THE PERCEPTION OF LECTURERS, TECHNICIANS AND TRAINEES ON THE RELEVANCE OF AUTOMOTIVE ENGINEERING TRAINING FOR INDUSTRY IN KENYA

BY

ODIWUOR JOHNSTONE OCHUMA

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DECLARATIONS

By The Student

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Sign……. Date ……..

Mr. Odiwuor Johnstone Ochuma

EDU/PGT/18/2004

By The Supervisors

This thesis has been submitted with our permission as University supervisors.

Sign …… Date ……..

Dr. H. Dimo

Moi University,

P.O. Box 1125, Eldoret.

Sign …….. Date …….

Dr. I. Kithyo

Moi University,

P.O.Box 1125, Eldoret.

DEDICATION

I would like to dedicate this work to my supervisors and my friends who advised and encouraged me to pursue this study. They were my eye opener in this study. Much thanks to my family especially my wife who went a head to support me financially. Special thanks to Moi University, technology education department. I owe you a lot all my participants, GOD bless you!

ABSTRACT

The purpose of the study was to determine the extent of the gap between the capability of technicians produced from TVET Institution and their performance in the workplace. The study was carried out in selected institutions i.e. all national polytechnics, two technical training institutes, two established garages and two jua kali areas. The research investigated the perception of lecturers in TVET institutions and supervisors in the automobile industry towards the performance of technicians. It also looked at the relationship between what they learnt in the TVET program and what was required of them by the automobile industry, and finally the perception of lecturers and trainees towards the available tools, equipment and instructional materials for learning the automotive engineering diploma course.

Systematic, random, purposive and stratified sampling methods were used in sampling while data was collected through questionnaires, interviews and direct observation. The statistical tools used for data analysis were chi-square and analysis of variance (ANOVA) at 0.05 level of significance (α=0.05). The statistical package for Social Sciences (SPSS Version 10.1 for windows) was used to confirm the findings. The qualitative data analysis was done using open coding techniques. The study found out that the Lecturers and Automobile Industry supervisors were dissatisfied with the performance of technicians and that a relationship existed between what the technicians learn and what is required of them in the automobile industry. Lecturers and trainees had the same view of dissatisfaction with regard to tools, equipments and materials for learning the automotive engineering diploma course. The study concluded that the respondents are not satisfied with the training given to automotive engineering trainees at diploma level and recommends that the Automobile Industry collaborates with TVET Institutions in reviewing the curriculum in order to cope with the first changing technological advancements.

The study recommends that a research to find out why there is continued decline in enrolment in automotive engineering courses at all levels of technical, vocational

education and training (TVET) institutions be conducted. The study also recommended that a research to find out how graduates of automotive engineering diploma course are fairing on in the informal sector.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ACKNOWLEDGEMENT

I would like to acknowledge my supervisors, Dr Dimo and Dr Kithyo for the valuable assistance they offered me during the study. My gratitude to Prof. Kerre, for this idea, which he assisted in molding and his relentless, pieces of advice that kept me going.

LIST OF ACRONYMS AND ABBREVIATIONS

ANOVA – Analysis of Variance

CITC – Christian Industrial Training Centre

Df – degree of freedom

DIT – Directorate of Industrial Training

EFI – Electronic Fuel Injection

GDP – Gross Domestic Product

IT – Institutes of Technology

ITC – Industrial Training Centre

KNEC – Kenya National Examination Council

NGO – Non Governmental Organization

NP – National Polytechnic

NYS – National Youth Service

PEP – Primary Education Programmes

SEP – Secondary Education Programme

TEP – Technical Education Programme

TTI – Technical Training institute

TVET – Technical, vocational Education and training

UEP – University Education Programme

YP – Youth Polytechnic

CHAPTER ONE

1.0 INTRODUCTION

This chapter introduces the concept of Technical and Vocational Education and Training (TVET) background information to the problem, statement of the problem, the purpose of the study and significance of the study. The scope and limitations of the study, the study assumptions, and the theoretical framework are also presented.

The concept of Technical and Vocational Education and Training (TVET)

Technical and Vocational education, according to UNESCO'S convention on Technical and Vocational Education (UNESCO, 1989);

...refers to all forms and levels of the education processes, the study of technologies and related sciences and acquisition of practical skills, know-how, attitudes and understanding relating to occupations in the various sectors of economic and social life. It can be provided…in educational institutions or through co-operative programs organized jointly by educational institutions, on one hand, and industrial, agricultural, commercial, constructional or any undertaking related to the world of work, on the other hand (Article 1).

Hence, technical and vocational education occurs in a large variety of structures and under various responsibilities, both in public and private sector. The technical and vocational education cluster is comprised of business studies, home science, and agriculture and health sciences. The technical studies components traditionally comprised of such school subjects as woodwork, metalwork, electricity/electronics, power

mechanics and technical drawing, among others, which have been adopted from the traditional classification of western system of education (UNESCO-BREDA, 1995)

As interest and technologies are changing rapidly, it necessitates a high rate of labour turnover across industries and occupations. Adaptability is, therefore, crucial. For example, the automobile industry over the last few years entered a new and challenging era. New materials have been developed and are appearing in the market in an ever-increasing volume. New vehicle makes have also evolved bringing along problems in design, organization, production, handling and storage. This has not been the case with technical and vocational subjects in the school curriculum in most African countries, which still reflects the traditional courses that are geared towards imparting skills in a particular trade without much regards for technological changes that have impacted the world of work (Kerre, 2000). To understand this phenomenon, an intensive research was required to establish how a modern technological change in the automobile industry was affecting TVET programs offered by our tertiary institutions of learning.

1.1 Background information of the study

With the current technological changes taking place in the world, tools for use by the technicians have kept abreast with the automobile industry. This has allowed an increase in production without an increase in labour (Butler, 1990).

It is important to note that people who have the relevant skills will not only make capital equipment more productive but also make effective use of machines and equipment they work with. This enables firms to invest more on sophisticated tools and productive

machines. Without a workforce that is continually acquiring skills, it is difficult to reap most of the returns from the current technological progress. Having this in mind, it can be observed that the workplace has changed and there is a mismatch between available human resources and the type of employment available in the world of work (kerre, 1997). The automobile firms' skilled labour demand and the TVET program graduates capacities are not in phase, a fact supported by the Daily Nation of Saturday, 6th July 2002 which reported that training institutions in most of the developing countries are unable to keep pace with the level of technology in the industry. This, therefore, called for the present study.

1.2 Statement of the problem

Kerre, (2000) pointed out that the world of work is in constant change. The development of a global economy and the influence of new technologies have altered the workplace. Employers want workers with many skills who can handle a wide range of responsibilities. To thrive in such a dynamic and constantly changing technological world demands radical restructuring of TVET programs.

Kerre (2000) observes that one of the challenges facing education and training in Africa is the changing demands of the work place. Technological changes occur often with new products and services appearing in the market. Employment trends, therefore, tend towards flexible and broad specialization. More emphasis is being laid on adaptive skills to new production environments. Burgess (1986) expresses the view that young people who have undergone TVET program acquire knowledge of particular subjects, but are ill

equipped to use the knowledge in ways that are relevant to the world outside the educational system. This imbalance, he observes, is harmful to the industry and society. A well-balanced educational program should, of course, enhance analysis and the acquisition of knowledge relevant to the world of work.

It is worth noting that given the demand for technical and vocational teachers in all education and training programs, the current production is quite insufficient. The lack of qualified teachers and instructors has contributed to the growing gap between education and the world of work (Kerre, 2000)

Singh, (1998) argues that job-specific training is most important for creating self-employment as well as meeting new challenges in the world of work. Kerre (2000) shares the same sentiments and elaborates that TVET programs

have not innovated to accommodate the rapid changing work environment, where technologies and work organizations demand new skills that many workers are lacking, hence widening this gap.

The challenge according to Ducci (1997) is to respond to three major issues at stake, which she outlines as:

..devising flexible and continuous training systems to meet the changing labour market requirement; mobilizing greater investment in education and training, and ensuring equitable access to training opportunities (pg 43).

From these observations it is evident that there exist a gap between the capacity of the people produced from TVET programs and their functioning in the workplace.

This therefore, calls for the need to innovate education and training systems to respond to the changing demands of modern society and the work place.

1.3 Purpose of the study

The purpose of this study was to determine the extent of the gap between the capacity of technicians produced from TVET institutions and their performance in the world of work.

1.4 Objectives of study

The study was guided by the following objectives:

1.4.1 General objectives

To determine the relevance of TVET technicians programs with respect to the technicians' performance in the automobile industry.

1.4.2 Specific objectives

1. To determine the perception of lecturers and supervisors towards the performance of technicians in the world of work; (Performance in terms of accuracy, use of materials, machine operating skills, speed in task completion, ability to work with others, independence and innovation).

2. To determine the perception of lecturers and trainees towards the available tools, equipment and learning materials in TVET institutions.

3. To determine if there exists a relationship between what technicians learn in TVET institutions and what is required of them in the automobile industry.

1.5 Hypotheses of the study

The following hypotheses were stated in the null form to guide in the investigations in the study.

H_{O1}: There is no significant difference between the perceptions of lecturers in TVET institutions and supervisors in the automobile industry towards the performance of technicians.

H_{O2}: There is no significant difference between the perception of lecturers and students towards the available tools, equipment and learning materials for teaching and learning automotive engineering diploma course in TVET institutions.

H_{O3}: There is no significant relationship between what technicians learn in automotive engineering diploma course in TVET institutions and what is required of them in the automobile industry.

1.6 Significance of the study

The present study was instrumental in determining the gap that existed between TVET program graduates vis-à-vis their performance in the world of work. Sifuna (1990) in outlining among others, the rationale of the 8-4-4 system of education on the issue of TVET, states that it was to ensure that students graduating at every stage of the system had some significant practical knowledge which could be utilized for self employment, salaried employment or further training. From this statement it was, necessary to find out the actual situation on the ground, and whether this rationale was being achieved or not.

This study, therefore suggests the need for relevant TVET curriculum, and since industries play a major role in the economic development of this country, TVET

institutions should provide them with skilled manpower able to perform the tasks endowed upon them within the automobile industry.

Child (1973) states that the term perception is reserved for an opinion, which represents a person's overall inclination towards an object, idea or institutions justified the use of perception in this study. Perceptions are positive, negative or neutral. Rao (1990) proposed a field theory in which he suggests that the product is more important than the process. The field theory leads to the teaching content that is designed to serve simple objectives. These objectives include the knowledge of the subject matter, the development of the cognitive processes of perception and orientation to the world. Since the respondents in this study are among the stakeholders within this industry, their perceptions and opinions provided an insight to the actual situation on TVET of automotive technicians and what is required of them in the automobile industry.

1.7 Scope and limitations of the study

The scope of this research was the area of modern technology in automobile industry. The study specifically looked at the performance of technicians only as viewed by garage supervisors and lecturers. Students (trainees) and lecturers perceptions towards tools and equipment within the TVET institutions was also considered. The study was faced with the limitation that only a few TVET institutions offered automotive engineering diploma course, and were spread all over the country. The research area covered Eldoret, Thika, Kisumu, Nairobi and Mombasa only. The specific research TVET institutions were Kenya polytechnic, Kisumu polytechnic, Eldoret polytechnic, Mombasa polytechnic, Thika technical training institute and RVIST (Nakuru). The automobile industries were D.T.dobie (Nairobi), Toyota Kenya and jua kali (Kisumu and Eldoret). Because of

limited time, the study could not cover aspects of technicians' performance in the national examination and securing employment in either private or public sector.

1.8 Assumptions of the study

During the study, the following assumptions were made.

a) Local automobile industries are up to date with the current technological changes taking place in the world at present.

b) All automobile firms keep records of their employees.

c) TVET institutions offering automotive engineering diploma course have similar resources and qualified staff.

d) The participants in the study would respond honestly to the questionnaire items.

e) The caliber of students admitted to the TVET institutions were the same.

1.9 Theoretical Framework

This research was based on human capital theory formulated by Schultz (1960) and later developed by Denison (1962) and Becker (1964). These economists focused upon the productive capacity of human resource in the development process and, in so doing, treated the improvement of human capacities as a form of capital investment.

According to the above economists human capital theory rests on the assumption that formal education is highly instrumental and necessary to improve the production capacity of a population in terms of skill acquisition. Technical and vocational education is fundamental to the world of work and for most people, work is the desired outcome of their education and it is through their work that people are fulfilled (Ramsey, 1997).

The main concern over TVET programs was the inadequacy in the production of skills. This, therefore, contradicts its aims of equipping its graduates with fundamentals skills and knowledge, which would enable them, perform effectively at the workplace. This situation, as seen by Malcolm (1993), is a puzzling coincidence of high unemployment and skill shortages. What, therefore, should be done is a great amount of change in the availability of training and its content. This will significantly improve the career opportunities for the bulk of potential workers in the face of technological developments taking place in the workplace.

Human capital theory, however, has been criticized on the ground that education may identify productive capacities without necessarily enhancing them (psacharoapolos and woodhall: 1991; Solomon: 1987), and that education does not directly improve skills but only confers credentials that are used by employers to select workers and determine relative wages and salaries. TVET programs, therefore, need to be redesigned in order to produce skills that are consistent with the technological advancements and changes we are currently experiencing.

1.10 Definition of terms

The following terms were used in this study;

Automotive engineering:

A profession, trade or business of repairing and servicing automobiles.

Automobile industry:

Organized economic activity concerned with making, servicing and repair of vehicles.

Curriculum:

A program or plan of activities scheduled to be carried out within a specified period of time with expected outcomes.

Capacity:

The ability to understand or do something.

Capability:

The ability or qualities necessary to do something.

Data:

Data refers to all the information a researcher gathers for his or her study.

Equipment:

One or more assembles capable of doing/performing a complete task or function

Hypotheses: This is the researchers anticipated explanation or opinion regarding the result of the study.

Job performance:

The performance of technicians in the practical aspect of the tasks endowed upon them within the automobile industry.

Manpower:

The work power provided by humans rather than machines.

Parameter:

A characteristic that is measurable and can assume different values in the population.

Population:

A population refers to an entire group of individuals, events, or objects having a common observable characteristic.

Productivity:

Yielding favorable or effective results.

Performance:

How well or badly something is done.

Sample: Part of the population chosen to represent the entire population.

Statistics:

The science of organizing, describing and analyzing quantitative data.

Skills:

Special ability in a task acquired by training or experience.

Supervisor:

A person who oversees works in the automobile workshops and garages.

Technicians:

A person who has undergone the TVET automotive engineering diploma course.

Technical Education:

Programs of study that impart skills, knowledge and attitude to individuals preparing to take middle level professional positions in the world of work particularly in engineering and scientific disciplines (Republic of Kenya, 1999).

Technology:

The knowledge available with scientific and industrial method for use in the automobile industry.

Theory:

A set of concepts or constructs and the interrelations that are assumed to exist among those concepts.

Tool:

Devices, instruments, or machine for performing an operation.

Training program:

Plan/sequence or procedure of bringing up a person to an agreed standard or proficiency within a stipulated time frame.

Variable:

Is a measurable characteristic that assumes different values among the subjects.

Vocational Education:

Programs that impart specific occupational skills required in the world of work particularly in engineering and scientific disciplines (Republic of Kenya, 1999)

CHAPTER TWO

2.0 LITERATURE REVIEW

This chapter discusses some previous researches done; then presents a view of literature on TVET programs in the following manner; growth and development of TVET in Kenya, aims and strategies of TVET in training provision, the role of TVET, it's curriculum in the institution of learning, how it is financed, the government's contribution towards TVET and finally the automobile industry in Kenya.

Previous research

Previous studies related to the present study are those of Geoffrey and Mutiso (1979) and kitainge (1997). Geoffrey and Mutiso's research took a critical look at how and why technical schools were established in Kenya and the politics behind their establishment. Their findings cannot be generalized to the present situation since the education system has since changed from 7-4-2-3 to 8-4-4 system which was brought about to solve the problems that the 7-4-2-3 system of education had. Moreover, the then technical schools were converted to middle level colleges offering certificate and diploma courses. Finally, it concentrated more on kiambu institute of technology to advance the study's argument.

Kitainge, (1997) carried out a research entitled Trainers and Trainees Attitude towards the 8:4:4 Secondary School's Power Mechanics course in Kenya. This study singled out the power mechanics course at secondary school level and did not consider the courses within the TVET curriculum at middle level colleges.

Obudho, (2003) studied TVET technician programs in building and construction industry. He established the competencies of TVET graduate technicians and their relevance in the current world of work.

He found out that there was no significant relationship between what technicians learn in building and construction diploma course in TVET institutions and what is required of them in the automobile industry. This study would draw parallel from the study appropriately for further enlightenment. Langat (2000) carried out a research on tools and equipment in TVET institutions in Kenya. He never considered the curriculum and the technicians using these facilities. He found out that most of these tools and equipment have become obsolete and therefore require modern back up with the new ones. There was, therefore, a need of examining the relevance of TVET curriculum in view of the technological changes currently experienced in the world today. The present study investigated the perception of lecturers, garage supervisors, technicians and trainees towards the TVET automotive engineering diploma course. These perceptions formed the basis of evaluating the relevance of TVET of automotive technicians.

2.1 Growth and development of TVET

The Second World War brought a greater influx of people, more sophisticated equipment, machinery and a greater need for training. Army corps was established, and recruitment on a very large scale began among the Kenyans. There was need for drivers, mechanics, builders, electricians, welders, carpenters and clerks.

The early fifties saw the industrial depots being upgraded to vocational schools and come early sixties they were again converted to secondary vocational schools.

Another major breakthrough for technical and vocational training in Kenya was the setting up in 1954 of a commission for higher education whose main recommendation was the establishment of the royal technical college, Nairobi. This institution later became Nairobi University College and thereafter, university of Nairobi. The Mombasa institute of Moslem education was already in existence having been established in 1948 to provide technical and vocational education to Moslem students of east Africa.

In 1966, it was converted to Mombasa technical institute and later became Mombasa polytechnic in 1972. In 1961, the Kenya polytechnic was established to provide basic craft courses, which were phased out beginning 1966 following the introduction of similar courses in technical vocational schools (Okaka, 1997).

Since independence, there has been a tremendous growth and development of technical and vocational education and training as a result of direct government involvement and community participation. In the late 1960s and 1970s the government developed industrial education in 35 secondary schools. At the same time 18 technical secondary schools were established to offer technical education at secondary level.

These were later converted to technical training institutes in 1986 and started offering artisan courses. In 1987 there were 3 national polytechnics, 17 institutes of technology, 4 vocational training programs for school levers run by Government ministries, parastatals, non-governmental organizations, industrial firms and private individuals.

Today, TVET in Kenya is offered in three distinctive strands: the formal, the non-formal, and the informal delivery strands. According to the sessional paper No.5 on Education and training in Kenya, the country has 4 national polytechnics, 17 institutes of

technology, 1 technical teachers training college and 21 technical training institutes. In addition, there are over 600 youth polytechnics distributed throughout the country. However, only 350 of the youth polytechnics receive Government assistance.

The private sector operates close to 1000 commercial colleges that offer courses in computers and non-technical areas of training.

The total enrolment in public TVET institutions in Kenya increased to over 79000 in 2003. Female students' enrolment constituted 44 percent of the total, but there exists serious gender disparities in terms of overall enrolment in science and technology related professions. Majority of female students are enrolled in business studies related courses compared to less than 5 percent in engineering programs. The Kenya polytechnic recorded the highest enrolment of women students at 4,562 out of 10,472 students in 2003.

Table 2.1: Enrollment in TVET institutions between 2003 and 2007

INSTITUTION	**2003**		**2004**		**2005**		**2006**		**2007**	
Gender	M	F	M	F	M	F	M	F	M	F
National polytechnics										
Kenya polytechnic	7738	4863	6386	3499	6410	3549	6405	3329	6521	3401
Mombasa polytechnic	2647	1390	2778	2436	3111	2631	3265	2710	3285	3012
Kisumu polytechnic	937	421	1124	476	1349	619	1410	710	1489	824
Eldoret polytechnic	1524	684	1675	752	1759	820	1834	832	1894	858
Total	**12845**	**7358**	**11963**	**7163**	**12629**	**7619**	**12914**	**7581**	**13189**	**8095**
Other TVET institutions										
Technical training institutions	7436	5648	9653	8350	9846	8684	9925	8731	10818	9517
Institute of technology	4799	3927	4715	3755	4904	3943	4961	4104	5407	4473
Total	**12235**	**9575**	**14368**	**12105**	**14750**	**12627**	**14886**	**12835**	**16226**	**13390**
Youth polytechnics	7171	13255	8605	13918	8691	14196	8741	14210	9528	15489
Total	32251	30188	34936	33186	36070	34442	36541	34626	38942	37574
Grand Total	**62439**		**68122**		**70512**		**71167**		**76516**	

Source; Sessional paper No. 5 on education and training in Kenya

Notable from table 2.1 above, is the fact that there is no information relating to the non formal sectors of TVET despite the immense numbers these sectors train. Due to the limited places available in TVET institutions, only a small proportion of eligible school leavers are absorbed. Every year less than a half of those graduating from the primary school either join the youth polytechnics for artisan training or enroll directly for apprenticeship training within the jua kali sector. There is need to develop quality skills development programs, through TVET institutions, that target this group, to enable them to engage in productive employment either directly or enter the informal sector.

The enrolments in these TVET institutions are represented in the Figure 2.1 below;

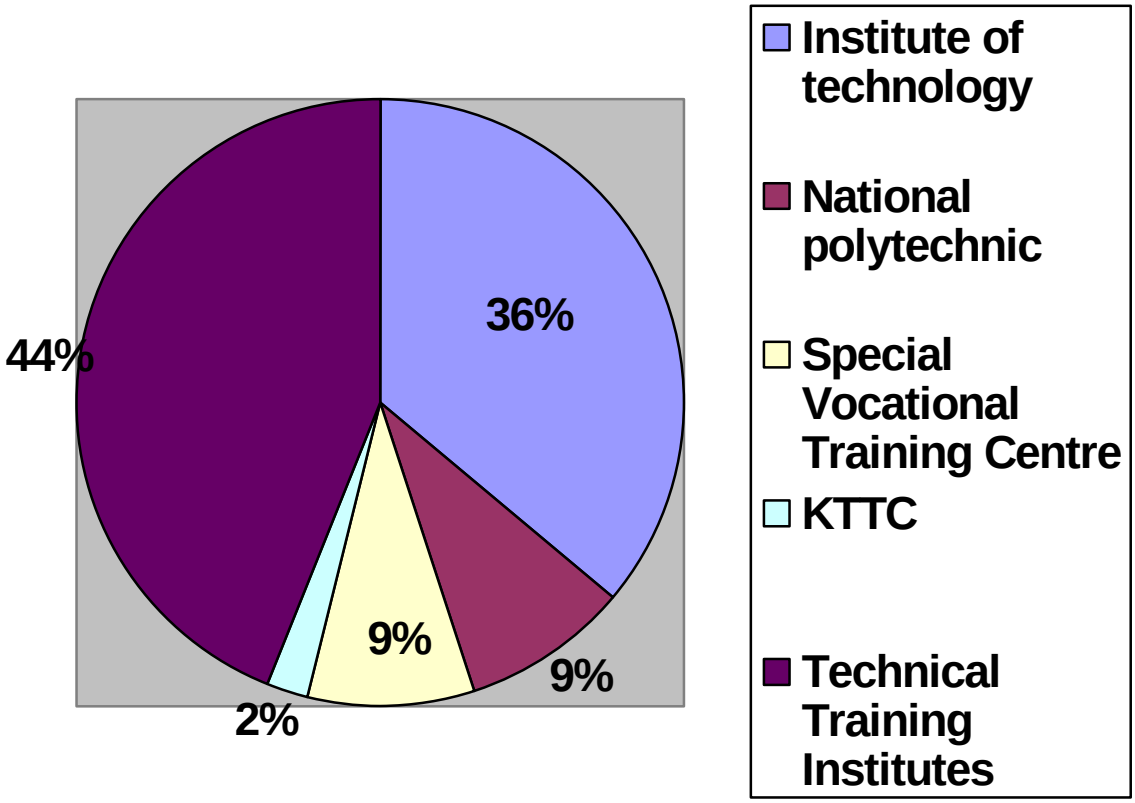


Figure 2.1. The enrolment in TVET institutions

Source: Ministry of education-sessional paper on education and training (2005-2010)

The ministry of labour and human resource development manages (1) vocational training centre at Athi River, three (3) industrial training centers the Kenya textile training institute, six hundred (600) youth polytechnics and three (3) skills training

2.2 Education commissions and committees

Over the years Kenya has been independent, the government has continuously reviewed the education and training system so as to ensure that it serves and satisfies the aspirations of the country's youth as well as cater for the wider interest of national development (Republic of Kenya, 1984). Various commissions and committees have been set up to investigate and recommended ways and means of achieving the national education and training objective.

The Ominde report (Republic of Kenya, 1964) stressed the role of education in manpower development of secondary education. It makes it serve the needs of Kenyans. Gachathi report (Republic of Kenya 1976) criticized the 7:4:2:3 system of education and advocated for restructured school system. It also advocated for an increase on pre-vocational studies.

The Mackey report (Republic of Kenya, 1981) recommended among other things, a change in the Kenya education system from the 7:4:2:3 to 8:4:4 system of education which was to augment the school curriculum with knowledge, skills and attitude that would enable graduates to contribute effectively in practical skills and exhibit favorable attitudes towards work. The government of Kenya in March 1982 accepted this

recommendation and its implementation started in January 1985. As an implementation strategy the education system was divided into four cycles.

1. Primary Education Program - PEP
2. Secondary Education Program - SEP
3. Technical Education Program - TEP
4. University Education Program - UEP

In the 8:4:4 system of education, each cycle is terminal. The curriculum developments are diversified to incorporate vocational oriented subjects at all levels.

The report of the presidential working party on education and manpower training for the next decade and beyond (The Kamunge report, 1988) focused on improving education financing, quality and relevance.

This was at a time when the government scheme for the provision of instructional materials through the national textbook scheme was inefficient and therefore adversely affected the quality of teaching and learning.

From the recommendations of the working party in 1988, the government produced sessional paper number 6 on education and training for the next decade and beyond. This led to the policy of cost sharing between government, parents and communities.

The commission of inquiry into the education system of Kenya (The Koech report, 2000) was mandated to recommend ways and means of enabling the education system to facilitate national unity, mutual social responsibility, accelerated industrial and

technological development, life long learning and adaptation in response to changing circumstances. The Koech report recommended totally integrated quality education and training (TIQET). While the government did not adopt the report due to the cost implications some recommendations such as curriculum rationalization have been adopted and implemented, (sessional paper No. 1 of 2005 on a policy frame work for education, training and research).

2.3 Training

Training refers to all those activities associated with the instruction and discipline (Jones and Hendry, 1994). Barrow and Milburn (1990) define training as preparing oneself by performing a set of instructions, so as to draw in a desired manner and bring one's body and knowledge a high pitch of efficiency. To train a person is to provide him or her with the know – how or the ability to perform certain actions from a variety of perspectives.

Training as a process entails both the mastery of manual endeavors and the concept ional development of the mind in line with the tasks to be performed. In the wider context training is the preparation of oneself through the performance of a set of instruction, which are later recalled at the workplace.

A key characteristic of a trained individual is that he has the ability to carry out some operations even if lacking the theoretical understanding that lies behind it. Once such an understanding is added, he slowly moves from the trained state to that of master of trade. Maliyamkono et al, (1982) states: training may require creativity, logical thinking, mathematical skills, verbal ability, detailed problem solving or an ability to understand a situation from a variety of

perspectives. It is reasonable to suspect that the strengths of the individual differ and that certain types of ability are appropriate for certain types of training. (pg.141)

In Kenya, a broad range of technical and vocational subjects are offered in both formal and non-formal institutions from primary to higher diploma or degree level. At primary level, the following TVET subjects are taken: Art and craft, Home science, Agriculture, business Education and music. The intention at this level is to create some occupational awareness and positive attitude towards work. At secondary school level the subjects offered include: Home science, Art and design, Agriculture, wood work, Metal work, Building construction, Power mechanics, Electricity, Drawing and design, Accounting, Commerce, Economics, Typing, Office practice and aviation technology. At this level, the students are given an opportunity to explore and if, possible, take some early specialization in an area of their liking.

At craft and artisan level multi-skilled courses lasting two to three years are offered and comprises of 80-90% practical component and the rest are support subjects.

Technician (diploma) level courses are offered to graduates of craft programs and secondary school leavers. Figure 1 below shows the career paths for TVET graduates.

Linkages 8.4.4 system

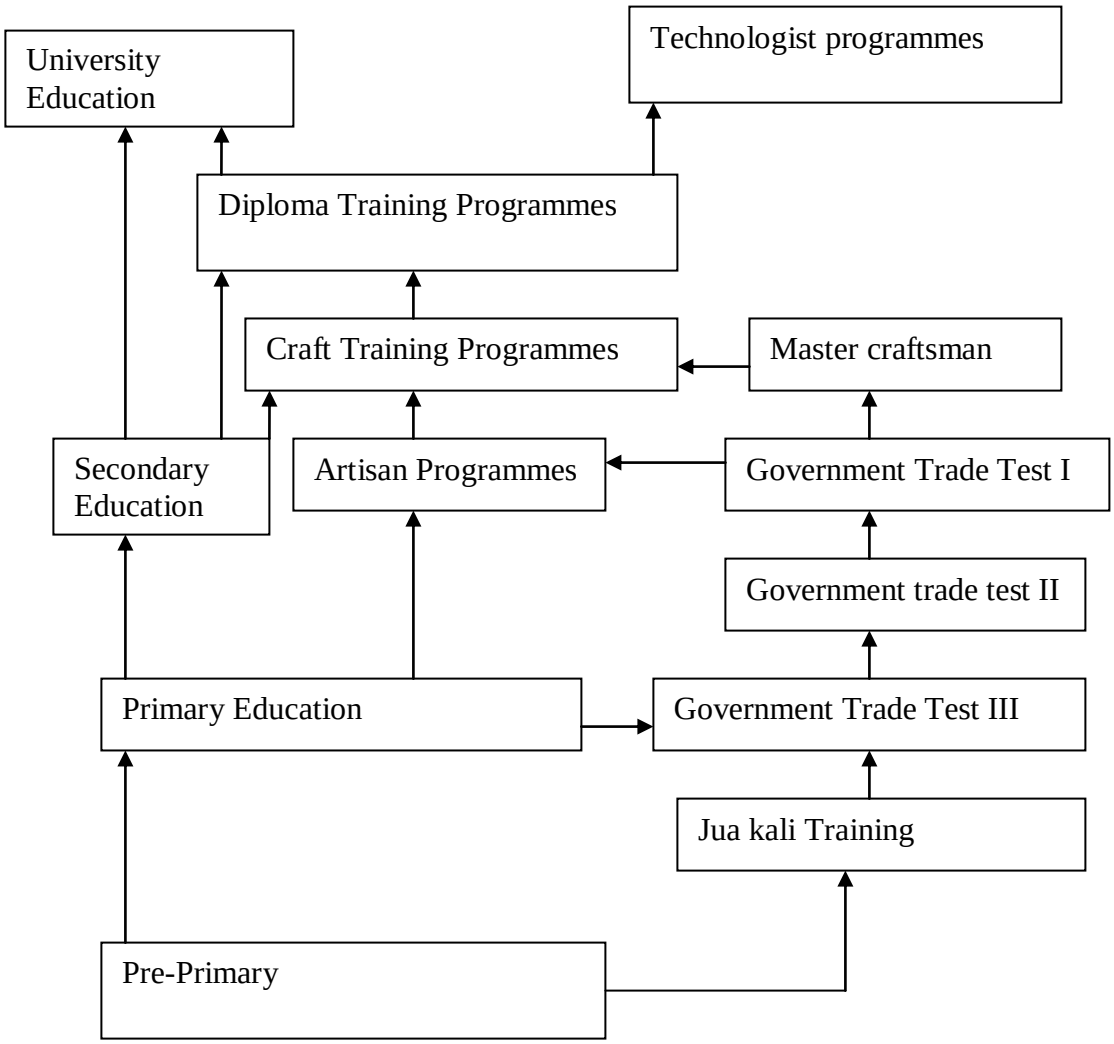


Figure 2.2: Career paths for TVET graduates

Source; Ministry of education, science and technology

2.4 Aims and strategies of TVET

According to master plan on education and training 1997 – 2010 P114 (Republic of Kenya, 1998) the aim of TVET as outlined in this among other things is to;

i. To inculcate the vocational and entrepreneurial skill necessary for self-employment.

ii. To develop the scientific, technological, practical and attitudinal

Skills needed for specific jobs in various trades, vocations and professions.

iii. To provide avenues for skills improvement and further training in TVET institutions.

iv. To integrate general education into training curricula.

The above aims can be achieved among others, through the following strategies: -

(i) Raising the quality and relevance of TVET programmes by developing relevant curricula and examinations, the provision of essential technologies and materials and the establishment of effective monitoring and management system of the TVET institutions.

(ii) Improve resource mobilization, allocation and accountability by

(iii) Creating an effective decentralized management framework and increase the efficiency of resource utilization by limiting the provision of funds to defined programme activities and priorities.

2.5 Role of TVET in training provision

As stated in several public policy documents in particular session paper No. 2 (Republic of Kenya, 1996) and the National Development plan 1997 – 2002 – industrialization has been identified as the link pin of the development of Kenya

economy. Policy and planning aim at Kenya's attainment of the status of a newly industrialized country by 2020.

The availability of a well educated and relatively trained workforce is regarded as critical to industrialization. Pertinent to this will be a national training strategy, which, while increasing opportunities for gainful employment is geared to:

i) An assured supply of well trained managers, entrepreneurs and technically qualified personnel capable of bringing together the process that constitute successful production chains-business, physical production, material management, maintenance, quality control, infrastructural support and distribution.

ii) Establishment and maintenance of a demand-driven balance between technologists (e.g. designers and engineers) technicians and artisans and craft workers at the shop floor and.

iii) Collaboration between all stake holders-the state, manufacturers and employers, labour, training institutions and communities especially in the provision of resources and development of training approaches (e.g. curricula and (pedagogy)

Currently, certified TVET under MEST is offered in a variety of trades and progressions at four-post school levels;

i. Artisan – in YP's and on-the-job (formal sector and Juakali apprenticeship) – certified by KNEC

ii. Craft – in TTIs and It's certified by KNEC.

iii. Technician – in some TTIs and ITs and all NPs – with diploma awarded by KNEC.

iv. Technologist – diploma in NPs awarded by KNEC. Universities also offer technologists degree courses to which, among other aspirants, some graduates of MST institutions proceed. Most on-the-job trainees who take the DIT's test do not proceed beyond the qualification designated trade test grade 1. Using one of at least

v. four alterative routes, theoretically other trainees can progress from primary school to technologist at the university level. (figure 8i)

Route a: Primary school → secondary school → university technologist

Route b: Primary school → Sec. School → Dip → industrial attachment → pre university → Internship → university technologist.

Route c: Primary school → sec school → craft cert → dip → university technologist

Route d: Primary school → Artisan → Craft cert Dip university technologist.

2.6 TVET Curriculum in the Institutions

TVET at tertiary level is offered to those who have completed secondary school level education and it comprises a wide range of courses; according to Kerre (1997), the purpose and objectives advanced for TVET Programmes in Kenya at this level is as follows:

a) To equip learners with relevant productive and entrepreneurial skills that will prepare them for gainful employment.
b) To provide skilled labour to match the demand for human resources in the scientific, technological and commercial sectors of the nation's economy.
c) Increase scientific and technological literacy,
d) Provide a sound foundation in the spirit of life long learning.

In Kenya today there is the tendency of moving towards a comprehensive school curriculum where TVET subjects are offered as part of general education.

2.7 Sponsorship of TVET programme

Education and training financing encompasses all financial outlays by central and local government, the private sector, NGOs, house holds, communities and external partners. The average government spending on education and training, excluding the share by households has ranged between 5 and 7 percent of the GDP. At the national level, recurrent government spending on education has been higher that any other social sector spending 75 percent of the social sector expenditure. (Sesssional paper No. 1of 2005 on Education and training) TVET programmes are expensive to run compared to general education as it has been estimated that the cost of technical school is equivalent to three schools offering general education (Kerre, 1997).

Governments are getting more concerned about financing of TVET to meet the new and emerging labour markets requirements. Various financing strategies are practiced in different parts of the world, and Kenya is no exception.

UNESCO, (1996), classifies some of the well known financing mechanisms as follows:-

a) Public financing
b) Enterprise financing
c) Private and public sponsored financing
d) International donor assistance

2.7.1 Public financing

Mostly public financed TVET programmes are implemented in schools before employment is taken up. Non-formal training canters, pre-service and in-service training for ministries also receive funding. Public financing is provided through public revenue (government funds).

When the state finances TVET programmes through public funds, it is on the assumption that the ultimate responsibility for development of human resources for national development lies with the state.

2.7.2 The enterprise financing

The enterprise/company conducts the TVET program for its labour directly and bears the entire costs of training. Sometimes enterprises contribute a small amount of money to a central pool like to the directorate of industrial training in Kenya, in form of taxes and these resources are used in different ways to finance training.

2.7.3 Private and public sponsored financing

Governments faced with a shortage of resources would like individuals, enterprises, non-governmental organization (NGOs) and the general public to share the financial responsibility for TVET. The Kenyan government introduced a cost-sharing policy in 1988 when it called upon the communities, parents and beneficiaries of TVET to assist in raising additional funds to accelerate the expansion of training opportunities to increase access without compromising quality and relevance (Kerre, 1997).

2.7.4 International donor assistance

Donor support plays on important role in developing TVET systems. In many developing countries such as Kenya, the large amount of international aid has contributed to the setting up of a base of training capacity (UNESCO, 1996).

Infrastructure and facilities have been created, staff trained and instructional systems implemented through donor assistance. Most donors provide financial resources for capital costs and it is limited for short periods (Herslchbach 1993).

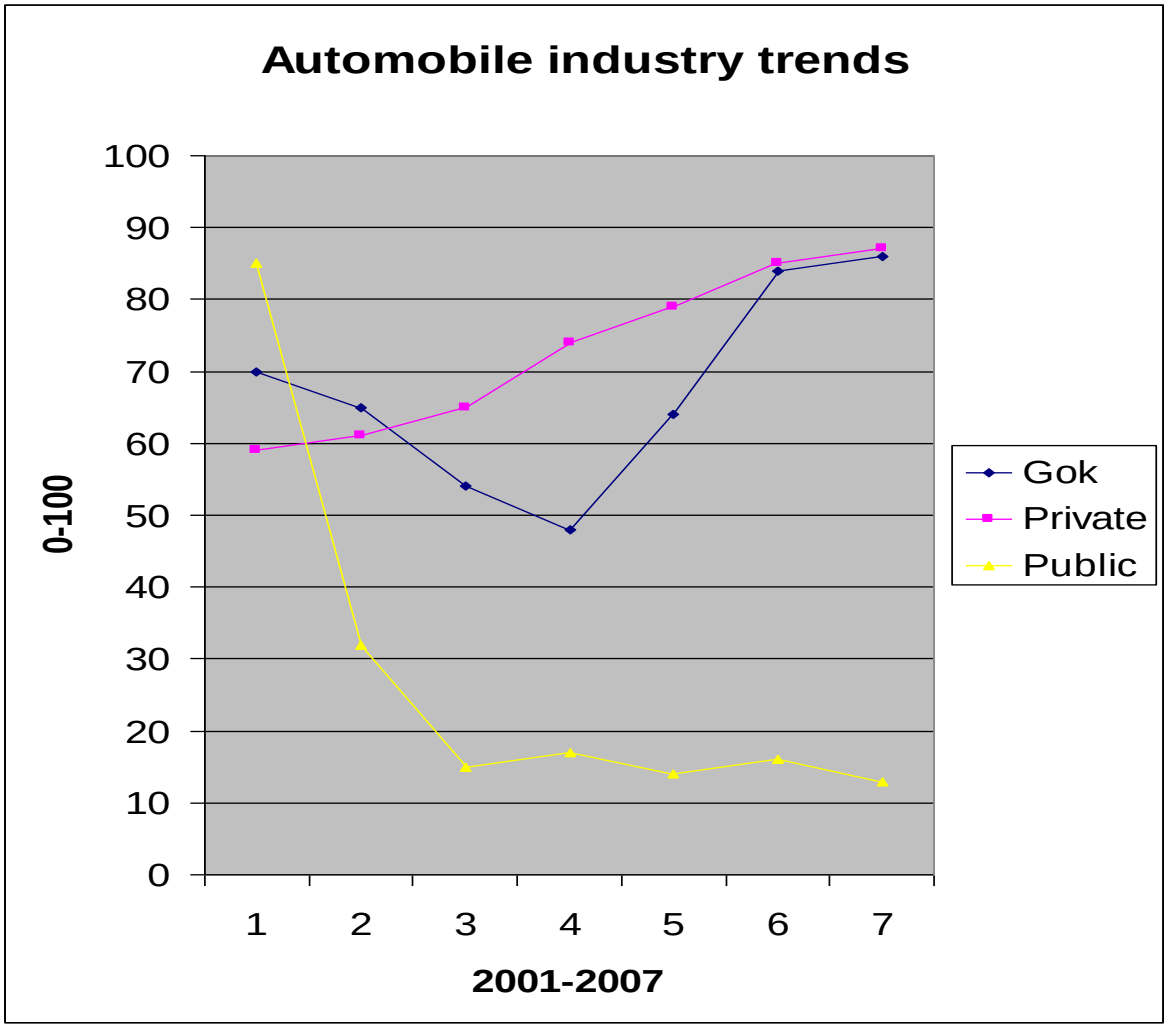
2.8 The Automobile Industry in Kenya

The automobile industry in Kenya makes a significant contribution to the socio-economic development process of the country, by employing a large proportion of the country's labour force and helping in the improvement and acquisition of skills, Republic of Kenya, (1995).This sector, which encompasses Jua-kali mechanics and trained technicians, plays

a role in the development of the economy by creating investment opportunities for individuals, firms and government.

Kenya boasts a fairly well developed automobile industry. There are currently more than 100 large-scale firms registered as general or special automobile body builders. The trend in automobile industry in Kenya is as shown in Figure 3.1.

From Figure 3.1, it is important to note that the private sector recorded a higher growth than the government parastatal over the same period of time. This is an indication that the privately owned automobile firms are carrying out more garage works than that done the government agencies. In terms of employment creation, the sector produces employment opportunities its labour-intensive technologies. The industry also stimulates other sectors through economic multipliers effects and makes a significant contribution in terms of conserving and generation foreign exchange.



index: **2007=100**

Figure 3.1: Automobile industry trend
Source: Bhushan, 2007

The literature reviewed provides an overview of the TVET program in Kenya and its current status vis-à-vis the automobile industry situation in the country. From the review of the researches already done and the statement of the problem, there was, therefore, a

need of determining the relevance of TVET curriculum in view of the technological changes currently experienced in the world today thus the impetus for the present study.

CHAPTER THREE

3.0 RESEARCH DESIGN AND METHODOLOGY

The main purpose of the present study was to determine the extent of the gap between the capacity of technicians produced from TVET institutions and their expected performance in the world of work. This was done on the basis of how this course relates to its objectives, that is whether graduates are able to perform effectively in the Automobile industry or not. This chapter covers research design; study Areas, population target, Respondents, development of the instruments, scoring of questionnaire items, reliability and validity of the questionnaire, and data processing procedure, and procedures for data collection and analysis.

3.1 Research Design

The study was descriptive ex-post-facto in nature. A descriptive study involves the use of numerical indices to summarize, describe and explore relationships among traits. It is a quantitative non- experimental research intended to describe a phenomenon with statistics such as frequencies, percentages, averages and sometimes a measure of variability such as the range and with visual images such as frequency polygons, pie charts and bar graphs. Ex- post-facto study examines phenomenon that has already occurred and attempts to infer cause-and-effect relationships (Jeffery, 2002). It is on the basis of these definitions that this study was designed to explore the gap that exist between what is learnt in the TVET institutions and what is expected of them in the world of work.

The research design borrowed from approaches adopted by Gordon (1998), and Bunn &

Stewart (1998). Gordon (1998), studied "Vocational Teachers Perception of The Use of Assessment Methods" while Bunn & Stewart (1998) studied "Perceptions of Technical Committee Members Regarding the Adoption of Skill Standards in Vocational Education programs". These were adopted as the better combination between approaches of studies carried out by Byo (1999).

Performance in the world of work was the dependent variable in this study. Perception towards automotive engineering diploma course and skills gained were the independent variables. By using data from the questionnaire and interviews, the researcher was able to describe and generate possible explanations of the trainees, technicians, supervisors and lecturer's perceptions towards the performance of automotive engineering technicians in the workplace in relation to the current trends in the automobile industry.

3.2 Study Areas

This study was conducted on automobile firms based in Nairobi and TVET institutions in Nairobi, Kisumu, Mombasa, Nakuru and Thika. The institutions were chosen because they offer automotive engineering diploma course and their departments are well established while Nairobi based firms were chosen because finding a large number of automobile garages was possible and the automobile industry is well developed. The institutions also provide different geographical setting with varying economical provisions ranging from city to city as the course is mostly concentrated in urban set up. Most importantly, the institutions were convenient to the researcher for data collection. The national polytechnics receive higher funding both from state and other non-governmental organizations hence they had better teaching and learning resources. Their

positions are also in a city setting which provides trainees with easier access to automobile firms.

The systematic, random, stratified and purposive sampling techniques were used in the study.

Kothari (1985) lists the advantages of systematic sampling as:-

i) It can be taken as an improvement over a simple random sample since it is spread more evenly over the entire population

ii) It is easier and less costly method of sampling and can be conveniently be used incases of large population when population list are available

Random sampling was used in the present study since it gives each element in the population an equal probability of getting into the sample and all choices are independent of one another. It also gives each possible sample an equal probability of being chosen.

3.3 Population target

The target population comprised of trainees, technicians, garage supervisors and lecturers. The national polytechnics had a student population of 98 (automotive engineering diploma course only); Thika technical training institute had 14, while Rift Valley Institute of Science and Technology had 16. The other groups were drawn from D.T.Dobie and Toyota Kenya motor firms. Lecturers were also selected from these TVET institutions. The total target population therefore, translated to 128 (N_1 = 128) trainees and 54 (N_2 = 54) lecturers. The participants in this study were third year trainees,

and lecturers in the automotive engineering programs from the selected TVET institutions. The trainees in this study were selected from the target population using purposive random sampling technique while technicians and garage supervisors were selected by the use of stratified random sampling technique. Ninety-six trainees were going to sit for automotive engineering diploma exams at the end of the year (2006) from these selected TVET institutions. The student nominal roll from the participating institutions was used to identify the candidates. Using the formula recommended by Pals (1993), a sample of 34 trainees was needed for the study.

Eleven (11) lecturers teaching automotive engineering diploma course in the participating institutions were identified. Because the number was small, they were all contacted in person by the researcher and they all consented to an interview.

3.4 The respondents

The respondents for this study were given questionnaires to respond to and were drawn from four groups namely: Lecturers in TVET institutions, students in TVET institutions, supervisors in automobile firms and technicians working within the Automobile firms.

The criteria used to select the respondents (lecturers and supervisors) were;

i) Must have worked /lectured for a period exceeding ten years.

ii) Supervisors must be working with technicians who had undergone the TVET automotive engineering diploma course at the time of study

iii) Trainees must have undergone a period of three months industrial attachment within an automobile firm

A total of six TVET institutions and two automotive firms and juakali were used in the study. These six TVET institutions included the four national polytechnics, one institute of science and technology and one technical training institute. All the national polytechnics were considered because of their evenly distribution throughout the country. Again the automotive engineering diploma course is offered in these institutions. Random sampling method was used in selecting one institute of science and technology. This method was appropriate here because it gave equal chances to all the science and technology institutions to be selected, Kothari (1985). The same random sampling method was used in selecting one technical training institute. Systematic random sampling method was used in selecting automobile farms.

Table 3.1 The distribution of the respondents in the study

TVET INSTITUTION	STUDENTS	LECTURERS	TOTAL
Kenya poly	08	02	10
Mombasa poly	08	02	10
Kisumu poly	06	02	08
Eldoret poly	04	02	06
RVIST	03	01	04
THIKA TTI	05	02	07
SUB TOTAL	**34**	**11**	**45**
FIRMS	TECHNICIAN	SUPERVISOR	TOTAL
D.T. DOBIE	03	02	05
TOYOTA KENYA	02	01	03
JUA KALI	02	01	03
SUB TOTAL	**07**	**04**	**11**
GRAND TOTAL	**41**	**15**	**56**

The Automobile firms that participated in the study were TOYOTA Kenya, D.T. Dobie (Nairobi).

The criteria used in the selecting the automobile firms were:-

I) Must have employees who have undergone through the automotive engineering diploma course from any of the TVET Institutions in Kenya.

ii) Must have been in operation for a period exceeding ten years from the year of study.

iii) Must have an automotive garage in progress at the time of study where skilled tasks are being undertaken. This was because they laid the foundation in terms of modern technology.

3.5 Procedure for data collection and data analysis

Data collection was through researcher-designed questionnaire, interviews and observations. Four types of questionnaire were developed and piloted for each of the subjects involved in the study. The questionnaires were precise and exact as possible to yield the information they were intended to provide. Interviews were also used to supplement the information collected by the questionnaires.

3.6 Development of the instrument

The questionnaire for students (trainees) and technicians were focused on obtaining data to establish their perception on what they expect the automobile diploma curriculum to offer in relation to the real automobile industry needs and whether the course aids them in the tasks that they perform within the industry in any way.

The questionnaire for lecturers and supervisor sought data to determine the relationship between what is learnt in TVET institutions and what is required in the real automobile industry.

This was achieved through seeking the perception of lecturers and trainees from TVET institution and those of supervisors and technicians in the automobile industry towards the automotive engineering diploma course. Suggestions on areas for improvement were also noted.

The Likert type of questions was used to measure perception. Kothari (1985) states that the Likert scale is easy to construct and more reliable objective.

Further, more it permits measurements of perception towards different aspects of the course on a single scale. English language was used to draft the questionnaires since it is the acceptable language of instruction for all the courses in Kenya. The questionnaire comprised of both open-ended and close-ended questions. The closed ended questions conformed to the likert-type scaling (Rosenberg & Daly, 1993). The open- ended questions were used to give an insight into the respondents' reasons as to the responses offered in the closed questions. The researcher used the Total Design Method (TDM) of conducting surveys at all stages of construction and administering of the four-part questionnaire (Dillman, 1978). The procedure involved visiting and delivering the questionnaires to the participants in their respective institutions, and collecting them after the participants had provided their responses. Permission to utilize these materials was granted by the principals of the particular institutions. The study was carried out in the month of September to December 2006.

3.7 Scoring of the questionnaire items

Varieties of scoring formats were used depending on the nature of items on the questionnaire. A five point likert scale was used: strongly agree (SA), Agree (A), Undecided (U), Disagree (D), and Strongly Disagree (SD). These were awarded 5,4,3,2, and 1 respectively, if the statement was positive and vise versa if the statement was negative. Mid point was taken as 3. Any value above 3 denoted a positive perception and any below 3 denoted a negative perception. A value of 3 inducted a neutral perception. In the last part of the lecturers and garage supervisor's questionnaires, a semantic differential scale was used to compare the aspect of job performance in the industry to what is learnt in the TVET institutions. The scale comprised of seven bio-polar adjectives, which describes the automotive job performance aspect. A ten- point scale ranging from 1=very poor to10=very good was used for each pair of adjectives.

3.8 Reliability and validity of the questionnaire

According to Lehman (1991) and Rosenberg and Daly (1993), reliability is the extent to which the item in the questionnaire are consistent in eliciting the same response every time it is administered. Similarly, a reliable instrument will yield consistent results when used across varied samples of participants.

To ensure reliability of instrument, the first draft of the instrument was presented to a few colleagues for their opinion and suggestions on the format, content and other related issues. Their opinion and suggestions were incorporated in the final draft of the instrument, which was pre-tested using trainees and lecturers of a pilot institution.

Further respondents who had undergone training in the automotive engineering field and had sat for a diploma course in their final examinations were sort from within these major towns.

To further ensure the reliability of the questionnaire, the Pearson product moment formula for split half-statistic technique was used to calculate the coefficient of correlation. A mean Pearson (r) correlation of 0.734 was computed meeting guidelines for test-retest reliability established by Kaplan & Saccuzzo (1982) and Fraenkel & Wallen (1990). The instrument was accepted for data collection.

Validity refers to the capacity of a measurement to reflect accurately the variable under study. The more valid a measurement is, the easier it is to interpret the data (Rosenberg & Daly, 1993). A valid instrument should thus reflect accurately the variable under study.

For a data collection instrument to be considered valid, the content selected and included in the questionnaire must be relevant to the need or gag established (Koul, 1984). The design of the instruments was such that emphasis was placed on the possible limitations and drawbacks of the questionnaires to increase their validity. The questionnaire was discussed with subject specialists to validate the questionnaire items.

3.9 Data Processing Procedures

The data collected was analyzed both quantitatively by inferential statistics and qualitative by descriptive data analysis. Quantitative data analysis was carried out to establish correlations supporting or conflicting with the hypotheses (Kothari, 1989). Statistical tests of significance to determine whether the selected variables had an effect on the performance of trainees were

carried out at 0.05 levels of significance. The Analysis of Variance (ANOVA) was used to test hypothesis Ho_3.

Further analysis employed the Chi- square to test hypothesis Ho_1 and Ho_2. As recommended by Einstein and Abernethy (2000), the statistical package for the Social Sciences (SPSS version 10.1 for windows) was used for the statistical computations. The package covers a broad range of statistical procedures that allowed the researcher to summarize data, examine relationships among variables, and graph results.

According to Morgan & Drury (2003), a quantitative perspective cannot accommodate all research interests. Qualitative approaches can and do offer a legitimate means of studying the nature of essence of phenomena, especially from the perspectives of individuals' own lived experiences. Qualitative methods were thus used to analyze these data, allowing a holistic view involving understanding phenomena and situations as a whole, since the whole is greater than the sum of its parts (Patton, 1990). Patton noted that qualitative data consists of detailed descriptions of situations, events, people, interactions and observed behaviors.

Cross-case analysis was used to group together interviewees' responses to each question in the interview. The use of cross-case analysis is a way of ordering and grouping or quantifying data so that large sums of data become manageable. Patton (1990) suggested cross-case analysis for open ended interviews. After transcriptions, open coding system was used to facilitate the organizing of data (Strauss & Corbin, 1990).

Quantitative and qualitative methods of data processing offered a variety of perspectives from the participants, and allowed for synthesizing, and interpreting the information gathered from the interviews.

Bunn & Stewart (1998) used both qualitative and quantitative methods to analyze data in their study to develop an understanding of the perceptions of national industry based skill standard technical committee members regarding the adoption of skill standards in vocational education programs at post secondary level.

Permission was sought from the principals of these TVET institutions to carry out research in their institutions. An introductory letter was attached to every questionnaire guaranteeing the confidentiality of the information gathered.

CHAPTER FOUR

4.0 DATA PRESENTATION, ANALYSIS AND INTERPRETATION

The main reason for the present study was to examine the effectiveness of the automotive engineering diploma course offered at TVET Institutions in preparing technicians for the modern automobile industry. This was done on the basis of how the course relates to its goals of enabling its graduates perform within the Automobile industry setting. This chapter discusses data presentation, analysis and interpretation.

4.1 HYPOTHESES

The study tested the following hypothesis;

H_{01}: There is no significance difference between the perception of lecturers in TVET Institutions and supervisors in the automobile industry towards the performance of technicians.

H_{02}: There is no significance difference between the perception of lecturers and students towards the available tools, equipments and materials for teaching automotive engineering diploma course in TVET Institutions.

H_{03} There is no significant relationship between what technicians learn in automotive engineering diploma course in TVET institutions and what is required of them in the automobile industry.

4.1. 1. $H_{01:}$ Perception of lecturers and supervisors towards the performance of technicians.

The perception of lecturers in TVET Institutions and supervisors in the automobile industry were sought and classified in the following manner with regard to the performance of technicians

a) Strongly agree (labeled as SA)

b) Agree (labeled as A)

c) Undecided (labeled as U)

d) Disagree (labeled as D)

e) Strongly disagree (labeled as SD)

Note: A strongly agrees response reflected a negative attitude; while a positive was graded as strongly disagree. This was in regard to whether technicians could actually perform within the automobile industry. Other immediate grades were; Agree, Undecided and disagree.

The data was tabulated as shown below in Table 4.1 and a chi-square was computed to find out whether the two groups opinions were similar or differed.

Table 4.1 The Chi-square Analysis of perception of Lecturers and Supervisors towards the performance of Technicians.

	SA	A	U	D	SD	TOTAL
LECTURERS	f_0=2 f_e =1.47	f_0=4 f_e =4.4	f_0= 0 f_e = 0	f_0=4 f_e =4.4	f_0=1 f_e =0.73	11
SUPERVISORS	f_0=0 f_e =0.53	f_0=2 f_e =1.60	f_0= 0 f_e = 0	f_0=2 f_e =1.60	f_0= 0 f_e =o.27	4
TOTAL	2	6	0	6	1	15
PERCENTAGE	13.33	40	0	40	6.47	100

df = (c-1)(R-1) = (5-1) (2-1) = 4x1 =4

α = 0.05

$\chi^2_{observed}$ = 1.36

$\chi^2_{critical}$ (0.05, 4) = 9.49

The null hypothesis failed to be rejected since $\chi^2_{critical}$ (0.05,4) was greater than $\chi^2_{observed}$ at α = 0.05.

This shows that both the lecturers and supervisors have similar opinions with regard to the technician's performance. 53.34% of lecturers and supervisors responded in affirmative that technicians were able to perform as expected the task endowed upon them.

In general from the table below, the attitudes of lecturers and supervisor were calculated. The mean score of 2.45 for lecturers and 2.5 for supervisors were obtained (see the Table C below). The two groups had a negative attitude towards the performance of technicians, since the scores were below the mid point score of 3 which signifies neutrality

TABLE 4.2: Perception scores for Lecturers and Supervisors.

RESPONSE	SA	A	U	D	SD	SUB TOTAL	AVERAGE
LECTURER	2	4	0	4	1	11	-
SCORE	2	8	0	12	5	27	2.45
SUPERVISOR	0	2	0	2	0	4	-
SCORE	0	4	0	6	0	10	2.5

Key (a) SA, A, U, D and SD are rated as 1,2,3,4 and 5 respectively

(b) The upper figure in each cell is the frequency while the lower figure is the cell score

4.1.2 H_{O2}: Perception of lecturers and trainees towards the available tools, equipment and materials

The opinions of both the lecturers and the trainees were classified in the following manner

(a) Need for more tools, equipment and materials (labeled N)

(b) Undecided (labeled) as U)

(c) No need for tools, equipment and materials (labeled NN)

The frequencies for each opinion were tabulated as shown below in Table 4.3 and a chi-squire computed

Table 4.3: Chi-square Analysis of Lecturers and Trainees towards the available tools, equipment and materials.

RESPONDENT	N	U	NN	TOTAL
LECTURER	$F_0 = 8$ $F_{e=} 8.07$	$F_0 = 1$ $F_e = 0.98$	$F_0 = 2$ $F_{e=} 1.96$	11
TRAINEES	$F_0 = 25$ $F_e = 24.93$	$F_0 = 3$ $F_e = 3.02$	$F_0 = 6$ $F_e = 6.04$	34
TOTAL	33	4	8	45
PERCENTAGE	73.33	8.89	17.78	100

$\alpha = 0.05$

$\chi^2_{observed} = 0.0024$

$\chi^2_{critical}$ (0.05, 2) = 5.99

The null hypothesis was accepted since $\chi^2_{critical}$ (0.05, 2) was greater than $\chi^2_{observed}$ at α=0.05 level of significance

4.1.3 Ho_3: Relationship between what technicians learn in TVET Institutions and what is required of them in the automobile industry.

To determine whether there was any relationship between what technicians learn and what is required of them in the automobile industry, a two-way analysis of variance (ANOVA) was carried out (shown in table 4.4 below). This was done to determine if there was any interaction effect between any of the following aspects considered for job performances. Accuracy, speed, in task completion; independence; innovativeness; interpersonal relations (Ability to work with others); machine operation skills; use of materials.

Table 4.4 ANOVA for aspect of job performance for what is learnt by technicians and what is required of them

SOURCE	SS	df	ms	$F_{observed}$	$F_{critical}$
Column C	166.75	1	166.75	224.94	3.34
Rows R	23.54	6	3.923	5.085	2.01
Interaction RXC	15.45	6	2.575	3.514	2.12
Within cells	145	184	0.788		
Total	**350.74**	**197**			

From Table 4.4, it was noted that $F_{observed}$ is greater than $F_{critical}$ at 0.05 level of significance for rows (R), Columns (C) and interaction (RXC). This therefore means that;

i) The main effects of rows were significant

ii) The main effects of columns were significant

iii) The main interaction effect was significant

This therefore shows that there is an interrelationship between what is learnt in TVET institutions and what the automobile industry requires. Figure 3, gives graphical representation of interaction effects between job aspects

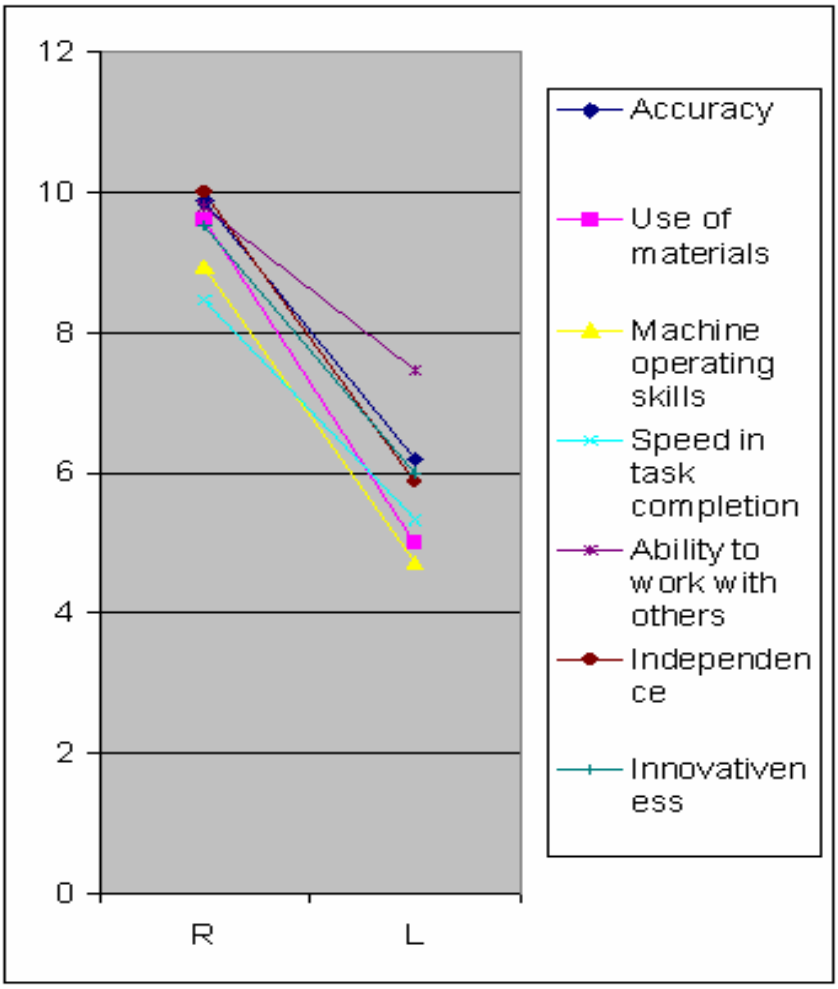


Figure 4.1: A graph showing the interaction effects between job performance aspects.

In figure 3.1, L represents what is learnt in TVET institutions by technicians while R represents what the Automobile industry requires

It can be observed that the requirement of the industry is higher in all job aspects than what is learnt in TVET institution. The interaction effects noted in the graph were;

i) Speed in task completion vis-à-vis all the other aspects of job performance

ii) Ability to work with others verses independence in job performance

iii) Machine operation skills are affected by ability to work with others

Therefore, the null hypothesis tested was rejected since $F_{observed}$ was greater than $F_{critical}$ at 0.05 level of significance for Rows, Columns (c) interaction (RXC)

4.2 Suggestions for improving the automotive engineering diploma course in TVET Institutions

The respondents who participated in the present study gave the following suggestions;

4.2.1 Suggestions by lecturers and supervisors

Most of the lecturers and supervisors were not satisfied with what the syllabus for automotive engineering diploma course offered and suggested it's trimming by removing irrelevant courses that crowded the syllabus.

The course therefore should be tailored to what the industry wants. This therefore calls for liaison between the industry and the TVET institution. This can be achieved through exhibitions, regular and supervisors organized by the automobile industry. Donation of used equipment by firms will also go along way in assisting with the shortage of resources for learning in these institutions.

Emphasis should be laid on garage visits, attachment to improve on the students' abilities in job performance. The students will also learn to appreciate the new product and technology in the industry and get used to them. Better remuneration for the resource personnel was also suggested, that would act as motivation and make them work harder. Evaluation and review of the course and the products of the course should be done at specific intervals (years) with a view of making changes whenever need arises

It was observed that the course coverage was geared towards excelling in the national examinations rather than the ability to perform tasks effectively. This, therefore, saw emphasis being laid to theory classes in favor of practical. This notion should be done away with:

4.2.2 Suggestions by students and Technicians

Both the students and technicians concurred on the fact that the syllabus should be reviewed to reflect the current technological changes in the automobile industry. Increase in the time allocated for attachment was also called for and that attachment be made compulsory, seemingly some Institutions never emphasized this crucial aspect of

the course. Regrettably, their lecturers never supervised some students during this period thus they felt neglected.

They also suggested that automotive firms identify with particular Institutions to an extent of giving small contracts to the students whenever time allowed. This would help them gain experience as they learn. Some lecturers were not conversant with the content of what they were handing and they therefore could not deliver in theory lessons leave alone practical, which they avoided at all costs.

Pertaining to the required tools and equipment, these were lacking and those that were available were archaic and mostly out of order. Most of them were surprised to see most of the tools and equipment during attachment.

CHAPTER FIVE

5.0 DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

The main purpose of this study was to examine the effectiveness of the automotive engineering diploma course offered at TVET Institutions in preparing technicians for the modern automobile industry. This was done on the basis of how the course relates to its objectives, that is, enabling its graduates performs various tasks endowed upon them within the automobile industry setting.

Data was collected to determine if this was being achieved by comparing the perceptions of the lecturer in TVET Institutions and those of supervisors in automobile firms. The relationship between what technicians learnt in TVET Institutions and what was required of them in the automobile firms in terms of job performance was also looked at and finally the attitudes of the lecturers and trainers towards the available tools, equipment and materials in TVET institutions was sought. The chapter presents the discussion of the present study findings, conclusions, suggestions and recommendations for further research.

5.1 Discussions

The discussion in this chapter is in the order of the null hypotheses that were being tested in the study. The first hypothesis was:

$H0_1$: There is no significant difference between the perception of lecturers in TVET institutions and supervisors in the Automobile industry towards the performance of technicians.

The result obtained (Table 4.1) showed that lecturers and supervisors held similar opinion with regards to the performance of technicians in the automobile industry.

On the basis of the result, the null hypothesis was accepted, Kerre (1995) concur with the same and observes that in the current state of changing needs of the societies and the work place, new knowledge and technologies are altering the skills requirement for production and maintenance. He therefore suggests that both trainees and employees seek quality assurance to ensure that the current mismatch between technicians and employment opportunities is arrested, if this is done, it will improve the performance of technicians at their work place.

The perception shared by the lecturers and supervisor can, therefore, be attributed to the changing work environment where technologies and work organization demand new skills and also that TVET program have not innovated to accommodate such changes.

The second hypothesis was:

$H0_2$: There is no significant difference between the perception of lecturers and students towards the available tools, equipments and materials for teaching and learning the Automotive engineering diploma course in TVET Institutions.

The result obtained in table 4.3 indicated that the lecturers and trainees held the same perception with regards to the available tools, equipment andmaterials for teaching and

learning automotive engineering diploma course in TVET institutions. On the basis of this result the null hypothesis was accepted. Both groups agreed that the tools and equipment were lacking and many of them (trainees) were very much scared of using them. The tools and equipment in most TVET institutions were archaic and mostly out of order. Kerre (2001) highlights this situation when he reports that;

The machinery available in the workshop is quite outdated in terms of the state of current modern technology. Laboratories are far from being adequate and often lack sufficient learning/teaching materials.

The equipment is not sufficiently maintained to cope with the needs of the modern industry. Lack of facilities and resources to equip and maintain has adversely impacted the practical orientation of the TVET programmer. They therefore suggested that the automobile firms donate some of their used tools and equipment to the TVET institutions, which will then aid in learning.

The third hypothesis was:

$H0_3$: There is no significant relationship between what technicians learn in automobile engineering diploma course in TVET institutions and what is required of them in the Automobile Industry.

The result obtained (Table 4.2) indicated that there actually existed a relationship between what technicians learnt and what the automobile firms are required of them;

therefore the null hypothesis was rejected. The notable difference in tasks considered for job performance in those groups studied was speed. Technicians in the industry were expected to perform their tasks faster than how they trained. This can be attributed to the work schedule in the industry where time is a major constraint.

The master plan on Education and Training 1997-2010 (Republic of Kenya 1998), amongst other policy documents, stresses on the need to provide avenues for skills improvement and further training and education on graduations at TVET institutions. This is an indicator that there exists a relationship between what is learnt by technicians and what is required of them, and that what is needed is an improvement of the skills they have.

5.2 Conclusions

The following conclusions were made based on the findings of this research:

First: The lecturers and automobile supervisors had negative perception towards the performance of technicians. This, therefore, means that the respondents are not satisfied with the training given to automotive engineering trainees at diploma level. Thus its relevance is questionable.

Secondly: a relationship existed between what the technicians learnt in TVET Institutions and what was required of them by the automobile firms.

This was a good indication that not everything learnt was irrelevant, but that is not enough, therefore more should be done to enhance the relationship and make it even

better through the review of syllabus. Finally the perception of the lecturers of trainees towards the available tools and equipment were negative. This therefore calls for equipping TVET Institutions with the relevant machinery / equipment where possible to enable trainees gain experience in their operation and use. When this is done the performance of technicians will be improved a great deal.

5.3 Recommendations

Based on the findings of this study, the following recommendations were arrived at First the current syllabus was seen, as not offering most of the knowledge and skills required by the automobile industry. It is therefore recommended that the subjects that crowded the syllabus should be trimmed and streamlined so as to meet the automobile industry - needs.

Secondly, a liaison between the automobile industry and TVET institutions should be encouraged. This can be achieved through seminar workshops, Industrial visits, attachment and exhibitions. This will go a long way in fostering a healthy relationship between learning institutions and the automobile industry.

Thirdly; there should be created an attachment placement office within the learning institutions, which will act as a link between them and the automobile industry.

This will eliminate the problems trainees experience when looking for attachment places and the automobile firms will also be prepared to receive them and assist them

accordingly during the attachment period. Another recommendation is the evaluation and review of the course syllabus at specified intervals and also when need arises so that it is in phase in view of the long time it has taken since the last syllabus review for TVET institutions was done.

The national development plan for Kenya in particular session paper No.1 (republic of Kenya, 2005) concurs with this and recommends the following:

i) The need for review of TVET programmes to make them consistent with the current and future needs of industrialization.
ii) Establishing a data base action.
iii) Legal and management infrastructure
iv) Staff development
v) Expanding the financial base and raising the efficiency in provision
vi) Curriculum development
vii) Improving assessment and certification

Finally, it is recommended that emphasis of course coverage should be de-linked from the performance in examinations on which it is currently pegged. Lecturers should therefore option some vigor with which they teach, to both theory and practical lessons. Examinations should also be carried out in continuous manner and not a final one at the end of the course

5.4 Suggestions for further research

With the current technological changes experienced in the Automobile industry, it is necessary to have the following researches done;

i) A research to find out why there is continued decline in enrolment in automotive engineering courses at all levels of technical, industrial , vocational and entrepreneurship training

ii) A research to find out how graduates of automotive engineering diploma course are fairing on in the informal sector

iii) A similar research as the one reported but on other courses offered in TVET institutions.

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APPENDICES

APPENDIX 1
Questionnaire for workshop / Garage Supervisors.

Introduction.

This part of an educational study being undertaken to find out the relevance of technical, vocational, Education and Training (TVET) program of automotive engineering technicians to the modern motor industry. The purpose of this questionnaire is to seek your opinion and views on the various aspects of the training program.

It is designated to allow you express your views freely and also propose improvement areas. You are one of the chosen supervisors to participate in this study. You are therefore requested to complete the questionnaire as accurately as possible and return it.

Your responses will be treated confidently both during and after the study.

Thank you.

Researcher

Given below are statements about automotive engineering diploma course. Circle one of the given choices to indicate the options that best described\s your opinion.

Key: SA - Strongly Agree

A - Agree

U - Undecided

D - Disagree

SD - Strongly Disagree

1. Automotive engineering diploma course is enough preparation for work in the motor industry

SA A U D SD

2. Automotive engineering diploma course is not in any way related to the work in the motor industry

SA A U D SD

3. The training offered at these level, best suites the technicians for the tasks they perform within the motor Industry

SA A U D SD

4. Most motor firms have had a tremendous change in technology over the last ten years in terms of materials and equipment.

SA A U D SD

5. Most motor firms have had tremendous change in skills requirement over the last ten years.

SA A U D SD

6 Automotive engineering syllabus needs to be restructured with focus on the work in the motor industry to make it better.

SA A U D SD

7. The Automotive engineering training syllabus is up to date with the technological changes experienced in the motor industry.

SA A U D SD

8. There is a big difference between what technicians learn and the tasks they perform.

SA A U D SD

9. Technicians in the motor industry cannot perform effectively the tasks endowed upon them.

SA A U D SD

10. Technicians in the motor industry cannot utilize materials properly.

SA A U D SD

11. Technicians in the motor industry cannot work independently.

SA A U D SD

12. Technicians in the motor industry relate well with others in carrying out tasks.

SA A U D SD

13. Technicians in the motor industry lack machine operating skills.

SA A U D SD

14. Technicians in the motor industry lack speed in completing task.

SA A U D SD

15. Technicians in the motor industry lack innovativeness.

SA A U D SD

16. Motor firms should work in liaison with the training institutes to update each other on technological changes and developments.

SA A U D SD

17. The tools and equipment for training technicians in TVET institutions are readily available.

SA A U D SD

18. The tools and equipment for training technicians in TVET institutions are similar to those in the motor industry.

SA A U D SD

19. Below are some aspects considered for job performance; Compare what the technicians learn in TVET institutions with what is required of them in the motor industry of a ten-point scale. (10=very good, 1 = very poor).

Aspect	What is required in the construction industry	What is learnt in TIVET Institutions
Accuracy		
Speed in task completion		
Independence		
Innovativeness		
Ability to work with others		
Modern operating skills		
Use of materials		

APPENDIX 2
Questionnaire for Automotive Engineering Lecturers

Introduction.

This part of an educational study being undertaken to find out the relevance of Technical, Vocational, Education and Training (TVET) program of automotive engineering technicians to the modern motor industry. The purpose of this questionnaire is to seek your opinion and views on the various aspects of the training program.

It is designated to allow you express your views freely and also propose improvement areas. You are one of the chosen lecturers to participate in this study. You are therefore requested to complete the questionnaire as accurately as possible and return it. Your response will be treated confidently both during and after the study.

Thank you.

Given below are statements about automotive engineering diploma course. Circle one of the given choices to indicate the option that best describes your opinion.

Key: SA - Strongly Agree

A - Agree

U - Undecided

D - Disagree

SD - Strongly Disagree

1. Automotive engineering diploma course is enough preparation for work in the motor industry.

SA A U D SD

2. Automotive engineering diploma course is not in any way related to the work in the motor industry.

SA A U D SD

3. The training offered at these level, best suites the technicians for the tasks they perform within the Motor industry.

SA A U D SD

4. Most TVET institutions are not well equipped with teaching and learning materials in face of the current technological changes experience in the motor industry.

SA A U D SD

5. Automotive engineering syllabus needs to be restructured with focus on the work in the motor industry to make it better.

SA A U D SD

6. The Automotive engineering training syllabus is up to date with technological changes experienced in the motor industry.

SA A U D SD

7. There is a big difference between what technicians learn and the task they perform.

SA A U D SD

8. Technicians in the motor industry cannot perform effectively the tasks endowed upon them.

SA A U D SD

9. Trainees in the TVET institutions cannot utilize equipment properly.

SA A U D SD

10. Trainees in the TVET institutions cannot work independently.

SA A U D SD

11. Trainees in the TVET institutions relate well with others in carrying out tasks.

SA A U D SD

12. Trainees in the TVET institutions lack material operating skills.

SA A U D SD

13. Trainees in the TVET institutions lack speed in completing tasks.

SA A U D SD

14. Trainees in the TVET institutions lack innovativeness.

SA A U D SD

15. Motor firms should work in liaison with the training institutes to update each other on technological changes and developments.

SA A U D SD

16. The tools and equipment for training technicians in TVET institutions are readily available.

SA A U D SD

17. Below are some of the aspects considered for job performance; Compare what the technicians learn in TVET institution with what is required of them in motor industry on a ten-point scale. (10=very good, 1=very poor).

Aspect	What is required in the construction industry	What is learnt in TVET Institutions
Accuracy		
Speed in task completion		
Independence		
Innovativeness		
Ability to work with others		
Modern operating skills		
Use of materials		

18. As lecturer in a TVET institutions, list down in order of importance the areas you feel should be emphasized during training so as to foster a positive relationship between training institutions and the world of work.

(i)_____

(ii)_____

(iii)_____

(iv)_____

(v)_____

THANK YOU FOR YOUR CO-OPERATION.

APPENDIX 3

Questions for Automotive engineering trainees

Introduction

This is part of educational study being undertaken to find out the relevance of technical, vocational, Education and Training (TVET) program of automotive engineering technicians to the modern motor industry. The purpose of this questionnaire is to seek your opinion and views on the various aspects of the training program.

It is designated to allow you express your views freely and also propose improvement areas. You are one of the chosen trainees to participate in this study. You are therefore requested to complete the questionnaire as accurately as possible and return it. Respond by ticking the in boxes provided and writing in the spaces as appropriate.

Your responses will be treated confidentially both during and after the study.

Thank you.

Given below are statements about automotive engineering diploma course. Circle one of the given choices to indicate the options that best describe your opinion.

Key: SA - Strongly Agree

A - Agree

U - Undecided

D - Disagree

SD - Strongly Disagree

1. I chose to study Automotive engineering diploma course in this TVET institution.

SA A U D SD

2. The automotive engineering diploma course offered in this TVET institution will assist me in getting employment within the motor industry.

SA A U D SD

3 Most of the tasks I undertake during the current training are related to the tasks in the motor industry.

SA A U D SD

4. Both the theory and practical lessons for automotive engineering diploma course are well covered during the training.

SA A U D SD

5. Automotive engineering diploma course content is mainly covered for examination purposes.

SA A U D SD

6. Automotive engineering diploma course content is mainly covered for related skills for world of work.

SA A U D SD

7. I have experienced problems with learning equipment and material during the training.

SA A U D SD

8. The equipments and material for learning Automotive engineering diploma course are adequate and available in this institution.

SA A U D SD

9. There is no relationship between what I learn in the automotive engineering diploma course and what is required of me in the motor industry.

SA A U D SD

10. I encountered most tools, equipments and materials for the first time during my attachment period.

SA A U D SD

11. When there is lack of equipment and materials to be used for teaching/learning purposes, the lecturer does the following.

i) Tries to borrow ☐

ii) Improvises ☐

iii) Skips the topic ☐

iv) Others (Please specify) ☐

12. which of the following is the strongest problem experienced in learning automotive engineering diploma course?

i) Lack of time ☐

ii) Lack of tools, equipment and materials ☐

iii) Lack of lecturers ☐

iv) Others (please specify) ☐

13. How frequent do you go for field trips or industrial visits?

i) Very often ☐

ii) Often ☐

iii) Rarely ☐

iv) Never ☐

14. As a student of automotive engineering diploma course, who has been for attachment, list down in order of importance, the sections you feel should be emphasized so as to foster a positive relationship TVET institutions and the world of work in the motor industry.

i) _____

ii) _____

iii) _____

iv) _____

v) _____

THANK YOU FOR YOUR CO-OPERATION

APPENDIX 4
Questionnaire for Automotive engineering workshop technicians

Introduction.

This part of an educational study being undertaken to find out the relevance of technical, Vocational, Education and Training (TVET) program of automotive engineering technicians to the modern Motor industry. The purpose of this questionnaire is to seek your opinion and views on the various aspects of the training program.

It is designated to allow you express your views freely and also propose improvement areas. You are one of the chosen technicians to participate in this study. You are therefore requested to complete the questionnaire as accurately as possible and return it.

Your responses will be treated confidently both during and after the study.

Thank you.

Researcher

Given below are statements about automotive engineering diploma course. Circle one of the given choices to indicate the option s that best describes your opinion.

Key: SA - Strongly Agree
A - Agree
U - Undecided
D - Disagree
SD - Strongly Disagree

1. Automotive engineering diploma course is no enough preparation for work in the motor industry.

SA A U D SD

2. Automotive engineering diploma course is not in any way related to the work in the motor industry.

SA A U D SD

3. The training offered at these level, best suites me for the tasks I perform within the motor Industry

SA A U D SD

4. Most motor firms have had a tremendous change in skills requirement in technology over the last ten years

SA A U D SD

5. Most motor firms have had tremendous change in skills requirement over the last ten years

SA A U D SD

6. Automotive engineering syllabus needs to be restructured with focus on the work in the motor industry to make it better.

SA A U D SD

7. The Automotive engineering training syllabus is up to date with the technical changes experienced in the motor industry.

SA A U D SD

8. That is a big difference between what I learn and the tasks I perform

SA A U D SD

9. Both the theory and practical lessons for Automotive engineering diploma course were well covered during my training

SA A U D SD

10. Automotive engineering diploma course content was mainly covered for examination purposes

SA A U D SD

11. Automotive engineering diploma course content was mainly covered for related skills for the world of work

SA A U D SD

12. I have experienced problems with equipment and materials I work with during my learning automotive engineering diploma course

SA A U D SD

13. I never came a cross most of the equipment and materials I work with during my learning Automotive engineering diploma course

SA A U D SD

14. There is no relationship between what I learnt in the automotive engineering course and what is required of me in the motor industry

SA A U D SD

15. As a technician working in a motor garage, list down in order of importance the sections you feel should be emphasized so as to foster a positive relationship between TVET institutions and the world of work in the motor industry

(i) _____

(ii) _____

(iii) _____

(iv) _____

(v) _____

THANK YOU FOR YOUR CO – OPERATION.

APPENDIX 5
Interview Schedule

1. Looking at the TVET automotive engineering diploma course,
    (a) Is it relevant to the modern automobile industry?
    (b) If not, what should be done to ensure that it is relevant?
2. What are the limitations of this program in terms of skill and knowledge acquisition?
3. How can these limitations be overcome

What should be done to the TVET automotive engineering diploma course curriculum in view of the current technological changes in the automobile industry?

APPENDIX 6

Two-way ANOVA data for aspects of job performance for what is learnt by technicians and what is required of them

Aspect	What is required in the construction industry	What is learnt in TVET Instructions
Accuracy	N= 15 $\sum x = 148$ X=9867 $\sum X^2$=14.62	N= 15 $\sum x = 93$ X=6.2 $\sum X^2$=481
Speed in task completion	N= 15 $\sum x = 144$ X=9.6 $\sum X^2$=1388	N= 15 $\sum x = 75$ X= 5 $\sum X^2$= 369
Independence	N= 15 $\sum x = 134$ X=8.93 $\sum X^2$=1224	N= 15 $\sum x = 71$ X=4.73 $\sum X^2$=367
Innovativeness	N= 15 $\sum x = 127$ X=8.467 $\sum X^2$=1209	N= 15 $\sum x = 80$ X=5.33 $\sum X^2$=497
Ability to work with others	N= 15 $\sum x = 147$ X=9.8 $\sum X^2$=1445	N= 15 $\sum x = 112$ X= 7.467 $\sum X^2$=888
Modern operating skills	N= 15 $\sum x = 150$ X= 10 $\sum X^2$=1481	N= 15 $\sum x = 88$ X= 5.867 $\sum X^2$= 562
Use of materials	N= 15 $\sum x = 143$ X=9.53 $\sum X^2$=1375	N= 15 $\sum x = 90$ X= 6 $\sum X^2$=538

APPENDIX 7
BUDGET

ITEM(S)	QUANTITY	COST (KSHS)
Foolscaps A4 size @ksh.250	4 reams	1000
Ball point pens@ksh.20	12	240
Document holder @ksh.60+	4	240
Traveling allowance @ksh.200 per day	60 days	12000
contingencies		9000
Typing thesis @ksh.50 per page	150 pages	7500
Building of thesis @ksh.500	6 copies	3000
Subsistence allowance @ksh.400	60 days	24000
Major equipment		42000
Total		**98,980**

APPENDIX 8

Time schedule

DESCRIPTION	DURATION
Literature review	8 months
Development of instrument and testing	2 months
Adjustment of test instrument and the procedures	1 week
Delivery, administration and collection of questionnaire; interview conduction, observation and document analysis	4 months
Data analysis, writing and typing thesis for examination	6 months
Defence,correction and submission of final thesis	3 months