CAUSES OF POOR PERFORMANCE IN KNEC EXAMINATIONS AT SELECTED TERTIARY INSTITUTIONS IN KIAMBU, NYERI AND NAKURU COUNTIES

GATUNDU ROBERT KARUMBA
E55/CE/22828/2010

A RESEARCH PROJECT PRESENTED TO THE SCHOOL OF EDUCATION, DEPARTMENT OF EDUCATIONAL MANAGEMENT, POLICY AND CURRICULUM STUDIES IN PARTIAL FULFILLMENT FOR THE DEGREE OF MASTERS IN EDUCATION OF KENYATTA UNIVERSITY

NOVEMBER, 2014
DECLARATION

This is my original work and has not been submitted to any other university for any award.

................................................ ................................................
GATUNDU ROBERT KARUMBA DATE
E55/CE/22828/2010

Supervisors’ declaration

We confirm that the work reported in this project was carried out by the candidate under our supervision as the University supervisors.

................................................ ................................................
PROF. JACK GREEN OKECH DATE
Professor of Education,
Department of Educational Management,
Policy and Curriculum studies,
Kenyatta University

................................................ ................................................
DR. FLORENCE KITHINJI DATE
Senior Principal Lecturer,
Kenya School of Government
DEDICATION

This project is dedicated to my mother, Zipporah Wanjiru who has always encouraged me to further my education.
ACKNOWLEDGEMENTS

I would like to acknowledge the invaluable input from my two supervisors; Prof. Green Okech and Dr. F. Kithinji. May I also express my appreciation to Dr. John O. Orodho who introduced me to the concepts of research.

I would also like to acknowledge the kind support by Mr. Muriithi, Principal Kiambu Institute of science and Technology towards my data collection in his institution and his Secretary, Ann. Special regards also go to Mrs. Mutai, the Deputy Principal Rift valley Institute for her assistance.

Thanks also go to my classmates whose consultations have enriched my knowledge in research, not to mention the typist, Miss Monica who tirelessly and faithfully typed this project report.

Special thanks to my loving wife, Charity Muira who has been patient and supportive of my academic work. The author is wholly responsible for any errors and omissions in the final report.
# TABLE OF CONTENTS

DECLARATION.................................................................................................................. ii  
DEDICATION................................................................................................................... iii  
ACKNOWLEDGEMENTS.................................................................................................. iv  
TABLE OF CONTENTS.................................................................................................... v  
LIST OF FIGURES........................................................................................................... vii  
LIST OF TABLES............................................................................................................. ix  
ABBREVIATIONS AND ACRONYMS............................................................................ x  
ABSTRACT....................................................................................................................... xii  

CHAPTER ONE: INTRODUCTION................................................................................... 1  
1.1 Introduction ............................................................................................................. 1  
1.2 Background to the Study ....................................................................................... 1  
1.3 Statement of the Problem ..................................................................................... 3  
1.4 Purpose of the Study ............................................................................................ 4  
1.5 Objectives of the Study ......................................................................................... 5  
1.6 Research Questions ............................................................................................. 5  
1.7 Assumptions ......................................................................................................... 6  
1.8 Limitations of the Study ...................................................................................... 6  
1.9 Delimitations of the Study ................................................................................... 6  
1.10 Significance of the Study .................................................................................... 7  
1.11 The Theoretical Framework .............................................................................. 7  
1.12 The Conceptual Framework .............................................................................. 9  
1.13 Operation Definition of Key Terms .................................................................. 10  

CHAPTER TWO: REVIEW OF RELATED LITERATURE.............................................. 11  
2.1 Introduction ........................................................................................................... 11  
   2.2.1 Challenges Facing Technical Education in Sub-Saharan Africa ............. 11  
   2.2.2 Vocational Versus General Secondary Education ................................... 14  
   2.2.3 Challenges Facing Technical and Vocational Education in Ghana ....... 17  
   2.2.4 Evolution of Tertiary Education in Kenya ............................................... 19  
   2.2.5 Commitment to International Conventions and National Legislations . 26
2.2.6 The Place of Higher Education, Science, Technology and Innovation Sector in National Development in Kenya ................................................. 28
2.2.7 Challenges Facing TVET in Kenya ................................................. 31
2.2.8 Recommendations of revamping Kenya’s TVET ............................... 35
2.3 Summary of Literature Reviewed .......................................................... 40

CHAPTER THREE: DESIGN AND METHODOLOGY ................................. 42
3.1 Introduction .................................................................................................. 42
3.2 Research Design ......................................................................................... 42
3.3 Location of the Study .................................................................................. 42
3.4 Target Population ....................................................................................... 42
  3.4.1 Sampling Techniques ........................................................................... 43
  3.4.2 Sample Size ......................................................................................... 43
3.5 Research Instruments .................................................................................. 44
  3.5.1 Students’ Questionnaires ..................................................................... 44
  3.5.2 Interview schedules ........................................................................... 44
  3.5.3 HODs’ Questionnaires ........................................................................ 45
3.6 Pilot Study .................................................................................................... 45
  3.7.1 Validity of the Research Instruments .................................................. 45
  3.7.2 Reliability ........................................................................................... 46
3.8 Data Collection Techniques ........................................................................ 46
3.9 Methods of Data Analysis ......................................................................... 46
3.10 Logistical and Ethical Considerations ..................................................... 47

CHAPTER FOUR: PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSION ......................................................................................... 48
4.1 Introduction ................................................................................................ 48
4.2 Demographic Data ..................................................................................... 49
4.3 Analysis of Research Questions .................................................................. 52
  4.3.1 Performance in Electrical engineering ................................................. 53
  4.3.2 Performance in Building Technology .................................................. 56
  4.3.3 Performance by gender ...................................................................... 59
  4.3.4 Overall performance ......................................................................... 61
CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction .............................................................................................................73
5.2 Summary of the Findings .........................................................................................73
5.3 Conclusion ................................................................................................................77
5.4 Recommendations ...................................................................................................78
  5.4.1 Policy recommendations .....................................................................................78
  5.4.2 Suggestions for Further Research ........................................................................78

REFERENCES ..................................................................................................................79

APPENDICES ..................................................................................................................82
APPENDIX I: RESEARCH INSTRUMENTS ....................................................................82
APPENDIX II: TIME SCHEDULE ................................................................................89
APPENDIX III: BUDGET ..............................................................................................90
LIST OF FIGURES

Figure 1.0:  Motivation Model .......................................................... 8
Figure 4.1:  Distribution of Sampled students’ age brackets ..................... 49
Figure 4.2:  Distribution of Students by Gender ...................................... 50
Figure 4.3:  Distribution of Teachers by Gender ...................................... 51
Figure 4.4:  Performance percentage ..................................................... 59
Figure 4.5:  Percentage of KNEC Exams ............................................ 60
Figure 4.6:  Percentage pass by Gender ................................................ 61
Figure 4.7:  Overall percentage (Electrical Engineering) .......................... 62
Figure 4.8:  Overall percentage (Building Technology) ........................... 63
Figure 4.9:  Adequacy of learning resources ....................................... 65
Figure 4.10: Chances of securing industrial attachment ............................ 65
Figure 4.11: Rating of teaching personnel .......................................... 66
Figure 4.12: Chances of passing KNEC exam ....................................... 67
Figure 4.13: Challenges facing college Principals ................................... 70
LIST OF TABLES

Table 2.1: Technical enrolment in secondary education as a percentage of total enrolment ................................................................. 14
Table 3.1: Sampling Frame ............................................................................................................. 43
Table 4.1: Professional Qualifications of Tutors ......................................................................... 49
Table 4.2: Performance in Electrical in KIST ............................................................................ 53
Table 4.3: Performance in Electrical in RVIST ......................................................................... 54
Table 4.4: Performance in Electrical in Nyeri Technical ......................................................... 55
Table 4.5: Performance in Building in KIST ............................................................................. 56
Table 4.6: Performance in Building in RVIST ........................................................................ 57
Table 4.7: Performance in Building in Nyeri Technical ............................................................ 58
Table 4.8: % passes by Gender ....................................................................................................... 59
Table 4.9: % pass by Gender (RVIST) ...................................................................................... 60
Table 4.10: % pass by Gender (KIST) ....................................................................................... 61
Table 4.11: Overall % passes (Electrical engineering) ................................................................. 62
Table 4.12: Overall % passes (Building Technology) ................................................................. 63
Table 4.13: Challenges facing tutors ............................................................................................... 68
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRIC</td>
<td>Brazil, Republic of South Africa, India and China</td>
</tr>
<tr>
<td>BOM</td>
<td>Board of Management</td>
</tr>
<tr>
<td>CEDAW</td>
<td>Convention on all forms of Discrimination against Women</td>
</tr>
<tr>
<td>DOE</td>
<td>Directorate of Education</td>
</tr>
<tr>
<td>DOL</td>
<td>Directorate of Labour</td>
</tr>
<tr>
<td>DQASO</td>
<td>Directorate of Quality Assurance and Standards Office</td>
</tr>
<tr>
<td>DUC</td>
<td>Differentiated Unit Cost</td>
</tr>
<tr>
<td>EFA</td>
<td>Education for All</td>
</tr>
<tr>
<td>ERSWEC</td>
<td>Economic Recovery Strategy for Wealth and Employment Creation</td>
</tr>
<tr>
<td>FET</td>
<td>Further Education and Training</td>
</tr>
<tr>
<td>GER</td>
<td>Gross Enrollment Ratio</td>
</tr>
<tr>
<td>HELB</td>
<td>Higher Education Loans Board</td>
</tr>
<tr>
<td>HOD</td>
<td>Head of Department</td>
</tr>
<tr>
<td>ICT</td>
<td>Information Communication Technology</td>
</tr>
<tr>
<td>ILO</td>
<td>International Labour Organization</td>
</tr>
<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>KCSE</td>
<td>Kenya Certificate of Secondary Education</td>
</tr>
<tr>
<td>KESSP</td>
<td>Kenya Education Sector Support Program</td>
</tr>
<tr>
<td>KIST</td>
<td>Kiambu Institute of Science and Technology</td>
</tr>
<tr>
<td>KITI</td>
<td>Kenya Industrial Training Institute</td>
</tr>
<tr>
<td>KNEC</td>
<td>Kenya National Examinations Council</td>
</tr>
<tr>
<td>MDG’S</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>MOHEST</td>
<td>Ministry of Higher Education, Science and Technology</td>
</tr>
<tr>
<td>NP’S</td>
<td>National Polytechnics</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>NQF</td>
<td>National Qualifications Framework</td>
</tr>
<tr>
<td>PRSP</td>
<td>Poverty Reduction Strategy Paper</td>
</tr>
<tr>
<td>RVIST</td>
<td>Rift Valley Institute of Science and Technology</td>
</tr>
<tr>
<td>SAPs</td>
<td>Structural Adjustment Programmes</td>
</tr>
<tr>
<td>SETAs</td>
<td>Sector Education and Training Authorities</td>
</tr>
<tr>
<td>ST&amp;I</td>
<td>Science, Technology and Innovation</td>
</tr>
<tr>
<td>TC</td>
<td>Technical College</td>
</tr>
<tr>
<td>TSC</td>
<td>Teachers Service Commission</td>
</tr>
<tr>
<td>TTC</td>
<td>Technical Training College</td>
</tr>
<tr>
<td>TU</td>
<td>Technical University</td>
</tr>
<tr>
<td>TIVET</td>
<td>Technical, Industrial, Vocational Education and Training</td>
</tr>
<tr>
<td>TVET</td>
<td>Technical and Vocational Education and Training</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations Educational Scientific and Cultural Organization</td>
</tr>
<tr>
<td>VTC’S</td>
<td>Vocational Technical Colleges</td>
</tr>
</tbody>
</table>
The importance of tertiary education in our socio-economic growth projections cannot be gainsaid. It is the engine for technological growth in any country. Yet most Diploma students specializing in engineering courses fail the final examinations administered by KNEC every year. The purpose of this study was to determine the specific causes of poor performance in our tertiary institutions. A four-year analysis of performance in three Technical colleges was undertaken to highlight the problem. The fields of study under consideration were Electrical engineering and Building technology. The study was guided by three objectives which were to seek challenges facing Diploma students, find out the percentage of students who obtain certification after sitting KNEC exams over a duration of four years and challenges facing college administrators and tutors in these institutions. The expectancy theory of motivation informed the study. Whereas purposive sampling was used to identify the colleges to be involved in the study, random sampling was used in giving questionnaires to the students of the two fields of engineering. A descriptive survey research was adopted. Research was conducted in three tertiary institutions i.e. Kiambu Institute of Science and Technology, Nyeri Technical Training Institute and Rift valley Institute of Science and Technology, Nakuru. Two research instruments were used to collect data. Questionnaires were given to students and Heads of Departments while interviews were conducted with the college Principals. A pilot study was conducted to ascertain the validity and reliability of the instruments before commencing the actual research. The college participating in the pilot study did not take part in the main study. The Statistical Package for Social Sciences (SPSS) was used in data processing and organization. Processing involved computation of percentages and frequencies. The results were then presented in frequency tables, pie charts, bar graphs and line graphs. A population of twelve thousand was targeted and a sample size of one hundred and twenty nine was involved. This study revealed that a majority of students specializing in technical courses fail their final examinations due to many challenges facing them. An urgent programme of upgrading college infrastructure was proposed. It was envisaged that the findings of this study would inform the ministry of higher education to formulate relevant policies to address the challenges in TVET. College administrators would also benefit by gaining a deeper understanding of the challenges that undermine students’ performance in KNEC exams. Other stakeholders e.g. donors, curriculum experts and the Boards of Management of these institutions would also find this study helpful in their resource allocation and general college administration.
CHAPTER ONE
INTRODUCTION

1.1 Introduction

This chapter provides the background to the study and statement of the problem. The chapter also states the purpose of the study, highlights objectives and significance of the study, including limitations and assumptions.

1.2 Background to the Study

According to a World Bank report (2010), Tertiary education exercises a direct influence on national productivity, which largely determines living standards and a country’s ability to compete in the global economy.

Nge’the (2010) observes that Tertiary education institutions support knowledge-driven economic growth strategies and poverty reduction by training a qualified and adaptable labour force, generating new knowledge and building capacity to access global knowledge and to adapt that knowledge to local use.

In its report, UNESCO (2009) notes that sustainable transformation and growth throughout the economy are not possible without the capacity-building contribution of an innovative Tertiary Education system. This is especially true in low-income countries with weak institutional capacity and limited human capital. Access to tertiary education can open better employment and income opportunities to under-privileged students, thereby reducing inequity (UNDP, 2010).
The Sessional paper No. 10 (1965) identified relevant and quality education as a means of eliminating poverty, disease and ignorance. In the PRSP (2001-2003), the Government underscored the correlation between poverty and illiteracy among adults. Since independence, technical colleges and institutions commonly referred to as middle-level colleges have found favour with many KCSE examination leavers because they offer the broadest career choices that cater for the needs of students across several KCSE grades.

In Kenya, they are the major national institutions for technically-trained personnel that take up middle–level jobs in the industry. ERSWEC (2007) also asserts that education is a key determinant of earnings; hence an exit route from poverty as it improves people’s ability to take advantage of the opportunities that can improve their well-being and participate effectively in their communities.

The restructuring of Kenya’s education system from 7-4-2-3 to 8-4-4 introduced a broad-based curriculum that was meant to offer learners pre-vocational skills and technical education. In the vision 2030 blueprint, Kenya government identifies TVET as one of the main drivers of growth towards that vision, an ambitious long-term development agenda to transform the country into a newly industrialized nation by the year 2030. Consequently, the Kenyan government, in collaboration with her development partners e.g. World Bank, continues to commit substantial amounts of money to fund tertiary education.

Very few studies have been carried out on the causes of poor performance in tertiary institutions. Yet such a study would be very crucial given the central role of tertiary
education in Kenya’s development agenda. This study will seek to find out the challenges facing students in technical tertiary institutions that contribute to poor performance in the end of stage KNEC exams. The percentage of certification after KNEC exams over a four-year period will also be calculated to show the trends in performance. As the country gears up towards vision 2030, the quality, relevance and importance of TVET cannot be under estimated.

1.3 Statement of the Problem

Kenya’s vision 2030 and the constitution of Kenya (2010) explicitly place a premium on the generation and management of knowledge and the need to raise productivity and efficiency. Science, Technology and Innovation are critical to the creation and application of knowledge in a manner that enables a country to generate a portfolio of tradable goods and services.

Despite the various interventions and massive investments that have gone into enhancing TVET, the number of students who achieve certification after sitting KNEC technical examinations is worryingly low as shown in the table below.

<table>
<thead>
<tr>
<th>Course</th>
<th>% of certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical &amp; Electronics</td>
<td>23.4</td>
</tr>
<tr>
<td>Mechanical</td>
<td>25.1</td>
</tr>
<tr>
<td>Building</td>
<td>27.0</td>
</tr>
</tbody>
</table>

Source: KNEC annual report 2010
As the table above shows, less than 30% of candidates sitting KNEC technical exams were certified in 2010 alone in the three programmes sampled. It is suspected that the problem of poor performance could be much bigger in the individual colleges.

The task of this study was therefore to analyze in detail, the performance of Diploma students pursuing technical courses in KNEC exams in the various colleges under consideration and to find out the causes of this poor performance.

1.4 Purpose of the Study

The purpose of this study was to determine the underlying causes of poor performance of students in KNEC exams. In addition, this study was intended to reveal the challenges facing students, tutors and college Principals in Diploma technical institutions with a view to finding solutions. The importance of tertiary education sector in producing the much needed middle-level skilled manpower for our industrial and Technological growth cannot be overemphasized.

An evaluation of students’ performance over a four- year period was done after which the percentage of students who had been certified over this period was calculated. This covered the two main fields of engineering i.e. Electrical and Building technology and it was important in revealing the wastage of students after many years of training. A very deliberate effort was also undertaken to find out the challenges faced by both students and tutors in these institutions through Questionnaires.

Finally, an interview with the college Principals revealed the challenges they encounter when running tertiary institutions and what they think need to be done to
enhance the quality of education and training in Technical colleges. The task of this study was therefore to interrogate the factors behind poor performance in KNEC examinations by students specializing in technical courses.

1.5 Objectives of the Study

The objectives of this study were;

i). To determine the percentage of Diploma technical students who were certified in KIST, RVIST & Nyeri Technical after sitting the KNEC exams in the period between 2008-2011.

ii). To investigate the learning difficulties facing students in KIST, RVIST and Nyeri Technical Colleges.

iii). To find out the challenges tutors and college Principals face in running tertiary institutions.

1.6 Research Questions

i). What percentage of Diploma engineering students were certified after sitting KNEC exams in the period 2008-2011 in KIST, RVIST and Nyeri Technical?

ii). What learning challenges do Diploma technical students encounter in their studies?

iii). What Challenges do college principals and tutors go through as they run tertiary institutions?
1.7 Assumptions

The assumptions of this study were;

i). That all tertiary institutions involved in the study have basic infrastructure for teaching and learning.

ii). The respondents in the selected tertiary institutions will be cooperative and will provide reliable responses.

iii). Data on students who have sat KNEC exams between 2008-2011 is available.

The above assumptions were all valid since the institutions involved in the study were well established, had all the necessary information on facilities and data on students’ performance was availed though after lengthy procedures. All the respondents were cooperative and provided timely responses.

1.8 Limitations of the Study

This study was limited to selected technical tertiary institutions in Kiambu, Nakuru and Nyeri counties. This was because they train middle-cadre personnel only unlike some national polytechnics that have begun offering Degrees e.g. The Kenya polytechnic. In addition, the colleges involved were fairly accessible with surmountable logistical challenges.

1.9 Delimitations of the Study

The study confined itself to public technical institutions only. This is because the institutions are funded through tax payer’s money hence the need to evaluate if Kenyans are getting value for their money. In addition, only students specializing in engineering courses were sampled.
1.10 Significance of the Study

It was envisaged that the findings of this study would assist the ministry of higher education to clearly identify the critical areas that require strengthening in a bid to enhance TVET. This paradigm shift would hopefully enhance efficiency, access, equity, relevance, and quality of training.

To the other financiers of tertiary education e.g. UNESCO, USAID, World Bank, etc, this study would be important for them to know the critical areas that require funding. It was also hoped that this study would influence a change in pedagogy, the trainers being challenged to change their methods of teaching with a view to improve performance. The DQASO would also be challenged to rededicate their efforts in monitoring the quality and effectiveness of teaching and training in tertiary institutions.

Practically, the financiers of tertiary institutions will be provoked to ask more questions with regard to quality so that they can get value for money. This will go a long way in assisting the country to move towards achieving vision 2030.

1.11 The Theoretical Framework

This study was based on the expectancy theory of motivation first proposed by Victor H.Vroom. According to this theory, the strength of a tendency to act in a certain way depends on the strength of an expectation that the act will be followed by a given outcome and on the attractiveness of the outcome to the individual.
Therefore it includes three variables i.e.

**Attractiveness:** the importance the individual places on the potential outcome or reward that can be achieved on the job. This variable considers the unsatisfied needs of the individual.

**Performance –reward linkage:** the degree to which the individual believes that performing at a particular level will lead to the attainment of a desired outcome.

**Effort –performance linkage:** the probability perceived by the individual that exerting a given amount of effort would lead to performance.

Whether one has the desire to produce at any given time depends on one’s particular goals and perception of the relative worth of performance as a path to the attainment of those goals as shown in the diagram below.

**Figure 1.0: Motivation Model**

![Motivation Model Diagram]

From the above model, the strength of a person’s motivation to perform (effort) depends on how strongly s/he believes she can achieve what she attempts.

Accordingly, the efforts by students towards passing their exams depend on how they feel about their chances of success. When they see their senior colleagues flopping in the KNEC exams, this demoralizes them and many may end up not putting in the necessary efforts.
Similarly, the effort by college tutors and their commitment in their work depends on how they feel in as far as recognition/reward of their effort is concerned. If little effort is done by college management to motivate the tutors, their effort may be luck luster.

Additionally, if the tutors have to cope with harsh working environment where there are inadequate tools, apparatus, reference materials etc. this may contribute to the poor performance.

1.12 The Conceptual Framework

Figure 1.1: Factors influencing performance

From fig 1.1 above, an institution with modern and adequate training facilities combined with a well trained staff records a high level of certification. On the contrary, one with inadequate and obsolete facilities plus poorly trained staff realizes a low level of certification.
1.13 Operation Definition of Key Terms

Certification: Refers to sitting for the Kenya National Examinations council end-of-course exam and passing.

Vision 2030: Refers to The Government of Kenya’s plan for the country to achieve middle-income status by the year 2030.

Student: Anyone enrolled in a post-secondary institution.
CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter contains a discussion of related literature under various sub-headings and then a summary of the reviewed literature.

2.2.1 Challenges Facing Technical Education in Sub-Saharan Africa

People are the real wealth of nations (UNDP, 2010) and education enables them to live healthier, happier, and more productive lives. Lee (2008) observes that Modern Technologies have not been utilized in third World and most learning facilities have not been upgraded due to financial constraints.

According to UNESCO (2009), TVET is still underserved in most African countries. In this connection, one of the most challenging tasks is to change attitudes towards TVET among stakeholders, including policymakers and service providers, as well as parents and teachers which could slow progress towards achievement of MDGs, many of which require tertiary-level training to implement.

World Bank (2010) notes that Africa’s stock of human capital with tertiary-level skills is comparatively small, and its quality is highly variable in light of recent trends in technology. As such, neglecting tertiary education could seriously jeopardize SSA’s longer-term growth prospects (UNDP, 2010).

According to Kvaak (2004), while the number of vocational technical schools has greatly increased in the developed countries since 1900 and vocational education has
continued to thrive in many societies, Nigeria has neglected this aspect of education. Consequently, the Nigerian society lacks skilled technicians i.e. bricklayers, carpenters, painters and auto mechanics, laboratory and pharmacy technicians, electrical/electronic technicians, food processors and horticulturists and skilled vocational nurses. Kvaak (2005) posits that many vocational institutions and even polytechnics and universities in Nigeria are too poorly equipped to deliver quality teaching and learning, merely increasing students’ intake without a commensurate increase in quality of teaching.

A World Bank report (2010) observes that GDP growth in Sub-Saharan Africa (SSA) accelerated to over 6.0 percent on average during 2002-07 periods. This report argues that there is an urgent need for countries in SSA to acquire the capabilities that will spawn new industries that create more productive jobs, multiple linkages, and more diversified exports. These capabilities derive from investment in physical assets, such as infrastructure and productive facilities, and in institutions and human capital. Countries with more highly skilled and more agile workforces have a clear advantage in the global economy (UNESCO, 2009).

KIPPRA (2005) notes that although Kenya’s education budget is high (34 percent of aggregate public expenditure and 7.9 percent of GDP in 2002/3), the expenditures are skewed to personnel emoluments and primary education, leaving limited resources for other education sectors such as middle -level tertiary education.
According to Kerre (1992), the technological progress and development of a country is dependent on the technical and vocational training given to Technical and Vocational Education Teachers. Human capital, effectively harnessed, would enable African economies to increase allocative efficiency and maximize the returns from (initially) limited physical capital. World Bank (2010) insists that it is only through knowledge and informed judgment that African countries will be able to cope with profound threats from disease, an expanding youthful and urbanizing population, and climate change.

UNESCO (2009) observes that in most countries, the budget for TIVET from public sources is relatively small, ranging from 1 to 12 per cent of the current expenditure on education. The G.O.K (2005) emphasizes on the need for adequate staffing for the effective education at all levels of training. The Trainers level of qualification is critical in determining the efficiency of the training process. Nge’the (2010) observes that the trainer should possess higher qualification to effectively execute the training tasks.

The twenty first century presents a radically different economy and Society, which is likely to have profound implications on Technical Vocational Education and Training (TVET). Lee (2005) emphasizes that the TVET system must adapt to key features which include Globalization & Sustainability, ICT Revolution and Emergence of Knowledge Society.
According to a UNESCO report (2009), roughly 120 countries provide some form of technical or vocational secondary education, as distinct from a purely generalist curriculum. In 2010, just under one in nine of the world’s secondary school students attended such institutions – a figure that has remained static for over a decade, with only the Arab States and Central Asia seeing any significant change as shown in the table below.

Table 2.1: Technical enrolment in secondary education as a percentage of total enrolment

<table>
<thead>
<tr>
<th>Region</th>
<th>1998</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central and Eastern Europe</td>
<td>19%</td>
<td>20%</td>
</tr>
<tr>
<td>Central Asia</td>
<td>6%</td>
<td>19%</td>
</tr>
<tr>
<td>East Asia and the Pacific</td>
<td>14%</td>
<td>17%</td>
</tr>
<tr>
<td>North America and Western Europe</td>
<td>14%</td>
<td>13%</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>12%</td>
<td>10%</td>
</tr>
<tr>
<td>Arab States</td>
<td>14%</td>
<td>8%</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>7%</td>
<td>8%</td>
</tr>
<tr>
<td>South and West Asia</td>
<td>1%</td>
<td>2%</td>
</tr>
<tr>
<td>World</td>
<td>11%</td>
<td>11%</td>
</tr>
</tbody>
</table>


Advocates of vocational education point to a variety of advantages, but the strongest ones are economic. Aduda (2003) asserts that the provision of specialist skills can enhance individual earning capacity and therefore economic growth in the aggregate by easing the transition from education to the workplace. Secondly, such education is
more appealing to students who see its relevance far more clearly than they do that of traditional academic subjects.

Those who support a more general approach to education have strong arguments as well. Hammond (2010) reflects the view that education should primarily be about developing the human being as a whole as opposed to training in specific job-related skills. Advocates of a generalist education also contend that such an approach leaves an individual better able to adapt to change than one with very specific skill. This is particularly important given rapid technological change, which will make even a very advanced understanding of current equipment obsolete in a relatively short time.

Deciding which side has the stronger case is complicated. To Khemba (2004) a wide range of diverse institutions of varying quality provide vocational education, making it hard to know just what to compare to what. Moreover, such schools play markedly different sorting functions in different societies. Germany’s system – which involves fully vocational schools as well as those mixing vocational and general education – is highly regarded and includes over half of the country’s upper secondary students. In other countries, however, vocational schools serve as markers of a students’ lower socio-economic status. Hammond (2010) notes that in Hungary, 54% of pupils in vocational schools were from the bottom socio-economic quartile, and in South Korea the figure is 52%. In other countries still, these schools are simply seen as a destination for students who are unable to succeed in more academic environments.

Vocational school success is also difficult to measure. According to Lee (2008), one study found that in countries where these institutions are less attractive – as measured
by the socio-economic status of those who attend, mathematics grades of vocational students tend to be lower than those in general education. The opposite is true where vocational schools attract people from higher socio-economic levels, suggesting that demographic differences – rather than pedagogical ones – explain apparent grade disparity.

To get around some of these issues, researchers have tended to look at the impact of being educated by comparable vocational and general school systems within countries. A World Bank (2010) study of Germany, the Netherlands and the United Kingdom found that, while those with a vocational education began their careers with slightly higher average wages, this disparity disappeared in less than a decade and, for most of the remainder of working life, those with a generalist education received the better incomes. Similarly, according to UNESCO (2011), an examination of data from 18 countries found that vocational school students typically had higher employment rates immediately after graduation, but that this advantage also disappeared within a decade as generalists with flexible skills usually became more likely to be employed than their counterparts.

These data point to a definite trade-off between types of education, but still do not settle the question of which produces better overall economic results. In cases, average wages and employments levels were usually very close both at any given point and over the course of a lifetime. A UNESCO (2011) study which looked at 18 countries, for example, notes that “In line with the relative pace of economic change in their economies, the balance in lifetime earnings appears to be in favour of vocational education in Switzerland, but in favour of general education in Denmark and Germany.”
Stacking up general against vocational education, though, may be the wrong comparison. If their economic impact is similar at the individual and presumably the societal level, they are certainly both superior to an incomplete education or none at all. Here, the argument that vocational education is likely to be more attractive to those put off by more academic study becomes relevant. World Bank (2010) looking at OECD countries found that the amount of vocational schooling in a country as a proportion of total educational places available had no effect on the inculcation of cognitive skills – as measured by PISA scores – but correlated positively with the completion rate for secondary school. Presumably, the choice prevented students who were unsuited or not attracted to a general education to remain in the system.

Overall, then, vocational education may not help students earn or contribute to the economy more over their lifetime, and too specialized a curriculum may make them less prepared to cope with rapid technological change. Nevertheless, by providing an educational pathway for those who otherwise would drop out, they are likely to be well worth the additional cost.

### 2.2.3 Challenges Facing Technical and Vocational Education in Ghana

Ghana was one of the earliest countries in Africa to gain independence and has enjoyed political stability since then. Yet according to the international Journal of Scientific and Technology Research (June 2013), technical and vocational education and training (TVET) in Ghana is facing a number of challenges. According to the journal, three different forms of TVET have evolved in Ghana. These comprise the formal, non-formal and the informal.
The formal system includes primarily time-bound, institution-based, graded and certified training offered by institutions such as the National vocational training institute (NVTI), Ghana Education Service (GES), technical Institutes, Youth training institutions and a variety of private vocational training schools.

According to Ghana Education Service publication (2007), non-formal TVET typically has structured learning objectives, learning times and learning support but will not lead to certification. Workshops, short courses and seminars are typical examples of non-formal learning. The informal system includes a wide range of flexible programmes and processes by which individuals acquire skills and knowledge from designated training venues. Limited number of training institutes is one of the major challenges facing TVET in Ghana. The total number of Technical Institutes is woefully inadequate and statistics by ministry of Education indicate they are currently 21.

Lack of facilities and materials for training students is the other challenge. A Technical school, being a place to acquire practical knowledge and hands-on experience in a chosen field, lack of materials compromises the training.

In Ghana, there is a limited number of training institutions for technical teachers. Presently, it is only the Kumasi campus of the University of Education that is training pure technical graduates to become technical teachers in their areas of specialization. The rest of the Technical training colleges train technical teachers from those who have completed senior high or finished secondary technical schools and not from pure technical institutes. These categories of technical teachers are trained to teach pre-
technical skills or basic Design and Technology (BDT) in junior high schools (JHS) and even if these technical teachers progress into the university, they don’t teach in pure technical institutes since they are weak in theory and practicals which are the backbone of TVET.

A difficulty in career progression is yet another challenge facing TVET in this country. This is particularly difficult for students who begin at craft level. For them to finally acquire a degree in technical education is near impossible. Many road blocks have been placed their way e.g. having to pass very well in English language and mathematics. Whilst countries in Asia are making in-roads in Science, Engineering and Technology using their native languages, in Ghana English language is being used to impede the progress of those who will do the re-engineering.

Other challenges in Ghana’s tertiary education sector includes mismatch between acquired skills and market needs, widespread concern about poor quality training and training environments and negative public attitudes and perceptions regarding technical and vocational education and training (UNESCO, 2009).

### 2.2.4 Evolution of Tertiary Education in Kenya

Since independence, technical colleges and institutes commonly referred to as middle-level colleges have formed the bedrock of Kenya’s tertiary education. Over the years, they have found favour with many K.S.C.E examination leavers because they offer the broadest career choices that cater for the needs of students across several K.C.S.E grades.
These colleges offer what has globally come to be referred to as technical and vocational education and training (TVET). Nge’the (2010) notes that in Kenya they are the major national institutions for technically–skilled human resource development which has driven growth since the beginning of 1970’s. They also have been recognized as some of the key drivers of vision 2030, an ambitious long-term development agenda to transform the country into a newly industrializing nation by the year 2030.

Eshiwani (1993) notes that traditional African education trained individuals to fit in society as useful members. It provided skills, knowledge and values relevant to the society. The history of Technical and Vocational Education and Training in Kenya is as old as the formal education. The British Government used this type of Education to produce critical human resources needed to develop the then Kenya colony. The Koech commission (1999) observed that the country needed construction workers, home, office furniture, and agricultural workers. Sifuna (1992) observes that industrial training in basic skills had started by 1952.

When the Missionaries came, they spread Christianity to produce African priests to spread the word of God. Missionaries controlled education up to 1911 when colonial Government stepped in. The colonialists wanted Africans to form largely a laboring and clerical class. As such, the colonial education emphasized technical and vocational skills at the expense of an academic one. According to Eshiwani (1993), Africans wanted an academic education which would help them develop socially, economically and politically.
After independence, many Kenyans had access to formal education. However, the Government soon realized that academic education led to massive unemployment. This led to the Mackey commission (1981) which emphasizes that education should be aimed at enabling youths to play a more effective role in the life of the nation by imparting to them necessary skills and knowledge and inculcating the right attitudes. The Mackay commission recommended the restructuring of the education system to 8-4-4 with an emphasis on practical skills at early stages to enable school leavers be self-employed. The Government agreed and adopted these proposals by introducing technical subjects such as Music, Agriculture, Art & Craft, Home science and business studies.

In secondary schools, Metal work, Woodwork, Technical drawing & Design and Electricity are among the technical subjects that were introduced. Technical secondary schools were also introduced. In 1984, there were 15 technical secondary schools located in different parts of the country. Nine of the schools offered basic mechanical, electrical, agriculture mechanics and welding of the engineering trade while five offered basic carpentry, joinery, masonry, bricklaying, plumbing and surveying of the building trades. Kabete technical offered both. Consequently, the enrollment in technical education rose from 1500 in 1963 to 9000 in 1983 (MOHEST 2009). Presently, we have village polytechnics, Institutes of technology, National Polytechnics and Technical universities all offering various categories of technical and vocational training at different levels.

However, several years down the line, the technical subjects have been withdrawn in primary and secondary schools due to cost implications, lack of qualified teachers,
negative attitude, among others. Ironically, several decades later after independence, most African states are now stressing those aspects of education that they rejected before independence i.e. technical and vocational education.

Vision 2030 anticipates a 10 percent annual economic growth in order to propel the country to middle-income nation and guarantee quality life for Kenyans. According to the ERSWEC (2007), in order to achieve vision 2030, Kenya will need to train at least 90,000 electricity technicians, 400,000 artisans and 30,000 new engineers. Tertiary institutions will be expected to play a key role towards this.

According to Ng’ethe (2010), the institutions equip students with technical and professional competencies and some specific occupational skills which are seen as critical in providing students with science, technology and innovation skills. These skills are global and can enable students to work in different parts of the world.

Equally significant is that tertiary education has strong orientation to world of work because its curriculum emphasizes on acquisition of skills that directly relate to production and entrepreneurship skills. It offers the students a platform to explore their practical aptitudes and gain a good perspective of technology which is central to sustainable growth, wealth creation and poverty reduction (Ng’ethe, 2010).

In its report, MOHEST (2010) explains that tertiary education is mainly offered in youth polytechnics, technical training institutes, institutes of science and technology, National polytechnics and other private run institutions. The report states that Kenya has a total of 238 such colleges, 44 of them public. The 44 include National
polytechnics, 19 technical training institutes of science and technology and four vocational training institutes all of which admit about 100,000 full-time and part-time students. Although some national polytechnics have become constituent colleges of universities, they still offer non-degree training leading to the award of certificates, diploma or higher diplomas.

Over the years, the institutions have also fulfilled the significant role of relieving universities of pressure on student admission by absorbing a sizeable number of secondary school leavers. In the last 15 years, the enrollment in secondary schools has grown from about only 400,000 students to more than 1.4 million currently (MOHEST, 2010). Secondary school completion rates have also improved with at least 85 percent or about 300,000 of those who enter form one staying on to sit the K.C.S.E in form four.

Although university and higher education system has registered significant expansion over the years, 80,000 qualified candidates miss out on subsidized university education every year. Only less than half of these manage to enroll in the universities under the self-sponsored programs as the cost of the Programmes as the fees are prohibitive. They range from sh.150, 000 for general degree courses to sh.400, 000, for science and technical-based courses such as engineering and medicine in one year.

The vocational and entrepreneurial skills that technical colleges impart are very handy in the labour market. Because graduates of these institutions easily secure jobs immediately after completion, some students admitted to general degree courses in
universities nowadays prefer to join post secondary non-degree institutions that offer market oriented courses. Some later on pursue degree level education.

Significantly in the late 1970’s and 80’s, the government realized that the effectiveness of university-trained professionals such as engineers, doctors and architects would be inadequate without the middle-level cadre who are trained more on the job skills. According to Mackay Report (1984), these training Programmes are career focused.

In addition, the institutions are strong in exposing students to scientific and technological trends and thinking besides preparing them for university education. Technical training institutes, institutes of science and technology and vocational training institutes are spread in the 47 counties and offer courses leading to the award of certificates and diplomas in various disciplines. Different churches such as the catholic and the Presbyterian church of east Africa have also sponsored technical colleges that offer artisan and diploma courses to school leavers.

Some of the courses offered in the institutions include building and civil engineering, mechanical engineering, architecture, printing technology, library studies, business studies and food and beverages production. Other areas of training include information communication technology, graphics design, secretarial studies, survey and mapping, carpentry and joinery and masonry.

Most of the examinations offered are administered by KNEC. Certificate courses normally take one year while diploma courses go for up to three years. Applicants are
required to have met specific subject scores in K.C.S.E depending on the course applied for. For example in many engineering courses, applicants will normally be required to have scored at least a grade C in mathematics and science subjects.

Even if one enrolls for such courses, the students cannot be registered for KNEC examination without having met the K.C.S.E aggregate and subject requirements. Information on the courses offered and academic requirements can be obtained from the director of technical training, MOHEST or at the various districts and provincial education offices throughout the country or the individual institutions.

Upon completion of the programs, the trainees are easily employed in the private or public sector. Those with training in engineering fit in very well in production plants, construction industry and food production among others.

Since independence in 1963, the Government recognizes education as a basic human right and a powerful tool for human and national development. Nearly 73% of the Governments’ social sector spending and about 40% of the National recurrent expenditure go to education. This translates to 7 per cent of the GDP (Daily nation 3rd May 2011).

Recent government policy documents and Programmes have focused on the importance of education in eliminating poverty, diseases and ignorance. These include; economic recovery strategy for wealth and employment creation (ERSWEC 2003-2007), the Sessional paper no. 1 of 2005 on education training and research, policies on the HIV and AIDS and gender in education (2007), the non- formal
education sub-sector and the nomadic education sub-sector policies currently being developed and the most recent Kenya’s vision 2030, which aims at turning the economy into a middle income country in twenty years.

2.2.5 Commitment to International Conventions and National Legislations

Kenya is a signatory to several international conventions and agreements and has ratified a number of them thus committing her to the implementation of the recommendations therein. Some of these conventions and declarations include; the universal declaration on human rights (1958); the minimum age convention (1973); the convention on the elimination of all forms of discrimination against women (CEDAW) of 1979; convention on the protection of the rights of all migrants workers and members of their families (1990); Beijing declaration and platform for action (1975); convention on the elimination of the worst forms of child labour (1999); Dakar framework of action on EFA (2000); millennium development goals (MDGS) of 2000; convention on the rights of persons with disabilities (2006) as well as the goals of the African union.

Following the ratification of these conventions, Kenya Government has domesticated the same through legislative and policy pronouncements. These documents reiterate the need to eliminate all forms of discrimination, hence the right to education by all citizens. Key policy pronouncements include the initiation of free primary education (2003) and free secondary education (2008) among others.

The overall education policy goal of Government of Kenya is to achieve EFA by 2015 in tandem with the National and International commitments. This is to be achieved
through specific educational objectives and Programmes designed for the provision of
an all-inclusive quality education and training that is accessible and relevant to all
Kenyans.

The vision of the ministry of education is “to have a globally competitive education,
training and research for Kenyan’s sustainable development”. Its mission is to
“provide, promote, and coordinate the provision of quality education, training and
research for the empowerment of individuals to become responsible and competent
citizens who value education as a life-long process”.

This is guided by the understanding that quality education and training contributes
significantly to economic growth, better employment opportunities and expansion of
income generating activities. Education and training in Kenya is governed by the
Education act (1968) which gives guidelines on the establishment and development of
schools, their management and administration, development of curricula, and teacher
education.

Other related acts of parliament include teachers service commission (TSC) act;
Kenya national examinations council (KNEC) act; board of adult education (BAE)act;
higher education loans board (helb) act; universities act; and various other acts and
charters for individual universities. One of the major reforms in legal framework
include the formulation of the Sessional paper no. 1 of 2005, a policy framework for
education, training and research which has provided the foundation for further sector
reforms.
In addition, the Legal framework for TVET has been reviewed through the TVET Bill to provide for the establishment of a TVET authority to oversee the TVET system in the country. Kenya vision 2030, the country’s new long- term national planning strategy formulated in 2007, identifies education as key within the social pillar to steer Kenya into a middle- level income country in 20 years. The development of the National skills training strategy and the legal framework will strengthen mechanisms for the implementation of the necessary TVET reforms aimed at enhancing the capacity of the subsector.

Some of the challenges still facing TVET include inadequate facilities and capacities to cater for the large numbers of those who complete primary and secondary education and wish to undertake TVET and also to produce graduates with skills which are relevant to the industry.

2.2.6 The Place of Higher Education, Science, Technology and Innovation Sector in National Development in Kenya

Kenya’s vision 2030 and the constitution of Kenya (2010) explicitly place a premium on the generation and management of knowledge and the need to raise productivity and efficiency.

Given globalization and the imperative of knowledge-based economies, there is need for transformation to achieve the goals of becoming middle-income economy by 2030. This calls for a critical revisit in the application of science, research and technology and innovations as an engine driver of knowledge economies in general and knowledge-based economy in particular.
To optimally apply knowledge to National development, the governance and institutional framework should be robust and effective (Some, 2004). Science, Technology and Innovation are critical to the creation and application of knowledge in a manner that enables a country to generate a portfolio of tradable goods and services. By doing so, the country will be able to create quality goods/jobs, facilitate high value exports, reduce the cost of doing business, deploy efficient and effective infrastructure, protect and enhance the natural environment and enhance overall national productivity.

In this effort, there are three critical building blocks; namely the university education, technical, vocational education and training as well as basic education. Technological learning based on the lessons from the East Asian and BRIC’s countries is the key that will enable us to leapfrog in the development process (Kvaak, 2004). TVET is a critical component of this effort through the creation of a clear and deliberate system of vocational training aligned to National development needs and the requirements of the market place.

Achievement of synergy between these critical building blocks is a necessary requirement so that science, technology and innovation serve the knowledge needs of National development in a functional and effective national innovation system (Some, 2004). As a Nation, Kenya will realize the aspirations of a prosperous internationally competitive knowledge economy if the country’s tertiary education, science and technology sector is overhauled to significantly increase access while ensuring equity (Mcgrath, 2002).
Provision of incentives and an enabling environment for private sector to play an increased role in the sector is also crucial. Incentives should ensure development, attraction and retention of quality human resource (Hammond, 2010). Relevant research and training to the needs of the market should be carried out on national priorities and job creation.

Development of creative financing mechanisms to ensure sustainability and regulated expansion of the sector should also be fast tracked. According to Lee (2008), promotion of high standards of ethical and moral behavior in ST & I and the entire tertiary education community as defined in the constitution will also go a long way in enhancing quality tertiary education. In the context of the overall National planning horizon, there is a very strong relationship between the tertiary education, science and technology sector and the social- economic and political pillars of the vision 2030.

As the foundation upon which the pillars spring, the implementation of relevant ST& I and tertiary education and training initiatives, must be successfully delivered in order to achieve the goals of vision 2030 whose long term economic plan is set to guide the economy into a globally competitive and prosperous one, envisaging an average annual GDP growth rate of over 10 percent, create a just and cohesive society with equitable social development in a clean and secure environment and democratic political system that nurtures issue-based politics, respect, the rule of law and protects all the rights and freedoms of every individual in society (World Bank, 2010).
2.2.7 Challenges Facing TVET in Kenya

Tertiary education in Kenya faces a myriad of challenges. Staff shortage and development is one of the major challenges. The shortage of skilled professionals in Kenya has its roots in Higher education system that is in crisis (Somé, 2004). Although Kenya’s universities ought to be the breeding grounds for the skilled individuals whom the country needs, they are plagued by critical shortage of teaching faculty and research scholars.

They also face shortages of technical, administrative, and management staff. This situation cripples not only the higher education institutions but also affects the other levels of education services, health care systems and overall economic activities. Shortage of faculty and other staff is further amplified by brain drain, retirements, unattractive working conditions and attrition caused by HIV/AIDS.

Governance, leadership and management are yet another challenge afflicting tertiary institutions. According to Fielder (1998), weak leadership, management and governance are rampant and further exacerbate challenges to tertiary education in Kenya. Management inefficiencies drain scarce resources away from the fundamental objectives of increasing access, quality, and relevance.

Moreover, these inefficiencies and capacity limitations lead to under-utilized facilities, duplicative program offerings, high student-staff ratios, high dropout and repetition rates, uneconomical procurement procedures and allocation of a large share of the budget to non-educational expenditures. Academic leaders are rarely trained in the management of higher education institutions. According to Khaemba
(2004), institution leaders at all levels are generally unskilled in strategic planning, market research and advocacy, research management, financial planning, human resource management, performance management and partnership building and networking.

Problems of quality and relevance are yet another cause of concern. Africa’s higher education institutions face a decline in quality of education, learning and research. According to the World Bank (2002), technical institutions in Africa function with overcrowded and deteriorating facilities, limited and obsolete library resources and insufficient equipments and instructional materials.

Institutions operate with outdated curricula, unqualified teaching staff, poorly prepared secondary students and an absence of academic rigor and systematic evaluation of performance. In addition to these issues, these institutions lack access to the global knowledge pool and the international academic environment. Programs of study tend not to match labor market requirements, causing concern about the relevance of curricula and the effectiveness of preparing students for the employment market (Ng’ethe, 2010). Students have little opportunity to develop technical competencies, problem solving experience or communication and organizational skills.

Some (2004) notes that lack of effective regional, national and institutional quality assurance and enhancement systems and agencies in African countries further exacerbates the problems of quality and relevance. Structured quality assurance processes in tertiary education at the national level are a very recent phenomenon in
most African countries, but the situation is changing rapidly. Technical capacity is the most pressing constraint in national quality assurance agencies and institutional systems.

Weak research and innovation capacities have also been identified as a serious issue. According to Some (2004), our colleges in Kenya do not yet possess adequate research capabilities, infrastructure and facilities and funding needed to make them active beneficiaries of global knowledge and/or to generate or adapt knowledge, innovation and problem solving. They face critical shortage of staff to adapt and generate knowledge and innovate. There is little investment in research and innovation, particularly in high priority areas, such as agriculture and natural resources, applied sciences, health sciences, engineering and technology, limiting their capacity to meaningfully contribute to Africa’s development and integrate themselves to global knowledge network. These circumstances seriously constrain building up the elements of national innovation systems that are so essential for increasing national productivity - research capacity, trained researchers and professionals, graduates with advanced technical and managerial skills, and dynamic college-industry linkages.

The other issue is financial austerity and lack of capacity for diversification. Kvaak (2004) asserts that Higher education institutions generally in Sub Saharan Africa are critically constrained by lack of adequate finance, due to poor economic conditions, competing public service priorities and weak support of the international community. Financial austerities have led to inability to retain quality faculty and staff, minimizing staff-student ratio and poor learning and research facilities and resources.
Institutions are increasingly forced to diversify revenues, but usually with very limited experience, expertise and capacity to mobilize resources. The lack of adequate funding has constrained research capacities in Kenya, influencing our competitiveness in knowledge generation and adaptation, as well as integration in the global knowledge society. Poor physical facilities and infrastructure continue to undermine progress of this sector.

According to Fieldler (1998), technical institutions in Africa have seen little or no infrastructure improvements for the last few decades. Learning infrastructure is widely deficient due to insufficient budget and over dependence on public financing. Access to infrastructure such as the internet, library, textbooks, equipments, laboratories and classroom space is often limited, resulting in deterioration of quality of education and learning. The poor state of facilities also affects the quality of research and its ability to contribute to societal development and progress (UNDP, 2010).

Inability to meet increasing demands for access and equity is yet another major problem. Institutions in Kenya are increasingly unable to absorb the growing demand of students for higher education. Increasing number of students graduating from secondary schools has led to corresponding pressures in the demand for tertiary education. Among the unresolved challenges are the need to expand tertiary education coverage in a sustainable and equitable way, as well as inequalities of access and outcomes, in relation to gender, ethnic groups and geographic coverage (Atchoarena, 2010).
The great concern is also in the low enrollment figures in sciences, engineering and technology, and health fields, which are critically needed for innovation, knowledge generation and adaptation and overall national competitiveness. Less than 30% of students in higher education institutions in Sub-Saharan Africa are enrolled in the fields of agriculture, health sciences, engineering and technology and basic and applied sciences (World Bank, 2010).

2.2.8 Recommendations of revamping Kenya’s TVET

The following are the proposed policy interventions aimed at revamping TVET in Kenya;

- **Funding**

  Although expenditure on education and training sector has been on the increase, only 3.2% of the total allocation goes to TVET and close to 95% of the allocation to TVET goes to recurrent expenditure (MoHEST, 2010). This low budgetary allocation has continued to be a major constraint in the TVET sector and yet the sector is expected to be a vehicle for rapid industrialization as outlined in vision 2030.

  Consequently, the Tvet Act (2013) proposes the establishment of a secure and sustainable funding for TVET. This is to be done through a TVET funding board to mobilize and manage the TVET funds from public and private sectors. In addition, strengthening of partnerships between TVET institutions and the private sector and making loans available to qualifying students in TVET institutions through HELB. Increased bursaries and scholarships to
needy and bright students pursuing TVET and determination of DUC for grants to TVET institutions is also a proposed policy (McGrath, 2007).

- **Coordination, harmonization and management of TVET**

  The Policy Issue here is that the Coordination mechanisms and linkages between TVET institutions under the different ministries are weak. Decision making in TVET institutions is highly centralized at their respective ministry headquarters at the expense of the counties and institutions where actual education and training services are delivered (UNESCO, 2009).

  The proposed reform here is to establish a framework that will ensure a centrally coordinated system for accreditation, quality assurance and harmonized coordination of the TVET sector.

  The strategic Interventions here include establishment of a TVET authority to regulate institutions and programmes and assure quality. Restructuring of the TVET institutions into different categories such as; Vocational training centers to train artisans and award artisans certificates and Technical colleges to train craft and technicians and award craft certificates and technician diplomas. It is proposed that technical teachers training colleges are to offer Diplomas while National polytechnics to train technicians and technologists and award technical Diplomas and technologist Degrees (In collaboration with universities) and technical universities to train technologists and award technologists and post graduate Degrees.
• **Access and equity**

Many of K.C.S.E graduates miss training opportunities each year because post-secondary institutions do not have the capacity to absorb them (MoHEST, 2010). A large number of young people, over 400,000 graduate annually from the secondary school system.

To address this, it is proposed that the country needs to Pursue TVET expansion programmes at National, County and constituency level to accelerate attaining and sustaining a gross enrolment ratio (GER) of 20% in TVET by 2030 and provide adequate training opportunities for accessible competency based training. This can be done by making TVET delivery flexible and modular by 2014 to allow a large number of young people to access it (UNESCO, 2009). It can be enhanced through the use of ICT and e-learning.

Admission in TVET also needs to be streamlined and centralized. Expansion of TVET facilities and opportunities including establishing at least one vocational training centre (VTC) in each constituency, technical college (TC) in each county, National polytechnics and Technical universities. In addition, Vocational training at primary and secondary level should be introduced and entrepreneurship programmes in TVET reformed with greater simulated entrepreneurship training (TVET Act, 2013).
Quality and relevance of skills for industrial development

Vision 2030 recognizes the need for relevant skills particularly in TVET institutions to accommodate transformation of Kenya into a middle income country. Relevance of skills will be key to drive the vision 2030 core of training offered and the skills needs of the market place (Ngethe, 2010). Hence there is need to establish a system for curriculum development and competence-based assessments to enable TVET graduates acquire skills, knowledge and right attitudes to perform jobs to the required standards (Kvaak, 2004). Therefore, there is need to establish technical and vocational education and training curriculum development assessment and certification council with a mandate of developing training curriculum and administering assessment in TVET. In addition, TVET institutions and industry should make industrial attachment compulsory for all students and TVET trainers.

Establishment of TVET centers of specialization/excellence that are fully equipped with state-of-the-art training facilities as well as training staff to offer training programmes that are of National importance is also a key policy issue in this area. The apprenticeship system should be reformed to allow TVET graduates to work and study. Entrenchment of entrepreneurship training in all TVET programmes is going to promote self-reliance and aligning TVET to the proposed NQF.

Organizational governance

The performance and responsiveness of TVET institutions in Kenya is hampered by the lack of clear organizational structures (Ng’ethe, 2010).
TVET institutional management is the key in the decision making and transformation process of the sector. There is therefore need to Strengthen the sector and institutional governance and management of the TVET sector to promote accountability and provide proper leadership. This can be achieved through ensuring Vocational training centers and technical colleges are managed under Boards of governors and National polytechnics by councils.

Technical universities are to be established and managed in accordance with the provision of proposed universities act (2012). TVET trainers to be employed and managed by BOG’s of TC’s and VTC’s. Staff at the TTC, NP’s and TU are to be managed by the respective councils.

- **Legal framework**

  TVET in Kenya is governed by the education act (1968) cap 211 and other related acts of parliament. However, these acts do not adequately provide for TVET. There is therefore a need to develop a law that adequately caters for TVET. Formulation of TVET and legislation of TVET bill has been in progress (Zacharia, 2012).

- **Rebranding TVET**

  Currently, TVET has a negative perception which has accumulated over time unattended (Schuller, 1991). TVET has been viewed as the last resort for those who have failed in National exams. It is common knowledge that this negative perception is caused by lack of specialization in TVET institutions, lack of clear admission and progression procedures, inadequate infrastructures and
equipment, weak human resource development and management, weak curriculum, examination and competence assessment procedures and low funding (World Bank, 2010).

There is need therefore to rebrand TVET to reposition the sector in society and to attract the best candidates into the sector and ensure the utmost contribution to the economy as the main source of employment creation and to enhance prestige. This can be achieved through advocacy and publicity, adequate funding to TVET, Refurbishing infrastructure, improve environment and image change (Zacharia, 2012). Development of new products and engaging TVET students in programmes and projects of national importance can also enhance the image of the sector (UNDP, 2010).

2.3 Summary of Literature Reviewed

Kenya’s vision 2030 blueprint envisages a newly industrialized country, powered by a highly skilled workforce. To get a skilled manpower requires World class training. Yet the tertiary sector that is mandated to with this task is facing a myriad of challenges in many Third World countries.

To begin with, students have a bias against technical courses because they believe they are of low value than professional courses which promise a higher paying job as well as higher social status. Secondly, there is a lack of relevance in skills taught that match with occupation and social realities present in today’s economy. Some institutions continue to teach skills that no longer have a market and ignore those that do have.
Additionally, there has been a consistent decline in the quality of training offered in training centres as a result of declining number of quality trainers and a lack of modern and efficient machines and equipments. There are few and unevenly distributed technical training centres in Kenya. Those that exist are mostly concentrated in economically endowed counties and almost non-existent in arid and semi-arid areas.

Due to the emphasis put on professional courses, technical courses suffer from under-enrolment and under-funding, resulting with less number of people with technical skills. If proper re-evaluation of this sector is not done, there will be a serious shortage of middle-level engineers and technologists (as is currently the case) and a high number of unemployed graduates because the skills they have are saturated.
CHAPTER THREE
DESIGN AND METHODOLOGY

3.1 Introduction
This chapter focused on research design, location of the study, target population, sample and sampling techniques, data collection instruments, pilot study, data collection, analysis techniques and ethical considerations.

3.2 Research Design
This study adopted a descriptive survey design to investigate the causes of poor performance in our tertiary institutions over a four-year period. According to Luck and Reuben (1992), descriptive survey designs are used in preliminary and exploratory studies to allow researchers gather information, summarize, present and interpret it for the purpose of clarification. Mugenda (1999) observes that the descriptive survey design seeks to obtain information that describes phenomena, explaining or exploring the existing status of variables.

3.3 Location of the Study
The study was conducted in three colleges, which are located in what were Central and Rift valley provinces. The colleges were Kiambu institute of science and technology in Kiambu County, Nyeri technical training college in Nyeri County and Rift valley institute of science and technology in Nakuru County. The three institutions are all well established and spread in different geo-economic and political locations. Besides, whereas KIST is in a peri-urban neighborhood and fairly close to the capital city Nairobi, RVIST and Nyeri technical are in the country side. Both colleges however are fairly accessible and are in regions with high population densities.
3.4 Target Population

The target population for this study was all the 15 Institutes of Science and Technology and Technical Training Institutes in what were Central and Rift valley provinces, all the 12000 students of engineering, all the 30 HODs of Electrical engineering and Building technology and all the 15 college principals.

3.4.1 Sampling Techniques

In this study, simple random sampling was used to select the 120 students required in the study. This number was a fair representation of the number of students in the target population. Purposive sampling was employed in identifying the three colleges involved in the study and hence the college Principals and HODs of the two Departments of Electrical and Building in each college. This sampling was quite deliberate since the three colleges identified admit students from all over the country and are well established.

3.4.2 Sample Size

This comprised 120 students, 6 HODs and 3 College Principals.

<table>
<thead>
<tr>
<th>Target</th>
<th>Target Population</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>College Principals</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>HODs</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>Students</td>
<td>12000</td>
<td>120</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12045</strong></td>
<td><strong>129</strong></td>
</tr>
</tbody>
</table>

Source: (MOHEST, 2013)
3.5 Research Instruments

The study used questionnaires for data collection among the students and HODs. The questionnaires comprised open-ended and closed questions. Interview schedules were used to gather information from Principals.

3.5.1 Students’ Questionnaires

This questionnaire was divided into two sections; section A which dealt with Demographic data and section B which sought students’ views on the challenges which they go through as they pursue their studies. The students’ questionnaires were used to seek information on the challenges the Diploma engineering students in our colleges go through as they pursue technical training in Kenya. In this questionnaire, students had an opportunity to state their areas of specialization give a feedback on the quality of teaching/learning resources and list what they consider to be the main challenges that they go through.

Questionnaires were administered to Diploma Students in two fields of engineering courses i.e. Electrical and Building. This is because college students are literate and can interpret and respond to questions without any assistance. According to Orodho, A. J (2009), questionnaires are very useful when gathering large amount of information from a large group of literate respondents in less time.

3.5.2 Interview schedules

Interview schedules were used to gather information from each of the three college principals. Given their busy schedules, a structured interview was the most convenient tool for the administrators.
3.5.3 HODs’ Questionnaires

Each HOD of Electrical engineering and Building Technology in each of the three colleges were issued with questionnaires to fill. This questionnaire was divided into two sections; section A which sought information on demographic data and section B on the challenges they face in their work including their suggestions on how to address them.

In addition, they were also requested to provide quantitative data from school records on their students’ performance in KNEC exams over a four-year period i.e. from 2008-2011.

3.6 Pilot Study

The research instruments used were tested for purposes of modifying them. The sample for pilot study comprised of twenty students and two HODs, one in Electrical and one in Building. All were from one college which was not involved in the main research. The pilot study enabled the researcher to pre-test the research instruments and was able to rectify the weaknesses identified.

3.7.1 Validity of the Research Instruments

According to Gay (1992), validity refers to the degree to which a test measures what it is supposed to measure. Accordingly, the questionnaires were subjected to critical examination by my supervisors and a feedback given which was acted upon. All ambiguous and confusing items were identified and corrected.
3.7.2 Reliability

Reliability is the degree to which test consistently measures (Gay, 1992). To ensure reliability of the study, pretest method was applied. This involved administering the same questionnaires used during the final administration. Pre-testing was necessary to improve reliability of the instruments. This was done by assessing the clarity of the questionnaire so that any vague sections were modified to improve the quality of the research instrument hence improving its reliability.

3.8 Data Collection Techniques

The researcher ensured that the research instruments were complete and readily available. He ensured that they were error free and the numbers of copies needed was adequate. Distribution of the questionnaires both for students and for HODs was made by the researcher in advance through making appointments with HODs in the month of January, 2014. The HODs gave the questionnaires to students to fill in class sessions where they clarified all sections to the respondents.

The HODs later posted all the filled questionnaires to the researcher. The appointments were also booked in good time with the college Principals for the interviews which took place in March. In all, the researcher took three months to collect data from the field i.e. between the months of January- March, 2014.

3.9 Methods of Data Analysis

After collecting the raw data from the field, the researcher edited and coded it for analysis. Editing was done to ensure accuracy and consistency while reducing the number of responses to fewer categories. The raw data was then subjected to
descriptive statistics such as bar graphs, line graphs and pie charts using Statistical Package for Social Sciences (SPSS).

The objectives were analyzed as follows:

i). To determine the percentage of Diploma students who had been certified in KIST, RVIST and Nyeri Technical after sitting KNEC exams in the period between 2008-2011, the researcher used percentages, bar graphs and line graphs.

ii). To investigate the learning difficulties facing students in KIST, RVIST and Nyeri Technical, the researcher used percentages and tabulation.

iii). To find out the challenges tutors and college principals face in running tertiary institutions, the researcher used percentages.

3.10 Logistical and Ethical Considerations

The researcher got a letter of approval from the graduate school of Kenyatta university, a research permit from MOHEST and the National Council of Science and Technology (Nacosti) before any data was collected.

For effective administration of research instruments, the researcher booked appointments with the colleges forming the study sample through the Principals. The researcher then administered the questionnaires with the assistance of HODs of Electrical Engineering and Building Technology to both the students and the HODs. The students and the HODs were assured total confidentiality in the information they gave. All respondents remained anonymous. The researcher was available to make any clarifications to the respondents before they filled the questionnaires. The interviews were conducted in a relaxed environment through an interview schedule.
CHAPTER FOUR

PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter covers data analysis, findings of the study and a discussion of the findings. The chapter is divided into two main sections. Section one presents demographic data for the respondents comprising students drawn from second and third years of their study. It also includes that of HODs and the Principals.

The second section presents the results of the study. Presentations of the findings is based on the following thematic areas


ii). A discussion of the challenges facing learners in tertiary institutions.

iii). An overview of the challenges facing tutors and college principals in tertiary institutions.
4.2 Demographic Data

Respondents’ demographic data is presented in the following figures.

Figure 4.1: Distribution of Sampled students’ age brackets

Students’ Questionnaire

Figure 4.1 above shows that majority of the student respondents 79 (66%) were in the ages of 22-24 years, followed by 29 (24%) who were 25-27 years. Only 7 (6%) and 5 (4%) were in the ages of 19-21 and above 28 years respectively.

Table 4.1: Professional Qualifications of Tutors

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Qualification</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Masters</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Degree</td>
<td>38</td>
</tr>
<tr>
<td>3</td>
<td>HND</td>
<td>22</td>
</tr>
<tr>
<td>4</td>
<td>Ordinary Diploma</td>
<td>30</td>
</tr>
<tr>
<td>5</td>
<td>Certificate</td>
<td>8</td>
</tr>
</tbody>
</table>

HODs’ Questionnaire

49
Table 4.1 above shows that a majority of college tutors 53(38%) had a first Degree and 42 (30%) were holders of an ordinary Diploma. A further 22% had a HND while 8% were holders of a Certificate. Only 3(2%) had a Masters degree.

**Figure 4.2: Distribution of Students by Gender**

**i. Electrical**

![Pie chart showing distribution of students by gender for Electrical]

**ii. Building**

![Pie chart showing distribution of students by gender for Building]

**Students’ Questionnaire**

From the fig 4.2 above, female respondents comprised only 4(7.4%) of all students specializing in electrical engineering with males being the majority at 56(92.6%). In Building, the number of female respondents was 7(12%) while the males were 53(88%).
Figure 4.3: Distribution of Teachers by Gender

i. Electrical

Using the fig 4.4 above, the male tutors in electrical were 67 (95.2%) with females being 3 (4.8%). In Building Technology, females were 6 (9%) with the number of males being 74 (91%).

Discussion

On the distribution of students’ age brackets, the majority (66%) were in the 22-24 age bracket as shown in fig 4.1. This is significant as it means they are grown-ups who were able to interpret the questions clearly.
As far as the qualifications of tutors is concerned, those with the first and masters Degrees comprised 40% while those with certificates, ordinary Diploma and HND combined were the majority at 60% as shown in table 4.1. This does not reflect very well, where we have a Diploma holder teaching Diploma students.

Distribution of students in terms of gender is skewed against females who comprised only 7.4% of all students in electrical and 12% in Building as indicated in fig 4.2. These figures indicate that very few females are enrolled for engineering courses. In the teaching fraternity, female teachers were a paltry 4.8% of all tutors in electrical and 9% in Building technology. This clearly shows that the engineering field is dominated by males.

4.3 Analysis of Research Questions

Each research question was analyzed by summarizing the responses that relate to what it sought to answer. The summaries are presented in form of figures, tables and text.

Research Question one: What percentage of Diploma engineering students have been certified after sitting KNEC exams in the period 2008-2011 in KIST, RVIST and Nyeri Technical?

The responses for this research question were sought, obtained and analyzed separately for each college and for each study programme. The purpose of this research question was to determine what percentage of students usually passes the KNEC exams in one sitting. The section below is a detailed analysis of the results of Diploma students in KNEC exams in the three colleges and for the two engineering programs i.e. Electrical engineering and Building Technology for the years 2008-2011.
4.3.1 Performance in Electrical engineering

Table 4.2: Performance in Electrical in KIST

<table>
<thead>
<tr>
<th>YEAR</th>
<th>CANDIDATES</th>
<th>NO OF PASS</th>
<th>% PASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>38</td>
<td>12</td>
<td>31.6</td>
</tr>
<tr>
<td>2009</td>
<td>75</td>
<td>26</td>
<td>34.7</td>
</tr>
<tr>
<td>2010</td>
<td>82</td>
<td>11</td>
<td>13.4</td>
</tr>
<tr>
<td>2011</td>
<td>167</td>
<td>59</td>
<td>35.3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>362</td>
<td>108</td>
<td>28.75</td>
</tr>
</tbody>
</table>

HODs’ Questionnaire

The above information is represented graphically as shown below

Line graph showing trend of % pass for candidates who sat for KNEC electrical exam in KIST

As can be seen from the above graph, the number of candidates who had managed to pass the KNEC exams in the three years had been consistently less than 40 %, falling to as low as 13.4% in 2010. The performance also does appear to be very inconsistent, fluctuating each year. This indicates that the students registered a dismal performance over the years under consideration.
Table 4.3: Performance in Electrical in RVIST

<table>
<thead>
<tr>
<th>YEAR</th>
<th>CANDIDATES</th>
<th>No OF PASS</th>
<th>% PASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>22</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>2009</td>
<td>35</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>2010</td>
<td>43</td>
<td>9</td>
<td>20.9</td>
</tr>
<tr>
<td>2011</td>
<td>71</td>
<td>19</td>
<td>23.9</td>
</tr>
</tbody>
</table>

HODs’ Questionnaire

The above information is illustrated graphically as shown below

Line graph showing trend of % pass for candidates who sat for KNEC electrical exam in RVIST

The graph above shows that between 2008- 2011, the highest certification rate was 23.9 %. Although there is a positive development after each year, this performance indicates that in the four years under consideration, less than half of the students qualified for the award of Diplomas in their respective fields.
Table 4.4: Performance in Electrical in Nyeri Technical

<table>
<thead>
<tr>
<th>YEAR</th>
<th>CANDIDATES</th>
<th>NO OF PASS</th>
<th>% PASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>18</td>
<td>3</td>
<td>16.7</td>
</tr>
<tr>
<td>2009</td>
<td>21</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td>2010</td>
<td>22</td>
<td>5</td>
<td>22.7</td>
</tr>
<tr>
<td>2011</td>
<td>27</td>
<td>8</td>
<td>29.9</td>
</tr>
</tbody>
</table>

The above information is illustrated graphically as shown below.

Line graph showing trend of % pass for candidates who sat for KNEC electrical exam in Nyeri Technical

As can be seen from the table and graph above, whereas the highest % pass recorded for Nyeri Technical was 29.9% in 2011, it had been as low as 16.7% in 2008. In this year (2008), only 3 candidates passed the exam out of 21. However, there seems to be a positive trend of improvement.
4.3.2 Performance in Building Technology

Table 4.5: Performance in Building in KIST

<table>
<thead>
<tr>
<th>YEAR</th>
<th>CANDIDATES</th>
<th>No OF PASS</th>
<th>% PASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>42</td>
<td>9</td>
<td>21.4</td>
</tr>
<tr>
<td>2009</td>
<td>44</td>
<td>13</td>
<td>29.5</td>
</tr>
<tr>
<td>2010</td>
<td>43</td>
<td>15</td>
<td>34.9</td>
</tr>
<tr>
<td>2011</td>
<td>97</td>
<td>34</td>
<td>35.1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>226</td>
<td>71</td>
<td>30.2</td>
</tr>
</tbody>
</table>

HODs’ Questionnaire

The information above is presented graphically as shown below.

Line graph showing trend of % pass for candidates who sat for KNEC exam from KIST in Building Technology.

The above graph shows that even though there has been a positive development in the performance of Building exams in KIST, the overall % of certification is low, the highest recorded being a paltry 35.1%. The lowest % certification was in 2008, where only 9 candidates managed to pass the exam out of 51 who sat for it that year.
## Table 4.6: Performance in Building in RVIST

<table>
<thead>
<tr>
<th>YEAR</th>
<th>CANDIDATES</th>
<th>No OF PASS</th>
<th>% PASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>21</td>
<td>3</td>
<td>14.3</td>
</tr>
<tr>
<td>2009</td>
<td>22</td>
<td>6</td>
<td>27.3</td>
</tr>
<tr>
<td>2010</td>
<td>26</td>
<td>5</td>
<td>19.2</td>
</tr>
<tr>
<td>2011</td>
<td>38</td>
<td>12</td>
<td>31.6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>107</td>
<td>26</td>
<td>23.1</td>
</tr>
</tbody>
</table>

### Line graph showing trend of % pass for candidates who sat for KNEC exam from RVIST in Building Technology

The graph above indicates that performance of Building Technology students in RVIST keeps fluctuating, falling to as low as 14.3% in 2008 and rising to 31.6% in 2011. Overall, the average % certification is 23.1% which is low.
Table 4.7: Performance in Building in Nyeri Technical

<table>
<thead>
<tr>
<th>YEAR</th>
<th>CANDIDATES</th>
<th>NO OF PASS</th>
<th>% PASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>17</td>
<td>4</td>
<td>23.5</td>
</tr>
<tr>
<td>2009</td>
<td>20</td>
<td>7</td>
<td>35.0</td>
</tr>
<tr>
<td>2010</td>
<td>24</td>
<td>8</td>
<td>33.3</td>
</tr>
<tr>
<td>2011</td>
<td>29</td>
<td>9</td>
<td>31.0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>90</td>
<td>28</td>
<td>30.7</td>
</tr>
</tbody>
</table>

The above data is presented in a line graph as shown below.

The above line graph shows that the highest % of the students who passed KNEC exam was 35% in 2009 which later dropped to 31% in 2011. Table 4.7 above also indicates that out of a total candidature of 118 in the four years under review, only 28 candidates had managed to pass the KNEC exam.
4.3.3 Performance by gender

The tables below illustrate performance by gender in the two Diploma programs in the three colleges in electrical engineering.

Table 4.8: % passes by Gender
(NYERI TECHNICAL)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Male</th>
<th>Female</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>3</td>
<td>--</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td>2009</td>
<td>3</td>
<td>1</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>2010</td>
<td>4</td>
<td>1</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td>2011</td>
<td>7</td>
<td>1</td>
<td>26</td>
<td>4</td>
</tr>
</tbody>
</table>

HODs’ Questionnaire

Figure 4.4: Performance percentage

The Bar graph above shows that females were outperformed by their male colleagues in Nyeri Technical in all the years under consideration.
The performance in terms of gender in RVIST is as shown below.

### Table 4.9: % pass by Gender (RVIST)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Male</th>
<th>Female</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>3</td>
<td>1</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>2009</td>
<td>6</td>
<td>1</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>2010</td>
<td>7</td>
<td>2</td>
<td>16</td>
<td>5</td>
</tr>
<tr>
<td>2011</td>
<td>17</td>
<td>2</td>
<td>24</td>
<td>3</td>
</tr>
</tbody>
</table>

HODs’ Questionnaire

Figure 4.5: Percentage of KNEC Exams

Table 4.8 above indicates a better performance for males than girls in the four consecutive years. The highest percentage pass for females was just 5%. From Tables 4.7 and 4.8 above, it can be seen that between 2008-2011, the percentage of females who passed KNEC exams was consistently lower than that of their male counterparts. The table below shows the performance by gender in Building Technology in KIST.
Table 4.10: % pass by Gender (KIST)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Male</th>
<th>Female</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>8</td>
<td>1</td>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>2009</td>
<td>11</td>
<td>2</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>2010</td>
<td>14</td>
<td>1</td>
<td>33</td>
<td>2</td>
</tr>
<tr>
<td>2011</td>
<td>26</td>
<td>8</td>
<td>27</td>
<td>8</td>
</tr>
</tbody>
</table>

HODs’ Questionnaire

The information can be illustrated in the graph below.

**Figure 4.6: Percentage pass by Gender**

In Table 4.9 above, the percentage of males who were certified was higher than that of females in all the years under review. The bar graph shows a consistent dismal performance by females in technical exams.

**4.3.4 Overall performance**

The overall mean performance in the three colleges in the two Diploma programmes was as shown in the tables and pie charts below.
Table 4.11: Overall % passes (Electrical engineering)

<table>
<thead>
<tr>
<th>COLLEGE</th>
<th>% PASS</th>
<th>% FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>KIST</td>
<td>28.75</td>
<td>71.25</td>
</tr>
<tr>
<td>RVIST</td>
<td>20.70</td>
<td>79.30</td>
</tr>
<tr>
<td>NYERI TECH.</td>
<td>22.00</td>
<td>78.00</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>23.82</td>
<td>76.18</td>
</tr>
</tbody>
</table>

Figure 4.7: Overall percentage (Electrical Engineering)

Table 4.10 above shows the average percentage pass in Electrical engineering over four year period of 2008-2011 in the three colleges i.e. KIST, RVIST and Nyeri technical.

As seen in the pie chart above, only 23.8% of students managed to pass KNEC examination during this period of four years. This translates to 142 students out of 621 candidates who sat for this examination.
Table 4.12: Overall % passes (Building Technology)

<table>
<thead>
<tr>
<th>COLLEGE</th>
<th>% PASS</th>
<th>% FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>KIST</td>
<td>30.22</td>
<td>69.78</td>
</tr>
<tr>
<td>RVIST</td>
<td>23.10</td>
<td>76.90</td>
</tr>
<tr>
<td>NYERI TECH.</td>
<td>30.70</td>
<td>69.30</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>28</td>
<td>72</td>
</tr>
</tbody>
</table>

Figure 4.8: Overall percentage (Building Technology)

From the pie chart above, only 28% of candidates sitting for KNEC examination for Diploma in Building Technology managed to pass the examination while a staggering 72% failed in the same. Thus a total of only 118 students managed to pass while 306 students failed.
Discussion
The purpose of this research question was to find out the actual percentage of candidates sitting KNEC exams who manage to pass between 2008-2011. This study revealed that very few students sitting the KNEC Diploma exams manage to pass in any single sitting. In all the three colleges surveyed and in each of the courses studied, not a single programme produced a pass rate of more than 31%.

In KIST, an average of 28.7% students only managed to pass electrical KNEC exams in the four years under review as reflected in table 4.10. The average was 20.7% for RVIST and 22% for Nyeri Technical. This performance was far from satisfactory.

In Building Technology, 30.2% managed to pass in KIST and 23.1% in RVIST as indicated in fig 4.11. In Nyeri Technical, 30.7% passed in this examination. Just like in electrical, the overall performance in Building Technology was not impressive with an average of 70% of candidates failing this exam.

This is a serious indictment of a sector that is expected to be the engine of our growth. This weak performance is a huge challenge to all the stakeholders in the education sector and which requires concerted efforts to address.

Research Question two: What learning Challenges do Diploma technical students encounter in their studies?
Fig 4.9: Adequacy of learning resources

<table>
<thead>
<tr>
<th>Resource</th>
<th>Adequate (%)</th>
<th>Inadequate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory Apparatus</td>
<td>11</td>
<td>89</td>
</tr>
<tr>
<td>Machinery &amp; equipments</td>
<td>8</td>
<td>92</td>
</tr>
<tr>
<td>Working tools</td>
<td>13</td>
<td>87</td>
</tr>
<tr>
<td>Computers for Students</td>
<td>9</td>
<td>91</td>
</tr>
<tr>
<td>Time for practicals</td>
<td>12</td>
<td>88</td>
</tr>
</tbody>
</table>

Students’ Questionnaire

Fig 4.9 above shows a majority of students 110(92%) indicated that Machinery and equipments used for practical work was inadequate. 109(91%) said that the computers for students were not adequate. In the area of Laboratory apparatus, 107(89%) observed that they are not enough while 106(88%) students indicated that the time allocated to them to conduct practicals was not enough.

Figure 4.10: Chances of securing industrial attachment
Figure 4.10 above shows that no student had over 70% confidence of securing a place for industrial attachment. In addition, 24(20%) of students felt they had half the chance of getting a place in industry to practice what they have learnt. Half of the respondents felt they had less than 50% chance of getting a place while 36(30%) felt they stood no chance of securing a place for industrial attachment at all.

**Figure 4.11: Rating of teaching personnel**

Students Questionnaire

The above fig 4.11 indicates that technicians received a higher rating of 70% by students compared with the tutors whose rating was below 50%.
Figure 4.12: Chances of passing KNEC exam

![Chances of passing KNEC exam](image)

Students’ Questionnaire

As shown in fig 4.12 above, 84 students (70%) of the students felt they had less than half the chance of passing KNEC exam while 22 students (19%) felt they did not stand any chance of passing this exam. Only 2 students (1.7%) of students were confident that they stood over 70% chance of passing this exam.

Discussion

The purpose of this research question was to find out the major challenges that engineering students go through that affect their performance in the final examinations. Students identified a number of factors as being responsible for their dismal performance in KNEC exams. Top among them was inadequate machinery and equipments at 92% as reflected in fig 4.5. This was followed by computers for students whose inadequacy was rated at 91%. The other areas where students faced shortages were lack of adequate working tools and limited time for practicals. This is a critical area given that the courses they pursue are practical in nature.
On the students’ chance of securing industrial attachment, half of the students felt they stood less than 50% chance of getting a place to do their attachment with 30% feeling they stood no chance of securing a place as shown in fig 4.6. This is a very worrying situation given the practical nature of engineering courses. It’s nearly impossible for one to master the skills without getting a chance to practice what is learnt in class, hence the need to streamline field attachments.

Possibly due to the myriad of challenges facing the college students, it’s little wonder that 70% of them felt they had a less than half chance of passing KNEC exams as shown in fig 4.8 with 19% indicating they felt they stood no chance at all to pass. Lack of self confidence is a very critical issue that requires urgent address. The fact that the students rated their tutors lower than technicians is also telling.

**Research Question three: What challenges do tutors and college Principals go through as they run Tertiary Institutions?**

**Table 4.13: Challenges facing tutors**

<table>
<thead>
<tr>
<th>Cause</th>
<th>Those in Support (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Shortage of teaching/learning resources</td>
<td>100%</td>
</tr>
<tr>
<td>2 Poor entry behavior by learners</td>
<td>80%</td>
</tr>
<tr>
<td>3 Negative attitude of students</td>
<td>70%</td>
</tr>
<tr>
<td>4 Large classes</td>
<td>60%</td>
</tr>
<tr>
<td>5 Low staff morale</td>
<td>50%</td>
</tr>
<tr>
<td>6 Lack of in-service</td>
<td>40%</td>
</tr>
</tbody>
</table>

HODs’ Questionnaire
As shown in table 4.13 above, Lack of sufficient teaching and learning resources is a major problem. Indeed all tutors felt that there was a huge shortage of modern teaching and learning materials and facilities thereby compromising the quality of teaching and learning. This problem was compounded by the fact that many students were either unwilling or unable to purchase their own books as revealed by the some Principals during the interviews.

The other challenge facing 80% of tutors was the entry behavior of students. Tutors felt that many students did not have proper grounding in mathematics and sciences in ‘o’ level which should have prepared them for advanced courses. Thus, many students were not competent to handle technical courses.

Negative attitude by students towards technical courses is yet another challenge. According to the tutors, 80% of the students taking technical courses only enrolled either as a last resort after failing to qualify for university or after being compelled by their teachers. This made it difficult for them to work hard in their studies.

Large classes were also identified as a huge problem. Many tutors (60%) felt that with the introduction of module 2 programmes, the classes have bulged, making it much more difficult to provide individual attention to the students.

Rapid changes of technology and lack of proficiency courses for the teaching staff was also identified as a major hindrance to good performance. Almost all HODs felt that their staff competencies are daily being eroded by modern technologies yet they were not regularly in-serviced to keep abreast with the changes. This led to poor staff
morale and lack of any incentives to post good results. Many tutors also felt that there was generally low motivation among staff to achieve results.

Gender inequality was highlighted as a major issue by both tutors and administrators. On average, female teachers account for less than 8% of all teaching staff in our colleges. This makes it difficult to motivate more female students to pursue technical courses. Indeed, female students account for less than 10% of all students specializing in Diploma technical courses.

**Figure 4.13: Challenges facing college Principals**

The major challenge facing technical college Principals is the quality and quantity of the teaching staff. Indeed, all college administrators indicated that there were huge staff shortages in their institutions. This was blamed on the TSC which has the sole mandate of recruiting teachers. On the quality of teaching staff, 80% of them admitted that they lack key competent staff to handle certain courses e.g. Control Systems for the electrical engineering students. This was blamed on the way technical teachers are
trained in this country. According to them, only Moi University trained graduates in Technical Education. KTTC where most of their teachers come from admit students who have Diplomas in various fields who are only taught methods of teaching. So we have Diploma teachers teaching Diploma programmes.

Technical institutions suffer from low funding. Again all the Principals observed that the amount of fees they are forced to charge is grossly inadequate yet they receive very low funding from the Government. This is compounded by the fact that the fees are not charged based on the unit cost of each programme.

Rapid changes in Technology are yet another challenge facing technical institutions. 70% of the college principals felt that due to rapid changes in Technology, many of the equipments that they purchase for teaching become obsolete within a relatively short time.

While acknowledging that their students perform poorly in National exams, all college administrators blamed the current 8-4-4 system of education to the poor performance by their students in their end–of–course examinations. According to them, ‘O’ level graduates of the old 7-6-3 system of education had two more years to specialize in fewer subjects and master them before joining college. Those who wished to venture in science oriented courses did Mathematics, Physics and Chemistry (MPC) in A-level. This prepared them for professional training in engineering, Medicine among other courses. Today, the form four graduates lack grounding in these areas which make it difficult for them to grasp many scientific and mathematical concepts in their training leading to failure in KNEC exams.
An outdated and rigid Education act, last reviewed in 1968 was also to blame for the mess in the tertiary sector. This act gives no direction on private-public partnership in the provision of technical education which is the surest way of growing this sector.

Lack of a close link between training institutions and industry undermines the quality of training. Indeed, 60% of Principals observed that due to this problem, many students end up lacking Industrial attachment which they badly need to enable them gain hands-on skills from the theory taught in class.

**Discussion**

Tutors identified lack of enough teaching/learning resources as the biggest challenge facing them in their work. Entry behavior of students for technical courses, large classes, lack of motivation, limited refresher courses and a negative attitude towards technical courses by students are some of the other factors contributing to their dismal performance. According to them, many students regard themselves as failures for having not made it to the university.

The Structural Adjustment Programmes (SAPS) of the 90’s was also blamed for the decline in the standards of training in our tertiary institutions. These conditionalities imposed by IMF and The World bank forced developing countries to cut their expenditure in social programmes like education and health facilities.

Gender inequality in access to technical education is also considered as one of the challenges facing college administrators. Most of them indicated that society attitudes and stereotyping has continued to discourage females to enroll in technical courses, yet these courses provide a safe route to employment.
CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter gives an overview of the overall performance and a summary of the challenges facing students, tutors and college Principals. The chapter also offers some suggestions based on policy and for further studies that could deepen understanding of the complex nature of tertiary education.

5.2 Summary of the Findings

i. Majority of the students respondents 79(66%) were in the age bracket of 22-24 years followed by 29(24%) in the ages of 25-27. Only 7(6%) were between 19-21 years and 5(4%) who were above 28 respectively. Majority of the Heads of Department respondents 4(67%) were Bachelor of Education holders. One had a Masters degree while the other respondent was a Diploma holder. Majority of the tutors (38 %) are degree holders, 22% have a Higher National Diploma while 30% have an ordinary Diploma. Only 8% and 2% have a Certificate and a Masters Degree. Female students doing engineering courses were only 6% compared to 94% male. Only 4% of females teach engineering courses as opposed to 96% males.

ii. In electrical engineering in KIST, the students who passed were 12(31.6%) in 2008, 26(34.7%) in 2009, 11(13.4%) in 2010 and 59(35.3%) in 2011. In RVIST, the students who passed in electrical were 4(18%) in 2008, 7(20%) in 2009, 9(20.9%) in 2010 and 19(23.9%) in 2011. In Nyeri Technical, those students who passed in electrical were 3(16.7%) in 2008, 4(19%) in 2009, 5(22.7) in 2010 and 8(29.9) in 2011.
iii. In Building Technology, the number of students who passed in KIST were 9(21.4%) in 2008, 13(29.5%) in 2009, 15(34.9%) in 2010 and 34(35.1%) in 2011. In RVIST, those who passed in Building were 3(14.3%) in 2008, 6(27.3%) in 2009, 5(19.2%) in 2010 and 12(31.6%) in 2011. In Nyeri technical, the students who passed in Building were 4(23.5%) in 2008, 7(35%) in 2009, 8(33.3%) in 2010 and 9(31%) 2011.

iv. Looking at performance by gender, 0(%) of females passed in 2008 in electrical, 1(25%) in 2009, 1(16%) in 2010 and 1(16%) in 2011 in Nyeri Technical. On average, the percentage of females who passed in Nyeri technical in electrical was 14.3%. In RVIST, the females who passed in the same programme were 1(20%) in 2008, 1(13%) in 2009, 2(40%) in 2010 and 2(29%) in 2011. The average percentage pass by females in RVIST in the four years under review was 25.5%. In Building Technology in KIST, the females who passed were 1(25%) in 2008, 2(40%) in 2009, 1(25%) in 2010 and 8(40%) in 2011. The average pass in KIST by females in the four years under review in Building Technology was 32.5%.

v. In the overall performance in electrical, an average of 28.7% of all students who sat for electrical examinations managed to pass in the four years under consideration. In RVIST, 20.7% managed to pass in this examination while the score for Nyeri Technical was 23.8%. The average performance in the three colleges within the four years under review was 24.4%.

vi. In Building Technology, the mean % score for the four years in KIST was 30.2%. In RVIST, the average performance was a score of 23.1% while the mean was 30.7% in Nyeri Technical. The average % score for the three
colleges in Building Technology in the four years under consideration was 28%.

vii. On the learning challenges facing engineering students, a majority of students 110(92%) indicated that Machinery and equipments used for practical work was inadequate. 109(91%) said that the computers for students were not adequate. In the area of Laboratory apparatus, 107(89%) observed that they are not enough while 106(88%) students indicated that the time allocated to them to conduct practicals was not enough.

viii. On industrial attachment, no student had over 70% confidence of securing a place for industrial attachment. In addition, 24(20%) of students felt they had half the chance of getting a place in industry to practice what they have learnt. Half of the respondents felt they had less than 50% chance of getting a place while 36(30%) felt they stood no chance at all of securing a place for industrial attachment. In the rating of teaching personnel, technicians received a higher rating of 70% by students compared with the tutors whose rating was below 50%.

ix. Significantly, a majority of the students, 84 (70%) felt they had less than half the chance of passing KNEC exam while 22 students (19%) felt they did not stand any chance of passing this exam at all. Only 2 students (1.7%) of students were confident that they stood over 70% chance of passing this exam.

x. All tutors felt that there was a huge shortage of modern teaching and learning materials and facilities thereby compromising the quality of teaching and learning. This problem was compounded by the fact that many students were either unwilling or unable to purchase their own books.
xi. The other challenge facing 80% of tutors was the entry behavior of students. Tutors felt that many students did not have proper grounding in mathematics and sciences in ‘O’ level which should have prepared them for advanced courses. Thus, many students were not competent to handle technical courses.

xii. Negative attitude by students towards technical courses is yet another challenge. According to the tutors, 80% of the students taking technical courses only enrolled either as a last resort after failing to qualify for University or after being compelled by their parents. This made it difficult for them to work hard in their studies.

xiii. Large classes were also identified as a huge problem. Many tutors (60%) felt that with the introduction of module 2 programmes, the classes have bulged, making it much more difficult to provide individual attention to the students.

xiv. Rapid changes of Technology and lack of proficiency courses for the teaching staff was also seen as a major hindrance to good performance. Almost all HODs felt that their staff competencies were daily being eroded by modern technologies yet they were not regularly in-serviced to keep abreast with the changes. This led to poor staff morale and lack of any incentives to post good results. Many tutors also felt that there was generally low motivation among staff to achieve results.

xv. Gender inequality was highlighted as a major issue by both tutors and Principals. On average, female tutors account for less than 8% of all teaching staff in our colleges. This makes it difficult to motivate more female students to pursue technical courses. Indeed, female students account for less than 10% of all students specializing in Diploma technical courses.
The main challenge facing technical college Principals is the quality and quantity of the teaching staff. Indeed, all college Principals indicated that there were huge staff shortages in their institutions. On the quality of teaching staff, 80% of them admitted that they lack key competent staff to handle certain courses. 70% of the college principals felt that due to rapid changes in Technology many of the equipments that they purchase for teaching become obsolete within a relatively short time. Technical institutions suffer from low funding. Again all the Principals observed that the amount of fees they are forced to charge is grossly inadequate yet they receive very low funding from the Government.

5.3 Conclusion

This study has resulted in three main conclusions. Firstly, based on the findings in the three colleges, less than one third of all students sitting KNEC examinations in Electrical engineering and Building Technology manage to pass in any sitting each year.

Secondly, Diploma students face many challenges that affect their performance in National exams. These include lack of learning resources, modern training equipments and less time for practicals. There is also a poor link between colleges and industry, making it hard for them to secure industrial attachment.

Thirdly, college Principals and tutors have to cope with staff shortages, low funding and students with a negative attitude towards technical courses. These factors, along with others impede their ability to provide technical education.
5.4 Recommendations

5.4.1 Policy recommendations

i). On the first objective, this study recommends that technical courses be introduced in primary and secondary schools. In addition, training should be intertwined with industrial exposure. Hopefully, this will make students change their attitude towards technical courses and improve their performance.

ii). On the objective of challenges facing learners, a deliberate effort needs to be done by the Government to upgrade training facilities in all technical institutions in Kenya. This will make learning technical courses more friendly. A certain percentage of our tax revenue should be devoted to strengthening technical education.

iii). On the challenges facing tutors and college principals, the study recommends that the education Act should be reviewed to allow closer networking between colleges and industry. All tutors should also undergo a mandatory industrial attachment every year for them to upgrade their skills.

5.4.2 Suggestions for Further Research

The complex nature of tertiary education in Kenya is a mine field of research. Among many aspects, I would suggest further research into;

- What colleges are doing to mitigate the challenges identified in this research.
- How the poor performance by technical graduates impact on their employability and work performance.
- How to integrate classroom instruction and industrial experience in the training of technical students.
REFERENCES


APPENDICES

APPENDIX I: RESEARCH INSTRUMENTS

Questionnaire for students

You are requested to fill the questionnaire below as truthfully and accurately as possible.

The response(s) you give will be treated with utmost confidentiality.

You should not indicate your name anywhere on this paper.

Section A

1. Indicate your area of specialization (tick one)
   
   Electrical [ ]
   
   Building [ ]

2. Your gender
   
   Male [ ]
   
   Female [ ]

3. Kindly indicate your age bracket (Tick One)
   
   19-21 [ ]
   
   22-24 [ ]
   
   25-27 [ ]
   
   28 & Above [ ]
Section B

4. How can you rate the conditions and adequacy of the following in the college?

**General laboratory apparatus**

- Very good [ ]
- Average [ ]
- Below average [ ]
- Poor [ ]

**Training manuals**

- Very good [ ]
- Average [ ]
- Below average [ ]
- Poor [ ]

**Machinery and equipments**

- Enough [ ]
- Average [ ]
- Not enough [ ]
- Very few [ ]

**Working tools**

- Enough [ ]
- Average [ ]
- Not enough [ ]
- Very few [ ]


Computers for students

Adequate
Average
Not enough
Very few

Time for practicals

Adequate
Average
Not enough
Very short

5. How do you rate the teaching personnel in terms of mastery of content?

Tutors

Very good
Average
Poor
Not sure

Technicians

Very good
Average
Poor
Not sure
6. How can you describe your access to crucial reading materials and reference books?
   
   Very good [ ]
   
   Fair [ ]
   
   Not easy [ ]
   
   Inaccessible [ ]

7. What can you say about the quality of learning and reference materials?
   
   Modern and very relevant [ ]
   
   Good [ ]
   
   Fair [ ]
   
   Obsolete and irrelevant [ ]

Section C

8. What are your chances of getting a place for Industrial attachment?
   
   Very high [ ]
   
   Average [ ]
   
   Below average [ ]
   
   No chance [ ]

9. What do you feel about your chances of passing the KNEC exam?
   
   Over 70% [ ]
   
   50% [ ]
   
   Below 50% [ ]
   
   No chance [ ]
Questionnaire for HODs

Section A

1. Kindly indicate your gender

   Female [ ]   Male [ ]

2. What is your level of education?

   Masters/Phd [ ]   Degree [ ]
   Diploma [ ]   Certificate [ ]

3. What is the total enrolment in your Department?

   F...............................   M..............................

4. Kindly indicate the enrolment in the following study programmes;

   (a) Electrical engineering F...............................   M..................
   (b) Building Technology F...............................   M..................

5. How many members of teaching staff do you have in your Department?

   F...............................   M..............................

6. Please indicate their levels of education.

   Level of education       No.
   Masters/phd              F...............................   M..................
   Degree                   F...............................   M..................
   HND                      F...............................   M..................
   Ordinary Diploma         F...............................   M..................
   Certificate              F...............................   M..................
Section B

7. Please indicate the total number of students who got certified after sitting KNEC exams in the following years;

<table>
<thead>
<tr>
<th>Year</th>
<th>F</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. How can you describe the performance of your students in KNEC exams?
   - Very good [ ]
   - Average [ ]
   - Below average [ ]

9. If the performance is below average, what factors do you attribute to that performance? Please list.

10. What are the main challenges facing your Department? (Please list)

11. What measures can be taken to enhance performance in KNEC exams?
Section C

12. How can you describe the relevance of courses that you teach to the job market?
   Very relevant [ ] Relevant [ ] Not relevant [ ]

13. How closely do you work with Industry?
   Very closely [ ] Closely [ ] Not closely [ ]

14. How often do your members go for industrial attachment?
   Regularly [ ] Irregularly [ ] Never at all [ ]

Interview schedule

1. For how long have you been in this college? ............................................................
2. What are the strengths associated with this institution? ...........................................
3. What can you say about the staffing in this college? .............................................
4. How are the enrolment trends in terms of gender? .................................................
5. What can you say about the general performance of your students in KNEC exams?
   ..............................................................................................................................
6. Are there any major challenges that you could be facing with regard to teaching
   and learning? ...........................................................................................................
7. What interventions have you put in place to address the challenges? ......................
   ..............................................................................................................................
8. What areas do you feel require strengthening in order to boost your performance?
   ..............................................................................................................................
9. Are there some study programmes that you wish to start but are constrained by
   resources, both human and capital? Give examples please. ..................................
10. What can be done to mainstream tertiary education into vision 2030? .................
    ............................................................................................................................
## APPENDIX II: TIME SCHEDULE

### TIMETABLE

<table>
<thead>
<tr>
<th>Item</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literature review</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of proposal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of instruments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data collection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data analysis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report writing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Binding</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Item M J J A S O N D

2012

- Literature review
- Development of proposal
- Development of instruments
- Data collection
- Data analysis

2013

- Report writing
- Binding
## APPENDIX III: BUDGET

<table>
<thead>
<tr>
<th>ITEM</th>
<th>COST (Kshs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literature review</td>
<td>5,000</td>
</tr>
<tr>
<td>Development of proposal</td>
<td>6,000</td>
</tr>
<tr>
<td>Development of instruments</td>
<td>5,000</td>
</tr>
<tr>
<td>Data collection</td>
<td>15,000</td>
</tr>
<tr>
<td>Data analysis</td>
<td>5,000</td>
</tr>
<tr>
<td>Report writing</td>
<td>10,000</td>
</tr>
<tr>
<td>Binding</td>
<td>15,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>61,000</strong></td>
</tr>
</tbody>
</table>