyembe and Maslowski, the current study will focus more on the performance of learners, particularly girls, in science subjects.

The performance of any school is determined by the effectiveness of the principal and the leadership practices put in place. School leadership influences students' academic performance, and therefore, understanding how different school leadership practices impact students' academic performance is important in setting the institutional direction that members should follow. A study was conducted by Kilonzo and Kasivu (2020) about principals' transformative leadership practice of setting institutional direction as a determinant of students' academic performance in public secondary schools in Machakos County, Kenya.

The study adopted a descriptive survey design. The results revealed that there was a statistically significant relationship between the setting of institutional direction by principals as role models and students' academic performance, which was positive. Based on the results, the study concluded that principals' transformational leadership practice of setting institutional direction influenced students' academic

performance. It was therefore recommended that the principals increase their transformational leadership practices by setting the school's direction as role models not only to the teachers but to the learners as well, which will influence students' academic performance. However, the study was not specific to the performance of science subjects in girls' secondary schools, which is the gap that the current study sought to fill.

2.2.3 Principal-teacher Team Building and the Students' Performance

Leadership is enacted through relationships. Relationships between leaders and followers entail building connections. As a leader, a successful school principal facilitates and supports mutually beneficial relationships with teachers, students, and other community members. In line with this reasoning, Haiyan and Walker (2021) conducted a study in China about building emotional principal–teacher relationships in Chinese schools. The study used data collected from 101 primary school principals from six Chinese provinces. The study established that many of the principals managed to win the trust of teachers, which improved their performance, and this signified a strong personal bond founded on positive emotions. As such, the study provides an empirical basis on which the current study built to establish the influence of principal-teacher team building on the performance of students in science subjects in girls' secondary schools in Kenya.

Team building involves acting within the organization as a whole to create situations where team members try to introduce innovation, act effectively, and implement strategies appropriate to their task. In a qualitative study conducted by Ruperto and Mendoza (2019) in the Philippines, it was hypothesized that the innovative team-building facets manifested in the participants would influence their decision-making. Consistent with the hypothesis, the study established a positive

correlation between the principals' team building and their decision-making, which influenced the performance not only of teachers in schools but of learners as well. The study further revealed that, through team building as a process of developing a strong positive sense of belongingness, school principals as transformative leaders identify with the subordinates and can see their team as us rather than just a collection of individuals in a group. School principals feel more secure when they are cooperating with others, and this enhances the performance of the schools. The study, however, presented insufficient information regarding the performance in science subjects, which was the gap that the current study sought to fill.

A study was conducted by Altemamy (2019) about transformational educational reform in Egypt. The author used action-based methodology and the data was collected from teachers of private schools. The study revealed that principals play a fundamental role in creating conditions that enable teacher leadership to flourish. This has improved students' academic performance at school. It was established that the team-building projects created by the school principals in schools created a platform for teachers to start building a professional dialogue with colleagues, which acted as a step towards building collaborations and improving their achievements. The study reminded teachers that developing collaboration and teamwork in schools results in improved academic achievement. This study, however, did not address the performance of students in science subjects, particularly girls, which was the gap to be filled in the current study.

Fisser and Voogt (2014) investigated the impact of teacher design teams as a professional development arrangement for developing technology integration knowledge and skills among in-service science teachers in Tanzania. The study was conducted at a secondary school, where 12 in-service science teachers participated

in a workshop about technology integration in science teaching and worked in design teams to prepare technology-enhanced biology, chemistry, and physics lessons. Through collaboration in design teams, teachers were able to make science animations using PowerPoint and record videos to use in their teaching. The findings also revealed that principals' encouragement of teamwork among teachers leads to an increase in teachers' technology integration knowledge and skills. Collaboration in design teams had the potential for teachers to share knowledge, skills, experience, and challenges related to technology-enhanced teaching, which improved students' performance. This study by Fisser and Voogt, however, was not limited to the performance of girls in the sciences, which is the gap to be covered in the current study.

Kosgei (2023) investigated the effects of head teachers' participative leadership style on teachers' job satisfaction in public primary schools in Baringo Sub-county, Kenya. The study employed a descriptive cross-sectional survey design, in which both quantitative and qualitative methods of data collection and analysis were applied. The study established that those in top positions in schools enjoyed more benefits from their positions and that there was a need to streamline leadership aspects in most primary schools. The study further found that the teamwork created among the teachers contributed to job satisfaction and led to improved student academic achievements. This shows that public primary schools should consider applying the head teacher's participative leadership style, which encouraged teamwork and high performance not only among the teachers but among learners as well. The study recommends that the head teacher needs to play the roles of coach and mentor at the same time as cultivating a team spirit among the teachers. This, according to the study, would improve teachers' job satisfaction

and improve students' achievement. The current study will build on this study by Kosgei to establish how team building among the teachers impacts student performance, particularly in science subjects, in Tharaka Nithi County.

2.2.4 Provision of Supportive Learning Resources and Students' Performance

Learning resources have a significant role in determining students' academic achievement (Bakhshialiabad & Bakhshi, 2015). The availability of teaching and learning resources enhances the effectiveness of schools by enabling students to effectively perform academically. Such resources include human resources such as teachers and support staff and physical facilities such as laboratories, libraries, and classrooms. Such resources help to improve educational outcomes since students are less likely to be absent from schools that provide interesting, meaningful, and relevant experiences for them. Principals of schools should therefore ensure that resources are provided in quality and quantity in schools for effective teaching and learning.

In order to reinforce efficiency and accountability, many countries have decentralized financial management to schools. Crouch and Winkler (2008) discovered that all schools and institutions in the United States place a high value on accountability. Performance funding policies influenced state budgets and priorities for resource allocation at public institutions. The study established that there is a drive towards decentralization of financial resources to schools in a bid to enhance their management and performance of learners. A related study conducted in Sweden observed that tight budgetary control affects management behavior in public schools throughout the country. Both studies confirmed that despite the expectations placed on financial resource management by the school principals to bring much-needed change, in some schools, resources are mismanaged and

misappropriated by the school leaders. This affects the running of the school and eventually the academic achievement of the learners. The study does not, however, clearly elaborate on the connection between financial resources and the performance of learners in science subjects, which has necessitated the current study to fill the gaps.

Kien (2022) conducted a study in Vietnam about the pre-recorded lectures, live online lectures, and student academic achievement. The study used a randomized experiment to compare the impacts of live online and pre-recorded lectures on student achievement. The study concluded that the use of digital resources was helpful, especially in the conduct of online lessons during the COVID-19 pandemic. It was further discovered that pre-recorded lectures lower the ability of students' academic achievement but have no effect on higher-ability students' academic achievement. In particular, being taught via pre-recorded lectures as opposed to live online lectures through the use of digital resources decreased the likelihood of answering exam questions correctly. Furthermore, being taught via pre-recorded lectures in the early weeks of the semester compared to the later weeks tended to be more harmful to students' academic achievement. The study expressed a geographical gap given that it was done in Vietnam. This gap was filled by concentrating on Kenya, an eastern African country.

Egwu (2016) opined that the principal is a leader who must plan, coordinate and supervise the affairs of the school, so that they run smoothly. The principal is the chief administrator of secondary school who is expected to effectively use various resources through the adoption of management practices for the realization of school goals. If education system must achieve the national policies and goals, the school principal must ensure optimum management of human, material,

financial and time resources. Akinfolarin (2017) analyzed principals' managerial competencies for effective management of school resources in secondary schools in Anambra State. The study adopted a descriptive survey design. The study found that secondary school principals in Anambra State do not have managerial competencies in the procurement of physical and instructional materials, the provision of e-library facilities, or equipping classrooms and offices with the needed furniture for effective teaching and learning. The study also found that school principals have managerial competencies in prioritizing financial allocation according to school needs, keeping accurate financial information about the school, ensuring accountability in all school expenditures, carrying out periodic audits of school budgets, and adopting cost-saving strategies for effective financial resource management. The study recommended that school principals should strive to acquire managerial competencies so as to effectively manage school resources such as procurement of physical and instructional materials, provision of e-library facilities, and equipping classrooms and offices with needed furniture. Though the study focused on the provision of resources, it did not discuss how the provision of resources leads to learners' performance in science subjects.

A study conducted in Tanzania by Wambiya (2016) assessed the perceptions of teachers and students on the adequacy of resources and facilities for the implementation of learner-centered pedagogy in secondary schools in the Kilimanjaro region of Tanzania. The researcher adopted mixed research methods for data collection and analysis. Specifically, the researcher used a triangulation design. Data collection instruments were questionnaires for students and teachers, in-depth interview guides for heads of school and educational inspectors, an observation guide, and document analysis guides. The study found that teaching and learning

resources were inadequate in most schools, which hindered teaching and learning. Different from the study by Wambiya, the current study will establish how the provision of learning resources affects the girls' performance in science subjects.

The inadequacy of teaching and learning resources in secondary schools has been one of the greatest challenges facing the education system in Kenya. Yara and Omondi (2010) conducted a study about the effect of teaching and learning resources on academic performance in secondary school mathematics in the Bondo district of Kenya. The research design for the study was a descriptive survey design. The study established a positive correlation between the availability of teaching and learning resources and the performance of learners in mathematics. The study recommended recruiting more competent teachers and improving the student-book ratio in order to improve performance in mathematics. This study was only focused on mathematics; on the contrary, the current study was focused on the performance of all science subjects offered in secondary schools in Kenya.

2.3 Summary of Literature Review and Knowledge Gap

From the reviewed literature, most of the studies revealed some gaps. The gaps revealed in the studies ranged from knowledge, methodological, geographical and contextual gaps. For example, Florida and Ronfeldt (2015) conducted a study in Miami-Dade County and established that the principals' transformative leadership improves the performance of students especially the aspect of working together with the teachers. However, the study only concentrated on the performance of mathematic and did not mention about the performance of girls in science subjects which is the knowledge gap that was filled in the current study.

Zeinabadi (2014) conducted a study in Iran about **p**rincipal-teacher high-quality exchange indicators and student achievement. Salinitri (2019) conducted a

study in china and established that one of the factors that discourage girls' students from choosing science subjects is because the curriculum was designed on the western science which focuses on masculinized values and pedagogies. The studies of both Zeinabadi (2014) and Salinitri (2019), revealed geographical gaps since the school situation in Iran and china cannot be directly used to explain the performance of girls in science subjects in Kenya.

Haiyan and Walker (2021) in their study about building emotional principal–teacher relationships revealed a methodological gap since their study was purely qualitative. The current study was different in that it used both qualitative and quantitative paradigms in the collection and analysis of data.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter provides a detailed description of the research methodologies, which comprise the research design, location of the study, target population, sampling techniques, and sample size. In addition, the chapter presents the validity of research instruments, the pilot testing of study instruments, the reliability of study instruments, data collection procedures, data analysis procedures, and finally ethical considerations.

3.2 Research Design

Creswell (2018) describes research design as plans and procedures for research that elaborate and deepen methods of data collection and analysis. The current study employed a concurrent triangulation design. The design enabled the researcher to use both quantitative and qualitative techniques in the collection of data at the same time.

Quantitative data was collected through a cross-sectional survey research design, while phenomenological design was used to collect qualitative data for the study. Orodho and Kombo (2002) argue that a cross-sectional survey enables the researchers to gather, summarize, and present the data. A cross-sectional survey also provides a quantitative description of trends, attitudes, or opinions among the participants. It can be used to describe or explore the existing status and relationships between variables at a given time (Mugenda & Mugenda, 2013). The survey research design was appropriate for the study, which seeks to obtain information that describes the participants' views about the influence of principals'

transformative leadership on the performance in science subjects in girls' secondary schools.

A phenomenological research design was used to identify the lived experiences of the principals' transformative leadership and the performance in science subjects in girls' secondary schools by engaging them in interviews. Creswell (2007) contended that phenomenological designs involve studying a small number of subjects through extensive engagement to develop patterns and relationships of meaning. The qualitative data collected was used to support the quantitative data obtained from the cross-sectional survey.

3.3 Location of the Study

The study was conducted in Tharaka-Nithi County. The county is one of the 47 counties in Kenya and is located in the Central region. It borders Meru County to the North and North East, Kitui County to the East and South East and Embu County to the South and South West. It has an area of 2609 km2 and is home to the Chuka, Muthambi, Mwimbi, and Tharaka subgroups of the Ameru Community. This area has been chosen because girls who attend girls' secondary schools do poorly in science subjects (Muriungi, 2020). This raised the question of whether principals' leadership qualities have helped students do better in scientific subjects. The reviewed literature did not provide substantial information regarding how the transformational leadership of the principals influences girls' performance in science subjects.

3.4. Target Population

In research, the target population refers to a group or number of people or objects that the researcher is interested in or intends to study and make inferences about (Asiamah & Mensah, 2017). Asiamah and Mensah further argued

that this group represents the larger population that the researcher is interested in and typically possesses specific characteristics or attributes that are relevant to the research question or hypothesis. The target population for the current study was 11 secondary schools, 11 principals, 165 teachers, 1650 students, and one county director in Tharaka-Nithi County.

3.5. Description of Sample and Sampling Procedures

A sample size is a subset that is representative of the total population of the study (Ravikiran, 2023). Orodho (2009) points out that a technique for selecting the sample size should ensure that anything that is true about the sample should be applicable to the entire population. The study used probability and non-probability sampling techniques to determine the study sample size.

Through the use of probability sampling, the researcher stratified the teachers into males and females. Then simple random sampling was used to select teachers from each stratum. Thus, the study used simple random sampling to collect data from 100 out of approximately 165 teachers, which was 61% of the total number of teachers. The researcher applied proportionate sampling to collect data from 330 out of 1650 students. This was 20% of the target population of students. Non-probability sampling and, in particular, purposive sampling was adopted to include all 11 girls' public secondary schools, which is 100% of the total number of schools; 11 out of 11 principals, which is 100% of the target population of principals; and one county director in Tharaka-Nithi County, which is 100% of the target population. The percentages are informed by the arguments of Mugenda and Mugenda (2013) that a sample size of 10–50% is acceptable.

Horwitz (2015) stressed that purposeful sampling helps the researcher build a sample that is satisfactory for their specific needs. Thus, purposive sampling

was used because the school principals and the county director are not only few in number but, by virtue of their positions as school supervisors, had required information with regard to research objectives.

Table 1

Sample, Sampling Techniques and Sample Size

Category	Population	Sampling Technique	Sample size	Sample Size in percentages (%)
Principals	11	Purposive	11`	100
Teachers	165	Stratified random	100	61
Students	1650	Proportionate	330	20
County Director	1	Purposive	1	100
Total	1826		442	24

3.5.1 Sampling of Secondary Schools

Abubakar (2016) argued that the purposive sampling technique is the deliberate choice of a participant due to the qualities the participant possesses. Thus, the 11 principals of the selected schools will all be purposefully included in the study. The researcher used purposive sampling to concentrate on the population with particular characteristics that provided relevant research data.

3.5.2 Sampling of School Principals

The number of principals in the selected public secondary schools in Tharaka Nithi County was11, and they were purposefully included in the study. Principals of schools were included because they are leaders and in charge of the schools. As a result, they were able to provide relevant data about the principals' transformative leadership and the girls' performance in science subjects.

3.5.3 Sampling of Teachers

To ensure that both male and female teachers equally participate in the study, the researcher used stratified simple random sampling, where the teachers were divided into two strata, male and female. In the strata, the used the lottery method, where the teachers assigned numbers that were written on pieces of paper. The papers with names written on them were folded, put in a container, thoroughly mixed, and thereafter picked randomly until the desired sample size of 100 out of 165 teachers was reached.

3.5.4 Sampling of Students

Girls' public secondary schools in Tharaka Nithi County have a varying number of students. Consequently, the researcher will use proportionate sampling to ensure that the sample from each school is in proportion to the total population of students. The researcher employed Yamane's (1967) formula to calculate the

proportions. $n = N \div (1 + Ne^2)$.

n = sample size

N= Population size (1650)

e = level of precision (0.05)

$n = N \div (1 + Ne^2)$

The researcher distributed the sample size of 330 students among form four students in the 11 selected schools. Students in form four were considered because they have attained the maturity and, hopefully, the information necessary to respond comfortably to the questionnaire questions. From each school, the researcher used the lottery method, where the students were assigned numbers that were written on papers. The papers with names written on them were folded, put in

a container, thoroughly mixed, and thereafter picked randomly until the desired sample size was reached.

3.6 Description of the Research Instruments

Sharan and Elizabeth (2016) mentioned that data collection instruments are tools and procedures for measuring research variables. The current study used questionnaires and interview guides as data collection instruments. Creswell (2018) contended that the use of two instruments allows the researcher to gather both qualitative and quantitative data independently and to compare the findings.

3.6.1 Questionnaire

A questionnaire is one of the quantitative measurement tools that is designed in a form with a number of questions, both closed-ended and open-ended, and the form or sheet can be sent through the post to the respondents, or research can administer it to the participant physically when they are near. Questionnaires are normally used to obtain pertinent information about a population. Each item in the questionnaire is meant to address a specific research question (Mugenda & Mugenda, 2019). The current study used questionnaire to obtain quantitative data.

The reason for the choice of questionnaires in this study was that they are handy, can obtain information from the respondents directly, and enable a wide coverage of an area within a short time. The questionnaires were administered to both teachers and students at the selected public secondary schools. Two sets of questionnaires were designed, one for teachers and the other for students. The questionnaires were designed in sections and had both open-ended and closed-ended questions. The researcher ensured that the questionnaire covered all the research questions that guide the study. The researcher administered the questionnaire

personally to the respondents, and where necessary, a research assistant was employed.

3.6.1 Questionnaire for Teachers

The study used questionnaires that was comprised of both open-ended and closed-ended questions. The questionnaires were made up of five sections. Section one looked for data concerning the demographics of the teachers. Section two looked for information about how students' involvement in decision-making enhances their performance in science subjects. Section three looked for information about whether principal-teacher role modeling influences students' performance in science subjects. Section four sought information about whether principal-teacher team building can enhance performance in science subjects. Lastly, section five looked for information about the relationship between the provision of supportive learning resources and the performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya.

3.6.2 Questionnaire for Students

To collect data from students, the researcher utilized a questionnaire that was comprised of both open-ended and closed-ended questions. The questionnaire for students was also be made up of five sections. Section one looked for data concerning the demographics of the students. Section two looked for information about how students' involvement in decision-making enhances their performance in science subjects. Section three looked for information about whether principal-teacher role modeling influences students' performance in science subjects. Section four sought information about whether principal-teacher team building can enhance performance in science subjects. Lastly, section five looked for information about the relationship between the provision of supportive learning resources and the

performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya.

3.6.3 Interview Guide for the Principals and County Director of Education

An interview refers to a conversation aimed at gathering data for research purposes (Mugenda & Mugenda, 2013). According to Gale and Cameron (2013), interview guides probe for in-depth data from respondents since they do not restrict their answers. Interviews allow additional questions to be asked that may arise during the discussion for further clarification of responses. In the current study, the in-depth interview guide included questions seeking the demographic information of the principals and the county director of education, such as their experience and academic qualifications. Further, it had questions on the influence of students' involvement in decision-making, principal-teacher role modeling, principal-teacher team building, and the provision of supportive learning resources on the performance in science subjects in girls' public secondary schools in Tharaka Nithi County.

3.6.4 Validity of the Study Instruments

The validity of a questionnaire refers to its ability to measure what is expected to be measured and achieve the researcher's goals (Kothari & Garg, 2014). Content validity was used in validating instruments for the current study. To ascertain the validity of the research instruments, the researcher sought the views of experts in the field of study from the Catholic University of Eastern Africa and Tangaza University College, who reviewed all the questionnaire items to ensure that they measure all aspects of the study questions. The feedback from the experts was then used to improve the final draft of the questionnaire.

3.6.5 Pilot Testing of the Research Instruments

A pilot study is a small study to examine research protocols, data collection instruments, and the administration of the instruments to the samples in preparation for a larger study (Bryman, 2016). In the current study, the researcher conducted a pilot study in two public secondary schools that were not be part of the main study but with similar characteristics as the sample for the study. The outcomes were carefully examined for clarity and correctness to ensure that the items were comprehensive in terms of objective coverage. The results of the pilot study enabled the researcher to ascertain and enhance the validity and reliability of the research instruments.

3.6.6 Reliability of the Study Instruments

Reliability is the extent to which the instrument yields the same results over multiple trials (Mugenda & Mugenda, 2013). In the present study, the researcher carried out a pilot study and used a test-retest method to determine the reliability of the research instruments. The questionnaires were administered twice to the same respondents within a span of two weeks. The responses of two sets of instruments were correlated using SPSS version 23. The reliability coefficient of 0.708 was obtained, which was sufficient based on the argument of Schlepp (2020) that an alpha ($\alpha>0.7$) is normally deemed satisfactory.

3.6.7 Credibility and Dependability of the Qualitative Instruments

Shenton (2004) considers member checks to be the single most important provision that can be made to boost a study's credibility and dependability. The study used member checks to ensure the credibility and dependability of qualitative instruments. This technique involved establishing the truth of the research findings or showing that the findings are accurate and honest by sharing a brief summary of

the findings. The findings were shared with the county director of education and the school principals to enable them to correct any mistakes or provide more information if needed. The researcher also paid attention when transcribing the interviews in order to get the right expressions and views. The coding level was also done with done with diligence to avoid misrepresentation of views, perceptions, and divergence from the point.

3.7 Description of Data Collection Procedure

The researcher sough a clearance letter from the Directorate of Postgraduate Studies and Research at Tangaza University College. The researcher used the letter with the signed research proposal to apply for the research permit from the National Commission for Science, Technology, and Innovation (NACOSTI). The research permit was used to seek permission from the office of the County Directors of Education to conduct research in girls' public secondary schools in Tharaka Nithi County. The researcher asked the administrators for their consent before interviewing respondents in the sampled schools. The researcher also informed teachers and students know what the purpose of the study was and to get their approval by having them sign the consent form.

3.8 Description of Data Analysis Procedures

Kothari and Garg (2014) argued that proper data preparation, conversion, and analysis are required to get reliable results (Kothari & Garg, 2014). Data from the questioners was coded to help in categorization for easy recording. The researcher analyzed quantitative data with the help of the Statistical Package for Social Sciences (SPSS), in which descriptive statistics such as frequencies and percentages were generated and presented in frequency tables and percentages. The data from interviews were thematically analyzed and recorded in narrative form and as direct

quotations. The researcher then analyzed quantitative and qualitative data independently before combining the results to confirm whether the results agreed or disagreed (Creswell, 2018).

3.9 Ethical Considerations

As noted by Creswell (2014), the researcher should adhere to the code of ethics when conducting the study. Before the collection of data, the researcher presented a signed copy of the research proposal to the Department of Postgraduate Studies at Tangaza University College in order to secure a clearance letter. The clearance letter was used together with the duly signed proposal to secure a research permit from NACOSTI. To get access to secondary schools, the researcher first sought permission from the county director of the area and the principals of the schools. The researcher requested the informed consent of the participants and explain to them the purpose of the study. The study ensured that participation was voluntary through informed consent before proceeding. The study assured the participants that the information provided would be treated with confidentiality. The researcher ensured participant safety by avoiding situations that could cause physical or psychological harm to participants (Kombo & Tromp, 2013). The researcher upheld integrity and avoid plagiarism by citing all sources of information used in the study according to the APA 7th edition..

CHAPTER FOUR

PRESENTATION, INTERPRETATION AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter discusses data analysis, presentation, interpretation, and the study findings. In the main, the chapter focuses on the influence of principals' transformative leadership traits on the performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya. The chapter, based on the objectives of the study, provides the response rate of the study participants, demographic data, and the presentation of the findings in the sections that follow below.

4.1.1 The Response Rate of the Participants

The research instruments were distributed to various categories of participants that comprised of the principals, County directors of education, teachers, and students. The questionnaires were used to collect data from teachers and students, while an interview guide was employed to collect data from the county director of education and the principals. Table 2 shows the response rates of the study participants.

Table 2

The Response Rate of the Study Participants

Participants	**Sampled Participants**	**Actual Participants**	**Response Rate (%)**
Principals	11	9	82
Teachers	100	91	91
Students	330	310	94
County Directors of education	1	1	100
Total	**441**	**411**	**93**

As shown in Table 2 the 11 principals were expected to participate in the study, but only Nine (9) were available for interviews, which constituted 82% response rate. The two principals who did not participate in the study were attending a conference hence not available for interviews. The number of teachers who were expected to participate in the study was 100. However, only 91 filled and returned the questionnaires, making the response rate 91%. Some four teachers did not return the questionnaires because they were attending a workshop organized by the Teachers' Service Commission (TSC) on the Competency-Based Curriculum.

Some five teachers had accompanied students to the sports festivals, so they were not available to return the questionnaires. The number of students who filled and returned the questionnaires was 310 out of 330, which made the response rate for students 94%. The students who did not return the questionnaires had misplaced them, and since their participation in the research was voluntary, the researcher did not question them or demand any explanations. The County director of education was available for the interview, hence 100% response rate. According to Mugenda and Mugenda (2019), a higher return rate is preferable by pointing out that 60% is marginal, 70% is good, 80% is better, and 90% is the best. Based on Mugenda's (2019) observation, the return rates for the current study are acceptable, thus propelling the study to be undertaken.

As shown in Table 2 above, the response rate for all participants was high, which was attributed to various factors. For example, the researcher ensured that the questionnaire was well-structured, easy to understand, and free from ambiguity. A clear layout and logical flow could have encouraged participants to complete the questionnaires. The researcher also provided the respondents with various options as

they participated in the study, such as online questionnaires, telephone interviews, or paper questionnaires, which accommodated their preferences and accessibility, leading to higher response rates. The researcher further ensured respondents' privacy and emphasized that the information provided would be kept confidential and used solely for research purposes, which helped build trust and enhanced participation in the study.

4.2 Demographic Information of the Study Participants

The background of the respondents is very significant because it defines their characteristics. Thus, the study sought to establish participants' personal characteristics, such as gender, age, professional qualification levels, and years of experience. This was done to find out whether personal characteristics relate to how principals' transformative leadership influences the performance in science subjects in girls' secondary schools in Tharaka Nithi County, Kenya.

4.2.1: Distribution of Respondents by Gender

The study participants were asked to indicate their gender in order to determine whether gender had an impact on how principals' transformative leadership affected the performance in science subjects in girls' secondary schools in Tharaka Nithi County. Figure 2 provides a summary of the findings.

Figure 2

Distribution of Teachers by Gender

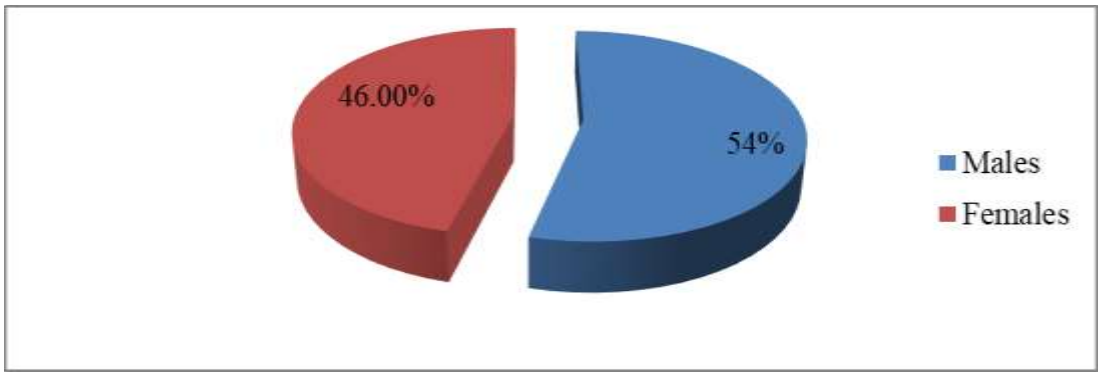


Figure 2 above shows that in terms of the teachers' gender, the majority (54%) were males, while females constituted 46%, implying a gender gap. It shows that the number of female teachers in girls' public secondary schools in Tharaka Nithi is relatively smaller than that of male teachers. This situation of having male teachers as the majority could be brought about by traditional practices of preferring to educate the boy child over the girl child, which could have had an impact on the female teaching profession in public secondary schools in Tharaka Nithi County, Kenya.

The findings concur with Jakiela and Hares (2019), who observed that in the current century, gender equality in education is very much cherished. However, most countries, particularly in Africa, are still far from achieving gender equality in education. This disparity has also impacted equality in job opportunities. Based on the study's findings, there could be more reasons why more male teachers may be found in girls' public secondary schools in Tharaka Nithi. For instance, girls' schools may intentionally hire male teachers to provide diverse role models for their female students.

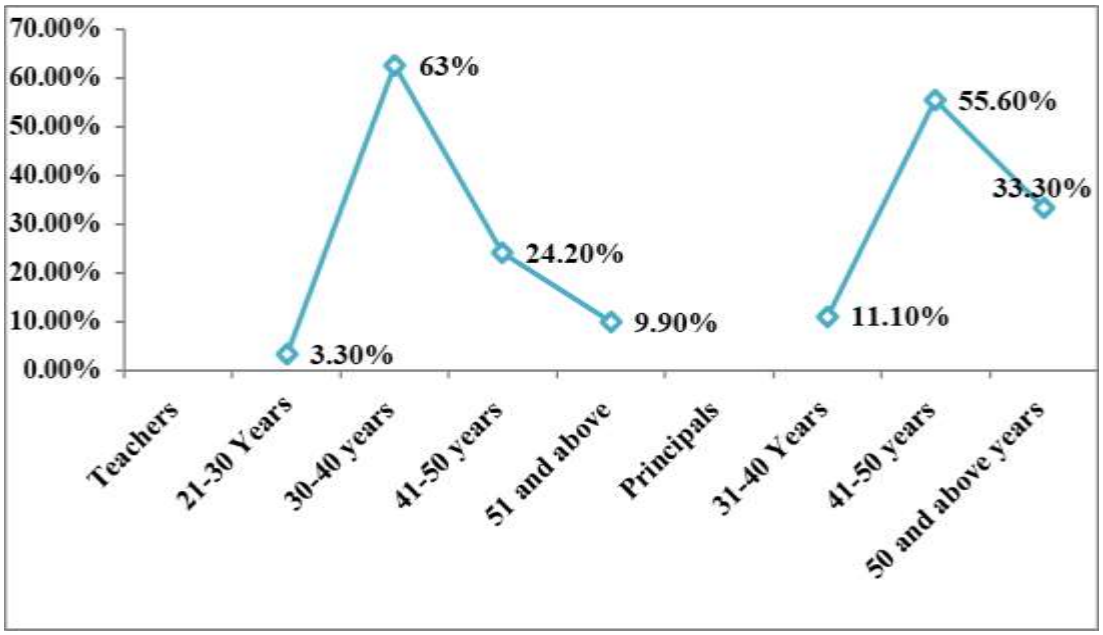
Having male teachers in the school can challenge traditional gender stereotypes and show young girls that both men and women can excel in various professions, including teaching. Some schools believe that male teachers can bring a stronger sense of discipline and authority to the school environment. This perception might lead to the intentional recruitment of male teachers, especially for girls' schools. In some cases, male teachers might be hired for specific subjects where they are perceived to have greater expertise or interest. This can be true for subjects such as science, technology, engineering, and mathematics (STEM), which are often areas where female students have been underrepresented.

4.2.2 Distribution of the Teachers and Principals by Age

The study sought to determine the ages of the participants. This was to find out whether age is linked to the influence of principals' transformative leadership on the performance in science subjects in girls' secondary schools in Tharaka Nithi County. The results are summarized in Figure 3 below.

Figure 3

Distribution of the Teachers and principals by Age



The findings in Figure 3 above indicate that most teachers (63%) fall under the age group of 30–40 years. This might be advantageous in the study of science subjects in schools in various ways. For instance, youthful teachers often have a good understanding of technology and its role in modern education. They can use digital tools, interactive apps, and multimedia to present scientific concepts in a more visually appealing and interactive manner. This in turn makes the learning process of science subjects more enjoyable hence influencing positively its performance in exams. Young teachers can also draw examples from current events and social media that students can relate to. This approach makes abstract scientific

ideas more accessible and easier to comprehend. The study also established that there were few teachers (3.30%) who were in the age bracket of 21–30 years.

Teachers who were 51 years of age or older were also few (9.90%). The prevalence of fewer teachers in schools above the age of 51 could be attributed to several factors. One of the factors could be that teaching can be physically and mentally demanding, and some teachers may find it challenging to maintain the same level of energy and enthusiasm as they age. As a result, they may choose to retire earlier to maintain their health and well-being. Some teachers may opt for early retirement to make way for younger teachers and create opportunities for career progression within the education system. In some cases, older teachers may feel discouraged by the limited opportunities for career advancement and additional incentives within the teaching profession. This lack of recognition and reward may influence their decision to retire early. The small number of teachers between 21-30 could be attributed to the hiring practices of the Teacher Service Commission in schools, which might favor more experienced candidates, making it challenging for younger teachers to secure teaching positions in the public girls' secondary schools.

As shown in Table 3 above, the majority of the principals are in the age range of 41-50 years. Very few principals (11.10%) were in the age bracket between 31- 40 years. This indicates that most principals were older than the teachers, and as a result, they could easily provide the guidance required by the younger teachers. As pointed out by Khatete (2020), young teachers need the guidance of older and more experienced mentors in their teaching practice in order to effectively perform their duties. Age and experience can bring a wealth of knowledge and expertise that can be important in guiding teachers, especially in subjects such as science.

4.2.3 Distribution of Teachers and Principals According to Academic Qualifications

The researcher found out the academic qualifications of both teachers and the principals. This was to find out whether teachers' and the principal's qualifications had an effect on their job performance. The results are presented in Figure 4 below.

Figure 4

Distribution of Teachers and Principals According to academic Qualifications

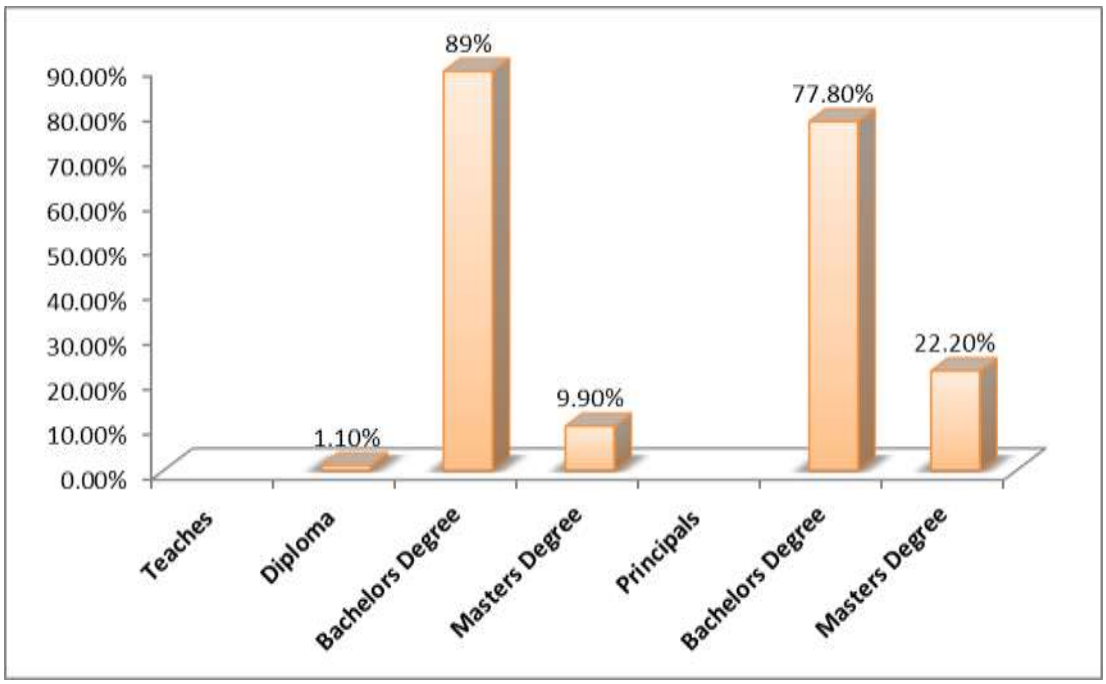


Figure 4 above shows that most of the teachers (89%) had attained bachelor's degree qualifications. Teachers with master's degree qualifications constituted 9.9%, while those with diplomas were 1.1%. The findings further indicate that the majority of the principals (77.80%) had bachelor's degree qualifications, while 22.20% of the principals had acquired master's degree qualifications. These findings show that the teachers were qualified enough to teach at the secondary school level since they had the minimum diploma required by the TSC. Given that they were qualified teachers, it’s expected that they had the

expertise needed to help learners perform well in all subjects, including the sciences. Since most of the principals had degree qualifications, they were considered qualified enough to head public girls secondary schools. It must be acknowledged that pursuing higher degrees reflects a commitment to ongoing learning. Thus, such principals may understand the importance of continuous improvement and encourage a culture of learning that can be acquired and applied by students in the study of science subjects.

4.2.4 Distribution of the Teachers and Principals according to Duration of Service

To determine the teachers' experience, teachers in the selected public secondary schools were required to indicate their teaching experience measured in years of service. Further, the study sought to find out the years of experience of principals. This information sought to determine whether they accumulated more knowledge and skills with years of service that could help them improve students' performance in science subjects in their schools. The findings are presented in Figure 5 below.

Figure 5

Distribution of the Teachers and Principals according to Duration of Service

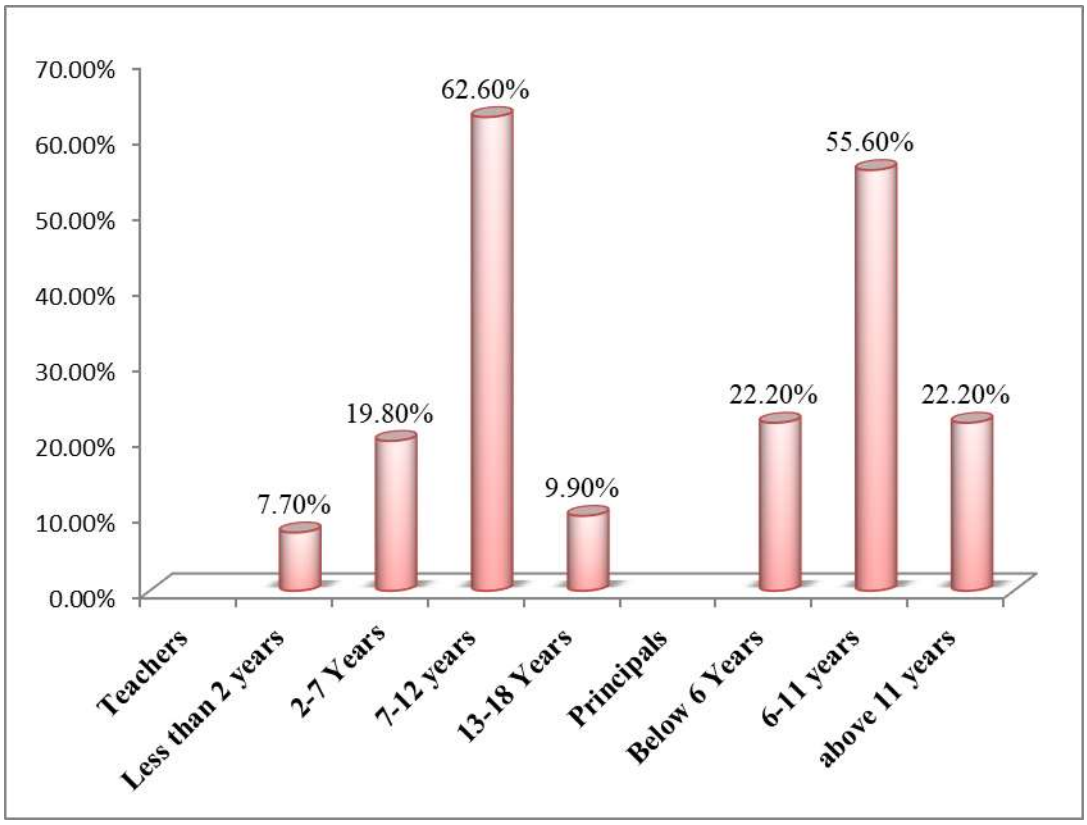


Figure 5 above shows that the majority of the teachers (62.60%) have been teachers for 7–12 years, while 19.80% have had experience of 2–7 years. Teachers who had experience of less than 2 years were 7.7%, while those with experience between 13-18 years were 9.9%. This finding shows that the majority of the teachers had acquired enough experience to allow them to impart knowledge and skills to the learners. Such knowledge translates to improving the study of science subjects. Mufidah and Yenni (2021) studied the effect of teaching experience in Nigeria and found that a teacher's performance is greatly influenced by how long he or she has been teaching.

Table 5 above further shows that more than half of the principals (55.6%) have served between 6 and 11 years. This could mean that the principals had sufficient experience accumulated over the years of service to allow them to provide

the effective leadership needed for the improvement of learners in science subjects. In most cases, experience breeds wisdom, and a long-serving principal will have faced and resolved numerous issues arising in a school setup over the years.

This wealth of experience leads to more effective decision-making. Consequently, they are likely to make better choices for the school's overall improvement concerning the study of science subjects. Mbangula (2022) conducted a study about the effectiveness of principals' roles on school performance from the perspective of school principalship in Nigeria. The study found out that principals tend to be effective with years of experience. Mbangula (2022) further argued that principals with experience tend to help teachers teach in a way that enables learners to realize their academic goals. This is because they encourage teachers to build effective relationships with the learners, which enhances their performance.

4.3 Students' Involvement in Decision-making and their Performance

The first research objective sought to find out whether students' involvement in decision-making enhances their performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya. The researcher administered questionnaires to teachers and students and interviewed principals and the county director of education. Teachers and students were given five choices and were requested to choose the response that best represented their feelings on a five-point scale ranging from "SA=Strongly Agree, A=agree, UN=undecided, D=disagree, and SD=Strongly Disagree." Table 3 below presents a summary of the findings.

Table 3

Students' Involvement in Decision-making and their Performance in Science Subjects

Statement	SA		A		UD		D		SD	
Teachers(n=91)	**F**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Students' involvement in the key decisions of their educational process improves motivation to learn.	6	6.6	74	81.3	6	6.6	4	4.4	1	1.1
Students in our school perform better in science subjects because they are involved in the decision about the selection of science subjects.	2	2.2	4	4.4	7	7.7	63	69.2	15	16.5
The principal encourages students to collaborate well with teachers so as to improve their performance in science subjects.	3	3.3	70	76.9	7	7.7	10	11.0	1	1.1
The principal encourages the participation of girls in science activities, such as science fairs.	3	3.3	74	81.3	4	4.4	4	4.4	6	6.6
The principal encourages girls to discuss the selection of science subjects with their teachers.	62	68.1	20	22.0	4	4.4	2	2.2	3	3.3
Students (n=310)										
Being involved in decision making motivates us to perform better in science subjects.	2	0.6	245	79.0	50	16.1	12	3.9	1	0.3
The principal involves us in making decisions, especially in matters that affect us academically.	1	0.3	20	6.5	53	17.1	9	2.9	227	73.2
The principal encourages us to collaborate well with teachers so as to improve our performance in science subjects.	11	3.5	193	62.3	83	26.8	17	5.5	6	1.9
The principal encourages us to participate in science activities, such as science fairs.	12	3.9	218	70.3	59	19.0	17	5.5	4	1.3
The principal encourages girls to discuss the selection of science subjects with their teachers.	1	0.3	47	15.2	39	12.6	34	11.0	189	61.0

Teachers were asked to rate their level of agreement regarding whether students' involvement in the key decisions of their educational process improves motivation to learn. The results, as indicated in Table 3, show that 80(87.3%) of the

teachers agreed with the statement. This finding shows that students feel motivated when involved in decision-making and feel empowered and valued, which may trigger improved performance. By allowing students to make decisions about their learning, such as selecting topics or projects that align with their interests, educators can create a more personalized and engaging learning experience. These findings agree with the findings of a study by Hakiza (2017) about student involvement, which revealed that the involvement of students in the management of schools is considered essential for the effective performance of students.

Further, the present study also sought to find out whether students perform better in science subjects because they are involved in the decision about the selection of science subjects. The results show that 78(85.7%) of the teacher respondents disagreed with the statement, and only 6(6.6%) agreed with it. This could indicate that performance in the sciences is not in any way linked to students' freedom of decision-making. In line with these findings, Okongo, Ngao, Rop, and Nyongesa (2015) argued that improved academic performance is a result of a collective sense of responsibility among students, teachers, and parents, proper instruction, early syllabus completion, and hard work. In this case, the general academic performance of students requires engaging other aspects of the learning process rather than students' involvement in decision-making.

Regarding whether the principal encourages students to collaborate well with teachers so as to improve their performance in science subjects, the majority of the teachers 73(80.2%) agreed and 11(12.2%) disagreed with the statement. This result implies that teachers' value collaboration as a strategy to improve students' scores in the sciences. Collaborative activities can boost student interest and engagement in science subjects. In turn, this creates a free atmosphere for learning.

A similar result was arrived at by Momanyi, Too, and Simiyu (2015), who argued that collaboration among teachers and students is crucial in the teaching and learning of science subjects. This is because it enhances understanding, promotes active learning, and improves communication and problem-solving skills.

The study also sought the opinions of the teachers on whether the principal encourages the participation of girls in science activities, such as science fairs. The study results show that 77(84.6%) agreed with the statement. There were also 10(10.6%) of the teachers who disagreed that the principal encourages the participation of girls in science activities. Therefore, the study findings under this item imply that the school principal is intent on motivating girls to do better in science subjects. It may also imply that the school at large is interested in promoting science subjects among girls so as to demystify the notion that science is for boys. In an interview, one of the principals had this to say:

> As a principal, I do my best to encourage girls to study science. I have created a program in the school where I invite female scientists and engineers to speak at the school, sharing their experiences and achievements. This has always inspired girls to see potential career paths and opportunities in science. The presence of female science teachers who act as mentors and role models has also helped inspire girls to work hard and perform better in science subjects (Principal C,16/07/2023).

The study also sought the opinion of teachers on whether the principal encourages girls to discuss the selection of science subjects with their teachers. Results in Table 3 show that 82(90.1%) of the teachers strongly agreed, while 5(5.5%) disagreed with the statement. This result clearly shows that students are given an opportunity to choose subjects to study and that they are afforded a chance

to consult their teachers before they make a decision. This finding relates to what Owino and Odundo (2016) revealed that students need to be guided by teachers and career masters in their choice of subjects based on interests, ability, and performance.

Concerning whether student involvement in decision-making motivates them to perform better in science subjects, it was found that the majority of student 247(79.6%) agreed to the statement, while 13(4.2%) disagreed with it. Involving students in decision-making fosters a sense of ownership and empowerment, creating a more inclusive and student-centered learning environment. When students have a voice in school matters, it allows them to contribute their unique perspectives, insights, and ideas. This finding is in agreement with that of Kilonzo (2017), who found out that involvement of students in decision-making creates a sense of responsibility and accountability. As such, this goes a long way toward improving performance and the development of critical thinking and problem-solving skills. On this, one principal pointed out that:

> My experience is that when you empower students to be part of the decision-making process, they become more organized and responsible in school. I understand that students are the best judges of their learning needs. By involving them in decisions related to teaching methods, projects, or assessments, teachers can gain valuable insights into what works best for each student. This understanding can lead to more effective instructional strategies that help improve students' performance in all subjects, including the sciences (Principal D, 17/07/2023).

The County Director of education also observed that when students are encouraged to participate in decision-making, they develop problem-solving and

critical thinking skills. They learn to analyze situations, consider various options, and make informed choices. These skills are transferable and can positively impact academic performance across subjects, including the study of the sciences, which seems to be challenging in most schools.

The study further found out that the majority of the students 236(76.1%) strongly disagreed with the statement that the principal involves them in making decisions, especially in matters that affect them academically, while 21(6.8%) agreed with the statement. It appears that school principals involve students in making decisions in other areas of life but not in those touching on academics. Exclusion of students from the decision-making process may make them feel disconnected and disengaged from their studies. Mati, Gatumu, and Chandi (2016) made similar observations and argued that the failure or reluctance of school leadership to give an ear to students often leads to the development of a sour relationship between the two parties. This relationship affects students in all areas, including their academic lives in school.

Further, the study sought to find out the students' opinions on whether their principal encourages them to collaborate well with teachers so as to improve their performance in science subjects. The study results in Table 3 show that more than half of the students 193(62.3%) agreed with the statement that their principal encourages them to collaborate well with teachers so as to improve their performance in science subjects. This result shows that students value collaboration in the learning of science subjects. Momanyi et al. (2015) observe that collaboration provides opportunities to engage in discussions, group projects, and experiments, which can deepen their comprehension of the sciences. In an interview, a principal pointed out that science subjects often involve complex problem-solving.

Encouraging students to collaborate and work in groups allows them to combine their knowledge, skills, and insights to tackle challenging questions, leading to more comprehensive and innovative solutions.

The majority of the students 230(74.2%) as shown in Table 3 reported that the school principal encourages them to participate in science activities, such as science fairs. On the other hand, 21(6.8%) disagreed with the statement. This finding implies that both the school and the student value taking part in science fairs as a way of increasing learning and promoting interest in science. Besides this, science fairs provide an opportunity for students to develop their presentation and organizational skills. Gitonga (2018) made similar observations that science fairs expose students to new knowledge and challenges, and this helps drill in scientific concepts. Further, Njoroge, Changeiywo, and Ndirangu (2016) held similar observations that science congress activities enrich and supplement learning activities provided in school.

With regards to the statement that the principal encourages girls to discuss the selection of science subjects with their teachers, study shows that a majority of the students 222(72%) disagreed with the statement. This shows that the discussion on subject selection between teachers and students is rather informal and voluntary rather than a school policy. This finding may also imply that such freedom given to students makes them more mature, independent, self-directed learner who will own up the consequences of their choices. Njoroge et al (2016) held a similar opinion that giving students the freedom to choose subjects can help them align their academic pursuits with their future career goals. This enables them to acquire the necessary knowledge and skills required for their chosen profession, increasing their chances of success in the job market.

However, in an interview, the county director of education argued that it is important to acknowledge that guidance in selecting study subjects is crucial. As such, principals should consider it for students to make informed and appropriate choices. The selection of study subjects can have a significant impact on a student's academic and professional future. Without proper guidance, they may make the wrong choices that could lead to various negative outcomes. When students are not guided in selecting subjects that suit their abilities and interests, they may struggle to perform well in those subjects. This can affect their overall academic performance and hinder their chances of achieving their desired educational goals. In an interview, one of the principals emphasized the importance of involving students by pointing out that:

> I encourage having students involved; I encourage them to participate in decision-making and also to consult their teachers concerning subject matters. I ensure teachers are enthusiastic and can make the science subjects interesting and relevant to students' lives. This seems to be working in my school because I can see teachers enthusiastically involving students in practical demonstrations and laboratory work, which makes science more tangible and enjoyable for students (Principal E, 17/07/2023).

Based on the findings, it can be said that participants concurred with the notion that student involvement enhances their performance in science subjects. Nevertheless, there were instances where students were insufficiently engaged, particularly in matters pertaining to decisions that impact their studies in the field of sciences. This lack of involvement has been identified as a contributing factor to their decimal performance.

4.3.1 Principal-teacher role Modeling and Students' Performance

The study sought to ascertain whether principal-teacher role modeling influences performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya. Under this objective, respondents were asked to respond to the statement using the scale: strongly agree (SA), agree (A), undecided (UD), disagree (D), and strongly disagree (SD). Table 4 shows the findings.

Table 4

Principal-Teacher Role Modeling and Students' Performance in Science Subjects

Statement	**SA**		**A**		**UD**		**D**		**SD**	
Teachers(n=91)	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
The principal as a role model promotes a positive attitude towards science subjects	0	0	70	76.9	17	18.7	3	3.3	1	1.1
The principal, as a role model, discusses with students how to excel in science subjects.	43	47.3	29	31.9	9	9.9	2	2.2	8	8.8
The principal, as a role model, is always available to talk and encourage girls who have challenges in science subjects.	6	6.6	23	25.3	1	1.1	3	3.3	58	63.7
The principal, as a role model, ensures Students have the resources they need to perform better in science subjects.	3	3.3	13	14.3	-	-	61	67.0	14	15.4
The principal, as a role model, encourages students to read hard and consult teachers to perform better in science subjects.	4	4.4	70	76.9	4	4.4	4	4.4	9	9.9
Students(n=310)										
The principal as a role model promotes a positive attitude towards science subjects	6	1.9	53	17.1	166	53.5	59	19.0	26	8.4
Our principal, as a role model, discusses with students how to excel in science subjects.	240	77.4		-	34	11.0	26	8.4	10	3.2
Our principal, as a role model, is always available to talk to and encourages girls who have challenges in science subjects.	2	0.6	20	6.5	71	22.9	110	35.5	107	34.5
Our principal, as a role model, ensures that we have the resources needed to perform better in science subjects.	58	18.7	190	61.3	19	6.1	24	7.7	19	6.1
Our principal is involved in teaching us some of the science subjects	16	5.2	27	8.7	7	2.3	44	14.2	216	69.7

The study sought to find out the opinion of teachers on the statement that the principal, as a role model, promotes a positive attitude towards science subjects. The results in Table 4 indicate that a majority of teachers 74(81.3%) agreed, while

13(14.4%) disagreed with the statement. This finding implies that by actively demonstrating enthusiasm and curiosity for science, the principal sets a powerful example for both students and teachers. Engaging in science-related activities, such as participating in science fairs or encouraging scientific research within the school, showcases a genuine interest in the subject. Dhuey and Smith (2018) added that in promoting science-based subjects, school principals can foster a culture of appreciation for science by recognizing and celebrating students' achievements in science subjects, whether it be through awards, commendations, or showcasing their work.

The study also sought the opinion of teachers on whether the principal, as a role model, discusses with students how to excel in science subjects. The majority of the teachers 43(47.3%) strongly agreed, 29(31.9%) agreed, 9(9.9%) were undecided, 2(2.2%) disagreed, and 8(8.8) teachers strongly disagreed with the statement. By demonstrating enthusiasm and passion for science themselves, principals can instill a sense of curiosity about science among students. When students witness their principal's genuine interest in science, they are more likely to develop a positive attitude towards the subject. Adan Keiyoro (2017) made a similar observation when they reported that school principals show support for science subjects by providing necessary resources, professional development opportunities, and recognition for their efforts. By doing so, they show that science education is valued within the school community.

Regarding whether the principal, as a role model, is always available to talk to and encourage girls who have challenges in science subjects. The study results show that the majority of the respondents 58(63.7%) strongly disagreed with the statement. The principal’s failure to discuss such matters may lead to a lack of

female role models in STEM fields since principals play a crucial role as educational leaders and mentors, and their engagement with students is essential for fostering a positive learning environment. Girls may not receive the guidance needed to nurture their interests and talents in science, potentially leading to self-doubt and a loss of interest in the subject. Similar views were expressed by Adhiambo (2016), who observed that without the guidance of school principals, girls may remain unaware of educational and career opportunities in science, hindering their access to valuable experiences. The lack of engagement may also reinforce gender stereotypes, associating science with male interests and abilities, further deterring girls from pursuing their passions in the areas of science.

Concerning whether the principal, as a role model, ensures students have the resources they need to perform better in science subjects, the study results show that the majority of the respondents 61(67%) disagreed with that statement. This negative response shows the failure of principals to provide the required equipment, materials, and technology that support hands-on learning and practical experiments, which may have severe consequences for the performance of science subjects. Further to this, principals play a vital role as educational leaders, responsible for creating an environment conducive to learning and academic excellence. When adequate resources are not allocated to science subjects, it hinders students' ability to engage in hands-on learning, practical experiments, and exploration of scientific concepts. In a study by Adan and Keiyoro (2017), it was found that insufficient resources can also place an unnecessary burden on science teachers, limiting their ability to create dynamic and engaging lessons. Without access to proper laboratory equipment, technology, and materials, teachers may struggle to effectively convey scientific principles and foster critical thinking skills in their students (Adan &

Keiyoro, 2017).Concerning the availability of resources, the principal in the interview had this to say:

> While encouraging girls to engage in science subjects, I also try my best to provide what they need to excel. For instance, I ensure the availability of research papers, articles, and journals that students can access for further exploration and in-depth study. I also provide science kits and supplies to students to encourage independent learning and experimentation. Students in my school can explore scientific concepts during their free time, reinforcing what they've learned in the classroom (Principal E, 17/07/2023).

The study further sought teachers' opinions on whether the principal, as a role model, encourages students to read hard and consult teachers to perform better in science subjects. Table 4 shows that 70(76.9%) agreed with the statement. This result demonstrates that, as educational leaders, principals inspire and encourage students to develop a genuine interest in science. In doing so, school principals play a crucial role in setting a vision and direction for the school, fostering a sense of purpose and commitment among the school community. In relation to these findings, Eboka (2016) argued that the school principal has to be passionate and enthusiastic about science subjects in order to instill a strong work ethic and a thirst for knowledge that is required in science subjects.

The study also sought students' opinions on whether the principal, as a role model, promotes a positive attitude towards science subjects. Results in Table 5 show that 166(53.5%) of the student respondents were undecided and 3(17.1%) agreed. This result shows that a majority of the students are unable to directly link the school principal to the development of positive attitudes towards science subjects. On whether the principal, as a role model, is always available to talk to and

encourage girls who have challenges in science subjects. The study results were in the negative, with 110(35.5%) disagreeing and 107(34.5%) strongly disagreeing. This could mean that school principals are failing in their role of having instructionally focused interactions with students that involve problem solving and student guidance. Wanjala, Aurah, and Koros (2015) warn that the failure of school principals to be available to the students may breed the development of sketchy opinions regarding the sciences, making students have negative attitudes towards the sciences.

The study also sought the opinion of the students with regards to the provision of resources for use in science subjects. Study results in Table 4 show that 215(69.4%) of the students respondents agreed with the statement. This result shows that principals are aware of the specific resource needs of science classrooms and laboratories. By providing equipment, materials, and technology that support hands-on learning, practical experiments, and inquiry-based activities, school principals act as facilitators of science subjects. Kariuki, Maiyo, and Ndiku (2016) argued that the roles that principals play in ensuring adequate teaching and learning resources in schools include: ensuring teaching and learning resources (library, e-learning resources, laboratory) are readily available; evaluating the extent to which the teaching and learning resources are adequate for effective teaching and learning in school; advising teachers on the most current textbooks to use in teaching and learning; and encouraging teachers to develop innovative teaching aids. Concerning resources, the County Director of education argued that though resources are limited in most of the schools the principals are encouraged to ensure that the schools have the required materials for science activities for students to learn.

The study further sought the opinion of students on whether the principal, as a role model, is involved in teaching students some of the science subjects and participating in mentoring them to acquire the skills needed to be successful in science fields. The study results in Table 4 show that most of the students 216(69.7%) strongly disagreed with the statement. This could mean that school principals do not go to class to teach, and in some cases, it may mean that school principals are not science teachers. It may be beneficial for the principal to teach a class since, by doing so; they can demonstrate their commitment to education and their passion for teaching, setting a positive example for both students and teachers. Teaching a class allows the principal to interact directly with students, understand their needs, and gain insights into the teaching and learning process within the school. It should also be mentioned that the failure of teachers to go to the classrooms to teach is due to having demanding administrative responsibilities, so taking on regular teaching duties could divert their attention from essential leadership tasks.

The participants unanimously concurred that a principal who serves as a role model within a school can have a substantial impact on students' academic accomplishments. When both principals and teachers establish elevated academic standards for both themselves and their students, a distinct message highlighting the significance of education is conveyed. This, in turn, serves as a potent motivator for students to aspire towards excellence and invest greater effort in attaining their objectives. Regrettably, this desirable dynamic has not been effectively realized in the context of girls' public schools in Tharaka Nithi County. The study's respondents widely shared the perspective that principals are not consistently accessible for

dialogue and to provide encouragement to girls who encounter difficulties in scientific subjects.

4.3.2 Principal-teacher Team Building and the Students' Performance

The research sought to examine whether principal-teacher team building can enhance the performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya. Under this objective, participants were asked to respond to the statement using the scale: strongly agree (SA), agree (A), undecided (UD), disagree (D), and strongly disagree (SD). Table 5 shows the findings.

Table 5

Principal-Teacher Team building and learners' Performance in Science Subjects

Statement	**SA**		**A**		**UD**		**D**		**SD**	
Teachers (n=91)	**F**	**%**	**f**	**%**	**F**	**%**	**f**	**%**	**f**	**%**
Team-building creates a platform for teachers to build a professional dialogue, which builds collaborations and improves learners' achievements.	36	39.6	40	44.0	4	4.4	2	2.2	9	9.9
Team building enables teachers to share knowledge and skills needed in the teaching of science subjects.	4	4.4	58	63.7	18	19.8	10	11.0	1	1.1
The principal encourages collaborative teaching of science subjects.	7	7.7	6	6.6	19	20.9	53	58.2	6	6.6
The principal encourages teachers to share teaching resources to improve performance in sciences	1	1.1	72	79.1	9	9.9	8	8.8	1	1.1
Students (n=310)										
There is teamwork among teachers in our school regarding the teaching of science subjects.	10	3.2	230	74.2	66	21.3	3	1.0	1	0.3
Team building improves the creativity of teachers in teaching science subjects.	117	37.7	168	54.2	1	0.3	4	1.3	20	6.5
Our principal and teachers collaboratively help us perform well in science subjects.	101	32.6	191	61.6	-		7	2.3	11	3.5
The principal encourages collaborative teaching of science subjects among teachers	52	16.8	180	58.1	-		1	0.3	77	24.8
The teachers are encouraged to share teaching resources to improve our performance in sciences	116	37.4	178	57.4	-		6	1.9	10	3.2

Table 5 above shows that 36(39.6%) strongly agreed with the statement that team-building creates a platform for teachers to build a professional dialogue, which builds collaborations and improves learners' achievements. Further, 40(44.0%) disagreed, 4(4.4%) disagreed, and 9(9.9%) strongly disagreed with the statement that team-building creates a platform for teachers to build a professional dialogue, which builds collaborations and improves learners' achievements. This result shows that school principals regularly organize team-building exercises and that teachers

see them as opportunities to exchange knowledge and ideas. Additionally, team building may enhance collaboration among teachers by enabling them to share best practices and learn from one another's successes and failures.

With regards to the statement that team building enables teachers to share knowledge and skills needed in the teaching of science subjects, 62(68.1%) of the teacher respondents agreed with the statement. On the other hand, 11(21.1%) disagreed with the statement. This finding indicated that besides social benefits to the teachers, team building provides a collaborative and supportive environment where teachers share their ideas, experiences, and challenges related to teaching science, leading to the discovery of innovative methodologies and resources that enhance the performance of learners in science subjects. This argument concurs with that of Dewey (2018), who argued that social events among scientists' act as a form of knowledge sharing and peer learning. As one principal commented:

> I firmly believe that team building among teachers is a vital aspect of fostering students' success in science subjects. As a result, I encourage teachers to brainstorm ideas together so as to develop *innovative* and creative teaching approaches. This can enhance learning experiences for students and make science subjects more exciting (Principal G, 16/07/2023).

In an interview, the county director of education argued that, "a *positive rapport established through team building among teachers extends to the students. Teachers' collaboration serves as a role model for cooperation for students, which in turn encourages them to work together towards excelling in science subjects*." Further, on whether the principal encourages collaborative teaching of science subjects, 52(58.2%) of the teacher respondents disagreed and 19(20.9%) were undecided on the matter. These findings indicate a failure of collaboration between

teachers of science subjects and the school principal, which could be a contributing factor to the failure of science in girls' public secondary schools in Tharaka Nithi County.

These findings may indicate that school principals are more focused on the managerial functions of the school than individual subject performance. The failure of principals to collaborate with teachers can also indicate a failure of the relationship between teachers and the school principal. When collaboration breaks down, there is a lack of open communication and mutual understanding between teachers and principals, leading to a disjointed approach to managing the school and consequently a decline in the performance of the students in science subjects. A similar view was taken by Kariuki et al. (2016), who argued that when collaboration is absent, opportunities for professional development and sharing best practices diminish, hindering the growth and improvement of both teachers and the school as a whole.

One principal commented that:

> My primary managerial functions are to provide strong leadership and direction to the entire school community. I strive to set a clear vision and mission for the school, aligning all stakeholders towards common goals. By establishing a positive and supportive school culture, I inspire and motivate both teachers and students to excel in their respective roles (Principal B, 17/07/2023).

With regards to the statement that the principal encourages teachers to share teaching resources to improve performance in sciences, study results in Table 5 show that 72(79.1%) of teacher respondents were in agreement. This result indicates that teachers of science subjects are actively sharing their knowledge, experiences,

and best practices, thus collectively staying updated with the latest developments and methodologies in their subject areas. Further, this finding may also indicate that knowledge sharing may enhance the quality of their teaching, making their lessons more engaging, relevant, and effective for students.

A majority of student respondents 230(97.2%) were in agreement with the statement that there is teamwork among teachers in their school regarding the teaching of science subjects. This finding indicates that science teachers work together as a team, pool their diverse expertise, experiences, and perspectives to develop more comprehensive and engaging lesson and ultimately benefitting students. Further teamwork among teachers may foster open communication and mutual understanding, allowing teachers to address challenges collectively and find effective solutions. Similar sentiments were expressed by Sifuna et al. (2016), who posited that teamwork among teachers may promote a culture of continuous professional development where educators can learn from each other's strengths and benefit from ongoing support and mentorship, creating a positive environment that benefits both the teachers and their students.

Students were also asked to rate whether there is teamwork among teachers in their schools regarding the teaching of science subjects. The results in Table 5 show that 168(54.2%) agreed with the statement and 117(37.7%) strongly agreed. This is a positive response from students and is an indication that students are able to deduce creative ways of a teachers approach to teaching a concept. It may also imply that teachers who collaborate as a team, bring together diverse perspectives and expertise, which sparks creativity and innovation. Creativity in teaching as was equally noted by Thomson (2015) that creativity among science teachers can develop engaging and dynamic lesson, hands-on experiments, and interactive

activities that captivate students' interest and encourage their curiosity about the subject.

Further, students were asked to rate whether the principals and teachers collaboratively helped them perform well in science subjects. From the results in Table 5, it can be seen that the majority of the students 168(54.2%) agreed with the statement. On the statement that the principal encourages collaborative teaching of science subjects among teachers, results in Table 5 show that 101(32.6%) strongly agreed and 191(61.6%) agreed with the statement. This is an indication that students see their teachers collaborate in order to enable them to improve their performance in science subjects. By working together, teachers can align their teaching approaches and content, ensuring that students receive a well-rounded and coherent education and identifying gaps in students understanding in advance. A similar view was expressed by Thomson (2015), who posited that students also benefit from the collective expertise and experiences of their teachers, who work collaboratively as a team.

Students were also asked to score the statement that teachers are encouraged to share teaching resources to improve their performance in the sciences. The study results in Table 5 indicate that 178(57.4%) agreed and 116(37.4%) strongly agreed. This finding shows that when teachers share materials and resources, they are able to access a wider range of materials. In so doing, they are able to diversify their teaching approaches and cater to various learning styles, ensuring that students receive a more comprehensive and engaging education. Simatwa and Adhiambo (2017) argued that sharing resources among teachers facilitates the implementation of innovative teaching methods. This is because the teachers adopt successful

practices from their peers. As such, this fosters a culture of continuous improvement that can enhance the performance of students in science subjects.

The findings clearly show that principal-teacher team building can have a significant impact on learners' performance in science subjects. When the principal and teachers work collaboratively as a team, they create a positive and conducive learning environment, which can lead to several benefits. For example, through team building, the principal and teachers can establish a shared vision and goals for science education in the school. This alignment ensures that everyone is working towards the same objectives. This improves coordination and resource allocation for science subjects. Working collaboratively can allow the principal and teachers to design study programs that are well-structured and aligned with the learning needs of the students, particularly in science subjects. In such a conducive leadership environment, teachers are able to identify the most effective teaching methods and materials to enhance the quality of teaching and learning in science subjects.

4.3.3 The Provision of Supportive Learning Resources and Students' Performance

The research further sought to find out the relationship between the provision of supportive learning resources and the performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya. To achieve this, participants were asked to respond to the statement using the following scale: strongly agree (SA), agree (A), undecided (UD), disagree (D), and strongly disagree (SD). Table 6 shows the findings.

Table 6

Provision of Supportive learning Resources and the Performance in Science Subjects

Statement	SA		A		UD		D		SD	
Teachers (n=91)	**f**	**%**	**F**	**%**	**f**	**%**	**F**	**%**	**f**	**%**
The principal provides the learning resources needed in the study of science subjects, such as laboratory equipment.	41	45.1	33	36.3	3	3.3	-	-	14	15.4
The school has digital devices that enable learners to conduct research.	6	6.6	3	3.3	5	5.5	60	65.9	17	18.7
A resource person is usually invited by the principal to encourage learners about the study of science	3	3.3	61	67.0	18	19.8	1	1.1	8	8.8
Students (n=310)										
The principal provides the learning resources needed in the study of science subjects, such as laboratory equipment.	1	0.3	32	10.3	123	39.7	71	22.9	83	26.8
The school has digital devices that enable learners to conduct research.	52	16.8	125	40.3	-	-	8	2.6	125	40.3
The principal provides enough books for us to study and succeed in their exams.	58	18.7	53	17.1	3	1.0	11	3.5	185	59.7
A resource person is usually invited by the principal to encourage us in the study of science subjects.	15	4.8	177	57.1	72	23.2	36	11.6	10	3.2

Table 6 shows that the majority of the teachers, 75(81.4%), agreed with the statement that the principal provides the learning resources needed in the study of science subjects. On the other hand, 14(15.4%) strongly disagreed with the statement. This could mean that school principals actively source teaching resources and materials needed by both students and teachers to carry out science lessons. Further, by equipping classrooms with the necessary resources, such as laboratory equipment, scientific instruments, specimens, and multimedia tools, students can actively participate in practical activities that reinforce theoretical concepts. A

similar observation was made by Ibrahim and Dalim (2019), who arrived at a positive correlation between resource availability and learners' development of critical thinking and problem-solving abilities in science. In an interview, the County Director of education observed that:

> Principals play a crucial role in the educational development of students, and providing learning resources for science subjects is essential to facilitate effective learning. They must understand that having access to a variety of learning resources, such as textbooks, laboratory equipment, multimedia materials, and online resources, can significantly enhance students' learning experiences. These resources cater to different learning styles and help students grasp complex scientific concepts effectively (County Director, 18/07/2023).

The study also sought the opinion of teachers on the statement that the school has digital devices that enable learners to conduct research. The study results in Table 6 show that 77(84.6%) of the teacher respondents disagreed with the statement. This shows that learners do not have enough ICT-based equipment to enable them to conduct scientific experiments. Only a small number 9(10%) agreed with the statement. This finding may also imply that, with limited access to modern ICT tools, students may be deprived of valuable opportunities to engage in interactive and immersive learning experiences. This, in turn, hinders their understanding of complex scientific concepts. A study by Okpechi and Chiaka (2017) noted that the inadequacy of resources for use in science subjects hampers the students' continued mastery of scientific principles and ultimately their performance in science subjects.

The study also sought responses from teachers on the statement that a resource person is usually invited by the principal to encourage learners about the study of science. The study results in Table 6 show that 64(70.3%) of the teacher respondents agreed with this statement. However, 46(14.2%) disagreed with the statement. This implies that over half of the sampled schools invite experts and motivational speakers to motivate learners in the field of science. Further to this, motivational speakers bring a fresh perspective and real-world experiences to the classroom, igniting a sense of passion and curiosity for the subject by sharing their own success stories. As was equally noted by Bukoye (2019), motivational speakers can shed light on the diverse career opportunities within the scientific domain, encouraging students to explore various paths they might not have considered before and thereby fostering a positive mindset and boosting self-confidence among students.

From the student's perspective, results in Table 6 show that 123(39.7%) were undecided, while 154(49.7%) disagreed with the statement that the principal provides the learning resources needed in the study of science subjects, such as laboratory equipment. This finding shows that respondents were split in the middle, with the majority of the school having few learning resources for science subjects. This failure of schools to provide adequate resources for learning science subjects in school have severe consequences for the learners' acquisition of critical knowledge in science.

Also from the student's perspective, the study sought responses to the statement that the school has digital devices that enable learners to conduct research. Study results in Table 6 show that 177(57.1%) agreed while 133(42.9%) disagreed with the statement. This finding could mean that some schools have digital devices

and others do not. With regards to the provision of reading material as a resource for science subjects, 111(36%) agreed, while 196(63.2%) disagreed. This shows that a majority of the students feel that the books available for use in science subjects are inadequate. As noted by Bukoye (2019), schools without such critical resources may struggle to produce good grades in national examinations as opposed to those with adequate resources.

Finally, the study sought the opinion of students on the statement that a resource person is usually invited by the principal to encourage them in the study of science subjects. Study results in Table 6 show that 15(4.8%) strongly agreed, 177(57.1%) agreed, 72(23.2%) were undecided, 36(11.6%) disagreed, and 10(3.2%)) strongly disagreed with the statement. This finding shows that over half of the sampled students are from schools that regularly invite motivational speakers in the field of science. This also implies that schools that invite motivational speakers are keen on good grades and the promotion of science subjects among the students, as opposed to schools that do not.

The findings from Table 6 seem to confirm that the provision of supportive learning resources can have a significant influence on the performance of students in science subjects. Supportive learning resources help to enhance the learning experience of learners and help students better understand and engage with the subject matter.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter presents a summary of the findings that are presented and discussed in Chapter four about the influence of principals' transformative leadership on the performance in science subjects in girls' secondary schools in Tharaka Nithi County, Kenya. The chapter further presents the conclusion of the study and recommendations, which are in the form of recommendations for policy, recommendations for theory, recommendations for practice, and recommendations for further research.

5.2 Summary of the Findings

The first objective of the current study was to establish whether students' involvement in decision-making enhances their performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya. Under this objective, it was found that students' feel motivated when involved in decision-making and feel empowered and valued, which may trigger improved performance. The study further showed that most students disagreed with the statement that students perform better in science subjects because they are involved in the decision about the selection of science subjects. There was a general agreement among the teachers that principals encourage students to collaborate well with teachers. It was further found out that the majority of the students 236(76.1%) strongly disagreed with the statement that the principal involves them in making decisions about matters that affect them academically. The study shows that both the teachers and the students agree that their principals encourage students to collaborate with

teachers so as to improve their performance in science subjects. The study revealed that a majority of the students 222(72%) disagreed with the statement that the principal encourages girls to discuss the selection of science subjects with their teachers. There was agreement among the study participants that the involvement of girls in decision-making enhances their performance in science subjects.

The second objective of the study sought to ascertain whether principal-teacher role modeling influences performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya. The results show that the majority of teachers 74(81.3%) agreed that the principals, as role models, promote a positive attitude towards the study of science subjects. Most of the teachers 43(47.3%) strongly agreed that the principal, as a role model, discusses with students how to excel in science subjects. However, it was revealed that most of the participants 58(63.7%) strongly disagreed that the principal, as a role model, is always available to talk to and encourage girls who have challenges in science subjects. There was a general disagreement among participants that the principal, as a role model, ensures students have the resources they need to perform better in science subjects. It was further found out that most participants disagreed that the principal, as a role model, is involved in teaching students some of the science subjects and participating in mentoring them to acquire the skills needed to be successful in science fields.

Concerning principal-teacher team building and learners' performance in science subjects, the study found that most teachers agreed that team building enables teachers to share knowledge and skills needed in the teaching of science subjects. On whether the principal encourages collaborative teaching of science subjects, 52 (58.2%) of the teacher respondents disagreed, and 19 (20.9%) were

undecided on the matter. A majority of student respondents 230(97.2%) were in agreement with the statement that there is teamwork among teachers in their school regarding the teaching of science subjects.

The last objective was to find out whether the provision of supportive learning resources has an influence on the performance in science subjects in girls' public secondary schools. The study on this objective revealed that the majority of the teachers 75(81.4%) agreed that the principals provide the learning resources needed in the study of science subjects. There was a general disagreement that the schools have digital devices that enable learners to conduct research, which affects their performance in science subjects. Teachers 64 (70.3%) also agreed that a resource person is usually invited to talk to the students concerning the study of science subjects. Findings from students revealed a disagreement that the principal provides the learning resources needed in the study of science subjects, such as laboratory equipment.

5.3 Conclusions of the Study

The current study examined the influence of principals' transformative leadership on the performance in science subjects in girls' secondary schools in Tharaka Nithi County, Kenya, and made several conclusions. The conclusions are drawn based on the findings of the study. Thus, regarding whether students' involvement in decision-making enhances their performance in science subjects in girls' public secondary schools. The study concluded that students' feel motivated when involved in decision-making because they feel empowered and valued, which triggers improved performance in science subjects. The study further concluded that the principals do not effectively involve students in making decisions about matters

that affect them academically, which could hinder their academic performance in science subjects.

Regarding whether principal-teacher role modeling influences performance in science subjects in girls' public secondary schools in Tharaka Nithi County, Kenya. The study concluded that the principals of schools make efforts to promote a positive attitude towards the study of science subjects. However, they are not always available to talk to and encourage girls who have challenges in science subjects. It was also concluded that students are not provided with the sufficient resources they need to perform in science subjects, such as laboratory equipment, which has hindered their performance in science subjects. It was further concluded that principals do not participate in mentoring students to acquire the skills needed to be successful in science fields.

Concerning principal-teacher team building and learners' performance in science subjects, the study concluded that team building enables teachers to share knowledge and skills needed in the teaching of science subjects. The study further concluded that principals do not encourage collaborative teaching of science subjects.

Finally, the study concluded that the provision of supportive learning resources by the principals has an influence on the performance in science subjects in girls' public secondary schools. The study concluded that there are limited resources, such as the availability of digital devices that can be used to enable learners to conduct research, which affects their performance in science subjects.

5. 4 Recommendations of the Study

The current study makes several recommendations based on its findings. These are recommendations for policy, recommendations for theory, recommendations for practice, and recommendations for further research.

5.4.1 Recommendations for Policy

The study recommends that the government improve the infrastructure of schools and provide sufficient resources, such as textbooks, scientific equipment, and technology, to facilitate better learning of the sciences. The study also recommends that the ministry of education should encourage principals to conduct workshops, competitions, and extracurricular activities related to STEM fields, as this will enhance the study of science subjects. The government should enhance access to online resources, educational apps, and e-learning platforms in schools so as to complement traditional teaching methods and make learning more interactive, which can enhance the study of science subjects among girls.

5.4.2 Recommendations for Theory

The current study adopted transformational leadership theory by Bass (1995). The Transformational Leadership Theory is a leadership model that suggests leaders should inspire and motivate their followers to achieve extraordinary outcomes. However, this has not been the case with the principals and the performance of girls in science subjects in public secondary schools in Tharaka Nithi County. This necessitates the principals of girls' public secondary schools to understand and effectively apply the tenet of theory particularly the aspect of the tenant of Inspirational motivation as principal are not inspiring girls to perform better in science subjects.

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5.4.3 Recommendations for Practice

The study recommends that the principals involve students in making decisions about matters that affect them academically, as this will enhance their performance in science subjects. It is recommended that the principals ensure that the school science laboratories are well-equipped and up-to-date with modern resources and equipment, along with other resources such as science books in the library, to enhance performance. With resources in place, there can be an environment where students can actively participate in experiments and practical learning, enhancing their understanding of scientific concepts. The study also recommends that principals organize more mentorship programs where successful women in science-related fields can interact with and inspire students in science fields.

5.4.4 Recommendations for Further Research

The current study recommends that a study about factors that affect girls performance be conducted to get a wider understanding of what affects girls performance in science subjects apart from the principals' transformative leadership. This will make more literature available to illustrate the performance of girls in public secondary schools.

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APPENDICES

APPENDIX I: letter of Introduction

TANGAZA UNIVERSITY COLLEGE
(The Catholic University of Eastern Africa)
P. O. Box 15055
Nairobi, Kenya

Dear respondents,

RE: COLLECTION OF SURVEY DATA

I am a Masters student at Tangaza University College, a constituency college of the Catholic University of Eastern Africa (CUEA). I'm carrying out a study about the influence of principals' transformative leadership traits on the performance in science subjects in girls' secondary schools in Tharaka Nithi County, Kenya. Your school has been chosen to take part in this research, and you have been selected as one of the respondents. I kindly request your permission to collect the necessary information from you by means of a questionnaire. Please rest assured that your responses will be kept confidential.
Thank you!
Yours Sincerely,
Sr. Meakelinah Miano

APPENDIX II: Consent Form

My name is Sr**.** Meakelinah Miano, a Masters student at Tangaza University College (TUC), a constituency college of the Catholic University of Eastern Africa (CUEA). I'm inviting you to participate in a research study about: "*the influence of principals' transformative leadership traits on the performance in science subjects in girls' secondary schools in Tharaka Nithi County, Kenya*". Participation in this study is entirely voluntary. You have the right to refuse to participate, to withdraw at any time, and to skip any questions that you do not wish to answer. Refusing or withdrawing from this study will not affect your current or future relationship with the researcher or the institution.

There are no known risks associated with participating in this study, and there are no direct benefits to you from participating in this study, but your participation may contribute to advancing knowledge in this field.

Your identity and personal information will be kept confidential to the fullest extent possible. Your name will not be included in any publications or reports resulting from this study. Your data will be coded and stored securely, and only the researcher and authorized personnel will have access to it. If you have any questions about this study or any concerns about your rights as a research participant, you can contact Sr. Meakelinah Miano (mianomeakelinah@gmail.com).

Consent

I have read and understood the information provided in this consent form. I understand that my participation in this study is voluntary and that I may withdraw at any time without penalty. I agree to participate in this study and allow the researcher to use my data for research purposes.

Signature: _____

Name: _____

Date: _____

Thank you!

APPENDIX III: Questionnaire for Teachers

Section One: Demographic Information

Please indicate your responses by ticking (✓) the appropriate answers

1. Gender: Female [ ] Male [ ]
2. What is your age bracket? 21-30 years [ ] 31-40 years [ ] 41-50 years [ ] 51 and above
3. What is your highest level of education? Diploma [ ] Bachelors degree [ ] Masters Degree [ ] any other (specify).....
4. How long have you been a teacher? Less than two years [ ] 2-7 yeas [ ] 7-12 years [ ] 13-18 years [ ] 19-24 years [ ] above 24 years [ ]

Section Two: Students' Involvement in Decision-making and their Performance in Science Subjects

5. Students' involvement in decision making is said to increase students' performance. Using the key, Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D), or Strongly Disagree (SD), rate the extent to which students' involvement in decision-making influences their performance in science subjects by ticking (✓) where appropriate.

Statement		SA	A	UD	D	SD
I.	Students' involvement in the key decisions of their educational process produces motivation to learn.					
II.	Students in our school perform better in science subjects because they are involved in the decision about the selection of science subjects.					
III.	The principal involves students in making decisions, especially in matters that affect them academically.					
IV.	The principal encourages students to collaborate well with teachers so as to improve their performance in science subjects.					
V.	The principal encourages the participation of girls in science activities, such as science fairs.					
VI.	The principal encourages girls to discuss the selection of science subjects with their teachers.					

6. State how the principal in your school encourages better performance in science subjects

……
……
……

Section Three: principal-teacher role modeling and its influence on students' performance in science subjects.

7. Principal-teacher role modeling is said to have an influence on students' performance in science subjects. Please indicate the extent of agreement or disagreement to the following statements. Tick (✓) appropriately: Strongly Agree (SA), Agree (A), Undecided (UD) Disagree (DA), and Strongly Disagree (SD).

	Statement	SA	A	UD	D	SD
I.	The principal as a role model promotes a positive attitude towards science subjects					
II.	The principal, as a role model, discusses with students how to excel in science subjects.					
III.	The principal, as a role model, is always available to talk and encourage girls who have challenges in science subjects.					
IV.	The principal, as a role model, ensures students have the resources they need to perform better in science subjects.					
V.	The principal, as a role model, encourages students to read hard and consult teachers to perform better in science subjects.					
VI.	The principal is involved in teaching some of the science subjects and participates in mentoring the students to acquire the skills needed to be successful in science fields.					

8. State some of the ways in which the principal serves as a role model to students in your school

.....
.....
.....

9. How does the principal, as a role model, influence performance in science projects in your schools?

……
……
……..……
……

Section Four: How principal-teacher team building enhances learners' performance in science subjects.

10. Using the key, Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D), or Strongly Disagree (SD), rate the extent to which principal-teacher team building enhances learners' performance in science subjects by ticking (✓) where appropriate.

Statement	SA	A	UD	D	SD
I. Team-building creates a platform for teachers to build a professional dialogue, which builds collaborations and improves learners' achievements.					
II. Team building enables teachers to share knowledge and skills needed in the teaching of science subjects.					
III. Team building improves the creativity of teachers in teaching science subjects.					
IV. Our principal and teacher collaboratively work toward effective learners' performances in science subjects.					
V. The principal encourages collaborative teaching of science subjects.					
VI. The principal encourages teachers to share teaching resources to improve performance in sciences					

11. Explain how principal-teacher team building influences learners performance in science subjects.

……

Section Five: Provision of supportive learning resources and the performance in science subjects

12. Please indicate the extent of agreement or disagreement to the following statements. Tick (✓) appropriately: Strongly Agree (SA), Agree (A), Undecided (UD) Disagree (DA), and Strongly Disagree (SD).

Statement	SA	A	UD	D	SD
I. The principal provides the learning resources needed in the study of science subjects, such as laboratory equipment.					
II. The school has digital divisions that enable learners to conduct research.					
III. The principal employs professional and competent teachers of science subjects.					
IV. The principal provides enough books for the students to study and succeed in their exams.					
V. A resource person is usually invited by the principal to encourage learners about the study of science					

13 State the resources provided by the principal to support the performance of learners in science subjects in your school

.....

... 14.State the relationship between the provision of supportive learning resources and the performance of learners in science subjects

.....

Thank you

APPENDIX IV: Questionnaire for Students

Please read the following questions and tick (✓) your appropriate response.

Section One: Demographic Information

1. What is your gender: male [ ] female [ ]
2. Please indicate your age bracket: below 13 year [ ] 13-18 years [ ] 19 and above [ ]
3. Class: Form 1 [ ] Form 2 [ ] Form 3 [ ] Form 4 [ ].

Section Two: Students' involvement in decision-making and their performance in science subjects

4. This section seeks information regarding the students' involvement in decision-making on their performance in science subjects. Using the key, Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D), or Strongly Disagree (SD), rate the extent to which students' involvement in decision-making influences their performance in science subjects by ticking (✓) where appropriate.

Statement		SA	A	UD	D	SD
I.	Being involved in decision-making motivates us to perform better in science subjects.					
II.	The principal involves us in making decisions, especially in matters that affect us academically.					
III.	The principal encourages us to collaborate well with teachers so as to improve our performance in science subjects.					
IV.	The principal encourages us to participate in science activities, such as science fairs.					
V.	The principal encourages girls to discuss the selection of science subjects with their teachers.					

5. State how the principal involves students in decision-making
   .....
   .....
6. How does student involvement improve their performance in science subjects?

.....

Section Three: principal-teacher role modeling and its influence on students' performance in science subjects

7. Please indicate the extent of agreement or disagreement to the following statements. Tick (✓) appropriately: Strongly Agree (SA), Agree (A), Undecided (UD) Disagree (DA), and Strongly Disagree (SD).

	Statement	SA	A	UD	D	SD
I.	The principal as a role model promotes a positive attitude towards science subjects					
II.	Our principal, as a role model, discusses with students how to excel in science subjects.					
III.	Our principal, as a role model, is always available to talk to and encourages girls who have challenges in science subjects.					
IV.	Our principal, as a role model, ensures that we have the resources needed to perform better in science subjects.					
V.	Our principal, as a role model, encourages us to read hard and consult teachers to perform better in science subjects					
VI.	Our principal, as a role model, is involved in teaching us some of the science subjects and participates in mentoring us to acquire the skills needed to be successful in science fields.					

8. State some of the ways in which the principal serves as a role model to students in your school

.....
.....

9. How does the principal, as a role model, influence performance in science projects in your schools?

……

Section Four: How principal-teacher team building enhances learners' performance in science subjects.

10. This section seeks information regarding the influence of principal-teacher team building on learners' performance in science subjects. Using the key, Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D), or Strongly Disagree (SD), rate the extent to which principal-teacher team building enhances learners' performance in science subjects by ticking (✓) where appropriate.

	Statement	SA	A	UD	D	SD
I.	There is teamwork among teachers in our school regarding the teaching of science subjects.					
II.	Team building improves the creativity of teachers in teaching science subjects.					
III.	Our principal and teachers collaboratively work towards effective learners performance in science subjects					
IV.	The principal encourages collaborative teaching of science subjects among teachers					
V.	The teachers are encouraged to share teaching resources to improve our performance in sciences					

11. Explain how principal-teacher team building influences learners' performance in science subjects.

……

Section Five: Provision of supportive learning resources and the performance in science subjects.

1. This section seeks information regarding the influence of principals' provision of resources on the academic performance of girls in science subjects. Please indicate the extent of agreement or disagreement with the following statements. Tick (✓) appropriately: Strongly Agree (SA), Agree (A), Undecided (UD) Disagree (DA), and Strongly Disagree (SD).

	Statement	SA	A	UD	D	SD
I.	The principal provides the learning resources needed in the study of science subjects, such as laboratory equipment.					
II.	The school has digital devices that enable learners to conduct research.					
III.	The principal provides enough books for us to study and succeed in their exams.					
IV.	A resource person is usually invited by the principal to encourage us in the study of science subjects.					

2. State the resources provided by the principal to support the performance of learners in science subjects in your school.....

Thank you!

APPENDIX V: Interview Guide for Principals

SECTION A: Demographic Information

1. What is your gender?
   Male ( )
   Female ( )
2. What is your age bracket?
   21-30 years ( )
   31-40 years ( )
   41-50 years ( )
   51 and above ( )
3. What is your highest level of education?
   Diploma ( )
   Bachelor Degree ( )
   Master's degree ( )
   PhD ( )
4. For how long have you served as a principal?
   Below 6 years ( )
   6-11 years ( )
   Above 11 years ( )
5. Describe how you involve students' in decision-making at your school.
6. How does student involvement influence their performance in science subjects?
7. How do you influence students' performance in science subjects as a role model?
8. How do you ensure team building among the teachers?
9. How does team building influence the performance of girls in science subjects**?**
10. Which leadership style do you apply as a principal?
11. Describe how your leadership style has influenced the performance of girls in science subjects.
12. Describe how you ensure that girls perform well in science subjects.
13. Describe how you ensure that resources are sufficient to enhance leaning of science subjects in your schools
14. Which challenges do you experience in the process of ensuring that girls perform better in science subjects?

Thank you!

APPENDIX VI: Interview Guide for County Director

1. What are your academic qualifications?
   - Diploma ( )
   - Bachelor Degree ( )
   - Master's degree ( )
   - PhD ( )
2. For how long have you worked as a County Director of Education?
   - Below 6 years ( )
   - 6-11 years ( )
   - Above 11 years ( )
3. Describe how principals in your area involve students' in decision-making in schools.
4. How does student involvement influence their performance in science subjects?
5. How do principals as role models influence students' performance in science subjects in your schools?
6. How do you ensure team building among the teachers in your schools?
7. How does team building influence the performance of girls in science subjects**?**
8. Mention the resources that are available at your school.
9. How do the resources available in your schools influence the performance of girls in science subjects?
10. Describe the kind of leadership that your principals portray in your schools.
11. How do girls perform in science subjects in your schools?
12. Which challenges do the principals in your school experience in ensuring that girls perform well in science subjects?

Thank you so much!

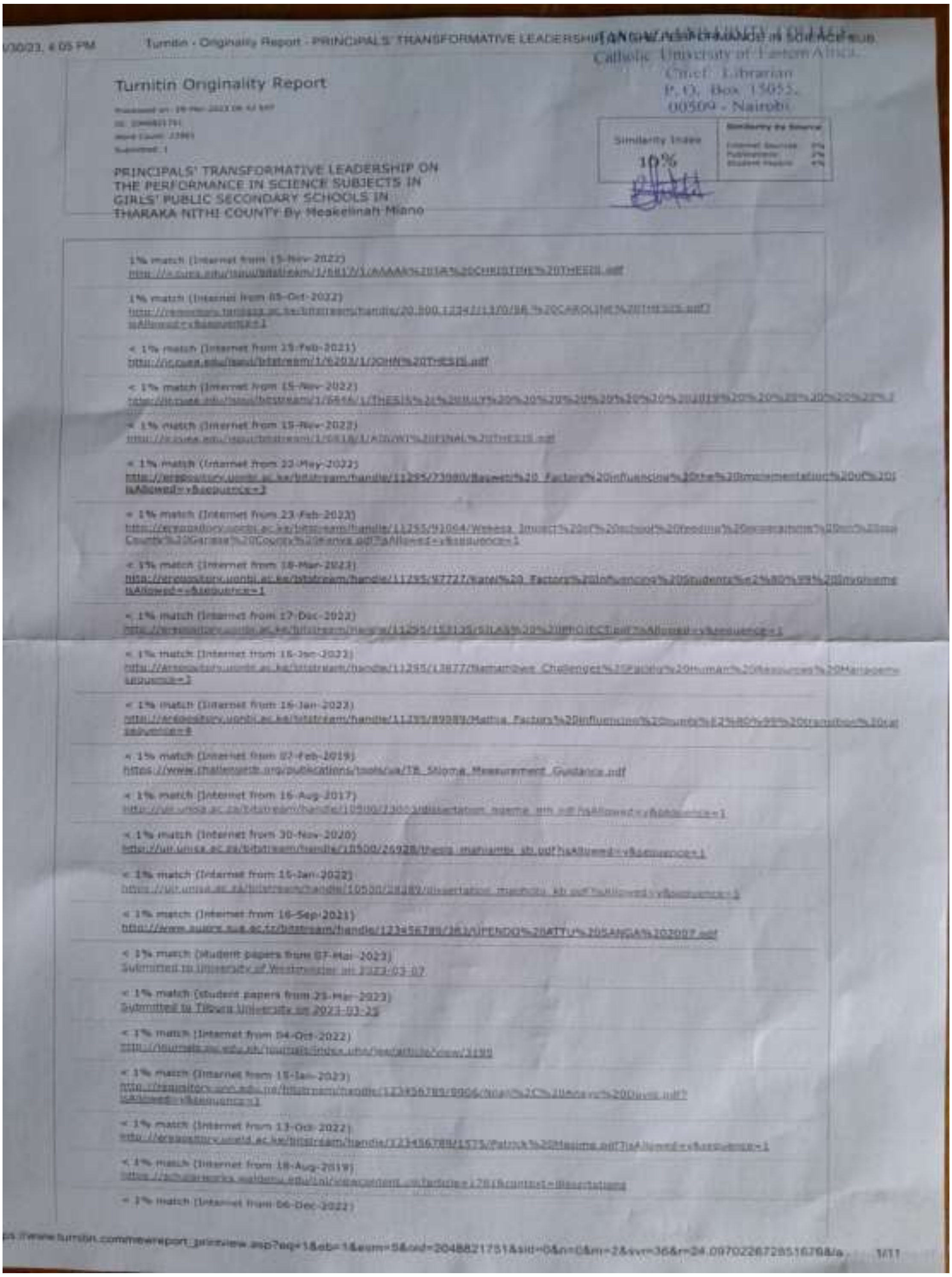
APPENDIX VII: Reliability Statistics

Cronbach's Alpha	N of Items
.708	11

Item-Total Statistics

Statements	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
The principal provides the learning resources	30.0330	25.677	.691	.718	.619
The school has digital devices	28.2088	34.878	.116	.219	.719
principal provides enough books for us to study and succeed in their exams	27.8462	29.087	.422	.794	.676
A resource person is usually invited by the principal	29.6264	30.859	.525	.595	.665
The teachers are encouraged to share teaching resources	29.7802	36.840	-.016	.307	.725
Team building improves the creativity of teachers	29.6044	31.064	.390	.422	.681
Our principal and teachers collaboratively work towards effective learners performance	27.9121	30.992	.280	.795	.704
Team building improves the creativity of teachers	29.6703	34.557	.216	.247	.705
There is teamwork among teachers in our school regarding	30.0879	30.859	.368	.625	.685
The principal, as a role model, encourages students to read hard	29.6923	29.393	.619	.737	.648
The principal, as a role model, ensures students have the resources they need to perform better	28.3077	33.704	.217	.248	.706

APPENDIX VIII: Plagiarism Report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APPENDIX IX: The Authorization letter

REPUBLIC OF KENYA
MINISTRY OF EDUCATION
STATE DEPARTMENT OF EARLY LEARNING AND BASIC EDUCATION

Telegrams: "Elimu", Chuka
Telephone: Chuka 630353
FAX: 064 630166
Email: *tharakanithicountyedu@gmail.com*
When replying please quote:

COUNTY DIRECTOR OF EDUCATION
THARAKA NITHI
P.O. BOX 113-60400
CHUKA.

24th July ,2023

TNC/ED/RA/GEN/129/96

Sr. Meakelinah Njeri Miano
Tangaza University

RE: RESEARCH AUTHORIZATION FOR MEAKELINAH NJERI MIANO

I am pleased to inform you that you have been authorized to undertake research on " ***Principals' Transformative Leadership on the Performance in Science Subjects in Girls Public Secondary Schools in Tharaka Nithi County***"The research will be undertaken for a period ending **18th July, 2024**.

On completion of the research, you are expected to give a hard copy and soft copy of the research report/thesis to this office.

The research Authorization is granted according to all existing rules and regulations in force from time to time and observance of Covid-19 Guidelines and protocols as recommended by the relevant government MDAs.

Good luck!

FOR: COUNTY DIRECTOR OF EDUCATION
24 JUL 2023
P. O. Box 113 CHUKA

Simon Waigwa
For: County Director of Education
THARAKA NITHI

APPENDIX XI: Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **171642**

Date of Issue: **18/July/2023**

RESEARCH LICENSE

This is to Certify that Sr.. MEAKELINAH NJERI MIANO of Tangaza University College, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Tharaka-Nithi on the topic: PRINCIPALS' TRANSFORMATIVE LEADERSHIP ON THE PERFORMANCE IN SCIENCE SUBJECTS IN GIRLS' PUBLIC SECONDARY SCHOOLS IN THARAKA NITHI COUNTY for the period ending : 18/July/2024.

License No: **NACOSTI/P/23/27753**

171642

Applicant Identification Number

Director General
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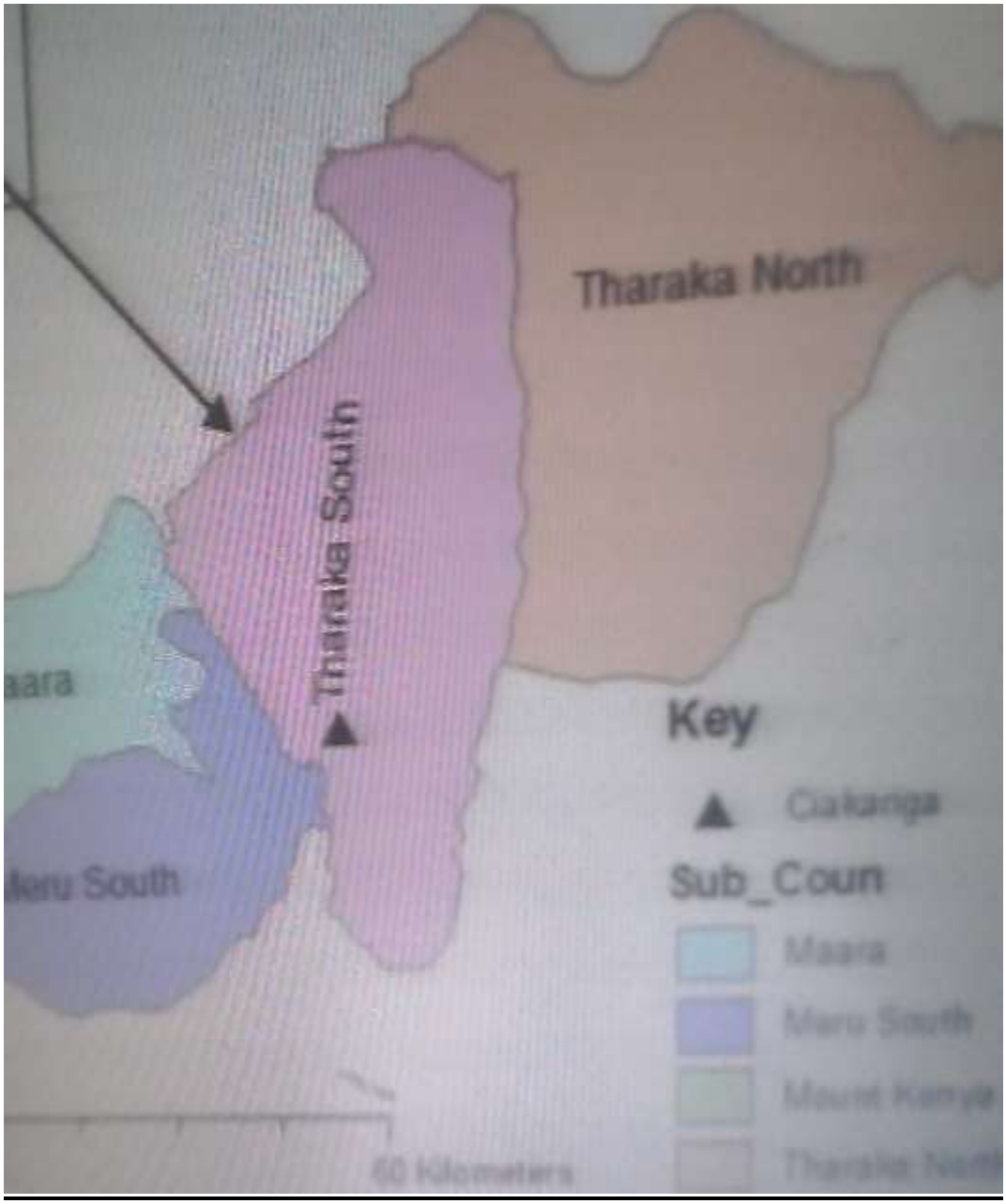
APPENDIX XI: The Map of Tharaka Nithi County



Source: https://www.researchgat