

**FACTORS INFLUENCING THE PERFORMANCE OF TRAINEES IN
ELECTRICAL ENGINEERING PROGRAMMES IN NATIONAL
POLYTECHNICS IN KENYA: A CASE OF SELECTED NATIONAL
POLYTECHNICS**

BY

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**A THESIS SUBMITTED TO THE SCHOOL OF EDUCATION IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF
DEGREE OF MASTER OF EDUCATION TO THE DEPARTMENT OF
TECHNOLOGY EDUCATION (ELECTRICAL AND ELECTRONICS
TECHNOLOGY) UNIVERSITY OF ELDORET, KENYA**

JULY, 2023

DECLARATION

Declaration by the Student

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DEDICATION

This thesis is dedicated to my wife Sheila Kiprotich for her love and endless support.

ABSTRACT

Despite previous efforts by various stakeholders, the performance in electrical engineering programmes in Kenyan national polytechnics is still poor. The purpose of this study was to determine factors that influenced the performance of trainees in electrical engineering programs in National Polytechnics in Kenya. The objectives of this study were to: determine the influence of instructional methods, assess the influence of trainer experience, determine the influence of trainee to trainer ratio and find out the influence of trainee attitude on the performance of trainees enrolled in electrical engineering programs in National Polytechnics in Kenya. The General Systems Theory introduced by Bertalanffy, (1968) formed the basis of this thesis. The research targeted all trainers and trainees in electrical engineering departments from national polytechnics in Kenya. This study sampled 35 trainers and 140 trainees drawn from two national polytechnics. The research used a descriptive survey design. Two sets of questionnaire were used. The Statistical Package for Social Sciences (SPSS) version 28 was used in analyzing the data. The relationship between the variables and performance was calculated using Pearson's product-moment correlation coefficient R. The findings of this study revealed that instructional methods, trainer experience, trainee to trainer ratio and trainee attitude influenced performance. In conclusion, this study pointed out the need for skilled trainers to engage various pedagogical skills during their training. Moreover, they should motivate learners and put into consideration trainee to trainer ratio as a factor influencing performance. Based on these findings, this study recommended the continuous capacity building of trainers in national polytechnics and strengthening of institutional memory by retaining experienced staff. The government also needs to review the TVET Act to enable institutions to admit students on the basis of trainee to trainer ratio. This study suggested the need for similar research to be undertaken in different counties and also from a gender perspective.

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ABBREVIATIONS, ACRONYMS, AND SYMBOLS

HoD-Head of Department

ICT-Information and Communication Technology

JKUAT- Jomo Kenyatta University of Agriculture and Technology

KUCCPS-Kenya Universities and Colleges Central Placement Service

MDGs-Millennium Development Goals

NCES-National Centre for Educational Standards

NECO-National Examination Council

NP-National Polytechnic

PTR-Pupil to Teacher Ratio

SPSS-Statistical Package for Social Sciences

TLA-Teaching and Learning Activities

TVETA-Technical and Vocational Education and Training Authority

UNESCO-United Nations Education, Scientific and Cultural Organization

WAEC-West Africa Examination Council

WIL-Work Integrated Learning

ACKNOWLEDGMENT

I would like to express my deep gratitude to the University of Eldoret for giving me the opportunity to study for my Masters degree in Technology Education programme.

I extend my indebtedness to my supervisors and lecturers without whose support, guidance and cooperation this thesis would not have been completed successfully.

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.1 Introduction

This chapter gives the background of the study, statement of the problem, the purpose of the study, objectives of the study, research questions, significance of the study, assumptions of the study, scope of the study, limitations of the study, theoretical framework, conceptual framework and operational definition of terms.

1.2 Background of the Study

Determinants of students' performance have been the subject of ongoing debate among educationists, academicians, and policymakers. There have been many studies that sought to examine this issue. In Kenya, electrical engineering is among the courses taught in National Polytechnics. The Electrical Engineering trainees sit for the final examination and the results are analyzed. The analyzed results determined the overall performance of the department. The impact of the performance trickles down to the student and parents.

According to the Ministry of Education, Science and Technology (MOEST, 2004) background paper on technical and vocational education and training in Kenya, one of the objectives of electrical engineering course in Kenya is to equip the youths with relevant expertise, skills, and knowledge to enable them to play productive and crucial roles in the industrial life of the nation. Despite these efforts, academicians, the community, and parents are concerned about the low performance in tertiary institutions (Simiyu, 2009). Maranga (1993) research on factors that influence performance in TVET in Kisumu County indicated in his study that overall

performance in polytechnics is still wanting and factors that influence the performance ought to be looked into. He argued in his conclusion that if the causes aren't looked into, the poor performances will persist. Hailu (2011) in a study on factors affecting the implementation of TVET in Tigray states in his findings that the factors which influence performance in engineering in third world countries were majorly inadequate school facilities. His study concludes by stating that the overall principal of an institution should have a well-defined mission and philosophy on which to develop objectives that ensure the performance of its trainees is improved. Kamau (2013) indicated that great institutions are identified from others by their understanding of the importance of good performance. The study which sought to identify challenges affecting TVET training in youth polytechnics in Kiambu concluded that the principals ought to supervise all the activities happening in their colleges and ensure they are tied to the institutions' mission.

According to Orodho (1992), on elements of education and social sciences research methods, he explained that technical training institutes and polytechnics enhance knowledge-driven economic growth and poverty reduction. This was possible by producing qualified and adaptable trainees in the labor market. Hundu (2012) indicated that a country's post-secondary education system is developed and implemented around the formulated and established tertiary objectives. These objectives have a global character and respond to the market demands. Gachira (2002) in a study on ensuring relevance and quality in education and entrepreneurship education in Nairobi further argues that tertiary institutions' main agenda in most countries is to produce the best performers with relevant skills to meet national human resources requirements in the industry. More critically, it aims to attain the following specific goals; to provide appropriate and adequate skilled engineers at all levels of

the economy through practical training experience and to provide life skills to trainers that will enable them to cope with the challenges of working in their adulthood.

Engineering performance in the industry is a leading tool for the growth of development in a country. This can be seen today from developed countries such as the United States, Germany, and China among others who embraced engineering many years ago. Ministry of education in Kenya singles out engineering education as a means to develop the country to a thriving economy. Engineering education and training are the tools to develop the country's economy and therefore factors that influence performance in electrical engineering cannot be overlooked (Kamau, 2013).

In South Africa, the state's new measures of determining factors influencing performance in electrical engineering education are known as "action plan 2014" (Fuller, 2010). The plan focused on the realization of improved performance in electrical engineering. Measures that were introduced by this plan include allocation of more resources to tertiary institutions, training trainers on changing technologies, access to textbooks of good quality by trainees, and strengthened school management by the institutions' principals. West Africa Examination Council (WAEC) has played a pivotal role in electrical engineering education in West African countries such as Sierra Leone, Nigeria, Liberia, and Ghana. They coordinate examinations in West Africa and issue certificates to successful candidates. They also come up with organizations to fund and improve performance in engineering education by providing lectures and assisting those who cannot access engineering education (Fuller, 2010).

The Kenyan system of education is a performance-oriented discipline in that the prospective candidates are determined by grades on their certificates (Okumbe, 1998). The performance is important for selection, placement of trainees in post-secondary institutions, enrollment into various courses, and also jobs in different companies. This view consequently determines their participation in the national development agenda. UNESCO (2002) notes that sustainable transformation and growth throughout a country's economy is not achievable without successful and innovative graduates from tertiary institutions. This is especially true in low-income countries with inadequate institutional capability and limited human capital. In Kenya's education support program (2005), the Kenyan government underscored the correlation between illiteracy and poverty among adults. Since independence, polytechnics have found favor with many high school leavers because they offer the widest career choices that suit their needs. In the blueprint of vision 2030, the government of Kenya recognizes polytechnics as the main pillars of growth towards achieving that vision by the year 2030. The Kenyan government, with other development partners such as World Bank, continues to support by providing substantial amounts of funds to boost the dwindling performance in engineering courses (MoEST, 2004).

Academic performance has been explained and defined differently by various researchers. According to Mwangi and Nyaga (2014), academic performance is the information gained that is evaluated by marks by a trainer. They further noted performance is educational goals set by trainers to be accomplished over a specific time. They added that these objectives are calculated by using examination results or continuous assessment tests. Campbell (2016) also established that performance measures outcome of an education system. He revealed that it gives the degree to which an educational institution, trainees, and trainers have attained their educational

objectives. Similarly, Cohen (2015) suggested that academic performance is an observable and measurable behavior of a trainee over a specified time. He added that it comprises marks gained by a trainee after assessment in a class test, mid-semester, class exercise, and end-of-semester examination. Again, Fuller (2010) stated that the academic performance of trainees is defined by a trainees' overall performance in a test, in coursework, and an examination.

The definitions given by the various researchers reveal that the meaning of academic performance is centered on measurable outcomes of a test or examination results. Based on this, academic performance used in this research is the results obtained by a trainee at end of a specific term or the end of a modular programme. In this study, a trainee who obtains a mark above 40 percent (40%) or a pass in a subject is considered to be academically good (KNEC, 2020).

Academic performance in electrical engineering programs in Kenyan polytechnics, therefore, determines whether the trainee will proceed to the job market or not (Walubengo, 2007). This also may dictate how an institution or department performs after analysis. A trainee's life will also be affected by his/her performance to a great extent. Despite previous efforts, the performance in electrical engineering programmes is still poor. The researcher was interested in establishing the factors influencing the performance of trainees in electrical engineering programs in selected national polytechnics in Kenya.

1.3 Statement of the Problem

Bwisa (2005) reported that electrical engineering programs are considered to be a prime stimulant for the development and growth of endogenous technological capability. Japan's rapid industrialization was fueled by the accumulation of technical

skills which were based on its already strong commitment to the engineering programs. According to the World Bank enterprise survey of Kenya (2010), about 30% of firms stated poor performance and inadequately skilled workforce as the most important detriment inhibiting development. This put the institutions providing this education to the task. According to TVET framework policy (2014), the Kenyan government aimed at achieving a continued growth of the country's labor force to position itself strategically on the global scene. The policy was formulated to guide the revitalization of the TVET Sub-sector. This was to adequately provide skilled and employable graduates needed to drive aspirations of the country. To achieve the above objective, Kenya was to reorient itself by ensuring student engineers who sit national examinations in polytechnics get higher grades and exit to the job market. Various efforts have been put forward into enhancing performance in electrical engineering but the performance is still low as evidenced in the table below.

Table 1.1 Performance of engineering trainees in KNEC technical exam in the year 2010 and 2016

Course of study	Overall percentage pass rate in 2010 (%)	Overall percentage pass rate in 2016 (%)
Building and civil Engineering	27.0	36.7
Electrical and Electronics Engineering	23.4	29.2
Mechanical Engineering	25.1	43.0
Automotive Engineering	43	36.7
Agricultural Engineering	39	30.3

Source: KNEC Annual report 2010 and Technical exam results report summary, 2017.

From the above table, the high failure rate of the majority of trainees in the electrical engineering course is a threat to achieving vision 2030 (NCES, 2016). The Kenyan government has put various efforts to improve the performance such as: facilitating the development of infrastructure, human capacity building, ensuring good governance which strengthens the quality, and providing incentives for industry linkages. However, the unanswered question is: why then is there still poor performance? The success and growth of electrical engineering programmes in TVET will depend on how swiftly they respond to this challenge.

My study focused on providing insight into factors influencing the performance of trainees in electrical engineering programmes.

1.4 The Purpose of the Study

The purpose of the study was to determine factors influencing the performance of trainees in electrical engineering programs in national polytechnics in Kenya.

1.5 Objectives of the Study

1.5.1 Main Objective

To determine the factors influencing the performance of trainees in electrical engineering programs in national polytechnics in Kenya: A case of selected national polytechnics in Kenya.

1.5.2 Specific Objectives

The research study was guided by the following four objectives;

1. To determine the influence of instructional methods on the performance of trainees in electrical engineering programs in national polytechnics in Kenya.
2. To assess the influence of trainer experience on the performance of trainees in electrical engineering programs in national polytechnics in Kenya.
3. To determine the influence of trainee to trainer ratio on the performance of trainees in electrical engineering programs in national polytechnics in Kenya.
4. To find out the influence of trainees attitude on their performance in electrical engineering programs in national polytechnics in Kenya.

1.6 Research Questions of the Study

The study sought to answer the following questions:

1. How did instructional methods influence the performance of trainee in electrical engineering programs in national polytechnics in Kenya?

2. How did trainer experience influence the performance of trainee in electrical engineering programs in national polytechnics in Kenya?
3. How did the trainee to trainer ratio in the institution influence the performance of students in electrical engineering programs in national polytechnics in Kenya?
4. How did the trainee attitude influence their performance in electrical engineering programs in national polytechnics in Kenya?

1.7. Hypothesis

The study was guided by the following research hypothesis;

2. There was no significant influence of Instructional methods on the performance of trainees in electrical engineering programs in national polytechnics in Kenya?
3. Trainers experience had no influence on the performance of trainees in electrical engineering programs in national polytechnics in Kenya?
4. There was no significant influence of trainee to trainer ratio on the performance of trainees in electrical engineering programs in national polytechnics in Kenya?
5. There was no significant influence of trainee attitude on the performance of trainees in electrical engineering programs in national polytechnics in Kenya?

1.8 Significance of the Study

The findings of this study will help the TVET sub sector to come up with ways and methods which will improve the performance of electrical engineering trainees in TVET institutions. The study findings will also generate new information which

would help national polytechnic administrators and trainers to be able to understand the factors influencing the performance of students in electrical engineering programs in Kenya.

1.9 Assumptions of the Study

The research study was guided by the following assumptions.

1. The participants had a sincere interest in participating in the study.
2. The respondents gave true and honest responses in the questionnaire.

1.9 Scope of the Study

The study was confined to the factors that influence the performance of trainees in electrical engineering programs in Kitale and Sigalagala National Polytechnics in Kenya. It explored how instructional methods, trainer experience, trainee to trainer ratio, and how trainee attitude influence the performance of trainees in electrical engineering programs in national polytechnics in Kenya

1.10 Limitation of the Study

The study used stratified and simple random sampling method to obtain the samples. The samples obtained were small compared to the general population. This led to inability of the study to draw valid conclusions on the general population.

1.11 Theoretical Framework of the Study

The General Systems Theory introduced by Bertalanffy (1968) formed the basis of this study. Under this theory, a system is a cohesive group of interrelated, interdependent parts that can be natural or human-made. Changing one part of the system may affect other parts of the whole system. Electrical engineering is regarded

as a system with goals and objectives that trainees ought to gain after undergoing the teaching and learning process (Collier, 2011). The theory systems denote the teaching and learning process as an instruction that has different related procedures that work cohesively to aid the trainees to acquire the set objectives (Akaniwor, 2004). The components in the teaching and learning of electrical engineering are interrelated and consist of exogenous and endogenous variables. In this study, the instructional methods, the trainer experience, the trainee-to-trainer ratio as well as the trainees' attitude were the exogenous variables that determined the performance of electrical engineering in national polytechnics. These factors among others affected the performance in one way or another. The systems theory thus was crucial to school administrators who dealt with several departments whose goals are good performance. The different departments had different goals all geared to the achievement of the institutional goals.

1.12 Conceptual Framework of the Study

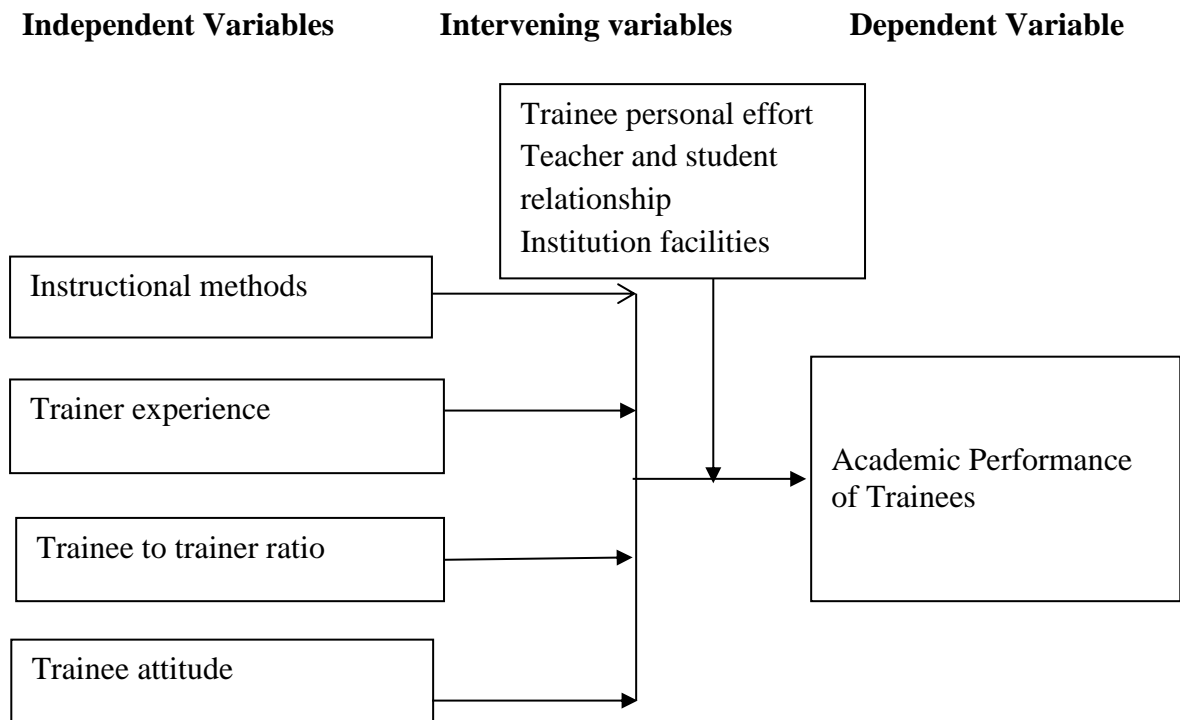


Fig. 1.1 Conceptual framework of the study

From fig.1.1, the conceptual framework showed the dependent, independent, and intervening variables. Performance in electrical engineering which is the output may be brought about by activities that take place in and outside the classroom. These can be instructional methods, trainer experience, trainee to trainer ratio, and trainee attitude. Among the intervening variables is the trainee personal effort. Those who tend to work harder and smarter tend to have a better chance to outsmart those who rely on the trainer only. Trainer to trainee relationship needed to be improved so that trainees can be able to ask questions without fear. Furthermore, they can also seek advice and counseling. Engineering courses are competence based and highly practical in nature, which means that performance in these courses can only be guaranteed by optimum frequent use of institutional facilities.

1.13 Operational Definition of Terms

Factors	These are predictors that influence trainees' performance.
Instructional Methods	Teaching strategies used by trainers in National Polytechnics
National Polytechnics	Government owned TVET institutions registered by the Ministry of Education and receiving government support.
Performance	Achievement of Student at the End of the Semester and KNEC Exam
Trainee	Any person enrolled in TVET institution and pursuing electrical engineering programme.
Trainee Attitude	Perception of Student towards Electrical Engineering Programme
Trainee to Trainer Ratio	Ratio of students to teachers in Electrical Engineering courses
Trainer Experience	Knowledge gained by trainer after training for a long time period

1.14 Summary

The purpose of this chapter was to present a rationale for the study and provide an overview of the thesis. It is subsequently clear that there are emerging issues that need well-researched-out studies. By developing an effective performance improvement system to produce more qualified electrical engineering graduates, this study is aimed at determining the factors influencing the performance of students in electrical engineering programmes in national polytechnics in Kenya.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviewed already written literature relating to factors influencing the performance of trainees enrolled in electrical engineering programs both globally and nationally in the following subheadings: syllabus coverage, entry behavior, trainee attitude, adequacy of training facilities and resources, trainer experience, instructional methods, and trainee to trainer ratio.

2.2 Performance in TVET institutions in Kenya

Academic performance of trainees is a vital aspect in TVET sector in Kenya (Kaloki, 2014). It is considered to be pillar unto which the whole system of education revolves. Ogembo, Otunga, and Nthenya (2015) opined that the academic achievement of trainees can determine the failure or success of any academic institution. Karachi (2012) also established that academic performance of trainees have a direct influence on the socio-economic growth of a country. Similarly, Kempa and Dube (2004) asserted that trainees achievement in an examination serve as bedrock for acquisition of knowledge. Additionally, Ng'ethe (2014) emphasized that the top most goal of a training system and its stakeholders is academic performance of its clients. According to Mwangi and Nyaga (2014), performance is the information gained and measured by giving out marks. They added that performance is measured by using continuous assessment tests or examinations results.

In New Zealand, TVET falls under the national quality assurance system that applies across the whole tertiary system. The New Zealand Qualification Authority (NZQA) is in charge of determining performance for all tertiary education institutions other

than universities. In 2010, New Zealand and the republic of China developed ways of assessing performance in TVET sector. This was aimed at establishing an enabling environment for learners to improve in their performance. The main indicator they developed to determine performance was successful completion of courses and the ability of students to progress to higher levels of studies (Fuller, 2010). They noted that the more the number learners completing a courses successfully and proceeding to the next level indicates how the tertiary institution has performed.

TVET institutes in Kenya use the KNEC examination for assessment and elevation to the next module. To graduate to the next yearly phase or next module, a candidate should have a minimum of pass in all the units he or she sat for. If not a candidate can also proceed to the next module with a pass in other units and not more than 2 fail units This is normally known as referred. In this case a trainee proceeds to the next module or phase but he or she re-sits the referred units later. According to KNEC grading system (2020), if a candidate scores 39 percent (39%) and below in a given subject, he or she is referred. This essentially means the student failed in that particular paper. In this instance, the candidate has to re sit the paper .However, any candidate who obtains marks above forty percent (40%) or a pass is considered to have performed well in the examination (KNEC , 2020).

2.3 Instructional Methods and its Influence on the Performance

Instructional methods consist of principles and methods used by teachers to enhance and relate training to leaners (Orodho, 2005). Each instructional method has its own use case with certain advantages and disadvantages. According to the daily education newsletter of October 9th, 2001, an effective teacher should be able to adjust their instructional methods to fit both the leaner and the material, recognizing that different

students learn in different ways. The newsletter states that using correct instructional methods can offer benefits to the learner. If used properly, they help attract and retain students' attention.

Cohen (2015), research on educational research in classrooms and schools in London established that the majority of TVET lecturers teaching in polytechnics had sufficient teaching methods. The study examined the educational research in classrooms and schools and had 150 respondents from TVET institutions in different countries in Africa. The respondents included policymakers, TVET teachers, and trainees. Out of the TVET lecturers interviewed 38% had acquired industrial work experience of only seven months or less, 25% had work experience of between 12-36 months and 16% had work experience of over 34 months. The study in its findings found out that initial work experience and correct instructional methods enables TVET lecturers to apply appropriate work contexts to students. Twoli et al., (2007) defines instructional methods as an overall way in which the process of teaching is arranged and executed. There is a teacher-centered and student-centered approach. The teacher-centered approach is characterized by the dominance of teacher-talk, with little or no involvement of students in practical activities. Similarly, Mutunga and Brekwell (1992) study on Mathematics education explains this approach as expository. It describes this approach as lacking active participation by the learners and effective teacher/learner interaction. Both studies suggest the need for the trainers to utilize appropriate and efficient training methods. Unfortunately, it did not indicate specifically the necessary instructional methods which the current study addressed.

According to Gunderson (2004), the teacher-centered approach is associated with less understanding of mathematical structure and concept, resulting in little retention of

what is learned. The study which examined the influence of vocational education on students' ultimate success in Tigray pointed out that methods in this category include lectures and demonstrations. He outlined that a heuristic approach is whereby a teacher helps the learners find information by indicating sources of information. He suggested the need to blend the above approaches (both teacher-centered and students centered approaches) to bring meaningful interaction in class. Mutunga and Brekwell (2014) study on mathematics education in Nairobi suggests that the learner-centered approach best suits tertiary institutions. He points out that under this approach; transfer and application of knowledge become natural to the student and adaptable to a familiar and unfamiliar situation. He indicates that if learners are encouraged to use this approach, they are bound to express themselves easily thus helping the trainer to gather for their challenges easily. Hailu (2011) indicated that one of the common learner centered method is problem-solving. He explained that it is characterized by the independence of the trainees in framing questions and generating answers. He further noted that knowledge obtained becomes new to the trainees and they use it to develop an answer that can support a point of view. The information generated is presented to others and ends up resulting in some kind of action. Problem-solving learning helps learners become creative, positive and improves their performance (Maundu, 2013). Ministry of education handbook for mathematic (2004) explains that heuristic approaches make retention of concepts higher and positively generate confidence among learners. It further explained in its findings that instructional methods employed have a significant impact on the students' achievement. The above studies centered on the teaching approach and learner approach but they did not give details on the various categories under them. It did not also explain in detail how each approach influenced the performance of the students. This study intended to outline

the various instructional methods commonly used in the classroom. It also sought from the trainers and trainees their views on how instructional methods influenced their performance.

2.4 Trainer Experience and Its Influence on the Performance

Trainer experience refers to accumulated instructor memory and culture which an individual obtains by doing something gradually over a lengthy period (Kitta, 1994). It is also defined as accumulation of knowledge or skill that results from direct participation in events or activities. The experience of teachers influences student's performance in many ways. Teachers who have had long experience tend to use adequate teaching methods which enhance classroom management approaches. Wanyama (2013) stated that experienced teachers have full autonomy thus taking responsibility for students learning needs, keeping students on task, and managing classroom problems. He further illustrates that there has been a growing concern in the performance of secondary schools in Kenya. The study which investigated school-based factors which influenced students' performance in Narok County did not outline the exact correlation between trainer experience and performance. However, it revealed that the dismal performance of learners is a major concern for all stakeholders. Poor performance in most secondary schools has been attributed to factors that range from student-related factors, government-related factors, school factors, and the status of the teaching force (Indoshi, 2010). Studies have established that less experienced teachers are typically less effective than senior teachers but the benefits of experience tend to level after six years (Keeves & Comber, 2013). Kafei (2004) review of 140 studies found that 30 percent of the studies found that teacher experience was correlated with student performance. He states that the positive relationship results from senior teachers being allowed to select classes with higher-

performing students and fewer discipline problems. Hailu (2011) in his analysis on factors affecting the implementation of TVET in selected public institutions in Tigray, found out that elementary teachers with more than 25 years of experience produced students with significantly higher performance than teachers with between 6–10 years' experience. The studies above are in agreement that teacher experience influences the performance of the student. However, they do not indicate extend to which the experience of the trainer impacts the performance of the trainee, which the current study investigated.

Karachi, (2012) in his studies on Secondary teacher training colleges in Kisumu County on teacher quality and its impacts on student achievement revealed that the mean score of students taught by teachers who had 1-5 years of teaching experience is 2.28 while 6-15years teaching experience is 3.04. In other words, the mean score of the students taught by teachers with teaching experience of between 6-15years was higher than that of students taught by teachers with teaching experience between 1-5 years. The study suggested contracting more skilled and experienced teachers to enhance the performance in secondary schools in Kisumu County. Since the suggestion raised from the above study was relating to secondary schools, the current study focused on selected National polytechnics in the western region in Kenya.

2.5 Trainer to Trainee Ratio and its Influence on the Performance

According to Campbell (2016) study on developing teaching as a profession in New York, he enumerates in his findings that trainee to trainer ratio is among factors influencing the quality of learners training. He alludes that a high student-teacher ratio indicates that each trainer is accountable for a large number of students. He further suggest that the smaller the ratio of trainees in the group, the higher the relative access

of students to the teacher. He concludes his findings by stating that a smaller ratio of trainee to trainer enables trainers pay closer attention to the individual trainees, which may positively impact on their performance. Equally, the size of the classroom and the number of learners influence the performance of trainees. Krueger (1999) notes that the smaller the classes the more they are believed to let instructors pay more attention to the learners' needs and reduce the duration required to engage with disruptions. Small classes with a fewer number of students offer great significance to some groups of learners especially those from the less affluent environment. The study sought to find out experimental estimates of education production functions in Africa. The study concluded that reduced classrooms tend to enhance creativity in the class, boost the morale of the tutors, and improved job satisfaction. The study suggested that the number of instructors to trainees predicts how education resources are distributed. Similar findings were obtained by Cohen (2015). His study on Educational research in classrooms and schools in London indicates that there are both economic and empirical challenges when a class is reduced. Class when reduced allows probability for increased investment in individual student learning. It concludes that it is not always possible in each institution to do so because it depends on the opportunities available in the institution. The two studies outline the importance of reduced class size but do not give hindsight on the influence of increased class size. It does not also give extend to which it correlates with the performance. This study researched the influence of both class sizes and their relationship on trainee performance.

According to Adam (2014) trainees in classes of 22-25 performed better than those above 50-100 in grade 3. He illustrates that lecturers prefer classes with a smaller number of learners because they can reduce the efforts they spend to deliver

instruction. His study on class size sought to ascertain the influence of the ratio of trainees per trainer and its influence on performance in Nairobi. The study recommended that bigger class sizes be reduced so that the number of trainees per trainer is reduced. Fuller (2010) in his study on raising school quality in developing countries notes in his findings that trainees work better in smaller groups and learn easily from their peers, build close relationships, and exchange knowledge, and their teachers as well stand enlightened. The study suggested the need for class reduction be adopted in all institutions. Callata (2013) in research on social development theory in Namibia found little evidence that minimized classes influenced the performance. He indicates that there are gaps in performance viability between large and small classes. He suggests in findings that factors that affect performance include resource allocation, learning conditions among others. It concludes by arguing that reducing class size is seen as allowing lecturers to concentrate on the learner more and having time to deal with disruptions, allows for more innovations and flexibility in the classroom. The study noted that the importance of trainee to trainer ratio should not be assumed as far as performance is concerned. He further outlines that student average performance in a small class is much greater compared to bigger classes. In Kenyan TVET institutions, the ratio of trainers to trainees is 1 to 100 against the required 1 to 25 Joackim, (2022). According to Best Values schools (2014) on class size in New York, they note that teachers have had experience teaching large and small classes. The study reveals that there are demerits to teaching a class with fewer than 5 students, just like there are downsides to teaching classes with above 100 learners. In terms of class performance, Best Values schools noted that classes that are between 1 and 19 students tend to obtain the highest scores in the best ranking model. While classes with 20 to 25 students do not fall into this category, they are far better

than extremely large classes. By considering all of these scenarios, Best Values Schools recommended that classes with a ratio of 1 teacher to 20 students are better than those with more than 20 learners. Since some of the above studies agree while others differ, it means that the above subject on the trainee to trainer ratio has not been concluded. Also, there was a need by the researcher to do this study in the Kenyan context to fill the gap.

2.6 Trainee attitude and its influence on the performance

Attitudes are ways of feeling or thinking about something or somebody, usually reflected in the behavior of a person (Afeti, 2014). In school, students who have a positive attitude always pay attention to the good, rather than the bad in situations and events. They have an optimistic approach to achieve long goals and results (UNESCO, 2002). On the other hand, a student with a negative attitude tends to believe their best days are in the past. They have nothing to look forward to. They consider anything they do a waste of time and energy. A student with a negative mindset is always pessimistic and believes he/she is not capable of handling critical issues (Orodho, 1992).

According to Simiyu (2009) in a research study on factors affecting academic performance in secondary schools in Trans-Nzoia County, the study findings had a direct correlation between positive attitude and improved performance. He summarized his study by explaining that students who do well in a subject generally have more positive attitudes towards that subject/course. However, he did not give an insight on the influence of negative attitude on the performance of students. Kyule et al (2014) carried out a study in Kwale County on students' and teachers' attitudes on the performance in Chemistry in secondary schools. The study found out that, some

factors relate to students' performance. These factors included teaching methods, age, the influence of parents, career interest, teacher's attitude, gender, societal view of science and scientists, achievement, and social implications of science. Empirical studies have shown that the effect of trainees' attitudes towards science affects how they perform (Olatunde, 2009). Kempa and Dube (2004) research on the influence of attitude at the department of general studies, at the federal polytechnic of Nasarawa, Nigeria wrote that attitude becomes more positive after teaching. It also revealed that prior diagnostic-prescriptive treatment enhances a positive attitude. Hough and Peter (1982) further explained out that the group of trainees who scored quite significantly high in the attitude test also scored high in the science test. This is supported by Quassie (2010) who argued that learners' attitudes on the value of learning science can be considered as both outputs and input variables because their attitudes and feelings regarding the subject determine their performance. The above studies are in agreement that to enhance performance of learners, the aspect of attitude ought to be put into consideration by teachers as a factor which contributes to students' performance. On the other hand, the agencies such as KUCCPS can take up the challenge and initiate measures which can gauge students' attitude before being enrolled in TVET institution.

NCES (2016) in Nairobi analyzed course offerings and enrolment in tertiary institutions. The study reported that learners with positive attitude have a higher chance of performing better than those who have negative attitude. Biggs and Tang (2011) narrow this argument in their study on learners' performance in elementary school, in Edinburg, by acknowledging that there are two categories of learners; those who have positive attitude (theory y) and those who have negative (theory x). The study explains that learners who have positive attitude have already set questions

whose answers they intend to seek during the class lesson. They are inquisitive, self-driven, and have an interest in a particular subject and profession. They thus work extra harder to achieve the skills, abilities, and knowledge, needed for that particular subject. Their instructors trust them and engage them in classroom work and are free to interact with the instructor and to carry out learning activities that improve performance of aspired outcome. They further indicate when learners who have positive and negative attitude meet in a particular class, positive attitude learners' work at a higher level of engagement, commonly known as a deep approach to learning. They can relate ideas theorize and apply concepts but learners who have negative attitude, are likely to be engaged in memorizing and note-taking a method commonly known as the surface approach. Their level of learning is at a lower level. Apart from memorizing and taking notes, they can describe and explain theories and concepts at a low pace. Biggs and Tang (2011) concluded by stating that learners, who have an interest, concentrate on the underlying meaning of every detailed learning instruction. Akaniwor (2004) in a research study on the fundamental of educational technology at Port Harcourt indicated that there is a positive correlation between attitude and performance. The study indicated that to perform, priority learners need to go to class on time, sit in a place that limits obstruction and finish assignments on time to avoid a game of "catch up" which is stressful and unproductive. Such a learning behavior gives learners time to reflect and connect ideas and therefore improve their performance. Biggs and Tang, (2011) seconded these views by arguing that a class composed of students with positive attitude students, can affect positively on the effectiveness and performance of a teacher. He further noted that learners should be aware of their abilities and interests to use their environment and circumstances to be productive rather than be used by

circumstances. Unfortunately, the study above emphasizes only the importance of attitude on the performance but do not elaborate ways in which the attitude of the student can be determined.

A study carried out to determine the enthusiasm the students had for the achievement of higher performance in Canada indicated in their findings that college graduates who had positive attitude had a greater achievement for learning (Collier, 2011). The study emphasized the need to assess students' attitudes before enrolling them in programme. He recommended that those who have negative attitudes should be counseled and be encouraged appropriately. The above study corroborated with previous studies that attitude of the trainee influenced the performance of the learners. Despite being carried in different settings, it recommended that attitude as a factor that influences performance should be emphasized during the teaching and learning process. However, they did not delve deeper to ascertain the extent to which the two correlate. The current study was carried out in selected national polytechnics in Kenya. Its primary objective was trainees' attitude and its influence on the performance. This was to ascertain the empirical relationship in which attitude and student performance relate.

2.7 Syllabus coverage and its Influence on the Performance

The core mandate of an institution is to provide a sound curriculum. Curriculum refers to what is taught at any given level at school and within a specified duration of time. Wanyama, (2013) in his study reported in his findings that; objectives of a learning experience in which student has been taught over a scheduled time frame should be met. The study established that at the end of a module of instruction, students who undergo a learning process in a set curriculum should be able to respond adequately to

any test item. The study suggested that to enhance the performance in secondary schools, the teachers needed to be adequately equipped with sufficient skills and syllabus to be covered on time. This demonstrates the way the 8-4-4 system of education is structured in Kenya. For a learner to perform well, he/she is expected to fully acquire the knowledge and skills expected by the curriculum goals at the close of the academic year. The study was interested on school-based factors influencing students' performance in KCSE in Narok –North Sub County, unlike the current study which was conducted in National polytechnics in Kenya. Because curriculum suggests that teachers are responsible for syllabus coverage to achieve desired performance, it does not spell methods in which this can be delivered. The trainers will only rely on the acquired methodologies they learned while in college. It is thus necessary to investigate instructional methods and its influence on the performance of trainees so that it can help trainers when covering the syllabus.

The contents of a curriculum are developed on agreed-upon national goals and objectives of having the subject taught to the learners. In research on head teachers' management and its influence on trainees' achievement in Nakuru municipality, Njunge (2015) explained in its findings that performance in engineering subjects in TVET institutions has gone down due to several factors including ineffective teaching methods and insufficient training resources. This study did not directly link the above factors to poor performance but instead, it concluded that late coverage of the syllabus and negative students' attitudes influenced performance. The study pointed out that syllabus coverage springs from under teaching which is attributed to lack of sufficient teaching staff and inadequate teaching methods. Hailu (2011) indicated that many factors hinder the coverage of the syllabus in any particular institution. Some of the critical factors include the broad content of the syllabus, the teacher's workload as a

result of understaffing, inadequately qualified staff, high student-teacher ratio, inadequate teaching material, learner's interest, and discipline. The study sought to identify factors affecting the implementation of tertiary institutions in Tigray. The study noted that a curriculum is a tool that guides an instructor in the process of teaching in class. If the institution and administrators are not able to monitor curriculum implementation then instructors will not cover the required syllabus as indicated. As far as the two studies agree that syllabus coverage influences performance, they do not give a solution to the aspect of inadequacy of trainers. This is because the issue of number of trainers will eventually arise when large enrollment takes place in an institution. There was need therefore for this research to explore the influence of trainee ratio to trainer ratio in national polytechnics.

Student's performance in any examination is determined by the syllabus coverage and teachers' experience. This is because if the exam items are set within any topic of the curriculum and if a student has not covered, he /she will be disadvantaged. According to the daily education newsletter of October 9th, 2001, on education matters, their finding was that 67% of the TVET lecturers indicated a direct relationship between performance and syllabus coverage. Its conclusion was that poor coverage of the curriculum, failure to understand questions and inefficient teaching strategies employed by lecturers are some of the weaknesses noted in many engineering programs. It further stated that proper teaching methods depended on the time management of the specific lecturer. The study recommended that trainers should use efficient teaching and learning methods and be encouraged to finish the syllabus on time. Keeves and Comber (1990) in a study published in an international journal in New York on science education in nineteen countries reported that many factors influence the performance of students. He highlighted some of them such as syllabus

coverage, the attitude of the learner, availability of sufficient facilities, and the quality of the trainers. He suggested that if the syllabus is covered and students are allowed sufficient time to revise, the higher the chances of greater performance. The two studies are in agreement that the influence of syllabus coverage cannot be underestimated if good performance is expected. The recommendation and points highlighted from the two studies formed the base which necessitated this study to be carried out in selected national polytechnics in Kenya.

In a research study done by Wittich and Schuller (2011) in New York on instructional technology, its nature, and use in secondary education, they established in their finding that syllabus coverage on time can effectively be achieved if only the tutor employs correct instructional methods relevant to the lesson. They further pointed that instructional methods employed by the teachers go a long way in helping the learners to achieve the set curriculum objectives. They recommended that other factors influencing performance need to be identified. It is from the above recommendations that factors influencing the performance of trainees in electrical engineering programs are necessary to be done in a Kenyan context.

2.8 Entry behavior and its Influence on the Performance

The entry behavior of a student refers to the initial knowledge, attitude, and interests of the student before interacting with an instructor (Maundu, 2013). Maranga, (1993) further defines entry behavior as prerequisite information or skills which the student already possesses that are relevant to the learning task and may require student to demonstrate before beginning of a module. The findings of a study by Olatunde, (2009) on mathematics anxiety and academic achievement in some selected senior secondary schools in south western Nigeria revealed that the best training institutions

in developed countries expose qualified students to an entrance examination before admitting them to training institutions. Hundu, (2012) in a study in Lagos on elements of science in education indicated that 85% of electrical engineering students in Nigeria, sat for an entrance examination carried out by the state in which the college is situated while in Japan, eligible university entrants have to sit for national center tests for university admission. In Nigeria, a post-university examination which includes an oral interview, aptitude test, and another post-secondary school examination was put in place in the year 2005. The study concluded that all this was done to ensure the quality of entrants to various courses in engineering science and technology. The study by Hundu (2012) compared the average score of college students (students who did not do the post-secondary test) and those students (those who did the post-secondary test). The findings were that post-secondary students who did a prior exam before joining college performed better than those who did not sit for the post-secondary examination. The two studies suggest that the students excelled due to the confidence level exuded by the students after passing the entrance exam. Although the two studies suggested the influence of students' attitude on the performance, their primary objective was prior performance before joining the next level of education. The review by Hundu (2012), in Lagos indicates areas in which students were examined on to ascertain their attitude. This can be of great insight to KUCCPS when selecting candidates joining polytechnics in Kenya.

In Kenya, grades obtained by students in KCSE determine the course he or she will join at the university. Busayo (2010) in his study findings on pre-university education in Nairobi indicated in his findings that some students who scored very highly in secondary school tests recorded very low scores in post-university exams indicating that secondary scores were not conclusive in determining the academic capability of

college entrants. The study noted that entry behavior was not effective in determining the future performance of students. It suggested the need for more studies determine more factors influencing the performance of students. (Wittich & Schuller, 2011) researched instructional technology, its nature, and its use in New York. The study argued in their findings that trainees' intellectual ability and resolve to think critically depended mostly on the way they were taught and assessed in their formative school years by their teachers. It observed that 64.26% of the students sampled did not do physics meaning poor engineering background. About ninety-three percent (92.7%) and 78.5% of teachers' and students' responses respectively showed that schools never took seriously the concept of entry grade and attitude of the student. The paper interpreted that there were zero relationships between the performance of the students in a' level physics and the entry grade (o' level physics) in the basic program. WAEC (1984) in their monthly bulletin; towards effective learning in Lagos, Nigeria explained that students' entry behavior refers to the attitude level and grade a learner obtains after being examined. The entry behavior is considered when admitting students to the next level. The entry grade is significant in predicting the students' performance at the end of the course. The research reported that if a student joins college with a negative attitude and very low marks, very little can be done to improve the student's performance. Thus, when a teacher is dealing with learners of mixed abilities, the instructor needs to vary his motivation style. This will enhance interest between the two groups involved during learning. A further study on the correlation between entry behavior and performance in A 'level Physics at the school of basic and remedial studies, Yobe State University by WAEC showed that the grade in physics at the West African examination council (WAEC) was the predictor and ordinary pass of between 50% to 54% was taken as the national entry grade while the

criterion was the grade earned in the short structured test administered at the end of basic 1. Three research questions and one hypothesis guided the study. A population of 99 regular students who registered for a 'level physics was used for the study. The students' data file and a checklist were the instruments used for data collection. The Pearson product-moment correlation coefficient (r) between entry behavior and eventual performance calculated from the data analyzed concluded a positive correlation. The above-reviewed studies do not conclusively bring out the factors influencing students' performance. Comparative analysis of the studies above indicates that factors influencing performance were not conclusive. To attain these, this study focused on the attitude aspect of the trainee and assessment methods of the trainers and their influence on the performance to fill the gap.

Gunderson (2004) study on the influence of technical education on learner's ultimate academic achievement in London established a linear relationship between positive attitude, entry grade, and final performance. He explained that the entry behavior of a student entails previous performance, attitude, and previous exposure to technical education. The study used a survey research design to obtain data among 3 groups with varying exposure to vocational education. Elliot (1996) as quoted by Cole and Espinoza noted that academic performance in science-related subjects before enrolling in college indicated how well a learner will perform in engineering-related courses when in college. The study pointed out in its findings that the confidence of the trainee, facilities, and class size had a significant positive influence on students' performance. Their findings differ from (McKenzie and Schweitzer's, 2001) findings that indicated a weak correlation between the above factors and performance in the university. The findings above are in agreement that entry behavior in terms of

qualifications in one way or another impacts the performance. However, it did not expound on the attitude aspect which is also correlated.

In the Kenyan context, a college education does not have a post-secondary examination that can determine which course best suits a particular student before being absorbed, unlike other countries which have been explained above. Most students in Kenyan Universities and TVET institutions get admitted depending on the clusters they obtain after completing form four. Through these criteria, most students end up doing courses that they had not chosen before. In some instances, some students end up being forced to choose a course they have no idea about because the courses they had dreamed of have been filled up. This thus lowers their morale, confidence level, and also their general attitude. This might influence their further studies. This study researched factors influencing the performance of trainees, specifically in electrical engineering programmes in national polytechnics in Kenya, with the attitude of the trainees as its main objective.

2.9 Adequacy of Training Facilities and Resources and Its Influence on the Performance

A facility refers to a place or amenity which is used to provide a particular purpose. Resource on the other hand denotes materials and other assets that can be drawn on by a student in an institution in order to meet goals of learning (Ministry of education Handbook, 2006). The handbook enumerates that qualified personnel including teachers is part of the crucial resource required for effective learning. Hailu (2011) researched the factors affecting the implementation of TVET programs in selected public institutions of the Southern zone of Tigray. The findings listed tutors, inadequate teaching methods, and resource inadequacy as some of the hindrances to

the performance of engineering students. The sample size constituted 162 trainees, 10 TVET institute coordinators, and 12 TVET officials. Purposive sampling and stratified random sampling were used in choosing the respondents. Data analysis was done with the use of statistical methods. The study recommended governments allocate more funds to the TVET sub-sector and employ more qualified and experienced trainers. This implies that the teaching and learning process requires maximum utilization of resources and facilities both by trainers and trainees in the teaching and learning process. Quality and sufficient teaching and learning facilities are important for a successful learning outcome since they improve the performance of learners. A study conducted by Bwisa (2014) at JKUAT on the challenges of managing youth polytechnics concluded that for teaching and learning processes to be conclusive, there must be sufficient facilities and qualified trainers which create a positive impact on the individual learner. This improves both learners –teacher interactions which in turn prepare students well to become future knowledge workers. The study stated that preparation of teaching and learning activities by learners and teachers depend mostly on the quality of the available teaching and learning facilities. It recommended that for performance to be enhanced, the trainers must have sufficient experience. It further stated that the trainer must prepare well before going for a lesson.

Walubengo, (2007) in his presentation on challenges and constraints facing youth polytechnics, found that training institutions that are constrained by insufficient teaching and learning facilities tend to develop a course that they can only offer. This study sought to find out the challenges and constraints facing youth polytechnics and resources and facilities as one of the inputs for influencing the performance of students. The study suggested that when the institution has sufficient facilities, the

trainers should have the requisite knowledge and experience to utilize them. The studies above though being studied in TVET set up have brought up the issue of quality of the trainer and their experience though they did not analyze its impacts on the performance. The current study researched trainer experience as the primary objective influencing the performance in selected national polytechnics in Kenya. It also established how the two variables are correlated.

Gachira (2002) in a research study titled; ensuring relevance and quality in education and entrepreneurship in Nairobi showed that the library facility at Kenyatta University and the University of Nairobi was overstretched due to increased enrollment of students from high school. The study pointed out that the high enrollment further increased the ratio of students per a lecturer. He concluded that in public colleges and universities the high enrollment has led to a high ratio of students to lecturers and overstretched facilities were which affected the performance of learners negatively. The study suggested that to obtain a quality education, institutions must have well-equipped facilities with sufficient qualified and experienced trainers. Research conducted by Bwisa, (2014) explored teaching and learning resources available to learners to determine their role in aiding lecturers and students in pursuit of quality education, revealed in their findings that due to college expansion in Kenya, public colleges lacked the requisite resources and facilities to effectively offer service to learners. Orodho (2004) wrote in his findings that students spend an average of 13,000 hours of their life in a school building and a lot of it is in the classroom. The study sought to establish elements of education and social science at Kenyatta University. It indicated that some educationists are convinced that the condition of school resources and facilities has a great influence on student performance. Hough and Peter (1982) reported that the turnover rate of teachers is also influenced by the

condition of school facilities. If the institution has poor facilities the lecturers tend to skip lessons or practical lessons which will affect the performance of learners negatively. Both studies suggest that there is a need to expand facilities to gather for high the population. This suggestion indirectly impacts the size of class allocated to students per trainer which this study is investigating to determine its influence on performance.

Maundu (2013) research published at Kenyatta University Bureau of Education Research reports that insufficient lecturers and physical facilities hindered students learning. He further argued that the majority of the institutions have only one lecturer per every 60 students. This contradicts Best Values Schools (2014) which suggests a ratio of 1 trainer to 26 students. He notes that in most cases, most classrooms are poorly equipped while others purchase cheap workshop equipment for examination periods purely for purposes of examining learners rather than for learning purposes. The study revealed that if the number of students is high, the trainer will have challenges in delivering his instruction. The study notes that excellent performance requires that every institution should be well equipped with sufficient classrooms which accommodate all learners. He indicated that the instructional methods used by the trainer play a central role in explaining the wide variation in overall performance. The study sought to establish student achievement in Kenya National Examination in Nairobi County. Wittich and Schuller (1981) indicate that the physical conditions and organization of schools can inhibit or facilitate the construction of a successful culture. They argue that for reasonable teaching and learning, the way classrooms are designed and furnished can be a crucial element in improving performance. The study explains that well-designed classrooms arouse the positive attitude of the students. Furthermore, they note that pictures through the use of posters in class and awards are

a big plus towards improved performance. He explains that this boosts students' attitude and enhances their performance in class. He suggested that classrooms be designed well and should accommodate the recommended ratio of trainees per trainer. The Kenyan education sector support program (2005-2010) cites prioritization, mobilization, and utilization of resources and facilities as some of the major challenges inhibiting performance in tertiary colleges. Eshiwani (1983) observes that most of the institutions where learners performed poorly used less finance on the purchase of resources for teaching and learning. The study explained in its findings that a large number of students led to overstretched resources which negatively affected performance. Since the studies reviewed above explain in detail the influence of resources on the performance, they did not zero in particular to the influence of the class size as a facility on the performance of the trainee which this study is investigated.

2.10 Summary of Reviewed Literature

The purpose of this chapter was to review the factors determining the performance of trainees pursuing engineering globally and nationally. From the review, it is clear that performance of electrical engineering students is still an issue of concern to many professionals, academicians and governments. Despite concerted efforts to improve performance in TVET institutions, little has been achieved (Njunge, 2015). The variables reviewed in the literature focused mostly on high schools and in other regions outside Kenya. The reviewed variables have not been tested in national polytechnics in Kenya. Hence, a study was necessary to establish whether the variables applied to other studies differ or concur with the present research. The valuable information obtained will guide the formulation of strategies that will address the issue of poor performance in National Polytechnics in Kenya.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter has the data preparation, collection, and analysis. It is arranged in the following headings; research design, area of study, target population, sampling techniques and sampling size, instruments of data collection, reliability and validity of instruments, procedures of data collection, data analysis and ethical considerations.

3.2 Research Design

This study used a descriptive survey design. Descriptive research design allows for gathering, interpretation and summarizing information to understand a social concept (Orodho, 2005). Mugenda and Mugenda (2003) on the other hand gave the purpose of descriptive research as a way of reporting and determining the way things are. The design was appropriate because it enabled the researcher to obtain administrators, trainees, and trainers' opinions about factors influencing the performance of trainees in engineering programs in polytechnics in Kenya. This method also enabled the researcher to obtain quantitative data regarding adaptation to engineering learning in polytechnics. The study was carried out in four stages as follows: Stage one involved the preparation of the proposal and development of research instruments. Stage two involved piloting of the research instruments so that they could be improved and validated. Stage three was data collection from the sampled polytechnics in the western part of Kenya using validated instruments. The last stage involved the analysis of the data collected from which conclusions and recommendations were inferred.

3.3 Location of the Study

The study was conducted at Kitale national polytechnic located about 1 kilometer from Kitale town in Trans Nzoia County and Sigalagala national polytechnic located 12.3 kilometers from Kakamega town in Kakamega County (TIVETA, 2021). The two institutions offer electrical engineering course and the samples to be selected had characteristics which can be used to represent the entire target population.

3.4 Target population

Table 3.1: Target population

S/NO	Target population	Frequency
01	Electrical Engineering Trainers in national polytechnics	354
02	Diploma students pursuing electrical engineering	4603
03	Craft students pursuing electrical engineering	2467
04	Artisan students pursuing electrical engineering	2305
	TOTAL	9,729

Mugenda and Mugenda (2003) define the target population as an entire group of events, objects, or individuals, having common characteristics which the researcher intends to generalize the results of the study. According to TVETA (2021), there were 12 national polytechnics in Kenya, 354 lecturers, and about 9,729 students in electrical engineering programs.

3.5 Accessible population

Table 3.2: Accessible population

S/NO	Accessible population	Frequency
01	Electrical Engineering Trainers	46
02	Diploma students pursuing electrical engineering	1081
03	Craft students pursuing electrical engineering	716
04	Artisan students pursuing electrical engineering	370
TOTAL		2213

An accessible population is the final group of participants from which data is collected by gaging a sample drawn from it. Barnejee et al. (2021) noted that an accessible population represents the sampling frame if the intention is to draw a sample from it. The researcher ensured that the accessible population is selected two national polytechnics in the western region of Kenya that offer electrical engineering programs.

As shown in above (**Table 3.2**) the accessible population was drawn from two national polytechnics in the western region of Kenya.

3.6 Sampling Techniques and Sampling Size

Mugenda and Mugenda (2003) define sampling as the process of selecting some individuals for a study in such a way that the individuals selected represent the large group from which they are selected. Kafei (2005) recommended that sample size of respondents for a study can be computed using the following formula, $n = \frac{P(1-P)Z^2}{e^2}$,

Where p is the percentage occurrence of a state and will be taken as 50% in the study, Z is the value corresponding to 95% confidence level required and e is the percentage

maximum error required and will be taken as 92% for the study and n is the required sample size. The sample size will, therefore, be $n = \frac{0.5(1-0.5)(1.96 \times 1.96)}{0.08 \times 0.08} = 150.06 \cong 150$.

Gunderson (2010) noted that when the target population is less than 10,000, then the sample size should be modified using the formula $n_f = \frac{n}{1 + \frac{n}{N}}$ where n_f is the modified sample size, n sample size when the population is less than 10,000 and N is the estimate of the population size. Thus, the sample size for trainers would be modified to $n_f = \frac{150}{1 + \frac{150}{46}} \cong 35$, while the sample size for trainees would be modified to $n_f =$

$$\frac{150}{1 + \frac{150}{2167}} \cong 140.$$

Table 3.3: Sample size of respondents

S/NO	Respondents	Total Number	Sample Size
01	Electrical Engineering Trainers	46	35
02	Diploma students pursuing electrical engineering	1081	69
03	Craft students pursuing electrical engineering	716	46
04	Artisan students pursuing electrical engineering	370	25
TOTAL		2213	175

Since there are only three national polytechnics in the region, two of them participated in the study. The sample comprised 35 trainers and 140 trainees. A stratified sampling technique was used in the study because it ensured each member of the target population had an equal and independent chance of being included in the sample. This technique allowed the researcher to divide the entire population into different subgroups and then randomly select the final subject proportionality from different subgroups.

3.7 Data Collection Instruments

To carry out this research study, questionnaire was used because all the respondents were deemed to be learned and capable to answer the questions in the English language. The questionnaire was structured and unstructured. The questionnaire was filled by both the lecturers and students. A questionnaire can collect a large amount of information in reasonably a quick time frame, allows anonymity and enables data to be analyzed easily (Orodho, 2005).

3.8 Validity of Instruments

Validity refers to the degree to which a test instrument measures what it is supposed to measure (Bwisa, 2014). The questionnaire was subjected to examination by my supervisors to ensure that data required was valid.

3.9 Reliability

Mugenda and Mugenda (2008) explain reliability as a measure of the degree to which a research instrument gives consistent results after repeated trials. The reliability of the instruments was ascertained by carrying out the test, retest of questionnaire. The questionnaire was administered twice to the same group of respondents (students) to check whether the same results was obtained. Pearson's product-moment formula for retest was employed to compute the correlation coefficient to establish the extent to which the contents of the questionnaire would elicit similar responses.

3.10 Data Collection Procedures

The researcher sought approval from the University of Eldoret postgraduate school. A research permit was obtained online from NACOSTI before embarking on data collection in the field. The two-county education officers were informed two weeks before the date of data collection. Consent from the institution principal and the respondents was sought before the study period. The trainers and trainees questionnaire was administered in person by the researcher. Respondents were guided through the questionnaire on the appointed date.

3.11 Data analysis procedures

Data collected from the study were analyzed using Statistical Program for Social Sciences (SPSS). Data received from the questionnaire was analyzed based on the main objectives through tabulation, coding, and drawing statistical interpretations. Open-ended questions were condensed into themes and put in form of frequency counts. Results from KNEC examinations from the two institutions was captured in their performance categories and weighted. The weighted scores were correlated with the means of the scores obtained from the responses of the independent variables. The dependent variable was regressed on the independent variable to obtain the percentages. Descriptive statistics were used to summarize the characteristics of the data set while inferential statistics as used to test the hypotheses of the study. Measures of dispersion such as standard deviation were used to give the study data distribution. The results were graphically presented using bar graphs and frequency tables.

3.12 Ethical Considerations

Voluntary consent to take part in the study was sought from the respondents by the researcher. Respondents' privacy was ensured by them not indicating their details anywhere in the questionnaire. This was done to safeguard the respondents from abuse and victimization. Confidentiality of KNEC and internal examination results obtained for specific modules and trainees from the two institutions was assured.

3.13 Summary

This chapter detailed various aspects of research design and methodology. It presented the research design which was adopted in the study, the study area, the target population, the sampling procedure, the study variables, the reliability and validity of the research instruments used. The chapter further described the data collection procedures, data analysis procedures and ethical considerations observed in the study.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter has the analysis of the data collection and interpretation of the findings of the study. The chapter has been arranged into three main sub-sections. The first sub-section presents the socio-demographic information of the respondents of the study. The second section presents descriptive responses to the findings on each of the objectives; teacher and trainee responses. Sub-section three presents the correlation between variables and influence between independent variables and dependent variables in the study.

4.2 Response Rate

The trainers (35) anticipated before the study took part in the actual study. Similarly, expected trainees (140) took part in the study giving a response rate of 100%. The percentage rates were deemed enough for the study.

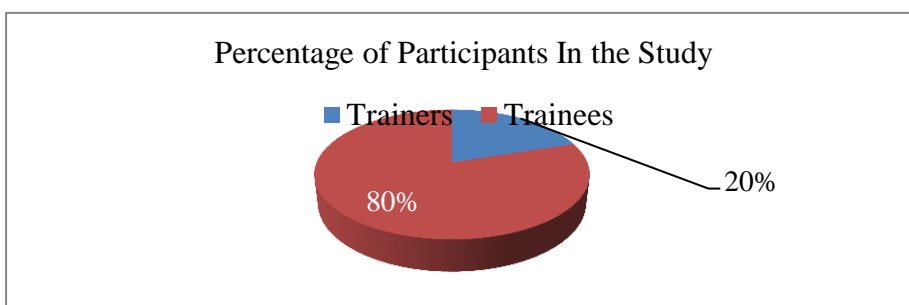


Figure 4.1. Response Rate of Participants who Took Part in the Study

4.3 Demographic Characteristics of the Respondents (Trainers)

The trainers who took part in the study were Thirty-Five (35). The majority 26(74.3%) of the trainers were male while the rest 9(25.7%) were female. A majority 15(42.9%) of the trainers were aged 26 to 35 years, followed by those aged above 46 years 12(34.3%). Those who were aged below 25 years were trainers just from college and comprised 2(5.7%) of the sampled trainers. The trainers had varied teaching experience ranging from one year to more than five years. 21(60.0%) of the trainers had experience of more than five years while those having an experience of two years or less comprised 12(34.3%). Those who had a teaching experience of three years were 2(5.7%).

In terms of highest academic qualification, a higher proportion 15(42.9%) had bachelor's degree. Cumulatively, those with postgraduate degrees comprised 12(34.3%) while 6(17.1%) had a higher diploma and 2(5.71%) had a diploma.

Table 4.1 Demographic Characteristic of Trainers (N=35)

Socio-Demographic Characteristics		N	N %
Gender of the respondent	Male	26	74.3%
	Female	9	25.7%
	Total	35	100.0%
Age bracket of the respondent	Below 25 years	2	5.7%
	26-35 years	15	42.9%
	36-45 years	6	17.1%
	Above 46 years	12	34.3%
	Total	35	100.0%
Years served as a trainer	Last one year	4	11.4%
	Last two years	8	22.9%
	Last three years	2	5.7%
	More than five years	21	60.0%
	Total	35	100.0%
Highest academic qualification	PHD	4	11.43%
	Masters	8	22.86%
	Bachelors	15	42.9%
	Higher Diploma	6	17.1%
	Diploma	2	5.71%
	Others	35	100.0%

The results indicate that there was greater participation by the male trainers than their female counterparts. The trainers were in their optimum career teaching in their life

and this is where they could make an impact as far as trainee life is concerned. Most of them also have a sufficient number of years in which they have had experience (more than 5 years) coupled with good qualifications.

Table 4.2 Demographic Characteristic of trainees (N=140)

		N	N %
Gender of the respondent	Male	73	52.1%
	Female	67	47.9%
	Total	140	100.0%
Age bracket of the respondent	Below 18 years	10	7.1%
	18-25 years	101	72.1%
	26-30 years	23	16.4
	31-35 years	6	4.4%
	Above 36 years	0	0.0%
	Total	140	100.0%
Period spent in the institution as a trainee	Last three months	0	0.0%
	Last six months	0	0.0%
	Last one year	31	22.1%
	Last two years	86	61.4%
	Last three years	23	16.4%
	More than four years	0	0.0%
	Total	140	100.0%
Level of training	Artisan	24	17.1%
	Certificate	24	17.1%
	Diploma	92	65.7%
	Total	140	100.0%

The trainees who took part in the study were One Hundred and Forty (140). The majority 73(52.1%) of them were male while 67(47.9%) were female. A majority 101, (72.1%) of them were aged 18 to 25 years, followed by 23(16.4%) aged 26-30years. Those who were aged between 31-35 years were 6(4.4%) years while those below 18 years were 10(7.1%). The trainees had varied durations they had spent in the training institution. Eighty-Six 86(61.4%) of them have been in the institution for the past two years followed by those who had spent 1 year 31(22.1%). Those who had spent the last three years were 23(16.4%).

In terms of the level of training, a higher proportion 92(65.7%) of the trainees were diploma students. Artisan and certificate students were both 24(17.7%) each.

4.4 Influence of Instruction Methods on the Performance of Trainees

The first objective of the study was to determine the influence of instructional methods on the performance of trainees in electrical engineering programs in national polytechnics in Kenya. The study asked the respondents' statements about instructional methods which influence performance.

4.4.1 Trainees' Response on Influence of Instruction on the Performance

From the study results the trainees who were in agreement that the lecture method was used by trainers during teaching in electrical engineering programs were 108(77.1%). 14(10%) remained neutral while 18(12.9%) disagreed that the lecture method was used by trainers during training. 101(72.2%) agreed that demonstration was used as an instructional method by trainers, 29(20.7%) remained neutral while 10(7.1%) disagreed. On the other hand, 96(68.5%) agreed that discussion groups among trainees were used as a training method. 24(17.1%) remained neutral while 20(14.3%) disagreed. On another aspect, 113(80.7%) agreed that problem-solving skills were

used as an instructional method, 14(10%) remained neutral while 13(9.3%) disagreed. Question and answers during lessons as an instructional method were agreed, remained neutral, and disagreed by 92(65.7%), 34(24.3%), 14(10%) respectively. 100(71.4%) agreed that practicals' were used as an instructional method while 28(20.0%) remained neutral. 12(8.5%) disagreed that practicals' were used as an instructional method. Assignments were given and marked regularly by teachers was agreed by respondents by 88(62.9%), 24(17.1%) remained neutral while 28(20%) disagreed.

Out of all respondents who participated, the results revealed that 101(72.1%) of the trainees disagreed that there are other instructional methods used by trainers in class while 39(27.9%) agreed on the same matter. The 39(27.9%) who agreed that there are other instructional methods used by trainers cited brainstorming and blended learning.

Also, the results indicated that 90(77.6%) of the respondents indicated that instructional methods influenced performance while 50(22.4%) indicated that it did not influence the performance.

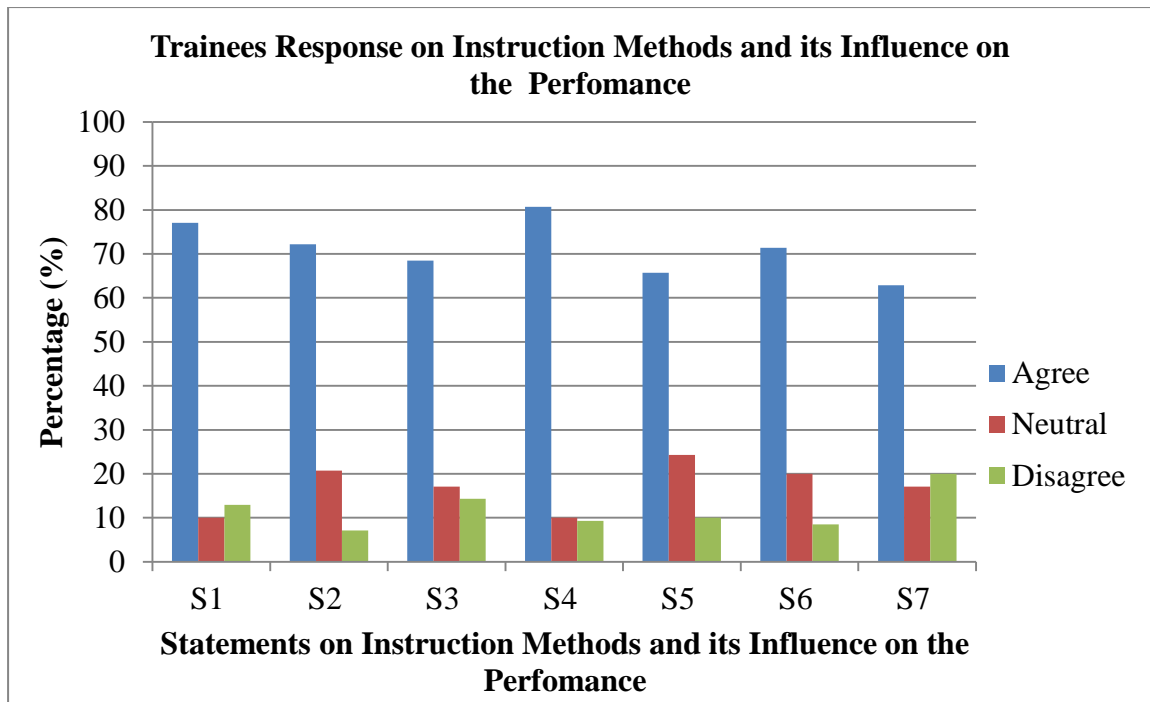


Figure 4.2 Trainees Response on Influence of Instruction on the performance

Key

S1-Lecture method was used by trainers during training

S2-Demonstrations was used as an instruction method by trainer

S3-Discussion groups among trainees was used as an instruction method

S4-Problem-solving skills was used as an instruction method

S5-Question and answers during lessons was used as an instruction method

S6-Practicals was used as an instruction method

S7-Assignments was given and marked regularly by trainers

From the results in **Figure 4.2**, trainers in National Polytechnics used a variety of instruction methods which influenced the performance during their training. The commonly used instruction method was problem-solving. Problem-solving is characterized by the independence trainees in framing questions and generating ways of answering them (Hailu, 2011). The new knowledge gathered during problem solving enabled trainees to apply in solving different questions. Problem-solving helped trainees become creative, positive and improved their performance (Maundu, 2013). Lecture methods, demonstrations, discussion groups, and questions and answers were used by trainers during lessons. Also, practical's and assignments which were given and marked regularly were other instructional methods used by teachers in class.

4. 3.2 Trainers' Response on Influence of Instruction Methods on the Performance

From the study results, out of the respondents who were in agreement that the lecture method was used by trainers during training, 21(60.0%) agreed while 4(11.4%) remained neutral. On the other hand, 10(28.6%) disagreed that the lecture method was used by trainers during training. Similarly, 31(88.6%) agreed that demonstration was used as an instructional method by trainers, 2(5.7%) remained neutral while 2(5.7%) disagreed. On the other hand, 23(65.7%) agreed that discussion groups among trainees were used as a teaching method, 10(28.6%) remained neutral while 2(5.7%) disagreed. 33(94.3%) agreed that problem-solving skills were used as an instructional method while 2(5.7%) disagreed. Question and answers during lessons as an instructional method were agreed, remained neutral, and disagreed by 23(65.7%), 10(28.6%), and 2(5.7%) respectively. 23(65.7%) agreed that practical's was used as

an instructional method, 10(28.6%) remained neutral while 2(5.7%) disagreed. Assignments were given and marked regularly by trainers was agreed by 21(60%) while 8(22.9%) disagreed and 6(17.1%) remained neutral.

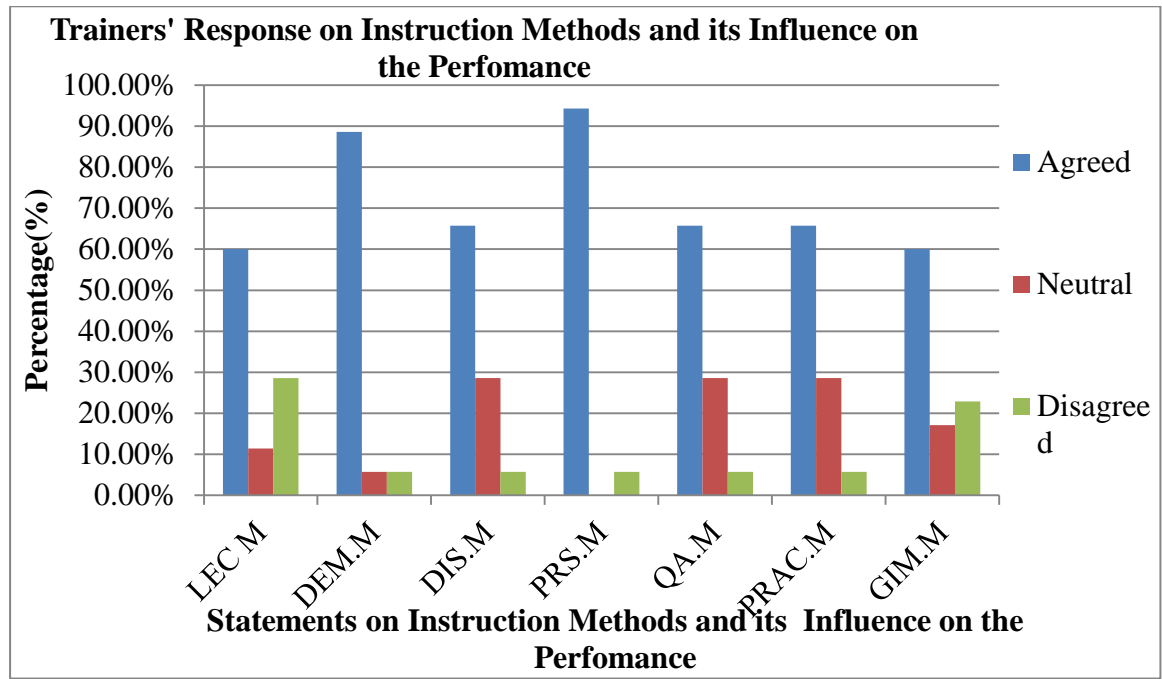


Figure 4.3 Trainers Response on Influence of Instruction Methods on the Performance

Key

LEC.M. -Trainers use lecture method during training

DEM. M -Trainers use demonstrations as a training method

DIS.M -Trainers use discussion groups among trainees as a training g method

PRS. M-Trainers use problem-solving skills as a training method

QA.M -Trainers use question and answer during lessons as a training method

PRACT.M Trainers use practical's as a training method

GIM.M-Trainers give and mark Assignments regularly

25(71.4%) of the trainers indicated that their departments have specific instruction methods aimed at improving academic performance such as use of demonstration and problem solving while 10(28.6%) disagreed. Of those who agreed, they stated that the specific instructional methods encourage trainer-trainee interaction and also leads to improved understanding of the content taught. 10(28.6%) of the trainers stated that there were other methods used by trainers which do not motivate trainees such as issuing handouts and assignments. 25(71.4%) of the respondents indicated that there were no other instructional methods used by lectures that do not motivate learners.

Table 4.3 Instructional Methods and their Influence on the Performance (N=35)

Electrical engineering department	yes	25	71.4%
have specific instructional methods	no	18	28.6%
aimed at improving academic performance	Total	35	100.0%
Effect of specific instructional methods			
Encouraged teacher student interaction			
Led to improved understanding of the content taught			
There are any other instructional methods used by trainers which do not motivate trainees	Yes	10	28.6%
	No	25	71.4%
	Total	35	100.0%
Methods which do not motivate trainees	Issuing assignments	of 8	80.0%
	Issuing handouts	of 2	20.0%
	Total	10	100.0%

The results from the study found that trainers in the national polytechnics used a variety of instructional methods which influenced the performance of the trainees. This was agreed upon by both the trainers and trainees. This is similarly pointed out by Cohen (2015) who established in his study that the majority of TVET lecturers in the United Kingdom had sufficient instructional methods which they applied during

teaching. From the results, the majority of both trainees and trainers agreed that the department had specific instructional methods such as lecture method and use of practical which positively influenced the performance of the students. However, Mutunga and Brekwell (1992) disapprove this assertion by stating that this kind of instructional method lacks active participation of the learners and has poor teacher/learner interaction. The Ministry of Education handbook for Mathematics (1987) disapproves the findings on the lecture method as the best mode of instruction by stating that the lecture method is associated with less understanding of Mathematical structure and concept resulting in little retention of what is learned. Mutunga and Brekwell (1992) indicate further in their studies that heuristic approaches such as using demonstrations, discussions, question and answer method and use of practical as instructional method enabled the learner to apply the knowledge easily and become adaptable to familiar and unfamiliar situation. This method (demonstrations, discussions, question and answer method, and use of practical as instructional method) in the study is supported by the respondents that it influences performance. In the study, there was a significant positive relationship between instructional methods and the performance of the students. This concurs with the Ministry of education handbook for mathematic (2004) which established that instructional methods employed by teachers have a significant impact on the students' achievement.

4.5 Influence of Trainer Experience on the Performance of Trainees

The second objective of the study sought to explore the influence of trainer experience on the performance of trainees in electrical engineering programs in national polytechnics in Kenya. The study asked respondents in electrical engineering

programs in national polytechnics in Western Kenya statements pertaining to experience which influences the performance of students in electrical engineering.

4.5.1 Trainers' Response on Influence of Trainer Experience on the Trainees Performance

From the results, 23(65.7%) agreed that there is a relationship between teachers' years of experience and students' performance while 10(28.6%) remained neutral and 2(5.7%) disagreed. That experienced trainers have the opportunity to utilize their skills and talents in the class, 31(88.5%) agreed while 4(11.4%) remained neutral. On the aspect of teachers who have undergone professional training for many years are more effective in teaching, 23(65.7%) agreed while 12 (34.3%) remained neutral. That teacher have opportunities to advance, learn and develop performance, 29(82.9%) agreed, 4(11.4%) remained neutral while 2(5.7%) disagreed. 19(54.2%) agreed that teachers are facilitated to attend engineering workshops, training, and seminars to enhance their experience while 10(28.6%) remained neutral. 6(17.1%) disagreed that teachers are facilitated to attend engineering workshops, training, and seminars to enhance their experience.

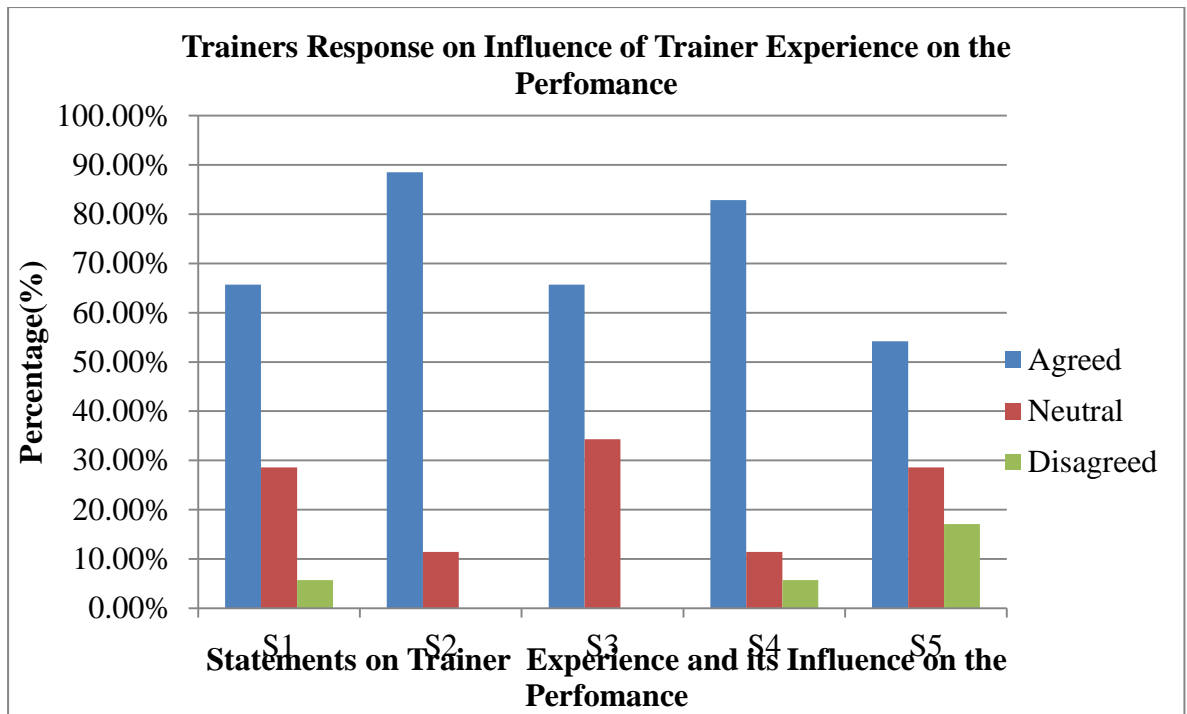


Figure 4.4 Trainers' Response on Influence of Trainer Experience on the Trainees Performance

Key

S1-There is relationship between trainers years of experience and trainees performance

S2-Experienced trainers have the opportunity to utilize their skills and talents in the class

S3-Trainers who have undergo professional training for many years are more effective in training

S4-Trainers have opportunity to advance, learn and develop performance

S5-Trainers are facilitated to attend engineering workshops, training and seminars to enhance their experience.

4.5.2 Trainees' Response on Influence of Trainer Experience on the Performance

Out of the all trainees (students), who agreed that experienced trainers teach better than new trainers, 104(74.3%) agreed that experienced trainers teach better than new trainers. 19(13.6%) remained neutral while 14(12.10%) disagreed that experienced trainers teach better than new trainers. Analogously 22(15.7%), 99(70.7%), and 19(13.6%) remained neutral, agreed, and disagreed respectively that performance was better in subjects taught by experienced trainers than newly appointed trainers. That trainers are experienced and well-trained, 26(18.6%) indicated neutral, 3(2.1%) disagreed, and 111(79.2%) agreed. That trainers who frequently undergo professional training in the area of specialty have a better experience, 105(75.0%) agreed, 13(9.3%) remained neutral, and 22(15.7%) disagreed. On the aspect of whether experienced trainers have better interaction skills with learners' unlike newly appointed trainers the statement was agreed, indicated neutral, and disagreed by 80(57.1%), 31(22.1%), 29(20.7%) respectively. 84(60%) agreed that there was a relationship between trainers' years of experience and students' performance while 43(30.7%) remained neutral. 13(9.3%) disagreed that there was a relationship between trainers' years of experience and trainees' performance (Table 4.7).

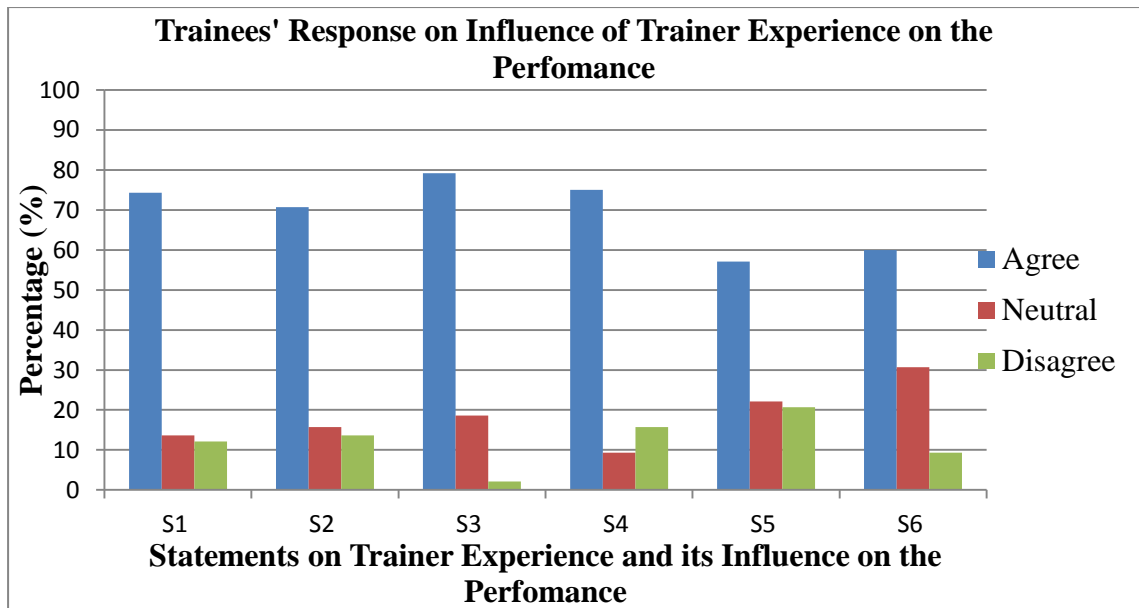


Figure 4.5 Trainees Response on Influence of Trainer Experience on the Performance

Key

S1-Experienced trainers train better than new trainers

S2-Performance is better in subjects taught by experienced trainers than newly appointed trainers

S3-Lecturers are experienced and well-trained

S4-Teachers who frequently undergo professional training in the area of specialty have a better experience

S5-Experienced trainers have better interaction skills with learners unlike newly appointed trainers

S6-There is relationship between trainers' years of experience and trainees performance

The results of the study reveal that experienced trainers teach better than new trainers.

Performance is better in subjects taught by experienced trainers than newly appointed

teachers. The trainers are experienced and well-trained. Trainers who frequently undergo professional training in the area of specialty have a better experience. Experienced trainers have better interaction skills with learners, unlike newly appointed trainers. There was a relationship between trainers' years of experience and trainees' performance.

A higher percentage of 74.3% of the trainees in the study indicated that experienced teachers teach much better than new teachers. Majority of the trainers 23(65.7%) indicated that there is a relationship between trainers' years of experience and performance. This statement concurs with Wanyama (2013) who stated that experienced teachers have full autonomy thus taking responsibility for students learning needs, keeping students on task, and managing classroom problems. From the analysis, 60% of the trainers had an experience of more than five years and this directly impacted the performance of the learners. This is in line with a study by Karachi (2012) on teacher quality and impacts on achievement which revealed that teachers who had many years of experience had a high mean score compared to teachers who had fewer years of experience. Both the trainers and trainees are in agreement with the findings that experienced teachers have the opportunity to utilize their skills and talents in the class. This again is pointed out by Hailu (2011) who revealed that experienced trainers employing varying skills in the class produced students with significantly higher performance. The majority of the trainers pointed out those trainers who frequently undergo professional training in the area of specialty tend to have a better experience in teaching. This result is in line with Cohen (1976) who established in his findings that initial work experience and workshop forums enabled TVET lecturers to apply appropriate work contexts to students which finally enhanced their performance.

4.6 Influence of Trainee to Trainer Ratio on the Performance of trainees in Electrical Engineering Programs in National Polytechnics in Kenya

The third objective of the study was to determine the influence of trainee to trainer ratio on the performance of trainees in electrical engineering programs in national polytechnics in Kenya. As with the other objectives, statements relevant to the trainee to trainer ratio were posed to the respondents.

4.6.1 Trainers Responses on Influence of Trainee to Trainer Ratio on the Performance of Trainees Performance

From the results, enrollment in the departments was as follows; 21(60%) and 12(34.3%) indicated that enrollment was between 500-1000 and 100-500 respectively while 2(5.7%) indicated that enrollment was more than 1000.

In terms of the trainee to trainer ratio in class, 19(54.3%) and 10(28.6%) of the trainers stated that the trainee to trainer ratio in class is 30; 1 and 15; 1 respectively. 2(5.7%) was noted in the ratio of 45; 1, 60; 1 and above 61. (Table 4.4)

Table 4.4 Trainers Responses on Influence of Trainee to Trainer Ratio

		N	N %
Level of trainees enrollment in department	50-100	0	0.0%
	100-500	12	34.3%
	500-1000	21	60.0%
	> 1000	2	5.7%
	Total	35	100.0%
Trainee to trainer ratio in class	15-1	10	28.6%

Table 4.5 Trainees Response on Influence of Trainee to Trainer Ratio

		N	N %
Level of trainees enrollment in class	1-25	27	19.3%
	26-40	55	39.6%
	41-60	44	31.4%
	> 61	14	10.0%
	Total	140	
Trainee to trainer ratio in class	15-1	20	14.3%
	30-1	68	48.6%
	45-1	22	15.7%
	60-1	9	6.4%
	>61	21	15%
Total	140	100.0%	
Ratio of trainee to trainer affect performance	Yes	118	84.2%
	No	22	15.8%
	Total	140	100.0%
How ratio trainees trainers affect performance in electrical engineering department	Low ratio	83	79%
	burden to teachers		
	Few	22	21%
	contact hours		
Total	Total	105	100.0%

According to the trainees' response to class enrollment, 55(39.3%) and 44(31.4%) indicated that their class enrollment ranged between 26-40 and 41-60 respectively.

27(19.3%) indicated class enrollment of 1-25 and 14(10.0%) indicated class enrollment of above 61. Out of all the trainees who participated in the study, majority 68(48.6%) indicated trainee to trainer ratio of 30; 1 while 22(15.7%) indicated a ratio of 45; 1. 21(15%), 20(14.3%) and 9(6.4%) indicated a ratio of above 61, 15; 1 and 60; 1 respectively. Out of all trainees who participated in study 118(84.2%) agreed that the ratio of trainees to trainers affects performance while 22(15.8%) disagreed that the ratio of trainees to trainers affects performance. Those who affirmed the influence of few trainers to student ratio 83(79%), stated that it increased burden to the trainers while 22(21%) said it led to few contact hours between trainees and the trainers.

The results of the study reveal that majority of trainers 19(54.3%) and trainees 68(48.6%) indicated that the trainees to trainer ratio was 30:1. This ratio is close to an agreement with the Republic of Turkey Ministry of National Education (2012) which noted that for effective learning, pupil to teacher ratio should 35:1. The analysis also differs from Benbow (2007) who established that pupil to teacher ratio is effective best at a ratio of 40:1. This study indicates that 25(71.4%) and 118(84.2%) trainees and trainers respectively agreed that the ratio of trainees to trainers affects performance. This concurs with Best Values schools (2014) which revealed that when the number of students is few in class the performance in the class tends to be higher than classes with many students. In this research study, respondents who noted that ratio affects performance stated that a high student-to-teacher ratio increases the burden to teachers and it reduces contact hours. Krueger (1999) established similar

findings that the smaller the classes the more they are believed to let instructors pay more attention to the learners' needs and reduce the duration required to engage with disruptions. Adam (2014) established in his study that lecturers prefer classes with a smaller number of learners because they can reduce the efforts they spend to deliver instruction.

4.7 Influence of Trainee Attitude on the Performance of Trainees

Objective four sought to explore the attitude of the student and how it influences their performance in electrical subjects. Statements relating to student attitude and its influence to performance were posed to the respondents.

4.7.1 Trainers Response on Influence of Trainee Attitude on the Performance

25(71.4%) of the trainers agreed that students had confidence in getting good grades in end-term exams. 8(22.9%) and 2(5.7%) remained neutral and disagreed respectively. 19(54.3%), 10(28.6%) and 6(17.1%) agreed, remained neutral, and disagreed respectively that Electrical engineering lessons were the best enjoyable. 27(77.1%) of the trainers agreed that students will go for an electrical engineering-related course in the next level while 6(17.1%) and 2(5.7%) remained neutral and disagreed respectively. On the other hand, 23(65.7%) agreed that students have confidence in tackling electrical engineering-related problems. 10(28.6%) and 2(5.7%) remained neutral and disagreed respectively. 21(60%) agreed that engineering students look forward to electrical engineering lessons. 10(28.6%) and 4(11.4%) remained neutral and disagreed respectively. 33(94.2%) agreed that students pay attention when the trainer is training in the classroom while 2(5.7%) remained neutral. 25(77.1%) agreed that students can get good grades in electrical engineering

as a result of hard work. 6(17.1%) remained neutral while 2(5.7%) disagreed. On if the trainee attitude affects students' performance, 31(88.6%) agreed while 4(11.4%) remained neutral.

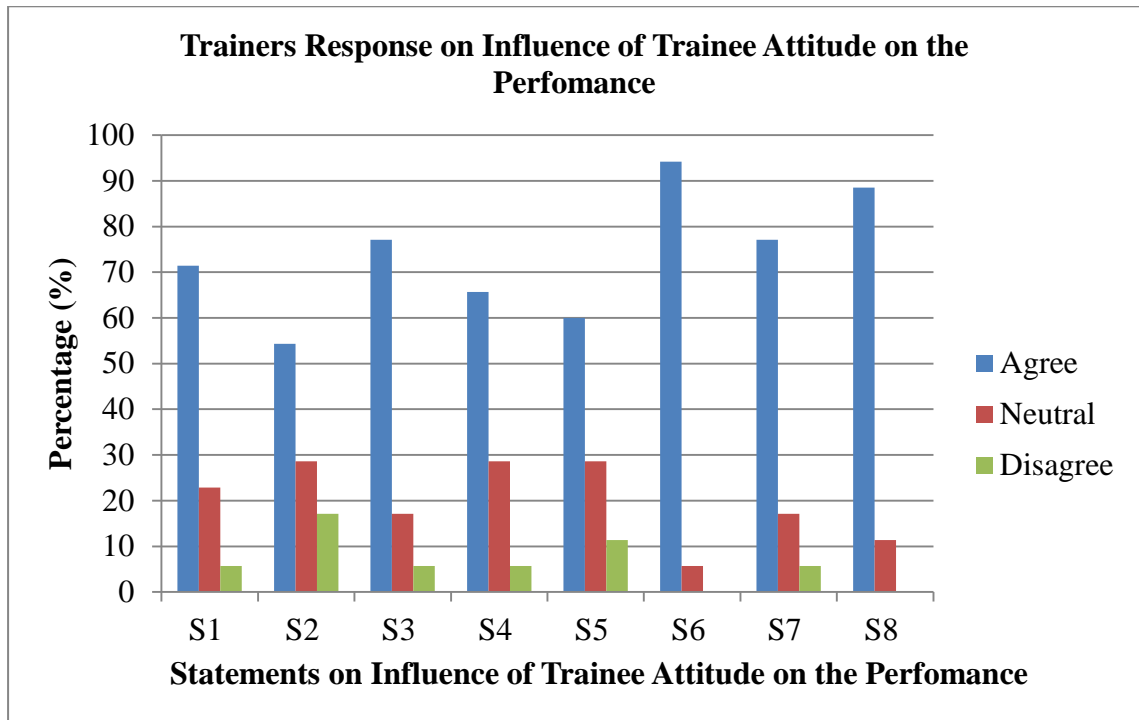


Figure 4.6 Trainers Response on Influence of Trainee Attitude on the Performance

KEY

S1-Student has confidence on getting good grades in end term exams

S2-Electrical engineering lessons are the best enjoyable

S3-Student will go for an electrical engineering-related course on the next level.

S4-Student has confidence in tackling electrical engineering-related problems

S5-Student looked forward to electrical engineering lessons

S6-Student pays close attention when the teacher is teaching in the classroom

S7-Student can get good grades in electrical engineering as a result of hard-work

S8-Attitude affects academic performance in class

Those who affirmed that attitude influence performance stated that positive attitude enable trainees absorb learning easily while negative attitude removes concentration and inhibits learning.

Table 4.6 Attitude and its Influence on Performance according to Trainers

Attitude affect academic performance in class	Yes	31	88.6%
	No	4	11.4%
	Total	35	100.0%
How attitude of students affect performance in electrical engineering department	Positive attitude makes trainees absorb learning easily	20	55.6%
	Negative attitude discourages learning, removes concentration and inhibits learning	11	18.5%
	Total	31	100.0%

4.7.2 Trainees' Response on Influence of Student Attitude on the Performance

121(86.40%) of the trainees agreed that they had confidence in getting good grades in end-term exams. 14(10.0%) and 5(3.5%) remained neutral and disagreed respectively. 107(76.4%), 18(12.9%), 15(10.7%) agreed, remained neutral, disagreed respectively that Electrical engineering lessons were the best enjoyable. 121(86.4%) agreed that they will go for an electrical engineering-related course in the next level while 11(7.9%), 8(5.7%) remained neutral and disagreed respectively. 117(83.6%) agreed

that they have confidence in tackling electrical engineering-related problems. 19(13.6%) remained neutral while 4(2.8%) disagreed. 109(77.9%) agreed that they look forward to electrical engineering lessons. 25(17.9%), and 6(4.3%) remained neutral ,disagreed respectively. 119(85.0%) agreed that they pay close attention when the trainer is teaching in the classroom while 10(7.1%) indicated neutral. 11(7.8%) disagreed on that aspect. A high percentage of the trainees 121(86.4%) agreed that they can get good grades in electrical engineering if they work hard. 8(5.7%) indicated neutral while 11(7.8%) disagreed.

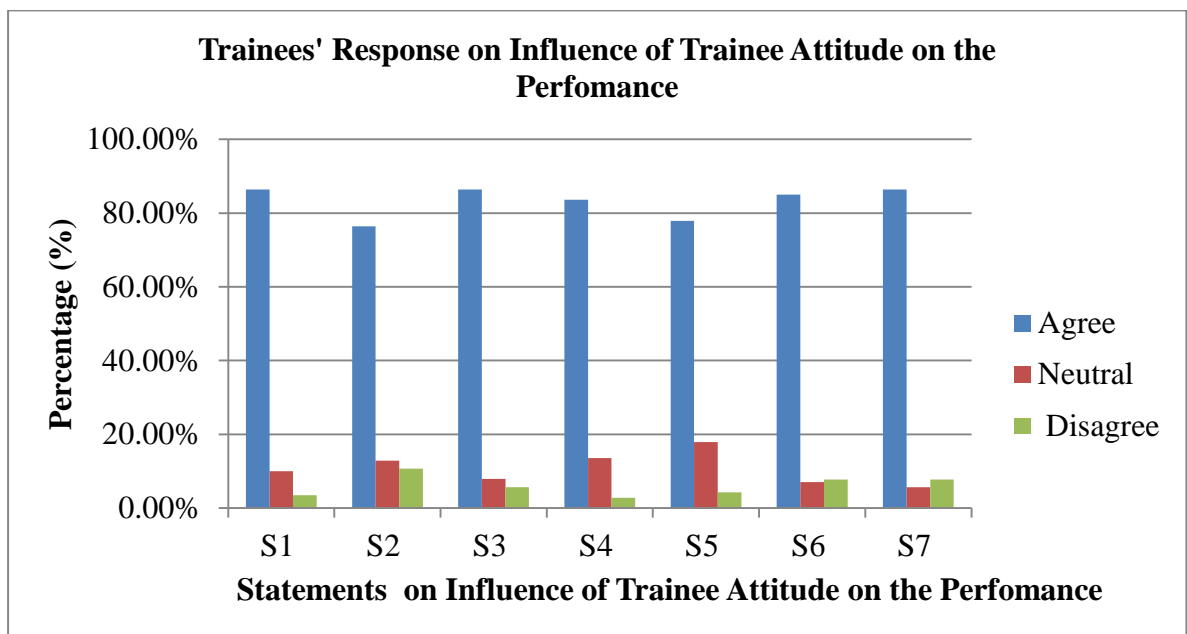


Figure 4.7 Trainees Response on Influence of Student Attitude on the Performance

KEY

S1-I am confident I will get good grades in my end term exams

S2-Electrical engineering lessons are the best enjoyable

S3-I will go for an electrical engineering-related course in the next level.

S4-I have confidence in tackling electrical engineering-related problems

S5-I always look forward to electrical engineering lessons

S6-I pay close attention when the teacher is teaching in the classroom

S7-I can get good grades in electrical engineering if I work hard

On if attitude affects performance, 108(77.17), said yes while 32(22.9%) stated No. Those who affirmed that attitude influence performance, 60(55.6%) stated trainees with a positive attitude tend to be very active in class and they regularly seek teachers clarification on areas where they don't understand while 20(18.5%) indicated that students with negative attitude lack sufficient courage to interact and consult with the teachers and their peers concerning academic matters.

Table 4.7 Trainees' Response on Influence of Trainee Attitude on the performance

Attitude affect academic performance in class	Yes	108	77.1%
	No	32	22.9%
	Total	140	100.0%
How attitude of students affect performance in electrical engineering department	Positive attitude students are active and seek clarification from trainers	60	55.6%
	Negative attitude students lacked confidence to seek information from trainers and peers	20	18.5%
	Total	80	100.0%

The results indicate that cumulatively, attitude (confidence aspect) is positive both for trainers and trainees. However, a positive attitude was more pronounced on the part of the trainees 121(86.4%) than their trainers 25(71.4%). This is usually expected because the study was carried out close to an examination period and students' had

put sufficient energy into preparing for the exam, unlike the trainers who simply teach the trainees to pass the examination. The majority of the trainers and trainees cumulatively agreed that attitude influences performance by 31(78.5%) and 108(77.1%). These results concur with Simiyu (2013) who stated that students who do excellently in a subject generally have more positive attitudes towards that subject/course. This is supported by Quassie (2010) who argued that learners' attitudes on the value of learning science can be considered as both outputs and input variables because their attitudes and feelings regarding the subject determine their performance. The study results for both trainers and trainees concur that students have confidence in tackling electrical problems. This is similar to findings by Collier (2011) on a study on the enthusiasm of students and achievement in Canada. He pointed out that college graduates who had great enthusiasm had greater achievement than those who had low enthusiasm for learning. The study results from both respondents indicate that trainees with positive attitudes absorb learning easily, are active, and seek clarification from trainers while students with negative attitudes appear discouraged in learning, have poor concentration, and lack the confidence to seek information from trainers and peers. Biggs and Tang (2011) in their study on learners' performance in elementary school, in Edinburg, acknowledged in his studies that confident learners have already set questions whose answers they intend to seek during the class lesson. They are inquisitive, self-driven, and have an interest in a particular subject and profession. They thus work extra harder to achieve the skills, abilities, and knowledge, needed for that particular subject. The study established that a trainees' attitude has a significant positive relationship with performance. Hough and Peter (1982) established similar findings by stating that performance and attitude are positively correlated.

4.8 Testing Hypothesis

In this section, the study presented the results of the test of the hypothesis. The study formulated four hypotheses;

H01: There was no significant influence of instructional methods on the performance of trainees in electrical engineering programs in national polytechnics in Kenya,

H02: There was no significant influence of trainer experience on the performance of trainees in electrical engineering programs in national polytechnics in Kenya.

H03: There was no significant influence of trainee to trainer ratio on the performance of trainees in electrical engineering programs in national polytechnics in Kenya and

H04. There was no significant influence of trainee attitude on the performance of trainees' electrical engineering programs in national polytechnics in Kenya.

These hypotheses were tested using Pearson correlation owing to the data type that was numerical (quantitative). In the study, the hypothesis was not rejected. Thus, it was concluded that, whereas there was a positive correlation between instructional methods, trainer experience, and trainee attitude with performance, the correlations were not statistically significant. Trainee to trainer ratio was negatively correlated to the performance.

Table 4.8 Correlation Table Matrix

		Instructional Methods	Trainer Experience	Trainee to trainer Ratio	Trainee Attitude	Perform ance
Instructional Methods	Pearson	1	.585 ^{**}	.073	.284	.194
	Correlation					
	Sig. (2- tailed)		.000	.678	.098	.265
	N	35	35	35	35	35
Trainer Experience	Pearson	.585 ^{**}	1	-.192	.460 ^{**}	.113
	Correlation					
	Sig. (2- tailed)	.000		.270	.005	.517
	N	35	35	35	35	35
Trainee to Trainer Ratio	Pearson	.073	-.192	1	-.583 ^{**}	-.059
	Correlation					
	Sig. (2- tailed)	.678	.270		.000	.738
	N	35	35	35	35	35
Trainee Attitude	Pearson	.284	.460 ^{**}	-.583 ^{**}	1	.268
	Correlation					
	Sig. (2- tailed)	.098	.005	.000		.119
	N	35	35	35	35	35
Performance	Pearson	.194	.113	-.059	.268	1
	Correlation					
	Sig. (2- tailed)	.265	.517	.738	.119	
	N	35	35	35	35	35

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

The study results indicated that there was a positive relationship between instructional methods, trainer experience, and trainee attitude. The correlation was $r= 0.194$, $r= 0.113$, and $r= 0.268$ respectively. However, there was a negative correlation of $r= -0.059$ on the influence of trainee to trainer ratio on the performance. The study findings further indicated that all the Pearson correlations between the independent variables and performance were not significant ($p\text{-value}>0.05$) at a 95% confidence interval.

Using regression, the variables were modeled using simple and multiple regressions. The relationship equations between each of the independent variables and the performance were recorded (**Table 4.9**)

Table 4.9 Regression model results for Influence of factor on performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	p-value
Instructional Methods	.194	0.0375	0.0083	15.7315	0.265
Trainer Experience	.113	0.0128	-0.0171	15.9316	0.517
Trainee to trainer Ratio	.059	0.0034	-0.0268	16.0071	0.738
Trainee Attitude	.268	0.0721	0.0439	15.4462	0.119
All	0.319	0.102	-0.018	15.9381	

The contribution or the percentage explained by each of the independent and dependent variables are as shown in **Figure 4.8**. All the variables combined (multiple regression) explained 10.2% of performance. Instructional methods and trainee attitude each explained 3.75% and 7.21% to performance. Trainer Experience and

trainee to trainer ratio explained 1.28% and 0.34% to performance in NPs in Kenya (Figure 4.8).

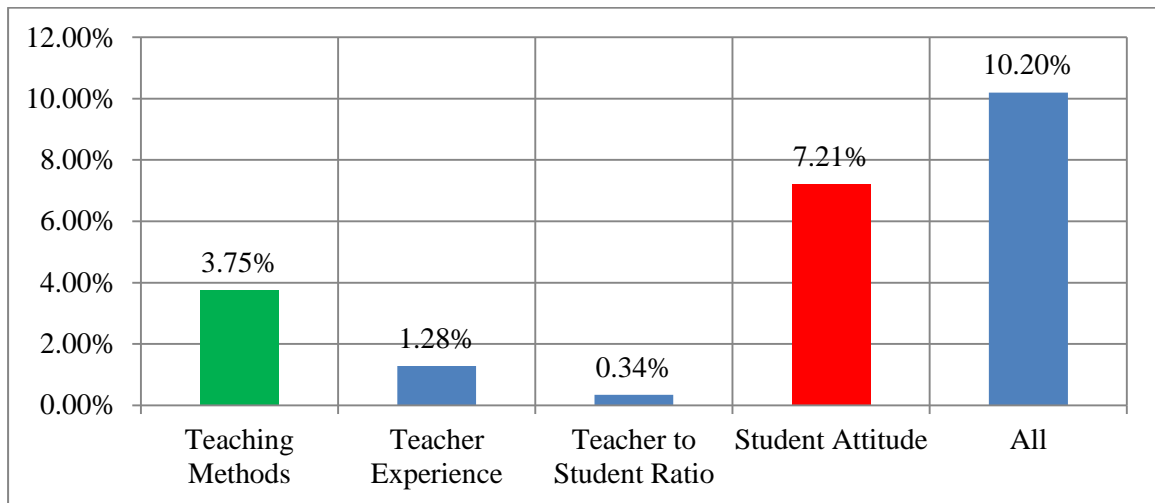


Figure 4.8 Contribution of independent variables to performance

4.9 Model equations

The model generated the equations for each of the model of simple regression between the independent and dependent variable and overall multiple regression for all the variables combined (Table 4.10).

Table 4.10 Regression Coefficients and Statistical Significance

Variable	Constant	Beta	p-value
Instructional Methods	29.14956	0.7540891	0.2653
Trainer Experience	33.16924	0.7448296	0.5171
Trainee to Trainer Ratio	46.07049	-0.5286885	0.7377
Trainee Attitude	23.2221	1.1367754	0.1189
Instructional Methods, Trainer	29.14956	0.7540891	0.4895
Experience, Trainee to trainer		0.7448296	0.6268
Ratio & trainee Attitude		- 0.5286885	0.6431
		- 1.1367754	0.1722

Key: FLP – Flexible learner Progression; SA-Skill Acquisition; ACT-Credit transfer; CU-Content Unitization.

The equation takes the general form:

$$y = \beta_0 + \beta_1 \chi_1 + \beta_2 \chi_2 \dots + \beta_n \chi_n + \varepsilon$$

Where;

y = dependent variable or performance in NPs in Kenya

β_i , $i=1, 2, \dots, n$ are the variable coefficients and

ε is the error term

Therefore, the equations are as follows:

Simple regression:

$$\text{Performance} = 29.14956 + 0.7540891 * \text{Instructional Methods} \dots\dots\dots (i)$$

$$\text{Performance} = 33.16924 + 0.7448296 * \text{Trainer Experience} \dots\dots\dots (ii)$$

$$\text{Performance} = 46.07049 - 0.5286885 * \text{Trainee to trainer ratio} \dots\dots\dots (iii)$$

$$\text{Performance} = 23.2221 - 1.1367754 * \text{Trainee Attitude} \dots\dots\dots (iv)$$

Multiple regressions:

$$\text{Performance} = 22.07634 + 1.228 * \text{IM} + 0.155 * \text{TE} + 0.832 * \text{TSR} + 1.019 * \text{TA} \dots\dots (v);$$

Where;

IM = Instructional Methods

TE = Trainer Experience

TSR = Trainee to trainer Ratio

TA = Trainee Attitude

4.10 Summary

This chapter detailed how the study results were analyzed and interpreted. It further details how correlation and regression values were computed to give meaning and interpretation of the relationship between independent and dependent variables from the study findings on factors influencing the performance of trainees in electrical engineering programmes in national polytechnics in Kenya.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMENDATIONS

5.1 Introduction

This chapter has a summary of the study findings, conclusion, recommendations and suggestions for further research based on the analysis of information that was collected.

5.2 Summary of the Findings

The purpose of the study was to determine factors influencing the performance of trainees in electrical engineering programs in national polytechnics in Kenya. The study explored four major areas; instructional methods, trainer experience, trainee to trainer ratio, and the influence of trainee attitude on their performance in electrical engineering programs in Kenya. Data was collected using a structured and unstructured questionnaire. This yielded both quantitative and qualitative data which was analyzed using descriptive statistics. The results of this study were presented using Pie charts, percentages, and frequency tables. The analyzed data revealed the following:

5.2.1 Instructional Methods and its Influence on Performance

The study analysis from the respondents established that the common instructional method used by the instructors during training of engineering programs was problem-solving. Giving out assignments and marking them on a regularly was the least common method. The study also found that the National Polytechnic trainers used a variety of instructional methods during training. Furthermore, National Polytechnics have implemented specific instructional methods aimed at improving academic

performance, such as demonstration and problem-solving. According to the respondents, the specific instructional methods encouraged teacher-student interaction and resulted in a better understanding of the content taught.

5.2.2 Trainer Experience and its Influence on the Trainees' Performance

From the findings of the study, respondents agreed that experienced trainers trained better than newly hired trainers. The study findings also demonstrated that experienced trainers used their skills effectively during training. The respondents also agreed that there is a link between the years of experience of teachers and the performance of their students. According to the study, the longer a trainer has taught, the better his or her performance. Professional training, short courses, and seminars assisted in expanding trainers' knowledge, allowing them to improve the performance of their students. This study's findings were consistent with those of Keeves and Comber (2013), who found that less experienced teachers were less effective than senior and experienced teachers. In his study, Kafei (2004) found that teacher experience had a direct relationship with student performance.

5.2.3 Influence of Trainee to Trainer Ratio on Performance of Trainees'

Analysis of the findings of this study revealed that as the trainee-to-trainer ratio increased, performance dropped. Similar findings were established by Kaloki (2014). He pointed out that many challenges such as overcrowding arose when the number of trainers is fewer compared to the number of trainees. He established that a large number of trainees promoted feelings of alienation and disengagement. This eroded the sense of responsibility among trainees and led to behaviors that promoted lack of engagement and, finally, poor performance.

5.2.4 Trainee Attitude and its Influence on the Performance

The fourth objective of the study was to find out the influence of trainee attitude on their performance in electrical engineering programs in national polytechnics in Kenya. The study findings found out that attitude influenced performance. The respondents pointed out that those students who had a positive attitude found it easier to seek assistance from trainers and peers. They were also ready to try new things and recognize many different kinds of learning opportunities that enabled them to better understand the content taught. When this happened, it made it easier for learners to improve their performance. A negative attitude on the other hand lowered student morale and affected his or her perception of a subject. It also reduced students' confidence, which finally led to a drop in performance.

5.3 Conclusion

The study was to investigate the factors influencing the performance of trainees in electrical engineering programs in national polytechnics in Kenya. From the study, instructional methods, experience of trainers, trainee to trainer ratio and attitude of the trainee significantly influences the performance of students. Experienced trainers are able to identify which strategies work well in a particular group of students. They know how to engage the trainees and connect with them individually. They are also able to make difficult decisions when required.

Large ratio of trainees to trainers threatens students' ability to learn and lowers trainers' effectiveness. It does not allow the trainer to cater for the individual needs of the students. It also increases burden supervising students at a time and reduces contact hours spent by the trainers with the trainees. A positive attitude makes trainees

absorb learning easily while negative attitude discourages learning by lowering concentration of students.

Positive attitude students are always active in classroom and seek clarification from trainers while negative attitude students lacked confidence to seek information from trainers and peers.

A good and effective instructional method enables the trainer to assess the needs of his trainees. It enables the trainer to use best classroom practices which engage the trainees during the entire lesson and also build positive relationships with the students. From the study, the four objectives must be applied together to attain maximum performance from the students. This is in line with The General Systems Theory introduced by Bertalanffy (1968) which states that a system is a cohesive group of interrelated and interdependent parts that can be human-made or natural. Changing a variable in the system may affect other parts of the whole system. Similarly, electrical engineering itself as a system has various variables which must work in tandem to achieve desired goals (Akaniwor, 2004).

5.4 Recommendations

Based on the study findings, the study made the following recommendations based on the objectives:

1. That, trainers need to widen their knowledge on various instructional methods so that they can be able to keep trainees engaged and motivated during learning process. The trainers should adopt highly effective instructional methods such as problem solving and demonstrations.

2. The human resource of the TVET education sub-sector should ensure that there is institutional memory by retaining experienced academic staff. Furthermore, the trainers should undertake regular trainings or workshops in their area of expertise to enhance their knowledge.
3. The growing number of trainees has made the trainee – trainer trainee ratio increase. This has led to congestion in classrooms thereby compromising the performance. The study recommends that the government needs to review the TVET Act to enable institutions admit students on the basis of trainee to trainer ratio. This study recommends TVET to adopt trainee to trainer ratio of 30:1
4. Trainee attitude needs to be worked on continually. This may be done by a raft of measures such as motivation talks to trainees in forums and offering support at the initial stages when they have chosen a career in Electrical Engineering.

5.5 Suggestions for Further Research

1. There is need for a similar study to be undertaken in different counties in Kenya to allow for the generalization of the study findings.
2. There is need for a similar study to be undertaken from a gender perspective in TVET in Kenya

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APPENDICES

Appendix I: Consent Letter

Calvin Kipsaina
P.O Box 520-30100
ELDORET.

17th February 2021.

Dear Sir/Madam

RE: REQUEST TO CONDUCT RESEARCH IN YOUR INSTITUTION

I am a student at the University of Eldoret pursuing a Master of Education in Technology Education. I am carrying out research entitled factors influencing the performance of students in electrical engineering programs in national polytechnics in Kenya. The purpose of this study is purely for academic pursuit. Your help in filling in the questionnaire will be highly appreciated. All information will be treated with strict confidentiality.

Yours faithfully,

Kipsaina Calvin Cherutich

0714359224

Appendix II: Questionnaire for Trainers

Instructions; Answer the following questions as freely as possible. The answers provided will be kept confidential and will only be used for this study.

A: Background Information

1. Indicate your gender by appropriately ticking the box

Male

Female

2. Indicate your age bracket from the choice given. (Tick appropriately)

Below 25 years

26-35 years

36-45 years

Above 46 years

3. How long have you been a trainer?

Last one year

Last two years

Last three years

More than five years

Others, specify.....

4. What is your highest academic qualification?

A) PhD (b) Masters (c) Bachelors (d) Higher Diploma

c) Diploma (d) Others (Please Specify).....

B. SPECIFIC INFORMATION

In this section, the study is interested in instructional methods which influence performance of trainees in electrical engineering programs. Using the scale herein, indicate each statement the extent to which you agree or disagree.

1-Strongly Agree, 2-Agree, 3- Neutral, 4-Disagree, 5-Strongly Disagree

S/No	Question	1	2	3	4	5
1.	Trainers use the lecture method during teaching					
2.	Trainers use demonstrations as a teaching method					
3.	Trainers use discussion groups among students as a training method					
4.	Trainers use problem-solving skills as a teaching method					
5.	Trainers use question and answer during lessons as a training method					
6.	Trainers use practical's as a training method					
7.	Trainers give and mark assignments regularly					

5. Does your electrical engineering department have specific instructional methods aimed at improving academic performance?

Yes []

No []

6. If yes in (5) above state the specific instructional methods put in place by the electrical engineering department

a)

b)

7. If yes in (5) above what effect(s) does it have on academic performance of trainees?

.....

8. Are there any other instructional methods used by trainers which do not motivate trainees?

Yes []

No []

9. If yes in seven (7) above, name the methods which do not motivate the trainees.....

C. SPECIFIC INFORMATION

In this section, the study is interested in trainer experience issues that influence the performance of trainees in electrical engineering programs. Using the scale herein, indicate each statement the extent to which you agree or disagree.

1-Strongly Agree, 2-Agree, 3- Neutral, 4-Disagree, 5-Strongly Disagree
 1-Strongly Agree, 2-Agree, 3- Neutral, 4-Disagree, 5-Strongly Disagree

S/No	Question	1	2	3	4	5
1.	There is a relationship between Trainers years of experience and trainees performance					
2.	Experienced Trainers have the opportunity to utilize their skills and talents in the class					
3.	Trainers who have undergone professional training for many years are more effective in training					
4.	Trainers have opportunities to advance, learn and develop performance					
5.	Trainers are facilitated to attend engineering workshops, training and seminars to enhance their experience					

D. SPECIFIC INFORMATION

In this section, the study is interested in trainee to trainer ratio issues that influence the performance of trainees in electrical engineering programs.

7. What is the level of trainees' enrollment in your department?

50-100 []

100-500 []

500-1000 []

Above 1000 []

8. What is the ratio of trainees' to trainers' ratio in your class?

15-1 []

30-1 []

45-1 []

60-1 []

Above 61 []

9. Does the ratio of trainees to trainers affect performance?

Yes []

No []

10.If yes, state how it affects the performance of trainees in electrical engineering department.....

E. SPECIFIC INFORMATION

In this section, the study is interested in trainee attitude issues that influence the performance of trainees in electrical engineering programs. Using the scale herein, indicate each statement the extent to which you agree or disagree.

1-Strongly Agree, 2-Agree, 3- Neutral, 4-Disagree, 5-Strongly Disagree

S/No		1	2	3	4	5
1.	The trainees are confident they will get good grades in end term exams					
2.	Electrical Engineering lessons are the best enjoyable lessons by trainees					
3.	My trainees have an interest in a further electrical engineering-related course in the next level					
4.	The trainees are confident in tackling electrical engineering-related problems					
5.	Engineering trainees look forward to electrical engineering lessons					
6.	Trainees pay attention when the trainer is training in the classroom					
7.	Trainees can get good grades in electrical Engineering if I work hard					
8.	Trainees attitude contributes to trainees performance					

11) Does trainee attitude affect academic performance in a class?

Yes []

No []

12) If yes, briefly explain its effects on students' performance.

.....

Thank you for your time and participation.

Appendix III: Questionnaires for Trainees

Instructions; Answer the following questions as freely as possible. The answers provided will be kept confidential and will only be used for this study.

A: Background Information

1. Indicate your gender by appropriately ticking the box

Male

Female

2. Indicate your age bracket from the choice given. (Tick appropriately)

Below 18 years

18-25 years

26-30 years

31-35 years

Above 36 years

3. How long have you been a trainer in this institution?

Last three months

Last six months

Last one year

Last two years

Last three years

More than four years

Others, specify.....

4. What is your level of training at?

a) Artisan (b) Certificate (c) Diploma

Others (Please Specify).....

B. SPECIFIC INFORMATION

In this section, the study is interested in instructional methods issues that influence the performance of trainees in electrical engineering programs. Using the scale herein, indicate each statement the extent to which you agree or disagree.

1-Strongly Agree, 2-Agree, 3- Neutral, 4-Disagree, 5-Strongly Disagree

S/No	Question	1	2	3	4	5
1.	Trainers use the lecture method during teaching					
2.	Trainers use demonstrations as a teaching method					
3.	Trainers use discussion groups among students as a teaching method					
4.	Trainers use problem-solving skills as a teaching method					
5.	Trainers use question and answer during lessons as a teaching method					
6.	Trainers use practical's as a teaching method					
7.	Trainers give and mark assignments regularly					

5. Are there any other instructional methods used by Trainers in class?

Yes []

No []

6. If yes in (5) above list the instructional methods.

.....

.....

7. Do you think instructional methods influence performance?

C. SPECIFIC INFORMATION

In this section, the study is interested in Trainers experience issues which influence performance of trainees in electrical engineering programs. Using the scale herein, indicate each statement the extent to which you agree or disagree.

1-Strongly Agree, 2-Agree, 3- Neutral, 4-Disagree, 5-Strongly Disagree

S/No	Question	1	2	3	4	5
1.	Experienced Trainers teach better than new Trainers					
2.	I perform better in subjects taught by experienced Trainers than newly appointed Trainers					
3.	Our trainers are experienced and well-trained					
4.	Trainers who frequently undergo					

	professional training (short courses) in the area of specialty have a better experience					
5.	Experienced trainers have better interaction skills with learners unlike newly appointed trainers					
6.	There's is a relationship between trainers years of experience and trainee performance					

D. SPECIFIC INFORMATION

In this section, the study is interested in trainee-trainer ratio issues that influence the performance of trainees in electrical engineering programs.

5. What is the level of trainees' enrollment in your class?

1-25 []

26-40 []

41-60 []

Above 61 []

2. What is the ratio of trainee to trainer in your class?

15-1 []

30-1 []

45-1 []

60-1 []

Above 61 []

10. Does the ratio of trainees to trainers affect performance?

Yes []

No []

If yes, state how it affects performance of students in your department

.....

.....

E. SPECIFIC INFORMATION

In this section, the study is interested in trainee attitude issues that influence the performance of trainees in electrical engineering programs. Using the scale herein, indicate each statement the extent to which you agree or disagree.

1-Strongly Agree, 2-Agree, 3- Neutral, 4-Disagree, 5-Strongly Disagree

S/No		1	2	3	4	5
1.	I am confident I will get good grades in my end term exams					
2.	Electrical Engineering lessons are the best enjoyable lessons					
3.	I will go for an electrical engineering-related course on my next level					

4.	I have confidence in tackling electrical engineering-related problems					
5.	I always look forward to electrical engineering lessons					
6.	I pay close attention when the teacher is teaching in the classroom					
7.	I can get good grades in electrical Engineering if I work hard					

13) Does your attitude affect your academic performance in a class?

Yes []


No []


14) If yes, briefly explain the effects on your performance.

.....

Thank you for your time and participation.


Appendix IV: Research Permit


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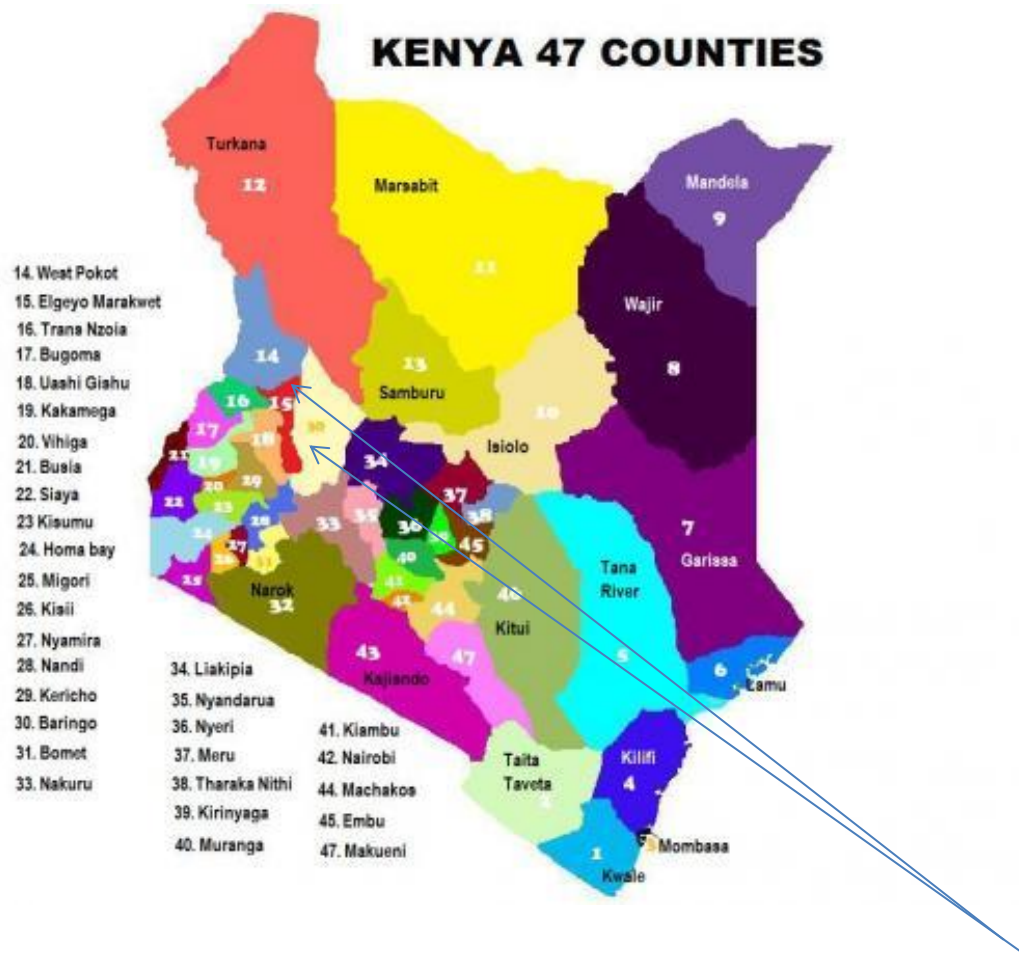
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Appendix V: Map of the Study Area



Study Area

Figure 5.1: Map of Kenya showing the two counties of study area.

Source: Independent Electoral and Boundaries Commission 2018.

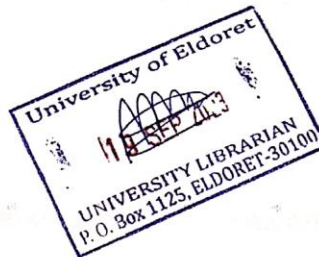
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Submission Information

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Title	FACTORS INFLUENCING THE PERFORMANCE OF TRAINEES..
Paper/Submission ID	974750
Submission Date	2023-09-18 14:10:49
Total Pages	111
Document type	Thesis

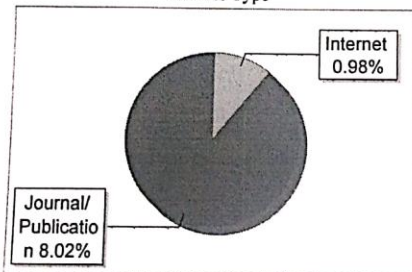


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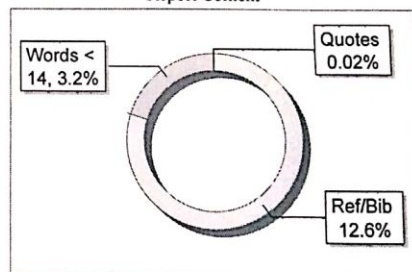
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