UNIVERSITY OF EDUCATION, WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

AN ASSESSMENT OF THE PERCEIVED FALLING STANDARDS IN PRACTICAL SKILLS OF TRAINEES: A CASE STUDY OF MECHANICAL ENGINEERING CRAFT- PRACTICE IN TECHNICAL AND VOCATIONAL EDUCATION IN THE TECHIMAN MUNICIPALITY

NUHU ABDUL-RAZAK

(7I41220015)

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I am grateful to Almighty God for His guidance and protection. Secondly I thank my supervisor Dr. Afrifa. I also acknowledge to my wife Rahinatu Abdul Razak and my head master Mr. Seth Akodaa for their immense contribution towards my successful completion of this programme.

DECLARATION

I, NUHU ABDUL-RAZAK, declare that this dissertation, with the exception of quotations and references contained in published works which have all been identified and acknowledged, is entirely my original work, and it has not been submitted, either in part or whole for another degree elsewhere.

Signature ……..

Date …….

SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this thesis was supervised in accordance with the guidelines and supervision laid down by the University of Education Winneba.

Name of Supervisor: ……

Signature ……

Date ……

ABSTRACT

The study assessed the perceived falling standards in practical skills of trainees, using mechanical engineering craft practice in Technical and Vocational Education within Techiman Municipality as a case study. The research design adopted for this study was the descriptive research design. Survey questionnaires were distributed to apprentice/students and master craftsmen in the Vocational and Technical schools. The population for the study was nine hundred and ninety eight (998) students currently undergoing Technical and vocational training in the respective schools in the Techiman Municipality. Random sampling technique was used to select one hundred and nine respondents for the study (97 apprentices and 12 master craftsmen). The questionnaire was delivered by hand to each respondent and collected after completion by respondents. Statistical Package for Social Sciences (SPSS) for windows (version 16.0) was the analytical tool used to analyze the data.From the research finding 80.4% of the respondents spent less than one year at the training institutions as compare to the pass years before one can get into the MET 1, which contributed greatly to the falling standard.The study findings shows that activity based method, demonstration method and observation were used to deliver competency based skills acquisition. Most of the apprentices had their technical competency training from master craftsmen. The designing of training programmes in technical training is good. Moreover, the practical competency training is good. Furthermore, the vocational training institutes lack adequate educational resources to facilitate vocational education. This means that availability of tools and equipment for TVET training is poor. This eventually contributed to the falling standards in practical skills of trainees. The study recommended that the Ghana Education Service through the District education office should provide Teaching and Learning Materials in a form of tools and equipment to enhance the practical skills of trainees.

DEDICATION

I dedicate this dissertation to my parents AlhajiNuhu, and wife Mrs. Raheenatu Abdul-Razak and my children Farihat, Arafat and Hickmat.

DEFINITION OF ABBREVIATIONS

i. Technical and Vocational Education Division (TVED)

ii. Technical and Vocational Education Training (TVET)

iii. Full technological Certificate (F.T.C.)

iv. Mechanical Engineering Technician (M.E.T.)

v. Certificate in Education (C.E.)

vi. Technical Examination Unit-Ghana Education Service (TEU-GES)

vii. Middle School Leaving Certificate (MSLC)

viii. Basic Education Certificate Examination (BECE)

ix. Teacher Learning Material (TLM)

x. National Vocation and Technical Institute (NVTI)

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CHAPTER ONE

INTRODUCTION

1.0 Background of the Study

The purpose of skills training is to provide the youth with quality, demand driven and employable skills for job creation, industrialization, wealth creation and national economic growth. Technical and Vocational institutions were established in Ghana to train skilled manpower requirement for industry and other related organizations, essentially for growth in national development, and also, to sustain economic growth which enhances the quality of life of the people.

At the initial stages, of their establishment Technical Vocational Institute, course structures of the various craft disciplines were unique and well maintained. Every craft discipline had a well-organized crafts workshop for practical skills training. Besides the workshops, they had several standard laboratories namely, machine tool, physics and electronics, metrology, and heat treatment.

Each laboratory was designed to teach the fundamental principles of its subject matter through the performance of experiments. That scheme of experimentation encouraged instructors to develop others of similar type, thus widening the scope of understanding of the students. In addition to all these, each course area had its own related subject. Examples of such related subjects areas are technical drawing, engineering science, engineering mathematics, engineering drawing and sketching and English language. All those related subjects accelerated teaching and learning and went a long way to help the learner to have a deeper understanding of the subject matter.

Besides the Technical Institutes training their candidates to acquire specific skills, some companies had their own training centers to train new employees to attain certain skills level to meet their specification. Some of those corporations and

companies wereGhana Nuts Company Limited and Corn dry Process Company limited. Most of those organizations also had a laid down programme where getting to the end of the school academic year, they went to the various Technical and Vocational Institutions to conduct a selection examination for employment into their organizations. The selection examinations conditions encouraged healthycompetition among the old students and the incoming ones.

At that time the entry requirement into the Vocational Institutes was a common entrance examination which required a minimum pass mark into the technical schools. The Education Service Reform introduced the Junior High School, JHS, and the Senior High School, SHS. As a result entry process to the second cycle schools also changed to a direct continuation from Junior High School to Senior High Secondary and Technical Schools without any extra examination apart from the Basic Education Certificate Examination (BECE), which is equivalent to the older Middle School Leaving Certificate Examination (MSLCE). The job market has also become saturated and employers are no more recruiting workers directly from the Technical and Vocational schools as they used to do.

Poor Public Perception

The problems started mounting after the education reform. The perception and attitudes of the public about Technical and Vocational Education changed. It has now been considered as a career path for the less academically endowed. This perception has been fueled by the low academic requirement (without any entrance examination) for admission into Technical and Vocational Education and Training (TVET) programmes and the limited prospects for further education and professional development.

The worse is the impression that is sometimes created by governments that the primary objective of the TVET track is to keep dropouts and "lockouts" form the basic and secondary school system off the streets, rather than project this type of training as an effective strategy to train skilled workers for the employment market. The term "lockout" refers to students who are unable to move up the educational ladder, not because of poor grades but because of lack of places at the higher level.

Inadequate Financing

It must be recognized that TVET is expensive on a per student basis. Unit costs are necessarily expected to be higher in TVET institutions than in primary and Secondary schools because of the smaller student-to-teacher ratios together with, its expensive training equipment and the costly training materials that are "consumed" during practical lessons.

Low Quality of Training

In recent times the quality of training has become low with undue emphasis on theory and certification rather than on skills acquisition and proficiency testing. Inadequate instructor for training, obsolete training equipment and lack of instructional materials are some of the factors that combine to reduce effectiveness of training in meeting the required knowledge and skills objectives. High quality skills training requires qualified instructors, appropriate workshop equipment, adequate supply of training materials and practice by trainees.

Weak Monitoring and Evaluation

Currently TVET programs are very often not designed to meet observed or projected labour market demands. The emphasis appears to be on helping the unemployed to find jobs, without any critical attempt to match training to available jobs. This situation has resulted in many TVET graduates not finding jobs or finding themselves in jobs for which they have had no previous training. Training institutions also do not track the employment destination of their graduates. hencevaluable feedback from past trainees on the quality of the training they have received and the opportunity for their experiences to be factored into the review of curricula and training packages are lost. In other words, the use of tracer studies to improve the market responsiveness of training programmes is currently absent. This affects development, (Afeti, 2009)

The following standards are used to assess the perceived falling standards

- Entry qualification
- Exit qualification
- Years spent in training
- Availability of training equipment and tools
- Industry's request for Technical and Vocational products
- Trainees ability to use machinery
- Infrastructure and government's support for Technical and Vocational institutions
- Interest of students in Technical and Vocational Programs
- Educational Reform on Technical and Vocational Education

1.2 Statement of the Problem

Standards of practical skills of trainees in the Technical and Vocational Institutions especially in mechanical engineering craft practice were established in Ghana to train skilled manpower required for economic growth and national development. The standards were maintained by strict entry requirement by passing an entry examination, small instructor-student ratios, availability of well-maintained training equipment and other instructional materials. Students population has increased without corresponding increase of instructors and training equipment have become old and poorly maintained if maintained at all and other instructional materials have become difficult to obtain. The changes mentioned above have brought a perception of falling standards of practical skills of trainees. The present study is carried out to find out the perceived falling standard in practical skills of trainees with respect to craft practice in technical and vocational institutions.

1.3 Purpose of the Study

The purpose of the research was to find out the extent of the effect of perceived falling standards in workshop practice skills in technical and vocational institutions. The study intended to reveal, the means by which workshop practice skills in technical and vocational institutions can be handled, to enhance general performance and equally promote national development. It is very natural that for every situation, there is a reason for its occurrence, it is because of this that, this study sought to identify the falling standards in workshop practice skills. This study is also to help promote awareness of the importance of practical skills acquisition to the students of technical and vocational institutions.

1.4 Research Objectives

Main objective

The main objective of the study was to assess the perceived falling standards in workshop practice skills and its effect on trainees.

Specific objectives

The specific objectives of the study were to:

1. Assess the causes of the perceived falling standards in workshop practice skills.
2. Investigate the impact of perceived falling standards in workshop practice skills on trainees and
3. Evaluate the impact of perceived falling standards in workshop practice skills on trainees performance.

1.6 Research Questions

The following research questions will be used for the study,

1. What are the causes of the perceived falling standards in workshop practice skills?

2.What is the impact of perceived falling standards in workshop practice skills on trainees? and

3. What is the impact of perceived falling standards in workshop practice skills on trainees performance?

1.6Significance of the Study (Relevance of the Research)

This study could be a reference document for technical and vocational education division (TVED) and other stakeholders. It also brought to light some of the causes of the problems of the perceived falling standards in workshop practice skills. Above all, the study would help to inculcate a good training and studying habit in the students of TVET institutions.

1.7 Scope of the Study

The study covered three Technical and Vocational Institutions namely: Ameyaw SHS Technology training Centre, Tuobodom Secondary technical School, Tanoso Technical Vocational Institute and Apprentices. The study is conceptually limited in scope to assessing the perceived falling standards in practical skills of trainees.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews relevant literature from published and unpublished books, journals and other relevant information related to the subject.

2.1 Technical and Vocational Education

The views of various researchers on the meaning and contents of technical and vocational education are similar. According to Afeti (2009),**Technical and Vocational Education** is used as a comprehensive term referring to those aspects of the educational process involving the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life. In the light of this, vocational and technical education is the preparation of individuals to acquire practical skills as well as basic scientific knowledge:It provides skilled manpower for the world of work, that is increasing the workforce in the country, individuals with specialized skill as offshoots of efficient vocational and technical education as they are trained, equipped, with workable practical/skills, knowledge, aptitude and competencies required in specific occupations.

He also continues by positing that one of the most important features of TVET is its orientation towards the world of work and the emphasis of the curriculum on the acquisition of employable skills. TVET delivery systems should therefore well placed to train the skilled andentrepreneurial workforce that the country needs to create wealth and emerge out of poverty. Another important characteristic of TVET is that it can be delivered at different levels of sophistication. This means that TVET can respond not only to the needs of different types of industries, but also to the different socio-economic and academic backgrounds, and prepare them for gainful employment and sustainable livelihoods. A skilled workforce is a basic requirement for driving the engine of industrial and economic growth, and TVET holds the key to building this type of technical and entrepreneurial workforce.

Okorie and Ezeji (2011) also pointed out that the theoreies of vocational and technical education are based on the acquisition of requisite skills which are means of increasing the productive power of a nation. Gills (2009) emphasized that poverty of any nation depends on the quality of its higher education. This goes further to buttress the fact that those with productive skills and tendency for learning can achieve all that they are set to achieve and gain fulfillment in all their endeavors. According to Okolocha (2005) "Vocational education programs focus on the acquisition of appropriate skills, abilities and competencies as necessary equipment for the individual to live and adapt to the real work situation and contribute to the development of his society. Vocational and technical education assists young people to secure their own future by using the practical skills acquired for self-employment.

According to UNESCO (2008),**Vocational and Technical Education** can be seen as an aspect of education which utilizes scientific knowledge in the acquisition of practical and applied skill in the solution of technical problems. It is the process of acquiring attitude, knowledge, competencies relating to occupations in various factors of economics and social life. Vocational and technical education has also been described by Udoye (2005) as the education that prepares students mainly for occupations requiring manipulative skills and is designed to develop skills, abilities, understanding, attitude and work habits needed for useful and productive work. It therefore means that vocational and technical education is that type of education that needs the inculcation of practical skills into recipients so that they will be able to practice experiences they acquired in real life situations. This can provide employment for its recipients.

Fafunwa, (2014) described **Technical and Vocational Education** as an important practical skill development program designed to equip persons of trainable

qualities with skills that employers of labor want in the industries, in fact, it is considered as the launching pad for technological development. Vocational education is also an area of study designed for the redevelopment of skills, attitudes and appreciation needed by workers to enter into and progress successfully in a chosen vocation. Olaitan (2008) andEya (2001), stated that it is a preparation for occupation endeavors in agricultural education and business education. This means that vocational education is also a training, that equips learners with the knowledge and skills in the productive, distributive, and service industries for self or paid employment, vocational technical education can also be regarded as the education that enables one to acquire knowledge and skills in the vocational and technical areas to systematically solve human or societal problems (Okwo, 2000).

Vocational and technical education refers to that 'integral part of general education'(including the Junior Secondary School, the Senior Secondary School and Technical Education obtained in Polytechnics, Monotechnics, and Colleges of education (technical) and in the universities) that trains and prepares it's recipients for the world of work. It lays great emphasis on skill acquisition and development to meet the human resources required in the world of work. (FRN, 2004: 30).

Osuala (2008) viewed this type of education as a training intended to prepare the student to earn a living in an occupation in which success is dependent largely on technical information and on the understanding of the laws of science and technology as applied to modern design, production, distribution, and services. Idialu, (2007), also said "**Vocational Education** can be described as an aspect of education which is concerned with, the preparation of skilled manpower. It is the form of education, training that is directed towards developing the students to become productive, employable or in self-employment. It is therefore the bedrock in which a country's

socio-economic, technological and cultural advancement must be built, also, vocational education, enhances opportunities for all types of learning, it has the function of providing qualified manpower demanded by changing the individual and enabling him to use complex technology".

To achieve the objectives of vocational and technical education, there is the need to create an enabling environment for the teaching and learning of vocational and technical education in our schools. Improved quality in teaching and examination, has become very necessary because in recent graduates who pass through training in this form of education are unable to perform adequately as they ought to and as such, unemployment, poverty has engulf most of them. The overall aim of quality teaching and learning is to create opportunity for high quality learning which will be evaluated through performance at the long run. This form of education has its own function as stated by the National Policy on Education (2011) in Nigeria as follows:

To provide manpower in applied science, technology and commerce particularly at sub-professional levels.

To provide the technical knowledge and vocational skills necessary for Agriculture, industrial, commercial, and economic development.

To provide people who can apply scientific knowledge to the improvement and solution of environmental problems for the convenience of man.

To give an introduction to professional studies in engineering and other technologies.

To give training and impart the necessary skills leading to the production of craftsmen, technicians, and other skilled personnel who will be enterprising and self-reliant, and to enable young men and women to have an intelligent understanding of the increasing complexity of technology. These expectations cannot be realized if good quality teaching and learning environment is not created.

2.2 Challenges in formal TVET sector in Sub-Saharan Africa

Lauglo and Lillis (2008) posited that one dilemma which has preoccupied many countries for a long time is whether to concentrate investment in general or vocational education. In human capital terms, general education creates ‚general human capital' and TVET leads to specific human capital.' The former has the advantage of flexibility and, therefore, the possibility of moving from one job to another, while the latter does not. In this regard, many people consider general education as a suitable type of education that is capable of responding to economic and labour force changes in society. On the other hand, technical and vocational education has the advantage of imparting specific job-relevant skills which make the worker more readily suitable for a given job and more productive. Hence, both are important. It is in this light that most educational systems in Africa try to combine both general and vocational streams of education in varying proportions to suit their educational goals and aspirations.

Conversely, Carnoy (2003) noted that, despite the advantages of imparting job-related skills and the high level of unemployment amongst those with general education, the recognition and preference for general education by the youth in the Sub-Saharan Africa is high. The reason for this is that personnel in administrative and leadership roles are generally chosen from people with a general education background. Therefore, talking about the importance of TVET, without any deliberate action to follow up the rhetoric, will not change its poor image and low status.

2.3 The challenges facing the effective preparation of practical skills training

With the introduction of the (6-3-3-4) system by national policy on education, the public teachers and students to some extent became aware of the need to develop

necessary useable skills required to operate our various industries. Subjects taught were offered with the aim of training the students in various skills and competencies required for their future developments. Osuji (2004) asserted that in Nigeria the government strongly believes that the objectives of job creation and poverty reduction can only be realized through appropriate education which empowers the product of the education system with skills and competencies to become self-employed. This hope could only be achieved if the vocational and technical subjects were well taught and appropriate learning environment created in the schools at various levels.

Vocational and technical education programs are designed for people who can profit and progress by it, in order to accomplish this outcomes, an enabling environment must be provided for quality teaching and learning program. Unfortunately, the teaching and learning of subjects in vocational and technical education has been besieged by numerous problems which include poor organization and slow pace of implementation. In Nigeria, some of the constraints that led to the problems of this type of education as stated by Okon (2003) were irregular and gross under funding, governments negative attitude towards vocational and technical education, lack of political will to address the compelling needs of vocational and technical education curriculum reforms, in adequate infrastructure. Yakubu, (2006),also mentioned low student enrolments and achievements, academic corruption, societal consumptive rather than productive attitude as some of the constraint affecting technical and vocational education.He continued by saying that vocational education cannot function properly without the availability of instructional materials, necessary infrastructure and high quality in the standard of teaching and that proper evaluation of students cannot be done where they are lacking in effective and efficient teaching and learning. According Yakubu (2006), vocational and technical education program in institutions in Nigeria were severely

underfunded as at that time as most institutional programs were run on deficit budgets. The difficult economic and political conditions made it difficult to increase fees in schools. Some of the current situation existing in the educational environment that affected the quality of teaching and learning in vocational and technical education were as follows:

2.3.1 Lack of Training Infrastructure

Infrastructure as described by Ehiametalor (2001) are the operational inputs of every instructional program and they constitute elements that are necessary for teaching and learning e.g buildings, laboratories, machinery, furniture and electrical fixtures. Infrastructure represent the empirical relevance of the totality of school environment for the realization of school business. He identified the following as components of infrastructure: landscape, playgrounds, buildings, classrooms, library, laboratory blocks, sick bays, toilets, hostels, administrative blocks and so on. The others are Utilities such as electricity, pipe-borne water, and security walls (fences), gates, telephone and information technology systems. It also included the basic systems and services that were necessary for smooth organization of buildings, transport, water, power supply and administrative systems.

To a large extent the issues discussed above are also lacking in Ghanaian educational institutions, For example classes are overcrowded, so also are libraries, offices, estates, hostels, etc. are in adequate. The shortage of equipment and facilities can hinder quality of teaching and learning, quality reduces when the facilities required for imparting and learning are not provided. Olaitan,(2008), remarked that the condition under which vocational and technical education was imparted was poor, most

secondary and tertiary institutions lacked equipment for training, lacked workshops and workshop facilities, had ill-equipped laboratories and libraries. Students in this programs were supposed to be exposed to a work environment while in school to enable them fit in and outside the school environment. The acute shortage/lack of infrastructure and equipment e. g. machinery, laboratories, tools, was a result of successive governments in Nigeria starving vocational and technical education of funds leading to poor or lack of laboratories, workshops, and training facilities. This situation, affected the production of skilled manpower, useful for employment and nation building. From the foregoing, the lack/deterioration of infrastructure in schools cannot in any way guarantee effective delivery of technical and vocational education. It was observed that in some schools, workshop equipment were not spaced enough to accommodate students.They were either crowded together or were outside the workshop during practical work which was improper for any meaningful academic work.

2.3.2 Funding

Inadequate funding has been a very serious problem in the effective implementation of teaching and learning in vocational and technical education. Oguntoye (2001) emphasized that, since vocational education was not accorded much recognition by general educators in Ghana, it naturally followed that only meagre resources were allocated to it. At every level of vocational education in Ghana. Enough funds were never allocated to it for acquiring the right environment. Due to inadequate funds, it became difficult to purchase and procure laboratory equipment and materials for vocational/technical education, for accommodation, for teachers, infrastructure and services.

2.3.3 The Image of Vocational and Technical Education in Society

The society still believes that vocational / technical education is meant for dropouts and children of poor people. It is seen as inferior to other types of education. Salami (2002) asserted that the Nigerian society of the time regarded technical education as a form of education meant for people who were backward academically, that was why most people enrolled in it as the last resort and prefer to invest in science and liberal education. Some parents view it as education meant for other people's children n and prefer theirs to read medicine, engineering, law etc. It is proper to note that vocational and technical education cannot yield the desired benefits unless there is a re-orientation of the society on the need to embrace it fully.

2.3.4 Shortage of Manpower

There is a severe shortage of vocational and technical Education teachers to man the program in the schools.The need for qualified teachers in this field of study is very necessary in order to ensure employment and self-employment for the teaming youths who go about looking, for white collar jobs. The implication of this is that people who do not acquire training in vocational technical education are drafted in some situations to teach vocational / technical education courses. Mkpa (2005) asserted that no educational program could succeed without an adequate crop of committed teachers. The objective of vocational education cannot be achieved in the face of gross inadequacy of teachers, and because of the shortage of vocational and technical education teachers, non-vocational subject teachers are being recruited to teach vocational subjects in schools and this could lead to poor performance of students.

2.3.5 Ineffective administration / Supervision of Teaching and Learning Vocational and Technical Education in Schools

Ineffective administrations/supervision of teaching and learning vocational and technical education in school can hinder effective development of vocational education program, the lack of coordination required between the various federal, state and local agencies/ministries responsible for the administration of the program led to a total disintegration of order in the school system whereby people did what they liked and ignored the main thrust of their job.. Most of the policies evolved by the government were far from being implemented. They included class size, infrastructure, funding, staffing, remuneration, and transitions from one class to the other. Monitoring, evaluation, supervision and inspection of the program can be a way of keeping with set standards but these were near extinction in the school system. The lack of coordination resulted in duplication of efforts at the various spheres of government/administration and had a great effect in the design of appropriate curricula for the youth.

2.3.6 Low training quality

The quality of training in this program was low due to much emphasis being laid on theory and certification, rather than on skills/competency acquisition and proficiency testing. This was besieged with inadequate training of instructors, obsolete equipment, lack of experts to operate equipment, lack of instructional materials, lack of quality class space, and instructors. All these were factors that leads to ineffectiveness of training in attaining the desired knowledge and skills expected.

Within the early 1990s, numerous concerns were raised about the effectiveness of TVET in Ghana. Nyarko (2006) summarised these concerns including:

- Poor quality in the delivery of TVET programmes;
- High cost of training;
- Training not suited to actual socio-economic conditions;
- Disregard for the needs of the informal sector; and
- Disregard for the labour market and high unemployment rate among graduates.

The concerns raised by Nyarko are similar to those in Nigeria discussed above.

In an attempt to address these challenges, Reddan and Harrison (2010) argued that TVET institutions need to restructure their programmes to be responsive to the needs of the job market, especially the industry. To achieve this goal, TVET curricula must focus on outcomes in terms of the skills, knowledge and attitudes required in industry. That is, TVET provision should be responsive to the demands of industry.

King and McGrath (2004) argued that with TVET being more diverse because of the changes in the labour market, it should be able to integrate the youth into the working world. Given the prevailing economic trend, UNESCO (2004) identified two major objectives of TVET as the urgent need to train the workforce for self-employment and the necessity to raise the productivity of the informal sector. UNESCO point out that inadequate teaching and learning resources affected the vocational training provided in public institutions. Budget cuts are a hindrance to pursuing the critical objectives of providing training and raising production. Considering the expensive

nature of TVET as a form of education, it is imperative that an expanded system with necessary and adequate facilities and equipment should lead to the effectiveness of the system.

Related studies carried out by Islam and Mia (2007) in Bangladesh revealed that both formal and non-formal TVET lacked an effective linkage between training and the world of work. It further noted that because of its lack of coherent mode, practical skills training which does not produce the requisite skills for the job market contributes to youth unemployment. Additionally, the trainees also lacked training experience, initiative and motivation to discharge their duties effectively.

2.4 Variation of Course Structure of TVET Programmes

2.4.1 City and Guilds of London-Course Structure

The earliest ever organized structure of practical skills training in this country was designed and ran by City and Guilds Institute of London, and was based on the applications of the various units of workshops under Mechanical Engineering. The syllabus just laid out the practice of those various units to the practiced. The following were the main items considered:

i. Bench fitting (basic hand-tools work). The practice of marking out and the use of common hand tools with their application, in the basic bench-fitting workshop.

ii. Metal forming and metal joining, instruction and practical demonstration in the basic sheet metal workshop. Trainees undertook simple basic fabrication with sheet metal, with the use of guillotine, folder and roller equipment. The types of welding application under that scheme were: oxy-acetylene welding, metallic arc welding, gas and air brazing. Detailed instructions were given in each of

these joining techniques. Trainees developed much interest in each of these skills joining techniques.

iii. Inspection and marking-out, instruction and practical demonstration of basic principles of measuring instruments and their common application with surface plates and wide range of measuring tools and gauges.

iv. Engine fitting, instruction and practical demonstration involved in the use of a complete Hercules sleeve-value engine and a Proteus gas turbine engine.

v. Electrical workshop, well-equipped with a large range of tools and instruments used for demonstration, to provide a sound introduction to practical electrical techniques. Each student had access to multiple ac and dc outlets.

vi. Basic Machining, The following machine tools were used to give trainees an introduction to the basic machining techniques. The machining processes included:

i. Shaping machine

ii. Radial drilling machine

iii. Vertical milling machine

iv. Horizontal milling machine

v. Universal milling machine

vi. Centre Lathe

vii. Horizontal surface grinding machine

viii. Cutter and tools grinding machine and

ix. Universal grinding machine

Under which scheme, all the various sections had their basic techniques and it was applied or demonstrated through performance of laid down standard experiment.

Besides those various sectional experiments, there were a number of well-equipped laboratories such as metrology, mechanics, physics and electronics and heat treatments used for work study experiments.The following course outline was the practical aspect of the structure and was supported by the theoretical structures below

i. Workshop processes	7 Hours per week
ii. Materials	7 Hours per week
iii. Engineering drawing and sketching	6 Hours per week
iv. Calculations	5 Hours per week
v. Science	5 Hours per week
vi. General lectures and visit	4 Hours per week

The schedule of time was 1:1 ratio for the practical and the theory that took a period of two years for the pre-technical training. Examination was conducted and those who successfully passed the pre-technical examinations continued with the intermediate craft skills course.At the intermediate, the same facilities of workshop and laboratories equipment were used with a step up techniques of the processes/ another set of standard workshop and laboratory experiments were assigned and the schedule of time was 4:1 ratio of practical work to theory for another two years. Examination was conducted and the successful candidates were awarded craftsman certificate.

2.4.2 Syllabus Review of theMechanical Engineering Craft Practice (818 MECP 1980-90)

(Technical Education Unit(TEU-GES))

During the early part of 1980, there was a gradual transition of the certification of the TVET programme, from City and Guilds of London Institute to the Technical and Vocational examination Unit of Ghana. That called for a major review of the

syllabus, therefore the newly reviewed structure, unlike the previous one, took into accounted for some few specific workshop application,such as the following examples:

a. The programme outlined the schemes of workshop practice which is complementary to the craft studies syllabus which was developed in detail.
b. The schedules were intended for use progressively throughout the course and should be carefully coordinated with the teaching programme.
c. The workshop instructor had a particular responsibility to ensure that safe working methods were fully understood before a student begins work with any new tool, machine or piece of equipment. The structure was arranged in the following order

Table 2.1: Outline of Practical Tasks

SCHEDULE	EXERCISE	OBJECTIVE
818/1/1	Tools grinding	The use ofan off-hand grinder for sharpening tools; ie. Twist drills, lathe tools and bench tools
818/1/2	Fitting exercise	Marking out, cutting out, and filling to size square angle, carved and tangential surfaces.
818/1/3	Marking out exercise	Use of veneer protractor and height gauge and more difficult setting out on the surface table.
818/1/4	Fitting exercise	More advanced precision filling
818/1/5	Heat treatment	Hardening, normalizing, annealing, tempering and case-hardening of plain carbon steel
818/1/6	Vee block and clamp	The shaping of square and inclined faces.
818/1/7	Power transmission	Practice in the installation and alignment of various types of drive including recognition of misalignment
818/1/8	Stem less scribing block.	Manufacture and assembly of components parts.
818/1/9	Clutch gear blank	Turning and boring concentric

818/1/10	Shaft	Turning and boring blind holes
818/1/11	Turning exercise	Faceplate work and balancing
818/1/12	Turning exercise	Taper turning by offset tail-stock
818/1/13	Taper centre and sleeve	Turning internal and external tapers
818/1/14	Shaping exercise	The shaping of square and inclined faces including re-entrant angles.
818/1/15	Screwed spindle	Screw cutting vee threads
818/1/16	Double screw	Cutting left hand and right hand threads
818/1/17	Screwed arbour	Eccentric turning taper boring and screw cutting single-start square thread.
818/1/18	Motor pulley	Form turning and boring
818/1/19	Adjustable vee block	Taper turning, form turning, screw cutting, knurling, advanced shaping and use of hacksaw, and assembly
818/1/20	Ratch brace	Marking out, shaping, boring, use of heat treatment, simple turning, use of 4-jaw chuck, stepped turning, screw cutting, taper turning and assembly

Source: Technical and Vocational Examinations Unit. 818- Mech, En. Craft Practical (1989)

2.4.3 Nabptex TVET Review

There were some recent educational reviews in 2007 that called for another review of TVET syllabus. The entry Qualification of craft programme in NABPTEXs' Review was: Candidates must not be less than 14 years of age and should have successfully completed three years of secondary education or its equivalent special consideration may be given to sponsored candidates with lower academic qualifications who hold trade test certificates and are capable of benefiting from the programme.

The Curriculum

The curriculum of each programme is broadly divided into three components;

a. General Education which accounts for 30% of the total hours required for the programme.
b. Trade theory, trade practice and related studies which account for 65% of the total hours.
c. Supervised industrial training, work wxperience which accounts for about 5% of the total hours required for the programme. This component of the course which may be taken in industry or in a college production unit is compulsory for students.

PROGRAMME: MECHANICAL ENGINEERING CRAFT PRACTICE

MODULE: GENERAL METAL WORK 1

MODULE CODE: CME 11

CONTACT HOURS 7 H/WK.

Learning outcome:

Practical competence: On completion of this module, the student will be able to

1. Use tools correctly ensuring the machinery guards and protective eye shields are used appropriately.
2. Comply with the general rules for safe practice in the work environment at all times.
3. Use and select hand tools for carrying out various bench fitting and assembly tasks? Hacksaws, taps, reamers, drills, dividers, surface gauge, etc.
4. Produce threads using taps and dies.
5. Correctly grind drill point anglesof . Drills, twist and flat drills.

6. Select and set drilling machine speeds to carry out a range of operations i.e. Drilling, reaming, counter sinking and counter boring using the appropriate coolants.
7. Perform metal joining by a range of processes. Cut through the joints and investigate the depth of penetration of the metal at the interface. The processes include soldering, brazing and fusion welding.
8. Mark out on metals and other material, datum line, angles, radii/circles and hole positions using a range of tools.

Table 2.1 gives the outline of the practical tasks.

Table 2.1: Practical tasks

Unit	**General objective**	**Specific learning outcome**	**Teaching/learning**	**Resource**
1. General workshop safety	1.0 Understand workshop safety rules and application in machine	1.0 Workshop safety rules and practice 1.1 state sources of hazards in the workshop and how to prevent them eg. a. Handling and using hand tools. Portable power tools and machines. b. Stepping on or striking obstructions left on floors or benches. c. Lifting, moving and storing materials or jobs.	1. Discuss sources and prevention of hazards in the workshop. 2. Through questions and answers, determine whether the trainees grasped the topic. 3 Assess the trainees 4. Show a film on industrial safety.	Safety poster common hand tools like files, hacksaw television video machine overall, goggles, gloves, safety shoes, head shield, fire extinguishers.

		d. using inflammable or corrosive liquids and gases		
2. Lathe and lathe work	2.0Understand the principles and operation of the lathe machine.	2.1 Sharpen cutting tool for plain turning, shouldering, parting off and facing operation. 2.2 Set up rough and turned stock in 3-jaw chuck. 2.3 Select appropriate cutting tool and set them up to centre height for turning or facing operations. 2.3 Select appropriate cutting tool and set them up to centre height for turning or facing operations. 2.4 Perform chuck work involving facing, step turning, undercutting, radiusing, chamfering, parting off and knurling, note: components should be produced to specified tolerance and finish. 2.5. Produce simple component involving	1. Guide the trainees to sharpen cutting tools for plain turning shouldering. Parting off and facing operation and allow trainees to practice till they become competent. 2. Prepare simple exercises and guide trainees to produce component involving taper turning using the compound slide 3. Guide the trainee to select appropriate cutting tools and set them up to centre height for lathe work (turning or facing) 4. Asses the trainees.	Lathe cutting tools grinding machine 3- jaw chuck and lathe machine and accessories like catch plate, face plate, dog, lathe centre fixed steady and traveling steady. Round nose turning tool fine finishing tool, fine finishing tool, part off tools boring tools, live and dead centre.

		taper turning using the compound slide.		

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter focused on the methodologies used for the study. It deals with the study area, research design, target population, sampling techniques and sample size, research instruments, methods of data collection and data analysis procedure. To be able to establish facts in this study and make them authentic, a survey was conducted, to find out whether standards have fallen or not in workshop practice skills with respect to mechanical craft practice. Ameyaw Akumfi Secondary Technical School, Toubodom Secondary Technical School, Tanoso Technical and Vocational Training Centre, were used as case study.

3.1 Research Design

The research design adopted for this study was the Descriptive Research design. Survey questionnaires were distributed to apprentice/students, master apprentice and instructors in training schools, to obtain their perception of mechanical craft practice.

3.2 Target Population

Population by research definition is "the full set of cases from which a sample is taken" (Saunders et al, 2007). The target population for the study included all students in the two Technical and Vocational institutions currently under training in the 2016/2017 academic year. Presently, there are three Technical and Vocational schools in the Techiman Municipality. Records from the administration of these institutes indicated there were about nine hundred and ninety eight (998) students currently undergoing training in the respective schools. In connection with this, it was impossible

to collect data from all individuals who were undergonetechnical and vocational training in the various TVET institutions in the Techiman Municipality hence the need for sampling.

3.3 Sample and Sampling Techniques

Sampling technique provides a range of methods that enables the researcher to reduce the amount of data to be collected by considering only data from a sub-group rather that all possible cases or elements, (Saunders, et al, 2007). The researcher adopted the quota sampling technique based on the Sample Size Determination Table by Krejcie and Morgan (1970) (Appendix B).

Out of the nine hundred and ninety-eight (998) students a total of ninety seven were selected based on the criteria of Sample Determination Table for each school depending on the population of the school. The distribution of quotas has been outlined in the table below;

Table 3.1: Sample Determination Table

Institution	No. of Technical students	No. Mechanical craft students used
AMEYAW SEC. TECH	450	33
TSTS	250	32
TANOSO VOC. INTS.	48	15
APPRENTICES	250	17
TOTAL	998	97

In addition, 12 master craftsmen (top officials) were also added to the study. The top officials are those who formulate policies and draw or prepare the annual budget for the institutions. The heads and teaching staff of the various institutions are the managers of

the departments. This sample was chosen to enable, the obtained results to be generalized to the larger population of the Technical and Vocational Institutions.

3.5 Data Collection Instruments

3.5.1Questionnaires

The students who took part were randomly chosen in each school to obtain the numbers in Table 3.1. The questionnaire was delivered by hand to each respondent and collected after completion by the respondents. The questionnaire items included both open-ended questions and closed-ended questions. The open-ended type of questions allowed respondents to express their opinions on the items by answering them in their own words. The closed-ended questions on the other hand, provided a number of alternative answers from which the respondents were expected to choose from. The respondents comprised the teachers and students who volunteered to participate in the survey and came from the three Technical and Vocational Schools in the metropolis.

3.5.2Semi – structured interview

A semi-structured interview guide was generated based on the survey questionnaire administered on the teaching staff of the schools, and was designed for the purpose of interviewing the Head teachers and the selected administrators of the selected schools in the municipality. The interviews were conducted in accordance to the interview guide (refer toAppendix C).

3.5.3Sources of Data

The collection of data was based mainly on primary and secondary data sources. Primary data was obtained through interviews and questionnaire.

Copies of the questionnaires were produced and distributed to the targeted population. The respondents were given enough time to respond effectively to the questionnaire. Opinions, facts, figures and all the needed materials were gathered from the targeted population.

3.6 Data Analysis Procedure

Once approval was obtained from the schools' respective Headmasters and in some cases Assistant Headmasters, students in the target school were contacted through the Public Relations Officers, while the researcher was introduced as an MTech Mechanical student from the University of Education, Winneba – Kumasi Campus. Questionnaire for students were administered with the help of the public relations officers and the head of the various departments. The questionnaire was distributed to the schools according to Table 3.1. The students were given enough time to respond to the items. The student's questionnaires were collected the same day. That of the heads and teaching staff as well as the top official of the various institutions were interviewed the following day after administering the questionnaire taking into consideration their heavy work schedules. In order to gain a more holistic view of the respondents on the perceived falling standards in the field, this research compared and contrasted different perspectives of students, heads and teachers with different levels of teaching experience. The teachers sampled comprised the heads of departments, experienced teachers, and new teachers.

3.7 Validity and Reliability of the Instrument

In order to assess the validity and reliability of the instrument used and to determine its accuracy and consistency, the instrument was pilot tested at Have Technical Institute before administering them finally. During the pilot study, it was

found that the students were unable to understand some of the responses provided on the paper from which they were to choose the one they considered most appropriate. The researcher changed those responses for the respondents to enable them respond to those items. Also it was detected that the item did not cover all the research questions posed in chapter one and the researcher modified some of the items so that all the research questions could be covered.

Some of the items were observed to be too long and for that matter made it difficult for the student to answer, such items were made shorter to facilitate answering. Some of the items also posed two questions at a time of which the student did not know which of the questions to answer or to leave out. These items were reframed to pose only one question. The researcher corrected all the errors on the items and printed them before administering them to the selected respondents. This actually made it easy for the respondents to respond to the items satisfactorily.

With regards to testing of Reliability, Cronbach's Alpha of .80 was used as the threshold to determine the reliability of the measuring instruments. The tests showed that the instrument obtained a Cronbach's Alpha of the pilot tests at have showed an alpha value of 0.80.

3.8 Data Analysis

Statistical Package for Social Sciences (SPSS) for windows (version 16.0) was the analytical tool used to analyze the data. The information collected was first grouped and edited to check contradictions and ensure better consistency. Edited responses were then tabulated and analyzed in chapter four. The measures used were both qualitative and quantitative. Tables were used to explain the findings. Percentages were found on respondents and their views on some important issues on the questionnaire. They were

used in the discussion of almost the whole questionnaires responded to by the respondents.

Since the responses from the students alone could not be generalized of the whole population, the responses from the heads of departments, teaching staff, as well as the top officials of the various institutions were also considered to generalize the obtained result.

CHAPTER FOUR

RESULTS AND FINDINGS

4.1 Introduction

This chapter deals with the analysis of the main data collected for the study as obtained from the questionnaires administered to all the respondents. All the items were structured to provide answers to the three main research questions posed in the first chapter and issues related to them. Views of respondents were analyzed in the questionnaires administered. These were tabulated according to responses to find out the number of responses and their percentages.

4.2 Profile of the Respondents

4.2.1 Demographic Information of the Respondents

Table 4.1: Demographic Information of the Respondents

Section of Questionnaire	**Gender of the Respondents**	**Frequency**	**Percentage**
Q1	Male	89	91.8
	Female	8	8.2
	Total	97	100
	Age range of the Respondents		
Q2	20 years and below	63	64.9
	21-25 years	34	35.1
	26-30	0	0
	Above 31	0	0
	Total	97	100

Source: Field survey, (2016)

Table 4.1 shows that 91.8% of the respondents were males while 8.2% were females. Moreover, 64.9% of the respondents were below 20 years while 35.1% were between the ages 21-25 years.

From the table 4.1 one can conclude that the majority of the trainees are men. This agrees with the general trend in the country where the majority of people in technical maintenance and repairs are men. Most of the trainees are also below the age of 25 are most likely under the sponsorship of parents.

Table 4.2 indicates that 52.6% of the respondents affirmed that their teachers advised them to take up apprenticeship training, 36% were advised by their parents, 9.3% were advised by their guardians to take up apprenticeship training while 2% were advised by their friends. The majority of the trainees (88%) were either advised by their teachers or parents. This shows that parents and teachers have a great influence on the choice of career of the trainees.

Table 4.2: Advisers of students on choice of career

Section of Questionnaire	Respondents	Frequency	Percentage
Q3 Who advised you to take up this apprenticeship training?	Parents	35	36
	Guardians	9	9.3
	Teachers	51	52.6
	Friends	2	2
	Total	97	100

Source: Field survey, (2016).

Table 4.3 shows that majority of the trainees (62.8%) entered the Mechanical Engineering Technician 1 with the BECE certificate. The remaining (37.2%) entered with the SSCE certificate. Non entered with the MSLS certificate because this

programme has been faced out about 14 years ago. It is worth noting that there was no entrance examination apart from the BECE and SSCE certificates.

Table 4.3: Entrance Qualification

Section of Questionnaire	Qualification	Frequency	Percentage
Q4. What was your entrance qualification?	BECE	61	62.8
	SSCE	36	37.2
	MSLS	0	0
Total		97	100

Table 4.4 depicts that majority, 80.4% of the respondents have been in the apprenticeship training for less than a year, 9.3% have been in the apprenticeship training for 1-2 years while 10.3% have been in the apprenticeship training for 3-5 years. The MET 1 programme normally lasts for three years. The table shows that the majority were in the first year while about 10% were in the second year. This difference could be that most of the students leave after the first year to look for sustenance or it also possible most of the majority of the respondents chosen were in their first year. Those who have spent more than 3 years could possibly be repeating some of the classes.

Table 4.4: Length of Apprenticeship Training

How long have you been in this apprenticeship training?	Frequency	Percentage
Less than 1 year	78	80.4
1-2 years	9	9.3
3-5 years	10	10.3
Total	97	100

Source: Field survey, (2016)

Table 4.4 shows that majority 69.1% of the respondents affirmed that activity based method of teaching was used to inculcate competency based skills in apprentices, 25.8% said that demonstration method was used while 5.2% said that observation was used to deliver competency based skills acquisition. This means that competency based skills in apprentices facilitates job creation.

Table 4.4: Methods of competency based skills acquisition

Methods of competency based skills acquisition	Frequency	Percentage
Activity based method	67	69.1
Demonstration	25	25.8
Observation	5	5.2
Total	97	100

Source: Field survey, (2016)

Table 4.5 indicates that 98% of the respondents affirmed that they learnt most of the technical competency training from master craftsmen while 1% said that they learnt technical competency training from chief apprentice and assistant chief apprentices. This means that the resource persons who imparted vocational knowledge to the apprentices were highly experienced in vocational training.

Table 4.5: Resource Personnel who taught competency based skills

Resource Personnel who taught competency based skills	Frequency	Percentage
Master craftsman	95	98
Chief apprentice	1	1
Assistant chief apprentice	1	1
Total	97	100

Source: Field survey, (2016)

Table 4.6: Respondents rating of the skills, competency and condition on the field of work

How do you rate your skills, competency and condition on the field of work?	1(**Very bad)** Freq. (%)	2 (bad) Freq. (%)	3(**neither good or bad)** Freq. (%)	4(good) Freq. (%)	5(**very good** Freq. (%)	Total Freq. (%)
Design of training programme	15 (15.4%)	9 (9.3%)	5 (5.2%)	61 (62.8%)	7 (7.2%)	97 (100%)
Practical competency	0	0	15 (15.4%)	74 (76.3%)	8 (8.2%)	97 (100%)
Skills learning are employable	5 (5.1%)	70 (72.2%)	12 (12.4%)	3 (3.1%)	7 (7.2%)	97 (100%)
Adequacy of tools and equipment for training	9 (9.2%)	4 (4.1%)	5 (5.2%)	70 (72.1%)	9 (9.3%)	97 (100%)
Maintenance of tools and equipment	5 (5.2%)	4 (4.1%)	5 (5.2%)	75 (77.3%)	8 (8.2%)	97 (100%)
Ability to measure in both centimetre and inches accurately	6 (6.2%)	5 (5.2%)	7 (7.2%)	72 (74.2%)	7 (7.2%)	97 (100%)

1-Very bad, 2-bad, 3-neither good or bad, 4-good, 5-very good

Source: Field survey, (2016)

The study shows that 70% of the respondents affirmed that the designing of training programmes in technical training is good, 24.7% said that the designing of training programmes in technical training is bad while 5.2% were neutral.

The study revealed that 84.5% said that the practical competency training is good while 15.4% of the respondents were neutral. Moreover, 77.3% of the respondents said that the good skills learning are employable, 10.3% said that employable is skills are bad while 12.4% of the respondents were neutral. This shows that practical competency training is an important requisite for vocational skills development.

Furthermore, 81.4% of the respondents affirmed that adequacy of tools and equipment for training is bad, 13.3% of the respondents said that adequacy of tools and equipment is good while 5.2% were neutral. UNESCO (2004) identified the two major objectives of TVET as the urgent need to train the workforce for self-employment and the necessity to raise the productivity of the informal sector. They pointed out that lack of resources have led to cuts in the volume of training provided in public institutions. These cuts are a hindrance to pursuing the critical objectives of providing training and raising production. Considering the expensive nature of TVET as a form of education, it is imperative that an expanded system with necessary and adequate facilities and equipment will lead to the effectiveness of the system.

The study further depicts that 85.5% of the respondents said that maintenance of tools and equipment is good, 9.3% of the respondents said that maintenance of tools and equipment is bad while 5.2% were neutral. The study revealed that 81.4% of the respondents affirmed that ability to measure in both centimetre and inches accurately is good, 11.4% of the respondents said that the ability to measure in both centimetre and inches accurately is bad while 7.2% were neutral.

4.3 Satisfaction Level of Trainees

Table 4.7: Respondents willingness to pursue this skills training programme

Q12. Did you willingly opt to pursue this skills training programme?	Frequency	Percentage
Yes	91	93.8
No	6	6.2
Total	97	100

Source: Field survey, (2016)

Table 4.7 indicates that 93.8% of the respondents affirmed that they willingly opted to pursue this skills training programme while 6.2% of the respondents said no. With the majority indicating willingness to pursue skills training programme, some said if they have had opportunity of been advised, would have also joined skills programme with regard to the current limited jobs opportunities.

Table 4.8: Respondents contentment with the kind of training programme they are pursuing

Q13. Are you happy with the kind of training programme you are pursuing?	Frequency	Percentage
Yes	12	12.4
No	85	87.6
Total	97	100

Source: Field survey, (2016)

Table 4.9: Reasons for not being happy with Training Programme

Section of Questionnaire	Reasons	Frequency	Percentage
Q15. If you are not happy, what are some of the reasons that make you unhappy	Poor public perception	4	4.1
	Lack of training equipment	67	69.1
	Lack of teaching and learning materials	25	25.8
	Not a white collar job	1	1

Table 4.8 indicates that 87.6% of the respondents said that they were not happy with the kind of training programme they are pursuing because they lack adequate teaching and learning materials while 12.4% of the respondents said that they are happy with the kind of training they are pursuing. The study concluded that the quality of training in this program is low due to much emphasis being laid on theory and certification, rather than on skills/competency acquisition and proficiency testing. This is besieged with inadequate training of instructors, obsolete equipment, lack of experts to operate equipment, lack of instructional materials, lack of quality class space, and instructors all these are factors that leads to ineffectiveness of training in attaining the desired knowledge and skills expected.

Table 4.9: The number of times respondents attend practical training/lessons

Section of Questionnaire	Reasons	Frequency	Percentage
Q14. How often do you attend practical training/lessons?			
Once a week		67	69
Once a month		15	15.4
Once a term		6	6.2
Every day		9	9.3
Total		97	100

Source: Field survey, (2016)

Table 4.9 shows that 69% of the respondents confirmed that they attend practical training/lessons once a week, 15.4% of the respondents said that they attend practical lessons once a month, 9.3% of the respondents attend practical lessons everyday while 6.2% attend practical lessons once a term. Most of the respondents however said more allocation of time is required to enhance perfection.

Table 4.10: The payment of additional fees for practical training

Section of Questionnaires	Frequency	Percentage
Q15. Do you pay additional fees for practical training?		
Yes	69	71.1
No	28	28.9
Total	97	100

Source: Field survey, (2016)

Table 4.10 indicates that 71.1% of the respondents affirmed that they pay additional fees for practical training while 28.9% do not pay fees for practical training. Inadequate funding has been a very serious problem in the effective implementation of teaching and learning in vocational and technical education. Oguntoye (2001) emphasized that, since vocational education is not accorded much recognition by general educators in Ghana, it naturally follows that only meagre resources are allocated to it at every level of vocational education.

Table 4.11: Respondents ability to read a working drawing

Section of Questionnaires	Frequency	Percentage
Q17. Can you read a working drawing?		
Yes	32	33
No	65	67
Total	97	100

Source: Field survey, (2016)

Table 4.11 shows 67% of the respondents affirmed that they cannot read a working drawing and 33% of the respondents can read a working drawing. The respondents said they are happy with the kind working drawing they can read and however said the quality of training is low due to much emphasis being on theory and certification.

Table 4.12 shows that 52.6% of the respondents rated their training programme as good while 47.4% rated their training programme as fair.

Table 4.12: Respondents rating of their training programme

Section of Questionnaires	Frequency	Percentage
Θ19. How will you rate your training programme?		
Very good	42	43.3
Good	9	9.3
Fair	46	47.4
Total	97	100

Source: Field survey, (2016)

4.4 The level of importance of the following forms of training methods.

Table 4.13 indicates that 94.8% of the respondents affirmed that observation teaching and learning methods is important in imparting technical knowledge while 5.2% of the respondents said that it is not important.

Table 4.13: Observing/watching

Q.20. Observing/watching	Frequency	Percentage
Very important	71	73.2
Important	21	21.6
Not important at all	5	5.2
Total	97	100

Source: Field survey, (2016)

Table 4.14 indicates that 100% of the respondents said that encouraging apprentices to try their hands on practical projects is important in imparting technical knowledge.

Table 4.14: Trying out your hands on the job.

Q20. Trying out your hands on the job.	Frequency	Percentage
Very important	85	87.6
Important	12	12.4
Not important at all	-	-
Total	97	100

Source: Field survey, (2016)

Table 4.15 shows that 100% of the respondents said that demonstration teaching and learning method is important when imparting technical knowledge.

Table 4.15: Demonstration

Q20. Demonstration	Frequency	Percentage
Very important	87	89.7
Important	10	10.3
Not important	-	-
Total	97	100

Source: Field survey, (2016)

Table 4.16 indicates that 44.3% of the respondents affirmed that TLMs are not adequate to enhance teaching and learning, 33% of the respondents said that the teachers in the district need the required TLMs and other necessary educational resources to enhance teaching and learning while 22.7% of the respondents said that TLMs are not available. Olaitan (2006) remarked that the condition under which vocational and technical education is imparted is poor, most secondary and tertiary institutions lack equipment for training, lack workshops and workshop facilities, have ill-equipped laboratories and libraries. Students in this program are supposed to be exposed to a work environment while in school to enable them fit in and outside the school environment.

Table 4.16: Availability of Teaching and Learning Materials (TLMs) and Challenges facing TVET education

Q9. Availability of TLMs and Challenges facing TVET education	**Frequency**	**Percentage**
TLMs are not adequate to enhance teaching and learning	43	44.3
TLMs are not available	22	22.7
The teachers in the district need the required TLMs and other necessary educational resources to enhance teaching and learning	32	33
Total	97	100

Source: Field survey, (2016)

Table 4.17: Availability of Infrastructure

Section of Questionnaire	Response	Frequency	Percentage
Q:21 Do you have enough infrastructure for the Mechanical Engineering Department?	Yes	30	30.9
	No	67	69.1
	Total	97	100

Table 4.16 indicates that 69.1%of the respondents affirm that they have no enough infrastructure and 30.9% said no.

Table 4.17: Effect of Lack of Infrastructure of Teaching and Learning

Section of Questionnaire	Response	Frequency	Percentage
Q22: If no, what is the effect of lack of infrastructure on teaching and learning?	Excellent	42	43.3
	Good	28	28.9
	Bad	15	15.4
	Very Bad	12	12.4

Table

The acute shortage/lack of infrastructure and equipment e g machinery, laboratories, tools, is a result of successive government starving vocational and technical education of funds leading to poor or lack of laboratories, workshops, and training facilities and other Teaching and Learning materials. This situation, has affected the production of skilled manpower, useful for employment and nation building.

4.5 Results of the Questionnaires from Master Craftsmen

Table 4.17: Skill Training for Master Craftmen

Section of Questionnaire	Response	Frequency	Percent
Q1 Which of these skill Training did you receive	Arc Welding	7	58.3
	Machining	5	41.7
	Total	12	100

Source: Field survey, (2016)

Table 4.17 depicts that 58.3% of the respondents said that they have received skill training in arc welding while 41.7% have not received skill training in arc welding.

Table 4.18: Place of apprentice training

Section of Questionnaire	Frequency	Percentage
Q2. Place of apprentice training		
Informal apprenticeship	8	66.7
Formal apprenticeship (school)	4	33.3
Total	12	100

Source: Field survey, (2016)

Table 4.18 shows that 66.7% of the Master craftsmen received their vocational training from informal apprenticeship programmes while 33.3% also received their training from formal apprenticeship training school. .

Table 4.20: Certificate awarded at the end of their training

Section of Questionnaire	**Certificates**	**Frequency**	**Percentage**
Q3: What certificate do you award at the end of Training?	NVTI	3	25
	Trade Proficiency certificate	5	41.7
	Passing out ceremony	4	33.3
	Total	12	100

Source: Field survey, (2016)

Table 4.20 shows that 41.7% of the Master craftsmen awarded trade proficiency certificate to their apprentices, 33.3% of the respondents conducted passing out ceremony to the apprentices while 25% of the respondents awarded NVTI certificates to their apprentices

Table 4.21: The mode of skills training

Section of Questionnaire	Frequency	Percentage
Q5. What is your mode of skills training?		
Theory/Practical	4	33.3
Watching/ Imitating the master	3	25
On-the job practical/training	5	41.7
Total	12	100

Source: Field survey, (2016)

Table 4.21 shows that 41.7% of the Master Craftsmen used on-the job practical training to teach apprentices, 33.3% of the respondents used theory and practical teaching methods to facilitate training while 25% used practical imitation of the master to impart knowledge.

Table 4.22: The availability of tools equipment for training

Section of Questionnaire	Frequency	Percentage
Q8. Do you have enough tools and equipment for your training?		
Yes	5	41.7
No	7	58.3
Total	12	100

Source: Field survey, (2016)

Table 4.22 indicates that 58.3% of the respondents affirmed that they do not have enough tools and equipment for their training while 41.7% said that they have enough tools and equipment for their training.As TVET involve the use of tools and equipments in production of whateverartefact,hence the availability and accessibility to use them for training is very important.

4.6 Perceived Competency Level of Skills Trainees are Expected to Acquire

Table 4.23 portrays the perceived competency level of skills trainees are expected to acquire

Table 4.23: Perceived Competency Level of Skills Trainees are Expected to Acquire

Please indicate your level agreement or disagreement in the following statements by ticking [ ]

Section of Questionnaire	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree	Total
Q8.All apprentices are employed after their training	3 (25%)	3 (25%)	1 (8.3%)	4 (33.3%)	1 (8.3%)	12 (100%)
Q9. Apprenticeship training is for low intelligent people	0	3 (25%)	3 (25%)	6 (50%)	0	12 (100%)
Q10. Tools and equipment for apprenticeship	0	0	2 (16.7%)	7 (58.3%)	3 (25%)	12 (100%)

training are adequate						
Q11. Apprentices cannot estimate the cost of project using only working drawing	7 (58.3%)	3 (25%)	1 (8.3%)	4 (33.3%)	0	12 (100%)
Q12. Employer's prefer apprentice training at the informal sector	9 (75%)	3 (25%)	0	0	0	12 (100%)
Q13. Parents encourage their wards to enrol in Arc welders apprenticeship	8 (66.7%)	2 (16.7%)	2 (16.7%)	0	0	12 (100%)
Q14. Apprentices are able to work without supervisor	2 (16.7%)	1 (8.3%)	0	7 (58.3%)	2 (16.7%)	12 (100%)
Q15. Trainees show enthusiasm in their apprenticeship.	4 (33.3%)	2 (16.7%)	0	5 (41.7%)	1 (8.3%)	12 (100%)
Q16. Government assists in the training of apprentice	5 (41.7%)	3 (25%)	2 (16.7%)	0	2 (16.7%)	12 (100%)

The study shows that 50% of the respondents agreed that all apprentices are employed after successful training, 41.7% of the respondents disagreed while 8.3% were neutral. Moreover, 50% of the respondents disagreed that apprenticeship training is for low intelligent people, 25% of the respondents disagreed while 25% were neutral. The findings indicated that apprenticeship training is for low and high intelligent people. The study results indicated that 83.3% of the respondents disagreed that tools and equipment for apprenticeship training are adequate while 16.7% of the respondents were neutral. The study concluded that tools and equipment for apprenticeship training were not adequate. The study revealed that 83.3% of the respondents agreed that due to incompetent training apprentices cannot estimate the cost of project using only working drawing, 33.3% of the respondents disagreed while 8.3% of the respondents were neutral. The study shows that 100% of the respondents agreed that employer's prefer apprentice training at the informal sector. The study indicated that 83.4% of the respondents agreed that parents encourage their wards to enrol in Arc welder's apprenticeship while 16.7% of the respondents were neutral. The study indicates that 75% of the respondents disagreed that apprentice are able to work without supervisor while 25% of the respondents were neutral. The study depicts that 50% of the respondents agreed that trainees show enthusiasm in their apprenticeship while 50% disagreed. The study shows that 66.7% of the respondents agreed that government assists in the training of apprentice, 16.7% of the respondents disagreed and were neutral respectively.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter deals with the summary of the research findings, conclusion and recommendations.

5.2 Summary

The study assessed the perceived falling standards in practical skills of trainees, using mechanical engineering craft practice in Technical and vocational education within Techiman Municipality as a case study. The research design adopted for this study was the Descriptive Research design, based on the standards set for the research as in page 4. Survey questionnaires were distributed to apprentice/students and master craftsmen. Records from the administration of these institutes indicated there were about nine hundred and ninety-eight (998) students/apprentices currently undergoing training in the respective schools. Random sampling technique was used to select ninety seven respondents for the study. The questionnaire was delivered by hand to each

respondent and collected after completion by respondents. Statistical Package for Social Sciences (SPSS) for windows (version 16.0) was the analytical tool used to analyse the data.

5.3 Major Findings

- **Entrance and Exit Qualification**

The study findings shows that the entrance qualification is mostly BECEwhiles that of the exit is still MET 1, almost 63% of the respondents affirm that of the BECE and 37% of the respondents also affirm that of SSCE.The MSLC was however not in the system.The findings shows that change in entrance qualification has affected the exit qualification hence, contributed the falling standard.

- **Years spent in Training**

From the research finding 80.4% of the respondents spent less than one year at the training institutions as compare to the pass years before one can get into the MET 1, which contributed greatly to the falling standard.

The study findings shows that activity based method, demonstration method and observation were used to deliver competency based skills acquisition. Most of the apprentices had their technical competency training from master craftsman. The designing of training programmes in technical training is good. Moreover, the practical competency training is good. To add more, the goo d skills learning are employable after successful completion of TVET training.

- **Availability of Training equipment and tools.**

The research furthermore shows that the vocational training institutes lack adequate tools and equipment for training of apprentices. The maintenance of tools and equipment is good.

- **Interest of students in technical and vocational programmes**

The apprentices willingly opted to pursue this skills training programmes. Also, 87.6% of the respondents said that they are not happy with the kind of training programme they are pursuing because they lack adequate teaching and learning materials. The study revealed that 67% of the respondents affirmed that they cannot read a working drawing.

- **Education reform onTechnical and vocational Education**

Also, 52.6% of the respondents rated their training programme as good. The observation teaching and learning methods is important in imparting technical knowledge, encouraging apprentices to try their hands on practical projects is important in imparting technical knowledge and demonstration teaching and learning method is important when imparting technical knowledge. The teachers in the district need the required TLMs and other necessary educational resources to enhance teaching and learning. Furthermore, 58.3% of the respondents said that they have received skill training in arc welding. Moreover, 66.7% of the Master craftsmen received their vocational training from informal apprenticeship programmes. To add more, 41.7% of the Master craftsmen had 11-15 apprentices, 33.3% of the respondents had 5-10 apprentices, 16.7% of the respondents had 1-4 apprentices while 8.3% had more than 16 apprentices under vocational training. The study holds that 41.7% of the Master Craftsmen used on-the job practical training to teach apprentices, 33.3% of the respondents used theory and practical teaching methods to facilitate training while 25% used practical imitation of the master to impart knowledge.

- **Infrastructure and government support**

Majority, 58.3% of the respondents affirmed that they do not have enough infrastructures for their training and this contributes to the falling standards in practical skills of trainees.

- **Industries request for Technical and Vocational products.**

The study shows that 50% of the respondents agreed that all apprentices are employed after successful training. Moreover, 50% of the respondents disagreed that apprenticeship training is for low intelligent people. The findings indicated that apprenticeship training is for low and high intelligent people. The study results indicated that 83.3% of the respondents disagreed that tools and equipment for apprenticeship training are adequate. The study revealed that 83.3% of the respondents agreed that due to incompetent training apprentices cannot estimate the cost of project using only working drawing. The study shows that 100% of the respondents agreed that employer's prefer apprentice training at the informal sector. The study indicated that 83.4% of the respondents agreed that parents encourage their wards to enroll in Arc welder's apprenticeship. The study indicates that 75% of the respondents disagreed that apprentice are able to work without supervisor. The study depicts that 50% of the respondents agreed that trainees show enthusiasm in their apprenticeship training. The study shows that 66.7% of the respondents agreed that government assists in the training of apprentice.

5.4 Conclusion

It could be deduced from the study that, the activity based method, demonstration method and observation teaching and learning are highly effective in

imparting vocational and practical knowledge. Furthermore, the adequacy of tools and equipment for training is bad. This means that availability of tools and equipment for TVET training is poor. This eventually contributed to the falling standards in practical skills of trainees. The study concluded that even though the apprentices willingly opted to pursue this skills training programmes, they are not happy with the kind of training programme they are pursuing because they lack adequate teaching and learning materials. The observation teaching and learning methods is important in imparting technical knowledge, encouraging apprentices to try their hands on practical projects is important in imparting technical knowledge and demonstration teaching and learning method is important when imparting technical knowledge. The study holds that the Master Craftsmen used on-the job practical training, theory and practical teaching methods and practical imitation of the master to impart knowledge.

5.5 Recommendations

According to the conclusion remarks of the study, the following recommendations should be noted:

- The Master craftsmen should use variety of teaching and learning methods to facilitate the instruction of practical TVET learning. The use of variety teaching and learning methods can improve student's practical expertise in technical skills education.
- The Ghana Education Service through the District education office should provide Teaching and Learning Materials in a form of tools and equipment to enhance the practical skills of trainees. The availability of teaching and learning materials can facilitate the understanding of technical knowledge and improve students' practical skills.

- The Master Craftsmen should use observation teaching and learning methods and practical demonstration teaching and learning methods to impart technical knowledge.

5.6 Suggestion for Further Research

A further study should be conducted to examine the use of variety of teaching and learning methods to enhance TVET training.

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APPENDIX A

Table for determining sample size from a given population

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	100000	384

Note. —*N* is population size, S= Sample size

Source: Krejcie, R.V. & Morgan, D.W. (1970)

APPENDIX B

QUESTIONNAIRE FOR STUDENTS/APPRENTICE

The study focuses on findings out the falling standard of mechanical craft practice under formal and informal apprenticeship module in the Techiman Area of Brong Ahafo Region. This questionnaire is designed purely for academic work in partial fulfillment of the award of the Master of Technology Education degree in Mechanical. All information shall be treated as confidential. The guarantee of your anonymity is assured.

Thank you in advance

APPRENTICES/STUDENTS

QUESTIONNAIRE

SECTION A

Bio-data

Please read and tick [] the appropriate box

1. Gender
   a. [ ] Male
   b. [ ] Female
2. Age

a. [ ] 20 years and below

b. [ ] 21-25 years

c. [ ] 26-30 years

d. [ ] Above 31 years

3. Who advised you to take up this apprenticeship training?

a. [ ] Mother

b. [ ] Father

c. [ ] Uncle

d. [ ] Brother/Sister

4. What certificate was your entrance qualification?

BECE [ ] SSCE [ ] MSLC [ ]

5. How long have you been in this apprenticeship training?

a. [ ] less than 1 year

b. [ ] 1-2 years

c. [ ] 3-5 years

d. [ ] more than 4 years

6 Would you be awarded a certificate at the end of your training?

Yes [ ] No [ ]

7. Please, describe how you acquired skills

a. Trying out……

b.

Demonstration……

c.

Observation……

8 Which of the following personnel did you learn most of the skills from?

a. [ ] Master craftsman

b. [ ] Chief apprentice

c. [ ] Assistant chief apprentice

d. [ ] Among the apprentice

9. How many are you in class

Less than 10 [ ] less than 15 [ ] less than 20 [ ] less than 25 [ ] above 30 [ ] above 40 [ ]

10. How many of you are on a machine during practical work?

One [ ] Two [ ] Three [ ] Four [ ] Five and above

11. How often do you maintain your tools and equipment?

Daily [ ] Weekly [ ] Quarterly [ ]

11 .What Methods are used to facilitate competency based skills acquisition?

[ ] Activity based method
[ ] Demonstration
[ ] Observation

12. How do you rate your skills, competency and condition on the field of work?

Please use the scale of answers from:

1-Very bad, 2-bad, 3-neither good or bad, 4-good, 5-very good

1	2	3	4	5	
[ ]	[ ]	[ ]	[ ]	[ ]	a. Design of training program pursing
[ ]	[ ]	[ ]	[ ]	[ ]	b. Practical competency
[ ]	[ ]	[ ]	[ ]	[ ]	c. Skills learning are employable

[ ] [ ] [ ] [ ] [ ] d. Reputation of the skills among the public

[ ] [ ] [ ] [ ] [ ] e. Adequacy of tools and equipment for training

[ ] [ ] [ ] [ ] [ ] f. Maintenance of tools and equipment

[ ] [ ] [ ] [ ] [ ] g. Safety at the workshop or firm site

[ ] [ ] [ ] [ ] [ ] h. Ability to measure in both centimeter and inches accurately

SATISFACTION LEVEL OF TRAINEES

13. Did you willingly opt to pursue this skills training programme?

Yes [ ] No [ ]

14. Are you happy with the kind of training programme you are pursuing?

Yes [ ] No [ ]

15. If you are not happy what are some of the reasons that that make you unhappy?

(a) Poor public perception of the programme [ ]

(b) Lack of equipment [ ]

(c) Lack of Teaching and learning materials [ ]

(d) Because it is not a white collar job [ ]

16. How often do you attend practical training/lessons every?

Once a week [ ] Once a month [ ] Once a term [ ]

Every day [ ]

17. Do you pay additional fees for practical training?

Yes [ ] No [ ]

18. Can you read a working drawing?

Yes [ ] No [ ]

19. How will you rate your training programme?

Very good [ ] Good [ ] Fair [ ]

20. Please, indicate the level of importance of the following forms of training methods.

a. Observing/watching

i. [ ] Very important

ii. [ ] Important

iii. [ ] Most important

iv. [ ] Not important at all

b. Trying out your hands on the job.

i. [ ] Very important

ii. [ ] Important

iii. [ ] Most important

iv. [ ] Not important at all

c. Demonstration

i. [ ] Very important

ii. [ ] Important

iii. [ ] Most important

iv. [ ] Not important at all

21. Do you have enough infrastructure for the Mechanical Engineering Department?

Yes [ ] No [ ]

22. If no, how does the lack of infrastructure affect teaching and learning?

(a) Very greatly [ ]

(b) Greatly [ ]

(c) Badly [ ]

(d) Very badly

THANK YOU

APPENDIX C

QUESTIONNAIRE FOR MASTER CRAFTSMEN

The study focuses on findings out the falling standard of mechanical craft practice under formal and informal apprenticeship module in the Techiman Area of Brong Ahafo Region. This questionnaire is designed purely for academic work in partial fulfillment of the award of the Master of Technology Education degree in Mechanical. All information shall be treated as confidential. The guarantee of your anonymity is assured.

Thank you.

QUESTIONNAIRE

SPECIFIC JOB CHARACTERISTICS

1. Which of these skill training did you receive?

   (a) Arc Welding [ ]

   (b) Machining [ ]

2. If yes, where did you receive this training?

   Informal apprenticeship [ ]

   Formal apprenticeship (school) [ ]

   Other please

specify……

3. What certificates do you award to your trainees?

   NVTI [ ]

   Trade Proficiency Certificate [ ]

   Passing out Ceremony [ ]

4. How many hours per day do you remain in office or with your students?

Less than 3 hours [ ] 3-5 hours [ ] more than 5 hours [ ]

8. Do you have enough tools equipment for your training?
Yes [ ]
No [ ]

5. What is your mode of skills training?

Theory/practical [ ]

Watching/imitating the master [ ]

On-the job practical/training [ ]

Others

specify…….

6. Do you have enough tools equipment for your training?

Yes [ ] No [ ]

Availability of Educational Resources (TLMs) and challenges facing TVET Education

7. What are the challenges that you face with regards to TLMs? Please tick as appropriate.

[ ] TLMs are not adequate to enhance teaching and learning

[ ] TLMs are not available

[ ] The teachers in the district need the required TLMs and other necessary educational resources to enhance teaching and learning.

PERCEIVED COMPETENCY LEVEL OF SKILLS TRAINEES ARE EXPECTED TO ACQUIRE

Please indicate your level of agreement or disagreement in the following statements by ticking []

No	Statement	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree	Do not know
9	All apprentices/students are employed after their training						
10	Apprenticeship/students training is for low intelligent people						
11	Tools and equipment for apprenticeship/students training are adequate						
12	Apprentices/students cannot estimate the cost of project using only working drawing						
13	Employer's prefer apprentice/student training at the informal sector						
14	Parents encourage their wards to enrol in Arc welders apprenticeship						
15	Apprentices are able to work without supervisor						

16	Trainees show enthusiasm in their apprenticeship.						
17	Government assists in the training of apprentice						

18. Do you have enough infrastructure for the Mechanical Engineering Department?

Yes [ ] No [ ]

19. If no, how does the lack of infrastructure affect teaching and learning?

(a) Very greatly [ ]

(b) Greatly [ ]

(c) Badly [ ]

(d) Very badly

THANK YOU