UNIVERSITY OF EDUCATION, WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

THE LOW ENROLMENT OF TECHNICAL COURSES AT THE SENIOR HIGH/TECHNICAL SCHOOLS IN THE UPPER WEST REGION: A CASE STUDY OF TUMU SENIOR HIGH/TECHNICAL SCHOOL

IMMURANA ISSAH YESSE

AUGUST, 2016

UNIVERSITY OF EDUCATION, WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

THE LOW ENROLMENT OF TECHNICAL COURSES AT THE SENIOR HIGH/TECHNICAL SCHOOLS IN THE UPPER WEST REGION: A CASE STUDY OF TUMU SENIOR HIGH/TECHNICAL SCHOOL

IMMURANA ISSAH YESSE

(7141220011)

A Dissertation in the Department of TECHNOLOGY EDUCATION, Faculty of VOCATIONAL AND TECHNICAL EDUCATION, submitted to the School of Graduate Studies, University of Education, Winneba, in partial fulfilment of the requirements for award of the Master of Technology (Mechanical Technology Education) degree

AUGUST, 2016

DECLARATION

STUDENT'S DECLARATION

I, **IMMURANA ISSAH YESSE**, 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 own 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 of this dissertation was supervised in accordance with the guidelines on supervision of work laid down by the University of Education, Winneba.

SUPERVISOR"S NAME: **DR. A. AGYEI-AGYEMANG**

SIGNATURE: ……..……

DATE: …….

DEDICATION

I dedicate this piece to my wife, Fauruza Abdullai and my brother, Iddrissu Issah through whose maximum effort and sweat, I am what I am today.

It also goes to my imams, Sheikh Abubakar Haruna Antigwei and Sheikh Ismail Speed Adam who encouraged me to pursue further studies, when I lost hope in climbing the educational ladder.

ACKNOWLEDGMENTS

I wish to express my profound gratitude to first and foremost God through whose guidance and protection I was able to complete this task.

I also thank my Headmaster in the person of Mr. Ahmed Moro Baba, Head of Department, Mr. Inusah Alidu Ghanha and all the members of the Department of Technical of Tumu Senior High/Technical School who helped me in diver"s ways to come out with this piece of work.

I am also greatly indebted to my supervisor, Dr. A. Agyei-Agyemang who spent his precious time to mark and correct all the mistakes contained in this work.

Again I owe a word of thanks to my wife and my brother-Fauruza Abdullai and Iddrissu Issah respectively.

TABLE OF CONTENTS

CONTENTS **PAGE**

LIST OF TABLES

TABLE **PAGE**

LISTOF FIGURES

FIGURE **PAGE**

ABSTRACT

It has become undeniable fact that most of the technical schools are virtually collapsing because people look down upon them. People have misconception that technical courses are for those with low academic performance, and for that matter they would not patronise or allow their wards to pursue any of the technical courses, therefore resulting in low enrolment in those institutions. The above challenge is the main reason why the technical institutions are collapsing and the few surviving ones had to introduce the secondary courses and within shortest possible time you see the enrollment of the secondary courses outweighing that of the technical. Meanwhile, it is technology that is going to solve the nation‟s economic challenges. The above challenge was what tickled the researcher to come out with this work. The total number of two hundred and sixty-seven (267) questionnaires were distributed to the respondents and two hundred and fifty-six (256) respondents responded. 225 (88%) respondents out of the total number disagreed with item 6 & 12 on the questionnaire and 2 (0.78%) being neutral, the remaining 28 (11%) respondents agreed. For item 7& 13, 105 (41%) respondents agreed, 17 (7%) respondents did not side and 134 (52.3%) respondents disagreed. With respect to item 8 & 14, 16 (6.3%) respondents were not having any idea, but 52 (20.3%) respondents said yes and the remaining 188 (73.4%) also said no. In respect of item 9 & 15, 66 (26) respondents agreed while 25 (10%) remained neutral and 165 (64%) disagreed. 81 (32%) respondents agreed with item 10 & 16 and 153 (60%) disagreed and in between above extreme ends are 22 (9%) respondents being in the neutral grounds. According to the above findings, it is concluded that both weak and intellectual students can be enrolled at both technical and secondary schools to read any of the technical courses or secondary courses. The technical courses are like other secondary courses and are also friendly. Also technical courses can offer self- employment.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

There are three domains that make a complete man, namely; cognitive domain, affective domain and psychomotor domain. Cognitive domain deals with the head of an individual (knowledge). The categories of people in this domain are those who are intellectually and academically good in the classroom. They are good in memorizing things. Lawyers, journalists, medical doctors, bankers, physicians, and what have you belong to this domain (Bloom, et al., 1956).

Affective domain also has to do with the heart of an individual. People in this category are of God fearing, dedicated, truthful, integrity, trustworthy, humble, sociable and just, (Bloom, et al., 1956).

And last but not the least, psychomotor domain deals with manual or physical skills (i.e. the use of hands, legs and the entire body). In this category, the physical body is put in good use. Anything that has to do with skills like welding and fabrication, assembling, production plant, building engineering, wood science and games, all belong to this domain (Bloom, et al., 1956).

After considering, all the three domains mentioned above, the researcher was of the view that affective domain serves as constant domain to the remaining domains. In other words those who are cognitively and psychomotocally good need affective domain to shape them to become well rounded people in the society who would be hardworking, dedicated, regularity, truthfulness and punctuality and above all God fearing at their various work places which would then transform the society in particular, and the whole country in general. For instance, people in the cognitive domain like a medical doctor, a lawyer, a journalist, after having acquired the knowledge the affective domain would also

prepare the doctor to be punctual at work to save patients from waiting and even dying. A lawyer will also be just, free, fair and firm at the bar, and a journalist will report an accurate, precise and truthful reportage and on the other hand those in the psychomotor domain; mechanical engineer, building engineer would also be shaped-up by the affective domain to become useful human beings in the society, for example work on time and close on time and do not accept bribes from people attended to. Anybody reading this report would strongly agree that, the whole country‟s economy can be transformed with all the above three domains properly taken care of. If one of the three domains is neglected, then the country would be in shambles. The researcher strongly believes that most developing countries, of which Ghana is not an exception, are facing the above challenges of neglecting or not properly managing one or more of the three domains.

Katakyie K. O. Agyemang said at the press release in 2014 farmers‟ day that "For some time now, it has been the political language in Ghana that agriculture is the backbone of the Ghanaian economy. And therefore, just as a human being cannot live without the backbone, there could be no any meaningful development in Ghana without agriculture." According to Jim Reese, the Oklahoma secretary of agriculture, „Agriculture is the backbone of both the Oklahoma and the U.S economies.‟ Mr. Obasajo, the then president of Nigeria states that "agriculture is the engine for growth in Africa." If a country‟s backbone is not well, then the economy of that particular country would not do well. The researcher found this statement to be narrowed. The Africa Report (TAR) on Sunday 12th July, 2015, reported that more than 64% of Ghanaians work in the agriculture sector. This means more than half of Ghana populations are farmers with very fertile and arable land but their farm produce cannot feed 27 million Ghanaians but only 5% of Britain‟s population are farmers with less fertile land but are able to feed a 60 million population, according to a press release by Katakyie K. O. Agyeman, in 2014. If

these countries are to be compared logically the former should have been able to feed its people better and sell the excess farm produce than latter but it is the other way round. You would agree with me that there is a missing link somewhere. The missing link has to do with technology. No country can have a flourished economy without technology. The developed countries including British and American farmers were able to feed their entire population and still have enough to export for foreign inflow because they have integrated their farming system with technology (mechanised farming), i.e. the use of sophisticated farm implements like tractors, rangers harvested etc. Ghana although with high number of farmers yet cannot feed its people because Ghanaians have not attached any importance to technology. In this case the researcher would like to qualify the word „agriculture" with the word „mechanised".

So the above statement would now read like this „Mechanised agriculture is the backbone of every country"s economy. Ghanaians have a misconception that technology or technical courses are for weak minded people. (Boateng, 2012) and as the results of that most people including the technical instructors do not want their wards to be called weak students. Most people shy away from pursuing technical courses (African Union, 2007), (Anamuah-Mensanh, 2004).

Most Ghanaians and Ghanaian students are bent on the secondary courses like business, general art and management at the expense of the technical courses like woodwork, applied electricity, block work and metalwork. This misconception has caused the nation a great harm. When Ghana was to host the Confederation of Africa Nations (CAN) football tournament in 2008, there was the need to construct new stadia and to augment the already existing few ones. The then government had to give the contract of building the new stadia to a Chinese contractor. To make the thing worse, the contractor did not use Ghanaian labour but rather the Chinese whom we (Ghanaians)

were at par or even better than. Now it is undeniable fact that China is one of the leading countries in the world, in terms of technology. To government, it was compelled to use foreign contractor for the reason that the country does not have enough qualified contractors who could execute the contract properly. If Ghana government and Ghanaians had invested equally in both general and technical schools we would have ended up by having good and qualified contractors with all the technical know-how to execute the work effectively and efficiently (Alam, 2007). The money spent in putting up those stadia would have remained in the country to boost the economy, in so doing unemployment rate in the country would have gone down (McWilliams & Kwamena-Poh, 1975:94).

The above problem has catapulted unemployment rate simply because our educational system is one sided. Many secondary schools are being built to contain numerous students who are yearning to be enrolled into these secondary schools to read business, general art or management. What is extremely worrisome here is that most of these students who are yearning to be admitted into these secondary schools would end up becoming jobless after their completion, because technical institutions are neglected. Also there is a mismatch between technical education and industries (Atchoarena and Dulluce, 2001).

The few industries, plants and firms in the country cannot absorb the jobless graduates. All these problems boil down to the fact that technical institutions have been looked down upon. The technical institutions that would have bred people with technical know-how who would later become qualified building engineers, wood scientists, mechanical engineers and so on; who would have established production firms, factories and even effectively and efficiently manned state industries that would have employed many of the jobless graduates who passed through the secondary courses to manage the administrative aspect of the firms and the industries. Also bringing in foreign contractors

to build our roads, overhead interchanges, stadia and the rest would have been a thing of the past. The researcher is of the view that, government, stakeholders and curriculum planners should revitalize and integrate the technical courses into the general courses as recommended (African Union, 2007).

Germany in 2009 had 53.2% of upper secondary students enrolled in Technical and Vocational Education and Training (TVET), Finland 55.1%, Ireland 33.9%, and Korea 24.4%. From the above figures, it is evident that these countries have all developed a strong manufacturing base and remain competitive partly because they were able to steer a large share of their secondary and higher education students into technical field of study. This compared to 20.9% for Burkina Faso, 22.4% for Cameroon, 13.2% for Ghana, 10% for Kenya and 9.7% for South Africa. These African countries fall short of TVET enrolment rate reached by some of the most competitive economies in the world and the results are evident as Korea, and Taiwan show us why we should demystify the suit and de-stigmatise (Maiga, 2013).

In spite of the above imbalances, the previous and even the current government put some measures to check these imbalances, but the implementation of these measures were abysmal (McWilliams and Kwamena-Poh, 1987). For example, during the era of our colonial masters, Sir Gordon Guggisberg between 1914 and 1927, proposed sixteen principles for education. Out of this proposal, he was able to establish four trade schools (technical and vocational schools) in Ghana as at 1922. In spite of this attempt, it was realized after the country‟s independence in 1957 that the type of quality education inherited from the colonial government did not address the critical problem of the country. This set the pace for new educational reforms in 1987 which proposed all citizens, regardless of gender social status are functionally literate (knowledge) and productive (skills or technology). (Boateng, 2012)This reforms even though was initiated

but could not achieve its fullest purpose. The failure in this reforms was as the result of partially implementation on the side of government in that in the reforms was a clause that each basic school(JSS) Junior secondary school should have well equipped workshop to cater for the students who are skillful (good in psychomotor) so at the end of the whole programme those who are cognitively good would further into secondary schools or secondary/technical schools to read any of the general secondary courses and on the other hand those who are good in psychomotor would also further at the same secondary/technical schools, technical institutes or polytechnics to pursue any of the technical programmes.

In 2000 to 2008 there was a new commission constituted by the then government to look into the current educational system. instead of the current government to continue from where the previous government left off thus: providing the equipped workshops to the basic schools which would have also taken care of those skillful pupils that most Ghanaians now see to be weak students and drop out. These people that we look down upon would have been the qualified people putting up magnificence edifices, mechanical equipment etc. for so-called precious doctors, lawyers, bankers, nurses, journalists, politicians and even government, if their education were properly taken care of (Foster, 1965). The successive governments shy away from technical schools because they see them to be too costly than the general secondary schools (Boateng, 2012).

For instance, the cost of one technical school would be able to build many general secondary schools and that would score political goal for the ruling government. The government would use the numerous secondary schools built to win many votes. But the question is, for as a country to have many general secondary schools that would pave way for many jobless graduates in the future and few technical schools that would produce productive graduates who would establish firms like auto mechanical fitting shops,

assembly plant, production plant which would give employment to many people; which of these scenario is better? Based on the above deficiencies or gaps in our educational system, the researcher was challenged to investigate into it and then apply measures to mitigate it, if not completely solve it.

1.2 Statement of the Problem

In Ghana, there are approximately 672 public senior high schools (SHS) including secondary-technical and technical institutes. Public technical institutes constitute 4.2 percent whereas public secondary-technical schools also constitute 2.9 percent. These figures therefore translate to 7.1 percent of both secondary-technical and technical institutes put together. Private Technical and Vocational Education and Training (TVET) provision is nevertheless expanding and such schools provide some significant training in Ghana.

The private sector participation in the provision of TVET equals public sector contribution. Churches‟ contribution to TVET at the private sector is overwhelming-it is approximately 80 percent. At the tertiary level, TVET courses are mostly run by the polytechnics and a few universities, yet, graduates who pursued TVET related programmes from all the 10 polytechnics in Ghana constitute 10 percent of the total number of graduates on yearly basis.

While many EU countries have achieved 50 percent TVET enrollment at both pre-secondary and post-secondary levels, Ghana is struggling below 10 percent at all levels with regards to public institutions. The laxity can be attributed to a myriad of factors such as lack of government priority, financial reason, lack of proper policy and leadership direction. It is true to the extent that, finance poses the greatest challenge in the provision of TVET; however Ghana has not had the kind of leadership to provide the direction. We

need leadership that will not only prioritise TVET but also diversify our long-cherished general education. That is the way to go (Raphael, 2014).It is now obviously clear that a country can only be transformed through technological advancement. A country cannot advance technologically without taking good care of its technical schools and institutions, and the courses they run.

The researcher through observation and interaction with some cross section of students from the various technical schools in the region, found out that the enrolment of technical courses like block work, woodwork, applied electricity and especially metalwork at the Senior High/Technical Schools in the region are declining which is not a good signal for the future for the upper west region in particular, and Ghana in general. Tumu Senior High/Technical School is not an exception. Out of the following five programmes run at the school i.e. Technical, Agricultural, Home Economics, General Art and Business, only the technical department is having the lowest enrollment with one hundred and sixty-five students out of about one thousand, two hundred student populations.

When we narrow down to only technical department, metal work is the course with the least enrollment of seven and five for forms one and two. The researcher as a teacher of the department of technical education of Tumu Senior High/Technical Schools in Upper West region, found it necessary to use Tumu Senior High/Technical School, as a case study.

1.3 The Purpose of the Study

The main goal of this study is to put measures in place to raise the enrolment of technical courses to be at par with the general secondary courses, or be higher than the secondary courses in Tumu Senior High/Technical School.

1.4 Objectives of the Study

The specific objectives of the study are:

1. To examine the causes of the low enrolment of technical courses at Tumu Senior High/Technical School.
2. To put interventions that will check these anomalies.
3. To introduce new ideas in the technical courses.

1.5 Research Questions

The research seeks to answer the following questions:

i. What causes the low enrolments?

ii. What new ideas can be introduced in the technical courses to make them attractive?

iii. What intervention will check these anomalies?

1.6 Significance of the Study

The importance of technology is undoubtedly a very salient ingredient in harnessing the natural resources for national development. Therefore the findings of this piece of work would put teachers in position to assist students to develop positive attitudes in the study of technical courses at the second cycle institutions and beyond and thereby become future human resource in science and technology exploration in the development of the nation and the world at large. Also, this piece of work will be used as additional information to guide policy makers, scholars and the academia in their quest to design and develop strategies that will enhance comprehensive teaching and learning of technical courses at the tertiary level.

1.7 Limitations of the Study

1. Everything in this world has its strength and short-comings. Although this study was successful, it encountered some difficulties, among them was the shedding of electricity.
2. The researcher was not also conversant with the internet so finding information at times on internet was difficult.
3. The findings of this research report may not be generalised because it is a case study of Tumu Senior/Technical School in Upper West Region.
4. Questionnaires used by the researcher could be problematic. Some respondents could give their response based on what they think would please the researcher but not the reality.

1.8 Delimitations of the Study

Due to the numerous senior high/technical schools, the distance between them and the large number of their population size, the researcher has decided to conduct a case study of Tumu Senior High/Technical School in the Sisala East district in the Upper West Region.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Introduction

This chapter is a review of the writings of recognized authorities and on previous researches related to topic under study. In this respect the chapter dealt with the role of Technical Courses in Society; the meaning, principles and importance of Technical Education. Other areas of concern included misconceptions people hold concerning technical education, strategies and approaches to arouse students interest in the learning of technical courses. Again, the role of Government in technical education, technical teacher education, equipping technical institutes, and improving enrollment in technical programs are addressed.

2.1 The Meaning of Technical Skills

Vocational technical education refers to the educational processes that involve the study of technologies and related sciences and the acquisition of practical skills and knowledge aimed at discovering and developing the individual for employment in various sectors of economic and social life. In recent times, the economic, technological, demographic, societal and educational context in which vocational technical education is practiced has changed (Moses & Liang, 1990). These changes offer a great challenge to the delivery of vocational technical education. Vocational technical education must respond appropriately to these changes in order to remain relevant in preparing individuals to be able to take advantage of the opportunities for the kind of workforce needed in today‟s world of work. In this regard, effective leadership becomes an important variable that must be considered in the new vocational education environment.

2.2 The Role of Technology in Society

The role and/or importance of Technical Education has been expressed in different ways by different writers and authorities. MOE (2006), in an attempt to discuss the role of Technical Skills in society said that Nations that have developed throughout history and in recent times are those whose development has been propelled by science, technology and manufacturing. MOE (2006), admitted further that the slow and painful development of third world countries is attributed to the fact that they have not put as much emphasis on science and technology as compared to the developed countries. It made reference to the policy guidelines of the 1974 Education Reform Programme which emphasis among other things the need for the creation of an awareness in the Ghanaian child to be able to use the knowledge derived from science and technology to transform his/her environment and improve the quality of life.

The introduction of Technical Skills in the curriculum is intended to provide young persons with basic technical skills as a predisposition to technical pursuits at advance levels. It is recognized that the advancement of the country will only accelerate if a preponderant number of persons are trained in science and technology, with manufacturing as the outlet. The subject therefore offers the pupils the chance to acquire valued technical skills that will open up a wide range of opportunities for productive work" MOE (2005).

Markin (2006), had the following to say on the importance of the subject: The structure and content of the Dzobo report which was implemented nationwide in 1987, had among other things in the recommendations, to introduce pupils to science and technology through the play-way method, to develop in them their creative and inquiry skills so as to acquire manipulative skills to pre-dispose them to many occupational skills as possible.

In addition to these, he added, the curriculum was designed to provide opportunities for students to acquire basic Technical, Vocational and scientific knowledge and skills that will enable them to discover their aptitudes and potentialities and induce in them desire for self-improvement, appreciate the use of hand, head, and heart to be creative and productive oriented.

Markin added that to a large extent this has boosted the morale and interest of students to take up courses in technical education. Technical students and prospective technical students therefore foresee prospects in technical education because of increased in attention being shown by the government, some NGO"s, individuals and some benevolent organization. One can therefore say for sure that through science and technology Ghana has improved in her developments.

Markin (2006), in his Rapid Results Notes on Pre-Technical Skills Methodology II, outlined the following observations that can be mad as a result of the development and improvement of the subject.

- Ghana can now boast of many small scale industries especially in manufacturing sector
- It has created job opportunities thereby reducing the unemployment situation in the country
- It has improved the economy of the Nation through the creation of small industries.
- There has been a reduction in the importation of goods such as machines and tools, since these machines and tools can be produced locally as a result of technical processes.
- Pupils can solve simple technical problems in society.
- It has made most Ghanaians self-employed

- Locally manufactured goods are exported and thus the country earns revenue and foreign exchange.

Dondieu (n.d.), in identifying the objective of 1st and 2nd Cycle education stated among other things the appreciation and use of hands as well as the mind and make them creative and productive oriented. This can be achieved only through studying Pre-Technical Skills.

Hayfron-Benjamin (1992), in explaining the role of Graphic Communication (Technical Drawing) which is a major aspect of technical Education touched on its importance in our today‟s world. “Almost all our occupations require the ability to read and understand graphics or pictorial representations-the engineers, architects, craftmen, etc, who design and build our homes, make our airplanes, ship, automobiles and tractors or produce our radio and television sets, make extensive use of drawings.”

Hayfron-Benjamin added that technical drawing is becoming part of many school curricular mainly because of the demands it makes on the intelligence of the student. In schools where it is fully established as a subject on its own right, it is recognized as one of the most important subject of general education (Mathematics and Language being the others).

According to parliamentary brief (2014), human capital has impact on labour market. Alam (2007) noted that investment in education and training benefits not just the individual but society as a whole. He continuous that returns on investment for society will include workforce, perquisites for global competitiveness and economic growth. For the individual, a better career path increase earning and a better quality of life will be the ultimate benefit. Again, Fagerlind and Saha (1989) consider human capital as education and training among other things that raise the productivity of workers, and increase their lifetime earning capacity. However, Alam further suggests that governments only

concentrate on ensuring Technical and vocational education receives boost when there is increased demand for skills, when labour supply shows rapid growth, when employment grows quickly, or when employment increases significantly. In his view, the TVET only receives governmental attention because it provides both unemployed young people and older people jobs, reduces the burden on high education, attracts foreign investment, ensures rapid growth of earnings and employment, as well as reduces the inequity of earnings between the rich and the poor.

Colin (1999) also in support of that position indicated that not only does TVET prepare skilled labour but also it provides general education to students. In his somewhat aggressive criticism, Foster (1965) points to Technical Vocational Education as a fallacy in development planning, referring to it being effective only if the acquired skills are utilized properly. Colin shares that view but adds that TVET can play a vital role in development planning, but warns that if the policy makers do not make it up-to-date and TVET schools do not have enough qualified teaching faculty and sufficient facilities to offer quality TVET, it will not be useful. He also claims that these are not limitations of TVET per se, but limitations of the educational policy of a country. In his counsel for balance, Bennell (1996) insists that though TVET has been a powerful influence in development planning, indiscriminately offering TVET may have negative impact on a nation‟s development.

Amagada and Ziderman (1992) differ from that position, saying TVET does not play an appropriate role in development claiming that the higher investment needed for TVET does not seem to be compensated for by high reforms. However his definition of TVET can explain a good significant role of TVET IN development. “Vocationalisation refers to efforts by schools to include in their curricula those practical subjects which are likely to generate among the students some basic knowledge, skills and dispositions that

prepare them to think of becoming skilled workers or to enter other manual occupations" The World Bank policy paper on TVET (1991) indicates that to get the maximum benefits of TVET for national development, the following factors must be considered:

- Well-timed modern courses linked to local and global demand;
- Relevant and up-to-date TVET courses need to be developed;
- Proper justification in respect of individual county as to the best level to introduce TVET courses and
- Wider range of TVET courses need to be developed taking into account demand and cost effectiveness.(not only for offering various courses but also for duration of the courses, for students" classification in terms of their merit, ages, job market, etc.) George (2012).

As one moves from country to country, vocational technical education is given different names: vocational education and training (VET), technical and vocational education (TVE), technical and vocational education and training (TVET), vocational technical education (VTE), or vocational and technical education and training (VOTEC). They all mean the same thing. Traditionally, vocational technical education refers to studies in area of technology, applied sciences, agriculture, business studies, industrial studies and visual arts. The universal justification for vocational technical education has been to provide occupational skills for employment (Strong, 1990). However, this keeps changing and vocational technical education has been assuming different meanings and purposes due to global demographic, social, technological, economic, and political developments (Pucel, 1990). These developments put pressure on governments and policy makers to keep expanding the purposes and expectations of vocational technical education. Lewin (1997) reported that, there are now five justifications for governments worldwide to invest in vocational technical education. These are:

1. To increase relevance of schooling by imparting individuals with skills and knowledge necessary for making the individual a productive member of the society.
2. To reduce unemployment as a result of provision of employable skills especially to the youth and those who cannot succeed academically.
3. To increase economic development due to the fact that it improves the quality and skill level of the working population.
4. To reduces poverty by giving the individuals who participate access to higher income occupations.
5. To transform the attitude of people to favour occupations where there are occupational prospects or future.

Various approaches have been adopted around the world to provide vocational technical education. Lillis and Hogan (1983) identified four different approaches to vocational technical education. The first approach is where the whole school curriculum is re-oriented towards providing occupational skills. There is also the parallel system approach, where vocational technical institutions exist alongside a general school system with a conventional academic orientation. This is the most widely used approach.

The third approach is called the core curriculum option approach. This approach provides vocational technical programs within the structure of general school curriculum as a minor but substantial system. The vocational subjects are incorporated into the system as compulsory core subjects or as options. The fourth, is the non-formal system approach which provides opportunities for out of school youth to acquire vocational technical skills, which may be used either to obtained employment in the formal sector or for promotion of self- employment and the development in the informal sector. These approaches are used either individually or in combination, depending on what policy

makers think is suitable. From one country to the other, vocational technical education is provided from a broad range of institutions: vocational technical institutions, polytechnic institutions, universities, institutes of technologies, and apprenticeship centres (Boateng 2012).

2.3 Misconceptions

Ghanaians have a misconception that technology or technical courses are for weak minded people (Boateng, 2012). As the results of that most people including the technical instructors do not want their wards to be called weak students. Most people shy away from pursuing technical courses (African Union, 2007; Anamuah-Mensanh, 2004). Most Ghanaians and Ghanaian students are bent on the secondary courses like business, general art and management at the expense of the technical courses like woodwork, applied electricity, blockwork and metalwork (George, 2014). This misconception has caused the nation a greater harm.

Another issue facing vocational technical education in Ghana is perception that it is a route for those who are not able to function within an academic setting; this perception is compounded by a lack of progression routes from vocational technical education into, higher education. In fact these negative perceptions are not limited to those who have little understanding of vocational education. In 2002, a survey of public TVET teachers found that none of the 87 respondents wanted their own children to study TVET programmes (Anamuah-Mensah, 2004).

Aside inadequate financing and negative perceptions, the socio-economic environment and the contextual framework within which vocational education is delivered in Ghana is characterised in general by other factors, the factors include, a huge numbers of poorly educated, unskilled and unemployed youth, uncoordinated,

unregulated and fragmented delivery systems, as well as low quality gender and economic inequities, weak monitoring and evaluation mechanisms, and poor management and ill-adapted organisational structures (African Union, 2007).

2.4 Challenges Facing Technical Education

The nature and characteristics of vocational technical education presents unique challenges to institutions and administrators. Vocational technical institutions require workshops, tools, equipment, and materials. Vocational technical subjects require more instruction and practical time than arts and science education. Vocational technical subjects need to be allotted sufficient time to satisfy their practical goals. Methods of assessing vocational technical subjects, especially the form of assessment require the training of assessors who can assess students‟ competence in the classroom and in the workplace. All these make vocational technical education more expensive than other types of education.

2.4.1 State of Technical Laboratories/Workshop

Laboratories are important elements in technical education. They allow applying and testing theoretical knowledge in practical learning situations. Students working in a local laboratory can directly see, hear, touch and smell the laboratory devices. There is another type of laboratory called remote laboratory, where students interact with remote devices through a computer user interface. This type laboratory is called „remote laboratory‟ by Aktan and he terms it: “Second Best to Being There” (Aktan, 1996). So students should have the opportunity to work with local laboratories to get a direct “hands on” experience.

According to (Wikipedia, 2013) Laboratories used for scientific research take many forms because of the differing requirements of specialists in the various fields of science and engineering. A laboratory might contain a particle accelerator or vacuum chamber, while a metallurgy laboratory could have apparatus for casting or refining metals or for testing their strength. A chemist or biologist might use a wet laboratory, while a laboratory might be a room with one-way mirrors and hidden cameras in which to observe behavior. In some laboratories, such as those commonly used by computer scientists, computers (sometimes supercomputers) are used for either simulations or the analysis of data collected elsewhere. Scientists in other fields will use still other types of laboratories. Engineers use laboratories as well to design, build, and test technological devices.

Scientific laboratories can be found in schools and universities, in industry, in or military facilities, and even aboard ships and spacecraft.

2.4.2 Computer Laboratory

Two state-of-the-art computer laboratories are used for instruction in the Enhanced Mitigation Experience Tookit (EMET) program. Students work with Microsoft Word, Excel, Access, and PowerPoint. In addition, they receive extensive instruction in the mechanical drawing software AutoCAD, as well as the solid modeling packages Solid Works and Pro/Engineer. Students also work with Master CAM, Lab VIEW, MATLAB/Simulink, RSLogix 500 and 5000, RSView, and a variety of other software programs in courses throughout the program.

2.4.3 Materials Testing Lab/Mechanical Laboratory

A material testing laboratory may have the following facilities:

- Instron Tensile Testing Machine
- Impact Tester
- Hardness Tester
- Heat Treatment Ovens

The Materials Testing laboratory provides access to an Instron tensile tester, heat treatment ovens, a Charpy impact tester, and assorted hardness testers. Students perform material testing on specimens and analysis of data. Tensile testing is accomplished with an Instron machine to evaluate material strength. Students utilize an Equotip hardness tester to determine the resistance to permanent deformation under dynamic loading. Impact strength is assessed using a Tinius Olsen Charpy impact tester. Ralph and Helen force Advanced Technology centre has the following Laboratories available:

2.4.4 Automation Laboratory - Force

- Programmable Logic Controllers
- Robots
- CNC Machining Equipment
- Laser Engraver

In the Automation Lab, there are eight benches where students work with Programmable Logic Controllers (PLCs), robots, and a sorting and assembly process composed of various industrial sensors and actuators. In addition, Computer Numerically Controlled (CNC) machining equipment, and a laser engraver / cutter are available for instruction and course projects.

2.4.5 Programmable Logic Controllers

Students learn to program PLCs (Programmable Logic Controllers), which are used in industry to control processes. Located at each PLC bench are two PLCs, one SLC 5/05 and one ControlLogix processor. Students program the PLCs using simple inputs and outputs (switches, pushbuttons, and lights) in the introductory course. In the subsequent course, students accomplish a sorting, assembly and inspection process by utilizing a variety of sensors and actuators used in combination with PLCs and programming. Students learn to program PLCs using a variety of languages.

2.4.6 Robots

The anthropomorphic robots have five axes which control movement, as well as grippers which open and close, allowing them to pick up and put down parts.

2.4.7 CNC Machining Equipment

Students learn the proper procedures for programming Computer Numerically Controlled (CNC) equipment in order to machine parts. Both a CNC mill and CNC lathe are used.

2.4.8 Laser Engraver

Students cut precision parts for use in assembling models using a laser engraver.

2.4.9 Projects Laboratory I – Force

Senior- level students utilize this laboratory to complete the assembly of their senior design projects each semester.

2.4.10 Projects Laboratory II Force

Mini-Baja Vehicle

This second Projects laboratory is also used for assembly of projects in the EMET capstone design course (EMET 440) and for the college's Society of Automotive Engineers (SAE) Mini-Baja team. This laboratory is fitted with an overhead hoist, a floor lift, overhead air lines and electrical lines, hand tools, and assorted power tools.

2.4.11 ASME Mini Baja Vehicle

Student members of ASME (American Society of Mechanical Engineers) design and fabricate a mini-baja vehicle and compete in an annual competition sponsored by the SAE (Society of Automotive Engineers).

2.4.12 Machine Shop - Force

The Machine shop is equipped with two manual mills, a manual lathe, a conversational CNC lathe, an iron worker, a sheet metal worker, a horizontal and a vertical band saw, and several different types of welding equipment. Students receive instruction in general laboratory safety and specific instruction in the use of each of the machines. They can then make use of this equipment in class projects as well as in their senior design project work.

2.4.13 Process Control Laboratory - Force

Students learn about process controls in junior and senior level coursework. They use various process control workstations, computer-controlled data acquisition equipment, and control system development and simulation software.

2.4.14 Computer Laboratory - Force

A second state-of-the-art computer laboratory is used for instruction in the EMET program. Students work with Microsoft Word, Excel, Access, and PowerPoint. In addition, they receive extensive instruction in the mechanical technical drawing software AutoCAD, as well as the solid modeling packages such as Solid Works and Pro/Engineer. Students also work with Master CAM, Lab VIEW, MATLAB/Simulink, RSLogix 500 and 5000, RSView, and a variety of other software programs in courses throughout the program. A Rapid Prototyper is also housed in this laboratory and is used by students to produce prototype parts used in their design work.

2.4.15 Electrical Laboratories

Two general electrical engineering laboratories accommodate hands-on study of electric circuits and advanced electronics. The facilities are equipped with customary laboratory instruments such as oscilloscopes, power supplies, function generators, and multi-meters. Integrated PC-based workstations are also available for design, testing, measurement, and analysis of electrical and electronic circuits. Computer-assisted circuit design simulation and rapid prototyping are supported by a variety of software packages including Matlab/Simulink, DSpace, LabView, and Electronics Workbench.

Additional Electrical Equipment: Experiments in AC and DC rotating electric machinery and electric drives are supported by configurable motor/dynamometer workstations. . Supporting equipment for these experiments includes high voltage power supplies, AC and DC motors and generators, dynamometers, optical encoders, programmable power electronics boards, and electrical load banks. PC-based workstations and the programmable power electronics modules are used to support experiments with variable speed AC and DC motor drives. Digital electronics and

microprocessor laboratories are equipped with modern FPGA (Field-Programmable Gate Array) boards and various microprocessor, microcontroller, and DSP (Digital Signal Processor) development boards.

New design-build-test experiences have been implemented at the Swedish institutions. Examples of products that have been developed in these institutions are a solar-powered aircraft at Kagiso Tiso Holdings (KTH) and a racecar at Chalmers. In coming years, the Laboratory and Workshops theme will outfit and operate the labs designed in the first year, create new courses with design-build opportunities, expand the current laboratories and workshops, coordinate with other educational projects and developmental efforts, as well as support capstone design experiences (Karl-Frederik & et al., 2003).

2.5 Technical Laboratories/Workshop in Some African Countries

2.5.1 Nigeria

Most technical education departments in Nigeria Universities do not have laboratories or workshop space let alone usable equipment and facilities and where they exist, they are grossly inadequate, as the laboratories only have the items or equipment that were provided when the departments were established. It is however most surprising to know that most technical education departments still depends on engineering workshop and lecturers to teach technical education concepts in this 21st century. This is a total shame and a high degree of irresponsibility on the part of the operators of this programme. The available facilities programme as at today are inadequate quantitatively and qualitatively and besides they are obsolete. Oryem-Origa (2005) indicated that only 40% of Institutions of Higher Education in Nigeria have laboratory or workshop space for technical education programmes. The laboratories only have the items or equipment that was provided when the universities were established. The others, 60% do not have a

laboratory or workshop space and that this reflects the low quality of technology programmes in higher institutions. He further noted that these few universities that have laboratories experience acute shortage of laboratory equipment and supplies. He concluded that this situation is partly responsible for the reason why it has been increasingly difficult to run experiments effectively for students and made the teaching and research in science and technology difficult and therefore the country was producing insufficient and ill-prepared technical education graduates necessary for driving the technological and socio-economic development of this nation.

The inadequacy in teaching, laboratory and workshop facilities has contributed to the diminution of the quality of technical education graduates in Nigeria. Reyes-Guerra (1989) categorized students into three, namely: Verbalizers, Visualizers and Doers. The Verbalizers are those who learn easily if information is in written or spoken form. They benefit from lectures, tutorials and hand-outs. Visualizers learn easily when information is presented in pictorial or diagrammatic form while the Doers learn more easily when information is presented by practical demonstration by the lecturers.

The inadequacy of facilities both qualitatively and quantitatively has put the visualizers and the doers at a disadvantage. The verbalizers may also have problem in a class with large students‟ population. The implication of this scenario is that only a small proportion of the students benefit from the current pedagogical system. There is dearth of ICT facilities for the training of students. The high cost of Computer and teaching aids ownership is a major constraint to acquisition of the items. Access to affordable and reliable internet connectivity is only available in a few institutions, faculties and offices, even then, power fluctuations have considerably reduced the reliability of the access and inadequate bandwidth also makes access difficult (Uwaifo,2009).

2.5.2 Zimbabwe

Facilities such as laboratories, workshops and libraries are required for effective training of engineering students. The availability of these facilities varies from one institution to another but it can be observed that most polytechnics and technical colleges in the country have some form of laboratories and workshops for training purposes. The facilities available at the Faculty of Engineering, University of Zimbabwe can be listed as follows:

- Laboratory for faculty of Engineering Computer Aided Learning (CAL)
- Faculty of Engineering Workshop
- Timber Research Laboratory for the Department of Civil Engineering
- Heavy Current and Light Current Electrical Engineering Laboratory
- Students Training Workshop
- Mining machinery and equipment for teaching at the Department of Mining Engineering Afonja & et al (2005).

2.5.3 Ghana

Lack of facilities, machines and equipment to give adequate training to their students have been a major problem to the polytechnics. Machines and hand tools, field equipment, laboratory equipment, Instruments are inadequate. Some are in obsolete state and others break down and beyond repairs. In some polytechnics, there are no such facilities for the students to have their practical work (Sherry et al., (2014).

Many technical institutions in Ghana have some form of laboratory and workshop. However, for the many years since they were established, there have not been much major rehabilitations of the facilities. Some equipment have never been serviced and some have become white elephants. Most of equipment are archaic and needs to be

replaced. Modern facilities are required for the training of engineers of international standards.

The situation is critical at the university where the highest level of manpower is developed. Owing to the limited facilities, class hours have to be organized for two or more batches of students. This causes excessive load on the instructors. In an effort to revamp the facilities, however, World Bank assistance to the Tertiary Education Project (TEP) has made some vital equipment available to a number of engineering and science programmes. However, this is not to the required level Afonja & et al (2005).

State of Technical Laboratories at the Kwame Nkrumah University of Science and Technology (KNUST)

Despite the above challenges, Kwame Nkrumah University of Science and Technology (KNUST) was fortunate to get a modern laboratory of international standards. The Central Laboratory was established with the objective of enhancing medical research in the University. The laboratory was built at a cost of one million, two hundred thousand Ghana cedis (GH 1,200,000) through a partnership between the university and the Champion Divine Clinic (Graphic Online, 2015).

The building, housing the laboratory, has been named „Champion Divine Building". It has a state the art laboratory equipment for research in subject area such as Pharmacy, Engineering, Biomedical Science and Chemistry.

In an address, read on behalf of the minister of Education by the Executive Secretary of the National Council for Tertiary Education, Prof. Mahama Duwiejua, she lauded the efforts of the management of the university for their foresight and creativity and leaded it to excellence in is activities. She emphasized the need for collaboration with scientific community in the country as a means of boosting research at the newly-established facility. She hoped that the new laboratory would serve as a hub for the

training of students of the university as well as those from other schools and organisations.

The Minister of Environment, Science, Technology and Innovation, Mr. Mahama Ayariga, on his part, said the government recognized the efforts the University was making to bring about quality its output. He said the established of such a modern laboratory should lead to the enhancement of joint research projects between the university and other research instructions in the country and abroad. He said since there was a great deal of value to be derived from research projects, researchers must collaborate on their works and come out with discoveries that would serve as sources for generating income.

The Vice-Chancellor of the KNUST, Prof. W. O. Ellis, said the construction of the laboratory was part of the university,,s vision to upgrade its research laboratories to international standards in order to boost research and provide qualitative teaching (Graphic Online, 2015).

Another laboratory was established at the same university (KNUST). Chairman for the event, Daasebre Prof Emeritus Oti Boateng, Omanhene of New Juaben, addressing the audience stated that the Kwame Nkrumah University of Science and Technology (KNUST) has established an mFriday Mobile Web Laboratory setup project, which the university authorities described as the first ever state-of-the-art mobile web lab in Ghana. It was founded by a group of students and ICT professionals in September 2011, and offers ICT students and industry experts a platform to facilitate the designing, testing and launching of commercially viable mobile web applications to solve problems. In collaboration with Vodafone, a major player in the telecommunication industry, KNUST have also set up an internet cafe at the College of Engineering reputed to be the fastest in Africa to boost teaching and research.

Professor William Otoo Ellis, Vice Chancellor of KNUST made this known in Koforidua at the weekend during the 7th Biennial Congress of the Alumni of the University referred to as "Teknokrats" on the theme: "Reducing Graduate Unemployment; The Role of Teknokrats."

He said the academic entity has established a Quality Assurance Unit which has developed policies on quality assurance; teaching and learning; research; HIV and AIDS, and intellectual property to guide operations. The university is also establishing off-shore centres under which a pilot project has begun in Dubai with Mechanical Engineering undergraduate top-up programme.

In this regard Prof Ellis has led a delegation to The Gambia, Nigeria and Liberia. Mr. Antwi Boasiako, Deputy Minister of Employment and Social Welfare said government is committed to invest in skills development in order to structure the largely informal sector, adding that job creation is one of the critical pillars of the Better Ghana agenda.

Mr. Ebenezer Okletey-Terlabi, Deputy Eastern Regional Minister who described the theme for the congress as "very apt and opportune" said the pervasiveness of poverty in the society is debilitating and threatens to keep the nation permanently in a vicious grip.

"Due to poverty, the society is only able to generate low levels of savings, resulting in low levels of investments with corresponding low levels of output, thus reinforcing…poverty," he added.

Mr. Okletey-Terlabi advocated the need for the academic board of the university to have constant dialogue with industry to restructure its curriculum so as to train students who would be more useful and functional to society (vibe Ghana. Com, 2012).

According to Ghana News Agency, on 26th day of April, 2016, the Ministry of petroleum through its Oil and Gas Capacity Building Project (OGCBP), has commissioned two state of the art laboratories, at the Kwame Nkurumah University of Science and Technology (KNUST), Kumasi. The two facilities-the chemical and petrochemical laboratories at the KNUST‟S College of Engineering, would help boost research, teaching and learning.

A statement signed by Mr. Edward Abambire Bawa, the head of communications at the Ministry and copied to the Ghana News Agency on Monday said the petroleum Minister Mr. Emmauel Armah-Kofi Buah in a speech read on his behalf said the OGCBP seeks to improve public management and regulatory capacity while enhancing transparency and strengthen local technical skills in Ghana‟s oil and gas sector.

To date a total amount of Twelve million nine hundred thousand dollars ($12,900,000) has been spent on KNUST‟s laboratory refurbishment, goods and equipment and training.

Professor William Otoo Ellis, Vice Chancellor, KNUST, expressed his gratitude to government for the continuous support in building the capacity of the university. He states that the university would apply strict maintenance rules to ensure that the laboratories are in good condition. It is noted that a new building housing the six thematic Petroleum engineering laboratories and equipment was commissioned in April, 2015. The statement said space had been refurbished in the chemical and petrochemical laboratories for chemical petrochemical engineering. Last but not the least, equipment worth about two million, five hundred thousand dollars ($2,500,000) has been procured and set up in thematic laboratories: Process Development Laboratories, the unit Operations Laboratory, Biotechnology Laboratory and Instrumentation Laboratory (GNA, 2016).

Professor S. I. K. Ampadu, the Provost, College of Engineering, said the College of Engineering is now well equipped to train students in both upstream and downstream sector of the oil and gas industry because of the OGCBP by government.

The statement said, currently what remains outstanding for KNUST under the OGCBP is the completing of training of four PhD students in the Petrochemical Engineering Departments.

It said it is expecting that two PhD holders would return to the college of Engineering later this year while the remaining two would join the faculty next year.

It noted that in addition, seven laboratory staff have been earmarked for training this year on the use of the newly installed equipment. It said other beneficiary institutions under the OGCBP since 2010 include: Petroleum Commission, Ghana National Petroleum Corporation, Environmental Petroleum Agency, Economic and Organised Crimes Office, Attorney General‟s Department, Regional Maritime University, Takoradi Technical Institute, Kikam Technical Institute Ministry of Petroleum (GNA, 2016).

Vocational technical education requires skilled and proficient teachers. Teacher preparation is therefore very important. There is the need for constant in-service training for teachers to upgrade their skills. Teachers need industrial training periodically in order to ensure that they are abreast with technological changes in industry. Vocational technical institutions must also develop strong cooperative linkage between the school and industry in other to design and implement programs that will meet the needs of industry.

Another important challenge facing vocational technical education is the fact that planners have to design programs and train individuals for future jobs on the basis of past and present labour market information. These notwithstanding, the intense need for economic growth and development and international competitiveness associated with the

rise of concerns for market-oriented education continue to make vocational technical education essential. This is because a country cannot achieve economic and social development and remain competitive on the global scene without skilled and productive labour force. The biggest challenge facing vocational technical education therefore is how to provide quality training programs that will ensure the development of productive and efficient workforce capable of meeting international competitiveness in spite of all the above problems mentioned (Boateng, 2012).

Vocational technical education in Ghana faces a lot of challenges as in other countries. In 2003, the Government of Ghana commissioned a body to review the general educational system for strategic planning for the year 2003-2015. The committee reported a serious deficiency in the present public educational system as the neglect of the vocational technical education sub-sector (Government of Ghana, 2003). The report stated that, the reforms introduced in 1987 ignored completely the vocational technical education sub-sector.

This has resulted in poor condition of the infrastructure and training facilities of the institutions, inadequate number of institutions, and outdated training content. Consequently, the quantity and quality of the stock of trained national workforce have been affected. The committee also found out that while the government manages and resources over 500 senior high schools in the country, only 21 technical and 29 vocational institutions are managed and resourced by both the Ministry of Education and the Ministry of Manpower Development and Employment, the two main bodies responsible for education and training in the country. The report further mentioned that in spite of the fact that vocational technical education is considered more expensive as compared to general education, the Ministry of Education spends only one percent of its annual budget, and the Ministry of Manpower Development and Employments spends 12% of its

budget on vocational technical education sub-sector. The government has no significant involvement in apprenticeship training either. Allsop et al., (2010), reported that government‟s budget allocation grew to 2.4% in 2007 and was 1.9% in 2008.

Another challenge facing vocational technical education in Ghana is perception that it is a route for those who are not able to function within an academic setting; this perception is compounded by a lack of progression routes from vocational technical education into, higher education (African Union, In fact this negative perceptions are not limited to those who have little understanding of vocational education.

In 2002, a survey of public TVET teachers found that none of the 87 respondents wanted their own children to study TVET programmes (Anamuah-Mensah, 2004). Aside inadequate financing and negative perceptions, the socio-economic environment and the contextual framework within which vocational education is delivered in Ghana is characterised in general by other factors such as huge numbers of poorly educated, unskilled and unemployed youth, uncoordinated, unregulated and fragmented delivery systems, low quality gender and economic inequities, weak monitoring and evaluation mechanisms, and poor management and ill-adapted organisational structures (African Union, 2007).

The total number of technical institutes (TI) available in Ghana is woefully inadequate and statistics by Ministry of education (2010a) indicate that currently they are about twenty one (21). The regional breakdown of technical institutes is very worrying compared to the number of senior high schools (SHS) available in the regions. For example, Greater Accra and Volta regions can only boast of four (4) and five (5) public technical institutes as against 54 and 75 senior high schools respectively. These numbers are woefully inadequate, looking at the population and the number of junior high schools (JHS) graduates in these regions.

The existing technical institutes lack facilities and materials for training students in the various vocations. Technical school is a place to acquire practical knowledge and hands-on experience in addition to the basic theory in the chosen field of specialization. And if the training materials or the tools needed to achieve these are lacking or inadequate then the products of these institutes will have deficiencies in their areas of specialization. This will eventually prevent them from practicing well on their own and working effectively in the industries. The teachers or the facilitators in these institutes are not enough and when they are more, majority of them have shortfalls in practical experience. Some of them have not worked in the industries to enrich their skills before coming to the classroom and therefore find it very difficult to deliver or make the necessary impact as far as acquisition of practical skills are concerned.

Formerly, some institutions are established to train technical teachers only, but now it is only the Kumasi campus of the University of Education, Winneba (UEW-K) that is training pure technical graduates to become technical teachers in their areas of specialization. The rest of the technical training colleges train technical teachers from those who have completed senior high or finished secondary technical schools and not from pure technical institutes.

These categories of technical teachers are trained to teach pre-technical skills or Basic Design and Technology (BDT) in the junior high schools (JHS) and even if these technical teachers progress into the university, they do not teach in pure technical institutes since they are weak in both theory and practical which is the main focus of technical and vocational education and training.

The biggest challenge facing technical education in Ghana is the progression of students from one levels to another vis-à-vis their counterparts from the senior high schools. After three years in the technical institute, one has to pursue advanced craft

course or technicians certificate part 1and 2 or 3 in the polytechnic before offering the Higher National Diploma (HND) in the same polytechnic.

Whilst their colleagues from the senior high or secondary schools proceed to offer the HND. For a technical student acquiring degree in Ghana the least talk about the better. One has to add a pass in English language and Mathematics from "O" level, SSCE or WASSCE to the plenty "degrees" one acquired in the polytechnic before qualifying to do a degree course in the University specifically at the Kwame Nkrumah University of Science and Technology, Kumasi (KNUST). Even some polytechnics started requesting for credit in English and Mathematics before technicians could be admitted into the HND programme; meanwhile it is the institution that is established to train technical students. This puts technical students at a disadvantaged position and only a few people were able to make it to the top. But the rhetoric question is what about those colleagues who are better than those people when it comes to their area of specialization.

The reality on the ground is that those who made it to the university with pure technical background perform very well in the job market as far as their area of specialization is concerned. When even the HND holders are given the chance to read the degree or do the top-up, pure technical graduates holding the HND are excluded due to insistence by the universities on English language and Mathematics. The question is, as a country, is it the English language and the Mathematics we are looking for or the advancement in science and technology? Hitherto, technical students have been studying English Language, Mathematics and Science in the various schools.

The only problem is that they do not write it as part of their final exams. The fact also remains that the medium of instruction in the technical and vocational schools is English Language and the examinations are written using lingua franca. So, it is not clear the reason why technical graduates are expected to write English and Mathematics

before climbing the educational ladder knowing very well that their direction is known and their area of specialization is defined from the scratch. Whilst countries in Asia are making inroads in Science, Engineering and Technology because they use their native languages, in Ghana English and Mathematics are being used to impede the progress of those who will do the re-engineering (Sherry and Fiagbe, 2012).

2.6 Approaches/Strategies to Arouse Students Interest in the Teaching of Technical Courses

Effective Teaching of Technical Courses

To my belief, before we talk of teaching methods we should first of all look at the word „teaching". Teaching is facilitating learners to acquire skills and knowledge using soft and hard technologies. It is in stages (introduction, steps, application and conclusion) therefore care must be taken carrying such activity. Objectives of technical drawing can be achieved by relying on the good teaching methods employed by the teacher in the lesson delivery.

The effective and efficient teaching of technical drawing requires a body of knowledge called principles of teaching and applied methodology. This involves motivation of students, class control, methods and strategies of giving knowledge, preparation of instructional materials, class management, and the correct use of teaching and learning materials. Above all the methods of teaching which reflect the teacher"s attitude to greater assets to enhance teaching and learning processes. That is, whether the teacher adopts the laissez-fair, autocratic or method to determine the extent of learning students make in a teaching and learning situation (Agyeman, 1993, p.87). In his bid to come out with quality methods of teaching.

It is lay manly said that every knowledgeable person can teach, yes every knowledgeable person can teach but not effective and efficient as a professionally trained teacher. It is also known that effective teaching of the subject can be attributed to the poor attitude of teachers due to lack of knowledge and skills, as well as lack of teachers‟ capability in teaching the subject. It is hoped that when teachers who professionally trained will be able to performed effectively to meet the challenges of teaching and learning of the subject, and thereby correct the imbalances that might have contributed false image or impression within the society.

“Effective classroom interaction is brought about by the choice of appropriate methods of teaching. Method of teaching is the kind of processes or arrangements used by teachers to reach pre-determined objectives. These involve interactions between the teacher, the pupils and the teaching/learning materials. Methods of teaching therefore forms an important link in the teaching and learning process which has on one hand the goals and purposes and another hand the targeted results and values to achieve”Dondieu (n. d).

Dondieu further outlined the following factors to consider in selecting a suiatble methods for teaching a particular topic:

- The set objectives to be achieved
- The characteristics of the learners
- The competence of the teacher
- The nature of the learning environment
- The resources available
- The number of pupils in class
- The time of day
- The form in which learning will be assessed

Amoakohene (1998), stressed that the teacher should be aware of the various strategies available to him/her to present technical skills and drawing. He added that the teaching of designing and technology demands the use of appropriate skills involved. He again said since the activities and skills within given projects are new to learners, they will find the effective employment of these methods by the teacher very useful. He finally called on teachers to discover how effective it can be to combine the teaching methods, since they are interrelated.

Huss (2004) suggested among others the following pupil centered approaches that are suitable for handling pictorial drawings. Demonstration method; Group interaction; Activity oriented approach; Motivational techniques and ensuring conducive and friendly classroom environment.

a. Demonstration Method

"The demonstration method is described as the practical presentation of skills and lesson. It involves the exposition of the materials, skills, and sequence of a given topic". – Amoakohene (1998) –p.169.

He added that the following steps should be carried out during a demonstration lesson.

- Review the topic to be demonstrated yourself; know where to begin and where to end
- Have all materials, equipment, and tools and machines at hand to ensure a steady and uninterrupted lesson.
- Make room for the learning environment e. g. physical comfort of students (seating arrangement, ventilation, etc.).
- Ensure that students can see the demonstration easily.
- Guard against distracting elements, which remove students‟ attention from your demonstration.

- Give an explanation as an introduction to your demonstration to avoid misunderstanding.
- Allow students to try their hands with the new skills to motivate them.

Nartey (2006), said demonstration is doing something in the presence of others in order to show them how to do it. Nartey added the conditions under which demonstration method is used as follows:

- When materials is scarce
- When materials/equipment is delicate or fragile
- When the operation involved is dangerous
- When a computer skills is involved.

They finally touched on the guidelines for effective use of demonstration and outlined the following:

- All the pupils should be placed so as to see and hear the demonstration.
- Distracters should be removed from the demonstration bench.
- All materials should be present before demonstration begins.
- Run a commentary on the demonstration.
- Rehearse activity before
- After the activity briefly review the steps involved.
- Have one or two pupils to replicate the demonstration when there is time.

Huss further gave some advantages of using demonstration. He said that it gives the pupils a model to emulate. Again it attracts and sustains interest and attention. It also allows for immediate knowledge of results and correction of errors. He further added that it trains pupils to be good observers and is economical as well.

However, Nartey et al outlined few disadvantages as:

- It can lead to imitations without understanding
- It is not suitable for large classes
- Much planning and preparations required on the part of the demonstrator

b. Group Interaction

Huss (2004) again said, small groups‟ interaction is the approach whereby the teacher divides the pupils into small groups for the purpose of reviewing information or solving problems. He added that leaders are assigned for each group of preferably 3-7 members. To achieve success, he said careful planning should be made and tasks given to each group should be supervised.

He then discussed types of grouping as ability, mixed ability, social/friendly, random, sex, and interest groupings depending on the purpose.

He outlined some merits of group interaction:

- It makes teaching flexible
- It creates the spirit of cooperation
- It encourages active participation
- It is best when materials are limited in number.

He however added some demerits

- It is time consuming
- It might raise the noise level if not well controlled
- It is not easy to evaluate the contribution of individuals in the group.

c. Activity Method

Many writers advocate that activity method is best for handling learners of the basic level. Dondieu (n. d) said that modern approach to teaching and learning are activity based. Dondieu shared a common view with the authorities who described the activity method as "a marriage between the teacher-centered and child-centered approaches to teaching and learning" He said on this method, pupils are actively involved. This method usually includes certain teacher activities like explanation, demonstration, distribution of learning materials and giving of instructions.

Dominating the lesson, however, he said, are pupils activities like answering questions, discussing pictures or charts, drawing, modeling, dramatization, searching for information, using learning aids, experimenting etc. All these can be done individually or in groups.

Dondieu presented three ways in which activity method can be used:

- To develop skills in reading, drawing and singing.
- To discover new knowledge through investigation and exploration.
- New knowledge can be applied to useful end.

He discusses among others the following importance of activity method: first he said it is enjoyable and sustains the interest of pupils.

Again, it allows ample freedom for pupils to express themselves. Also it aids in learner understanding of what is learned. Further children become highly motivated when they are able to perform an activity and get commendation from the teacher. Dondieu finally included that the activity method takes many forms including projects, assignments or the play way method.

d. Motivation

"The term motivation is derived from the Latin verb "movere": which means "to move". Motivation therefore is the process of moving oneself and others to work towards the attainment of individual or organizational objectives. In classroom teaching and learning, motivation can be seen as the process of arousing and sustaining interest in an activity"- Huss (2004). He further explained two types of motivation namely intrinsic motivation and extrinsic motivation.

He said of intrinsic as coming from within the person or self-imposed. This, he said, is where the learner is moved from within to perform an activity without any external influence. It has its emphasis on interest and excitement.

Extrinsic, according to Huss comes from outside the person or are externally imposed. It is concerned with learning or behavior that has connection with outside influence. He added that it has some artificial connection, teaching/learning materials and teachers/own personality.

He listed some importance of motivation as:

- Securing the attention and participation of pupils
- Encouraging learners to learn with all seriousness
- Eliminating boredom, fatigue, tiredness
- Creating interest and excitement.

Huss finally added some strategies for motivating learners. He said teachers must use praises, rewards, approval, words of encouragement, etc. In addition, he said that learning should be pupil centered involving suitable TLMs. Again, co-curricular activities like games and other competitions should be increased to arouse interest. Achievable goals and standards should be set.

e. Conducive/Friendly Classroom Environment

In discussing the issue of conducive and friendly classroom environment, Dondieu dealt with classroom management techniques. He explained that it is the "effective control and efficient use of available resources in the school or classroom in order to promote learning in pupils". p.63. He said these techniques are important in providing quality teaching to the learner.

Dondieu added that "Good Class Management" is center to school organization in that:

- It involves all that the teacher does in the classroom to make it possible for every pupil to benefit from the teaching and learning process.
- It dealt with all the strategies that the teacher uses to ensure harmony in the teaching and learning environment.
- It concerns itself with the provision of healthy conditions under which classroom activities can be carried out easily.
- Also included is the planning of the curriculum or classroom activities, organizing procedures and resources, organizing the environment to maximize learning efficiency, maintaining discipline, monitoring the progress of the pupils, anticipating the problems which are likely to occur and finding solutions to them"- p.63.

He further discussed the following factors which contribute to good class management

- The teacher"s personality
- Effective planning of lesson
- Availability of materials
- Class space
- Use of questioning
- Class size

However, he added that for the actual achievement of good management, the mere existence of these factors or conditions may not be enough. The teacher must therefore ensure its effective use to achieve results. He discussed the importance of good class management and concluded that "it involves all that go into teaching and learning effective and beneficial to pupils.

The following are the extracts from Dondieu"s Guide Notes to the Study of Education, volume I concerning the management of the class to make it conducive and friendly.

- Gestures, the movement of the body which serve as either supplements or substitute for speech or verbal communication, forms an integral part in pupil-teacher interaction. Examples are pointing to a pupil, shaking ones finger at a pupil, nods, cocking etc.
- Facial expression, like a simple smile from the teacher urges pupils to develop interest, that is, establish warm relationship. Also a frown, stern, or quizzical look at a pupil is a warning to a pupil for doing wrong or misbehaving. It is to be noted that an unfriendly facial expression makes lesson boring.
- With the use of voice, teacher teaching with confidence speaks with sufficient volume to be heard. Teachers must be loud without necessarily shouting. Vary tone of your voice for the desired effect.

A low-pitched and weak voice that is also slow tends to make lesson lifeless, dull and boring. On the other hand, high-pitched voice does not only disturb other pupils but is also a nuisance to fellow teachers in adjourning classes.

- Finally positioning in the classroom should be changed occasionally or periodically to suit activities. The seating arrangement is to be well in a correct order of formation.

The use and importance of TLMS/instruments in technical education

TLMs, What are They?

Dondieu (n.d), defined Teaching-Learning materials as instructional aids or devices used to supplement or complement the teacher"s task. He emphasized here that the mere use of those material does not guarantee effective teaching and learning but their careful selection and skillful handling by the teacher that ensure their usefulness in facilitating learning.

Adjei-Mensah et al., (2001), explained TLMs as resources we use to help learners to acquire knowledge, skills and attitudes. He added that they are sometimes referred to as instructional materials or audio-visual aids (AVA).

GES (2003), referred to teaching-learning materials as relevant items selected or prepared by the teacher or pupils to enhance teaching and learning. It also added that they have different names as one goes from one school to the other. Examples are Visual Aids/Audio Aids, Apparatus, Teaching Aids.

Types of TLMs

Dondieu (n. d), had the following to say under types of TLMs:

"They vary from simple and inexpensive ones such as the chalkboard, flat picture, diagrams, illustrations and maps to more complicated and expensive one like the television, movie, projectors, slides and filmstrip projectors. These are of educational value".

Adjei-Mensah et al., (2001), grouped the TLMs into three main types namely primary, secondary and tertiary TLMs. He explained primary teaching materials as real objects like plants, animals and other objects in the environment.

Secondary teaching materials, he said, are models of real objects such as statues of birds or animals or voice produced through the use of audio cassette recorder. Tertiary teaching materials include slides, photographs, charts and blackboard drawings. He added that tertiary teaching materials are used when secondary materials are not available just as secondary materials are used when primary materials are not available.

Adjei Mensah again touched on another type, teacher-made TLMs. He said that the teacher knows his pupils best and well enough to make suitable materials to help them learn. This is because many of the already made materials may not satisfy the needs of the pupils in his class. This involves using objects in the locality at a lower cost to make TLMs.

GES (2003), also stated that there are various types of TLMs including textbooks, chalkboard, flannel graph, bulletin board, posters, clippings pamphlets, photographs, concrete materials, real objects, model, puppets, High/Low Technological TLMs. GES also shared a belief in the teacher-made TLMs being effective in the teaching/learning situation.

Dondieu (n.d.), added that there are two types of teaching aids namely audio and visual aids. Those that assist in the medium of sound are called audio aids and those that assist through sight are visual aids. These encourage pupils to use their eyes in the classroom. He also categories Audio Visual Aids into three main groups: primary, secondary and tertiary audio-visual aids.

Effective use of TLMs

"We have to emphasize here that the mere use of these materials does not guarantee effective teaching and learning. Rather it is their careful selection and skillful handling by the teacher that ensure their usefulness in facilitating learning. The

preparation and effective use of these materials, however, present problems to the teachers especially beginning teachers"-Dondieu (n.d.) pg. 142.

He further added that to ensure effective use of these materials the following steps should guide you.

- Prepare yourself
- Prepare the material
- Prepare the environment
- Prepare the learners
- Use the material
- Evaluate the material

In discussing the effective use of TLMs, GES (2003), pointed out the following: First, TLMs should be used according to the detailed description in the lesson notes. TLMs are not only to be used by the teacher, but they are to be used by children as well. They maintained that children learn by doing and they learn more easily when they are allowed to move from using concrete items to the abstract. They also suggested for the effective use of the instruments because children have enough materials to work with in small group. Children sometimes fight over insufficient quantities of materials. Good classroom management means that each child or each group of children has enough materials to do the work teachers are asking them to do.

Finally, GES called on teachers to teach pupil how to use the TLMs. This includes: how to share materials; how to be good team leaders and team members in terms of the distribution of materials; how to carefully handle materials; how to take turns; etc. sequentially to help move from concrete points of learning to the abstract, integrated concepts to be mastered.

Adjei-Mensah et al., (2001): ensured effective use of TLMs;

- Try it out first before using it in the classroom
- Put pupils in group in situation where the materials are not enough
- Use materials at the most productive time in the lesson
- After preparing and using the TLMs, you should maintain and store them for future use.
- Keep a record of the materials you have prepared and used.
- Face pupils while demonstrating the TLM.

Importance of TLMS

Adjei-Mensah et al, (2001), is of the view that when TLMs are used in teaching appropriately, it makes lesson practical and real. It also saves time because fewer words are used to explain concepts.

He also emphasized that when pictures and concrete materials are used in teaching, pupils have the opportunity to interact with these objects and by that they are actively involved in the lesson.

Furthermore, some TLMs promote the development of generic skills for learning (observing, measuring, etc).

Adjei-Mensah finally added, by using TLMs, the pupils have confidence in you, because as they interact with the materials, their friends, and you, they are able to express and share their ideas freely. This reduces tension in the classroom and makes learning easy.

On its part GES (2003), put forward the importance of TLMs as:

- Focusing pupils interest and attention
- Showing basic structure of a concept

- Relating abstractness to concreteness
- Integrating scattered information into a new generalized holistic understanding
- Encouraging verbal and written expression
- Turning conceptual pattern into language
- Explaining relationship.

Dondieu (n. d), outlined the following reasons that makes necessary to use TLMs:

- They stimulate pupils interest.
- They promote memory of what is learnt.
- They save the time used by the teacher for lengthy verbal explanations in teaching.
- Through them pupils take an active part in learning.
- The pupils develop more confidence and satisfaction in the teacher.
- They promote easy understanding of what is learnt.
- They enhance easy transfer of learning.
- They reduce misconduct of pupils in the classroom as well as boredom and tiredness.
- They develop learning skills in children.
- They improve communication skills of pupils since may discuss or describe some aspect of these teaching materials.

2.7 Role of Government in Technical Education

The importance of Leadership in Vocational Technical Education in Ghana

Inferring from the challenges above, one cannot but conclude that effective leadership will be a critical success factor and should be one of Ghana‟s main priorities to revitalizing vocational technical education. The right things to do have been identified,

what is left is doing things right. With effective and efficient leadership, the right policies could be formulated, relevant goals could be set, strategic programs could be implemented, and effective measure could be put in place to monitor and evaluate programs to ensure that their expected goals will be achieved. This is essential in view of the enormous importance of vocational technical education to the ultimate survival and competitiveness of the Ghanaian economy on the global stage.

As leadership and leadership development became an important and long-standing concern in many disciplines and fields of practice, vocational and technical education was not an exception (Wonacott, 2001). The concern about leadership and leadership development in vocational technical education arise from the fact that there are series of changes that are rapidly and significantly altering the educational and economic environment in which vocational technical education exists.

The nature of work is changing; technology keeps changing rapidly; there is increased public demand on vocational technical education system to produce individuals with more opportunities for present and future prospects in multiple industries, and offer the individuals with enough skills for personal development and success in the changing society (Moses & Liang, 1990). Based on findings of studies done in other fields that leadership is critical to organizations in unsuitable situations where changes in the environment makes the usual ways of conducting the affairs of the organization unsuitable and irrelevant, Moss and Jensrud (1994) suggested that vocational technical education must begin its own transformation if it is to remain a viable form of education in the new environment.

They argued that, as the context in which it is practised changes, vocational technical education needs leaders who can chart new directions and influence others to believe and follow. This clearly emphasises the need for the restructuring of vocational

and technical educational leadership development in Ghana. In fact, the ability of vocational technical education to adapt constructively to its changing context resides to a large extent on the quality of leadership that is found in the field (Daughtry & Finch, 1997). Lutz (1986) also pointed out that because of the vast changes in human expectations and needs, as well as the rapidly changing technology, vocational technical education requires efficient and effective leaders as never before. Moreover, many people in the area of vocational technical education have come to realize that vocational technical education urgently needs astute and creative leaders at all levels in order to adapt to changes. It is the leaders who will provide the needed stimulus for the change (Bennis & Nanus, 1985).

Ghana‟s vocational and technical education system requires leaders who understand the broad scope of vocational technical education. They must be skilled communicators, they must move easily among people from government, education, and industry to establish partnerships that will enhance both the quality and quantity of TVET outcomes. They must be shareholders in the unifying vision. They must be able to links the internal world of TVET and the external world of the labour market. The system requires good quality leaders who can exert influence, set goals, prioritize the course for action, create new ideas, visions and policies and provide direction to ensure that the reforms lead to effective delivery of viable vocational and technical education in the country.

There is therefore the need to provide the current administrators and managers as well as new and aspiring leaders with programs and guidance. Finch, Gregson, and Faulkner (1989) reported that any program designed to prepare vocational technical administrators and managers should attempt to cultivate in individuals key attributes and characteristics that can predispose successful leadership performance. The available of

leadership development programs and the possibility of being able to acquire certain leadership behaviours and enhance and use certain leadership attributes holds great promise for those participating in and leading vocational educational programs, reform efforts, and the change process in the country.

Lewin (1997), reported that there are five justifications for any government to give greater attention to TVET:

It is a fact that no country can develop without quality technical and vocational education and training (TVET) sector. Over the years, three different forms of TVET have evolved in Ghana Bortei-Doku A. et al.,(2011). These comprise the formal system, the non-formal system and the informal system.

The formal system includes primarily time-bound, institution-based, graded, and certified training. It is offered by institutions such as the NVTI (National Vocational Training Institute), Ghana Education Service (GES) technical institutes, youth training institutions and a variety of private vocational training schools. Non-formal TVET typically has structured learning objectives, learning times and learning support but will normally not lead to certification. Workshops, short courses and seminars are typical examples of non-formal learning.

The informal system includes a wide range of flexible programmes and processes by which individuals acquire skills and knowledge from designated training venues outside of the home and, in some cases, at home. Traditional apprenticeships make up the majority of the informal sector. Technical vocational education affords an individual the chance to acquire practical knowledge and requisite skill training needed in the job market or for immediate self-employment Boateng, (2012). Almost all the technical skills we need to develop as a country are run by the technical and vocational schools across the country. Some of the courses mounted at the technical institutes are motor vehicle

mechanics, electrical works, welding and fabrication, carpentry and joinery, block laying and concreting or masonry, plumbing, tailoring and dressmaking, just to mention a few Bortei-Doku A. et al.,(2011).

Vocational Technical Education in Ghana

Education in Ghana is believed to be the vehicle for accelerated economic and social growth and development. This has been the philosophy of governments from the colonial era till today. On the accounts of the belief in the benefits of education, successive governments of Ghana have being using education to implement developmental policies and programs. Vocational technical education had been emphasised in Ghana‟s education system since the colonial era.

The purpose then was to train the youth in various trades such as catering, needlework, carpentry, masonry, blacksmithing, and others to become skilled craftsmen and useful citizen (McWilliams & Kwamena - Poh, 1975). Between 1914 and 1927, the Governor of the Gold Coast, Sir Gordon Guggisburg proposed 16 principles for education. This proposal called for the provision of trade school. As at 1922, there had been four trade schools established in the country.

After the country‟s independence in 1957 however, it was realised that the type and quality of education inherited from the colonial government did not address the country‟s needs and critical problems. Various review committees emphasised this fact and proposed remedies. Significant among them were the Kwapong Committee Report in 1968 and the Dzobo Report in 1973. These set the pace for reforms in Ghana‟s education system. However, it was not until 1987 that a new structure and content became operative. Under the 1987 educational reform, the objective has been to ensure that all citizens regardless of gender or social status are functionally literate and productive. The current structure under operation consist of six years of primary school, three years of

junior secondary school, making up the basic education level; three years of senior secondary school, forming the secondary level; and two to four years of tertiary level education. Vocational technical education is organised at all the three levels in the country: primary level, secondary level and tertiary level. Three different types of vocational technical education are organised. These are the pre-vocational, vocational and technical.

The pre-vocational type of vocational technical education occurs at the basic school level. The aim here is to expose pupils at the basic education level to a range of practical activities in the vocational field in order to make them familiar with, and stimulate their interest in vocational subjects; This gives pupils at this level equal opportunity to choose their future careers in either the vocational technical or general field. Also, it equips them with basic occupational skills that will enable those who do not seek further education to enter into gainful paid or self-employment in industry, agriculture and commerce. Graduate from the basic level could also enter the informal sector for apprenticeship training. Currently, there are 6,418 junior high schools in the country. All pupils in these institutions are to take courses in both pre-vocational and pre-technical subjects (Government of Ghana, 2007).

At the secondary level, training is vocational in nature. Ghana uses a combination of two approaches to organise vocational technical education at this level:

1. There is the parallel system where vocational technical institutions exist alongside the senior high school system. Graduates from the basic level can enter the technical institutes or the senior high schools. In the technical institutes, the aim is to train and impart practical training and skills leading to the provision of artisans, craftsmen, technicians, and other middle-level personnel in commerce, agriculture, technology, science, and industry.

2. The core curriculum approach is also used in the conventional senior high school system. For those who enter the senior high school after the basic level education, there exist a core curriculum and a cluster of elective subjects, which could be vocational technical in nature. Any student interested in a career in vocational technical could select at least three elective subjects in any particular vocational technical field, which the individual will have to study in addition to the four core liberal subjects.

At the secondary level, vocational technical education aims at equipping young men and women with relevant productive skill training that will enable them fulfill the country‟s manpower needs in the field of technology, industry, commerce, agriculture, and business (Baiden, 1996). There are 503 senior high schools, 23 public technical, and 29 vocational institutions in the country that are involved with the delivery of vocational technical education at the secondary level. These are supported by about 700 vocational technical institutions, which are operated by individuals, religious bodies, and non-governmental organizations; and a vibrant but unregulated apprenticeship system.

Vocational technical education at the tertiary level is technical in nature. It is organised within post-secondary institutions or tertiary institutions. This is the highest level of vocational technical education in the country. The Universities, Polytechnics, and other post-secondary pre-service training institutions, under sector Ministries provide it. The other post–secondary institutions include: Health Training Institutes, Nursing Training Colleges, Agricultural Colleges, Schools of Forestry, Teacher Training Colleges, Institute of Journalism, School of Communication, and Institute of Professional Studies. Courses generally last between two to four years and result in the awarding of a certificate, diploma or a degree. Vocational technical education at the tertiary level provides personnel with the technical knowledge and vocational skills necessary for

agricultural, industrial, commercial, scientific, technological, and economic development; while at the same time, pays attention to environmental issues. It aims at training human resources to match supply of skilled labour with demand.

Vocational technical education systems in Ghana continuous to undergo reform designed to build on the inherent strengths of the system. Recent major reform concern the setting up of national training bodies, and the enactment of laws to strengthen national vocational training programmes. Government Ghana has recently passed an Act of Parliament that establishes a Council for Technical and Vocational Education and Training (COTVET) which will have overall responsibility for skills development in the country (Boateng, 2012).

To address the numerous challenges facing vocational technical education in the country, both Ghana‟s Vision2020 and the Education Strategic Plan, 2003-2015 recognise the need for urgent action. Some of the priorities identified were:

1. Government to make a major shift in its state education policy in favour of the vocational technical education, in order to build the nation‟s stock of human capital and give employable skills to the numerous youth all over the country.
2. All Technical and Vocational Institutes to be rehabilitated and upgraded as a matter of urgency to the level of the model institutions-Accra Technical Training Centre and Biriwa Vocational Institute. Additionally, new vocational technical institutions to be built in all Region within the next 10 years.
3. Vocational technical institutions to review and update programs to bring them in line with modern trends and practices in industry. The ultimate aim is to make vocational technical education demand- driven and relevant to the needs of Ghanaian industries.

4. Government to formalise Apprenticeship Training, and establish a National Apprenticeship Training Board with membership from various sectors of the economy, to regulate apprentice-training in terms of registration of apprenticeship providers, content, duration of training programs, and certification.
5. A National Council for Technical and Vocational Education and Training (NCTVET) to be established under the Office of the President, to co-ordinate pre-tertiary vocational technical education in the country; since there are several ministries and private sector organizations which provide vocational technical education independently of each other.
6. A National Policy Framework for a nationally coordinated vocational technical education system be formulated.
7. Technical Teacher Training facilities in the country be expanded to cater for the training of more technical and vocational teachers.
8. Government to organise in-service courses for teachers in both public and private vocational technical institutions to improve upon their pedagogical skills.
9. Improve the linkage that exists between vocational technical institutions and industries in order to bring training more in line with the requirements of national industry and commerce.
10. Strengthen leadership and management capacity at both national and institutional levels.

According to Anamual-Mensah (2004)the negative public attitudes and perceptions towards technical and vocational education and training TVET can be improved by government promotion of TVET as an alternative route for school leavers, media promotion of the role of TVET in wealth creation, the provision of awareness

weeks, exhibitions and open days by TVET institutions and improved salaries for TVET graduates.

Key policy issues

The successful implementation of the proposed strategy will require that thorough consideration be given to the following critical policy issues:

Initial assessment of existing TVET system, it will be necessary for each country to first assess the existing national TVET

System capacity, including funding levels and budget utilization, strengths, weaknesses and deficiencies before embarking on a large-scale system reform or expansion strategy. There is therefore the need to conduct country-specific baseline studies that also explore the existing links with the other levels of education and national labour policies.

Linkage with other national policies and strategies

Each country will have to define and specify clear articulation lines between TVET and other sectors of the national economy in order to effectively link the TVET strategy to other national strategies and policies in the area of education and training, employment, and socio-economic development.

Linkage with regional and international policies

How does the national TVET strategy dovetail into existing regional and international education and training policy frameworks and protocols? National TVET strategies should take into account the education and training protocols of regional groupings like ECOWAS, SADC, and COMESA (where they exist), and those of

acknowledged international agencies involved in education and skills training, such as UNESCO, ADEA, and ILO.

Linkage with the world of work

Since the ultimate objective of TVET is employability and employment promotion, it is necessary to link training to the needs of the labour market. TVET must be relevant and demand-driven, rather than supply-driven and a stand-alone activity.

In order to do this, data is required on the actual employability of TVET graduates, available job opportunities, and the evolving skills demands on the labour front. Determining the demand for skills is best achieved through country specific Labour Market Information Systems (LMIS) and other survey instruments.

The function of a labour market information system or labour market "observatory" is to collect, process and make employment projections from information provided by employment ministries and agencies, demographic surveys, tracer studies that track the employment destination of TVET graduates, labour market related reports produced by economic think-tanks, and feedback from employers.

An effective LMIS will be difficult to establish and operate now in many African countries for the simple reason that there is a dearth of data and information from which labour market trends can be captured, as well as lack of trained research staff with adequate technical expertise to run the system.

In the short term, however, indicative labour market information can be gathered from trade and employer associations, NGOs, employment agencies, as well as large public and private sector employers. Training institutions can also conduct local labour market surveys in and around their localities. Information so gathered and analysed would then serve as inputs for the development of new or revised courses and programmes,

equipment and learning materials selection, instructor formation, and guidance and counselling of trainees.

Instructor training and professionalisation of national TVET staff

The professional and pedagogical competence of the technical teacher is crucial to the successful implementation of any TVET strategy. Governments should therefore make conscious efforts, not only to train but also to retain technical teachers in the system. Technical teachers may be suitably motivated through equitable remuneration packages and incentive schemes that may include government subventions and loans to teacher associations and special credit facilities for teachers to acquire cars, houses, etc.

TVET system managers, professionals and policy deciders will also have to be trained and their skills upgraded to enable them confidently drive the new strategy with its various implementation structures, e.g. qualifications framework, accreditation standards, assessment guidelines, quality assurance and accountability frameworks. The International Labour Office (ILO) has considerable experience and expertise in the design and implementation of such large-scale training programme reforms in TVET and may be approached for technical assistance in this regard.

Funding and equipping TVET institutions

On a per student basis and compared with other levels of education, in particular primary and secondary education, TVET is much more expensive to deliver.

There is the need therefore to spread the funding net as wide as possible to include:

National Governments: Governments should allocate a respectable percentage of their national budgets to the TVET sector.

Employers: Employers, both public and private, should contribute to a training levy based on a percentage of their enterprise payrolls.

Development Partners: The African Development Bank, for example, supports country-specific projects, multinational projects, and micro financing schemes.

Trainees: Fees paid by trainees should cover their training costs.

Training Providers: Training providers can raise funds internally through the operations of their production units.

Community: Local communities can make cash and non-cash contributions in the form of land and through community fundraising activities.

Donors: Individuals or groups (e.g. wealthy individuals, churches or faith based organisations, NGOs) can support TVET through donations.

Venture capital fund: Young entrepreneurs can benefit from such a fund to start their own businesses.

A key policy issue in this strategy is the need to empower TVET institutions to manufacture their own small training tools and equipment. This is possible and should be encouraged.

Female participation in TVET

Serious inequities exist with regard to the participation of women in TVET.

Women are underrepresented in many areas of skills development. Conscious efforts should be made to encourage equitable access to TVET by young women, not only in relation to jobs identified with women (e.g. sewing, hairdressing, cookery, etc.) but also in the male-dominated engineering or industrial sectors.

Policy roles and recommendations

The researcher now highlight briefly the policy and strategy implementation roles of the various stakeholders as recommendations for action:

African Union – Human Resources, Science and Technology

Department

- Disseminate TVET strategy document widely among AU member states;
- Encourage intra-African cooperation in the field of education and training;
- Reach out to the African Diaspora to support TVET in Africa;
- Identify, document and disseminate best practices to member countries;
- Sensitize governments on the role of TVET for socio economic development as well as the need to increase funding for TVET;
- Actively play TVET advocacy role within the international donor community;
- Offer technical assistance to member states in need of such assistance;
- Promote TVET as a vehicle for regional integration;
- Monitor implementation of strategy at the continental level.

Governments

- Give legislative backing to national TVET policies;
- Improve coherence of governance and management of TVET;
- Introduce policies and incentives that will support increased private sector participation in TVET delivery;
- Improve capital investment in TVET;
- Establish TVET management information systems for education and training, including labour market information;

- Institute measures to reduce gender, economic, and geographical inequities in TVET provision;
- Introduce sustainable financing schemes for TVET;
- Increase funding support to the sector;
- Set up venture capital to support TVET graduates;
- Build leadership and management capacity to drive TVET system;
- Mainstream vocational education into the general education system, so that the vocational track is less dead-end;
- Introduce ICT into TVET
- Constantly monitor and periodically evaluate the performance of the system and apply corrective measures accordingly.

Training Providers

- Provide training within national policy framework;
- Deliver a flexible and demand-driven training;
- Develop business plans to support training activities;
- Establish strong linkages and collaboration with employers and industry;
- Mainstream gender into training activities and programmes;
- Introduce ICT into training
- Institute bursary schemes for poor trainees;
- Training institutions should be encouraged to be profit-oriented and to become active operators in the training market;
- Strengthen guidance and counselling services to trainees;
- Network and bench-mark with other providers;
- Involve community, parents and guardians in training activities.

Parents and Guardians

- Support children and wards to choose the vocational education track;
- Reject perception that TVET is for the less academically endowed;
- Lobby politicians in favour of TVET;
- Support activities of training providers.

Donors and Development Partners

- Support development and implementation of national TVET policies and strategies;
- Fund small business development research;
- Fund acquisition of training equipment;
- Support post-training support services;
- Support capacity building in TVET sector – instructor training, management training, technical assistance, etc.
- Help in identifying and disseminating best practices in TVET;
- Support TVET advocacy initiatives, motivation campaigns and programmes.

Employers

- Deliver workplace training to employees
- Contribute financially to national training fund
- Provide opportunities for TVET teachers to regularly update their workplace experience;
- Provide opportunities for industrial attachment for trainees
- Contribute to the development of national skills standards.

Strategy evaluation

The following criteria may be used to evaluate national TVET strategies over a period of 3 – 5 years, depending on the situation in individual countries. The criteria may be classified under i) training outcomes, ii) employment, and iii) citizenship development.

i) Training-related criteria

- *Access and equity*: How has the strategy improved accessibility to vocational training and reduced economic, gender, and geographical inequities? How many child-soldiers, for example, have been trained?
- *Efficiency*: How efficient is the TVET system in relation to trainee input – output ratios? What are the dropout rates?
- *Proficiency*: Have the trainees attained the specified proficiency standards?
- *Trainee satisfaction*: Are the trainees satisfied with the training they have received?
- *Industry participation*: How effectively have employers and industry participated in the training programmes?
- *Articulation*: Is there improvement in the linkages and articulation pathways within the TVET system?

ii) Employment-related criteria

- *Employment after training*: What is the percentage of trainees in gainful employment after training, and how long after training does it take to be employed?
- *Wage/Salary levels*: Are earnings of trainees comparable to those of holders of similar or equivalent qualifications?

- *Employers" satisfaction*: Are employers satisfied with the performance of graduates?
- *Relevance of training to actual employment*: Are trainees employed in the skills area they have been trained?

iii) Citizenship-related criteria

- *Public perception of TVET*: Has the poor public perception of TVET changed for the better?
- *Social cohesion*: Has the level of awareness of political tolerance, ethnic diversity, and national unity increased?
- *Good governance*: Has the level of understanding of human rights and respect for the rule of law increased? What is the level of participation of trainees in the democratic process?

Technical Teacher Training/Education

As said earlier the total number of technical institutes (TI) available in Ghana is woefully inadequate and statistics by Ministry of education indicate that currently they are about twenty one (21). The regional breakdown of technical institutes is very worrying compared to the number of senior high schools (SHS) available in the regions. For example, Greater Accra and Volta regions can only boast of four (4) and five (5) public technical institutes as against 54 and 75 senior high schools respectively. These numbers are woefully inadequate, looking at the population and the number of junior high schools (JHS) graduates in these regions.

The existing technical institutes lack facilities and materials for training students in the various vocations. Technical school is a place to acquire practical knowledge and hands-on experience in addition to the basic theory in the chosen field of specialization. And if the training materials or the tools needed to achieve these are lacking or inadequate then the products of these institutes will have deficiencies in their areas of specialization. This will eventually prevent them from practicing well on their own and working effectively in the industries.

The teachers or the facilitators in these institutes are not enough and when they are more, majority of them have shortfalls in practical experience. Some of them have not worked in the industries to enrich their skills before coming to the classroom and therefore find it very difficult to deliver or make the necessary impact as far as acquisition of practical skills are concerned.

Formerly, some institutions are established to train technical teachers only, but now it is only the Kumasi campus of the University of Education, Winneba (UEW-K) that is training pure technical graduates to become technical teachers in their areas of specialization. The rest of the technical training colleges train technical teachers from those who have completed senior high or finished secondary technical schools and not from pure technical institutes. These categories of technical teachers are trained to teach pre-technical skills or Basic Design and Technology (BDT) in the junior high schools (JHS) and even if these technical teachers progress into the university, they do not teach in pure technical institutes since they are weak in both theory and practical which is the main focus of technical and vocational education and training.

The biggest challenge facing technical education in Ghana is the progression of students from one level to another vis-à-vis their counterparts from the senior high schools. After three years in the technical institute, one has to pursue advanced craft

course or technicians part 1& 2 or 3 in the polytechnic before offering the Higher National Diploma (HND) in the same polytechnic. Whiles their colleagues from the senior high or secondary schools proceed to offer the HND. For a technical student acquiring degree in Ghana the least talk about the better. One has to add a pass in English language and Mathematics from "O" level, SSCE or WASSCE to the plenty "degrees" one acquired in the polytechnic before qualifying to do a degree course in the University specifically at the Kwame Nkrumah University of Science and Technology, Kumasi (KNUST).

Even some polytechnics started requesting for credit in English and Mathematics before technicians can be admitted into the HND programme; meanwhile it is the institution that is established to train technical students. This puts technical students at a disadvantaged position and only few people were able to make it to the top. But the rhetoric question is what about those colleagues who are better than those people when it comes to their area of specialization.

The reality on the ground is that those who made it to the university with pure technical background perform very well in the job market as far as their area of specialization is concerned. When even the HND holders are given the chance to read the degree or do the top-up, pure technical graduates holding the HND are excluded due to insistence by the universities on English language and Mathematics. The question is, as a country, is it the English language and the Mathematics we are looking for or the advancement in science and technology? Hitherto, technical students have been studying English Language, Mathematics and Science in the various schools. The only problem is that they do not write it as part of their final exams.

The fact also remains that the medium of instruction in the technical and vocational schools is English Language and the examinations are written using lingua franca. So, it is not clear the reason why technical graduates are expected to write English and Mathematics before climbing the educational ladder knowing very well that their direction is known and their area of specialization is defined from the scratch. Whilst countries in Asia are making inroads in Science, Engineering and Technology because they use their native languages, in Ghana English and Mathematics are being used to impede the progress of those who will do the re-engineering (Sherry & Fiagbe, 2013).

Improving Enrolment in Technical Education / Equipping Technical Institutions

To address the numerous challenges facing vocational technical education in the country, both Ghana‟s Vision 2020 and the Education Strategic Plan, 2003-2015 recognise the need for urgent action. Some of the priorities identified were:

1. Government to make a major shift in its state education policy in favour of the vocational technical education, in order to build the nation‟s stock of human capital and give employable skills to the numerous youth all over the country.
2. All Technical and Vocational Institutes to be rehabilitated and upgraded as a matter of urgency to the level of the model institutions-Accra Technical Training Centre and Biriwa Vocational Institute. Additionally, new vocational technical institutions to be built in all Region within the next 10 years
3. Vocational technical institutions to review and update programs to bring them in line with modern trends and practices in industry. The ultimate aim is to make vocational technical education demand-driven and relevant to the needs of Ghanaian industries.

4. Government to formalise Apprenticeship Training, and establish a National Apprenticeship Training Board with membership from various sectors of the economy, to regulate apprentice-training in terms of registration of apprenticeship providers, content, duration of training programs, and certification.
5. A National Council for Technical and Vocational Education and Training (NCTVET) to be established under the Office of the President, to co-ordinate pre-tertiary vocational technical education in the country; since there are several ministries and private sector organizations which provide vocational technical education independently of each other.
6. A National Policy Framework for a nationally coordinated vocational technical education system be formulated.
7. Technical Teacher Training facilities in the country be expanded to cater for the training of more technical and vocational teachers.
8. Government to organise in-service courses for teachers in both public and private vocational technical institutions to improve upon their pedagogical skills.
9. Improve the linkage that exists between vocational technical institutions and industries in order to bring training more in line with the requirements of national industry and commerce.
10. Strengthen leadership and management capacity at both national and institutional levels.

Strategic Policy Framework

The main purpose of this document is to define strategies and policies to revitalize formal and non-formal TVET in Africa in light of the socio-economic needs of the continent to address youth unemployment, build human capacity and contribute to poverty eradication. The strategic policy goal is to position TVET as a vehicle for

stimulating economic growth, reducing poverty, and promoting responsible citizenship and good governance. How can this be achieved? We will first discuss the key issues that the strategy must address.

Key strategic issues

- **Poor perception of TVET**

The public and even parents consider the vocational education track as fit for only the academically less endowed. In many countries, students entering the vocational education stream find it difficult, if not impossible, to proceed to higher education. There is the need to make TVET less dead-end.

- **Gender stereotyping**

Some vocational training programmes like dressmaking, hairdressing, and cookery are associated with girls - very often girls who are less gifted academically. In Benin, for example, such girls are derogatorily referred to as following the "c" option of the secondary school curriculum: *la serie "c" – couture, coiffure, cuisine!*

- **Instructor training**

The delivery of quality TVET is dependent on the competence of the teacher; competence measured in terms of theoretical knowledge, technical and pedagogical skills as well as being abreast with new technologies in the workplace.

- **Linkage between vocational and general education**

In general, vocational education and training forms a separate parallel system within the education system with its own institutions, programmes, and teachers. This situation tends to reinforce the perception of inferiority of the vocational track. It is therefore important to create articulation pathways between vocational education and general education.

- **Linkage between formal and non-formal TVET**

It should be possible for students who drop out of the school system to learn a trade to re-enter the formal vocational school system to upgrade their skills, either on part-time or full-time basis. Similarly, regular vocational school students should be able to acquire relevant practical skills in the non-formal sector.

- **Linkage of TVET to the labour market**

The ultimate aim of vocational training is employment. TVET programmes therefore have to be linked to the job market. In this way, the socio-economic relevance of TVET can be enhanced.

- **Traditional skills, business management and entrepreneurial training**

TVET programmes in Africa should help develop indigenous skills associated with the manufacture of traditional artefacts and crafts. As employment opportunities in the formal sector shrink, the acquisition of business management and entrepreneurial skills for self-employment becomes a major imperative in the design of vocational training programmes.

- **Special case of post-conflict zones**

The difficult political and socio-economic conditions in countries affected by war and conflict, which include dilapidated educational infrastructure and shortage of teachers, calls for the design of special TVET programmes for such countries.

- **Harmonisation of TVET programmes and qualifications**

Education and training can contribute to uniting the peoples of Africa. This is possible if individual country training programmes and qualifications can be harmonised into a coherent system of mutual recognition of competencies.

Harmonisation in this context does not mean the uniformisation of courses and programmes. It means the readability and permeability of training qualifications across national boundaries. Portability of TVET qualifications across national frontiers can become a factor of integration in Africa.

- **Inadequate Technical Expertise to Drive TVET System**

There is a general lack of professional TVET managers and policy makers with adequate expertise and insight in the formulation and implementation of vocational education and training programmes. The TVET staff in many countries lack the technical capacity to develop national qualifications, courses, competency-based curricula and training packages as well as quality assurance and accreditation standards in TVET.

- **Inefficient operational and funding mechanisms**

In many countries, the parent ministry centrally controls the public TVET institutions, leaving little room for innovation on the part of the institutions. There is need to increase the operational autonomy of public training providers through decentralization and devolution of management powers to the institutions. Operational autonomy can be balanced by output-based funding mechanisms that link government funding to institutional performance in the area of success rates, innovation, employability of trainees, etc.

Guiding principles

What are the guiding principles that should inform and underpin the TVET strategy for Africa? We consider the following principles the major drivers:

- **Access and equity**

The strategy should not discriminate on the basis of social status, ethnic or religious affiliation, age, or academic background. Efforts should be made to eliminate or reduce gender, economic and geographical inequities that limit access.

- **Quality**

Quality, defined as a measure of the training received in meeting the knowledge and skills objectives, is at the heart of effective vocational training.

- **Proficiency**

The training must measure proficiency, rather than theoretical knowledge. Training must emphasize proficiency-testing where trainees demonstrate their practical competences rather than follow the strictly examination and certification approach.

- **Relevance**

The training system must be flexible, demand-driven and respond to the needs of the trainee, the community and the local industry.

- **Employability and entrepreneurship**

The acquisition of employable and entrepreneurial skills is one of the major objectives of a credible vocational training system.

- **Efficiency**

Training should give value for money. What is the expenditure per student per year, and what is the failure or dropout rate? Can the same type of training be delivered at

cheaper cost? The concern is about the internal efficiency of the training process with regard to the relationship between inputs (mainly time and money) and graduate output.

- **Sustainability**

The strategy must incorporate measures that ensure that the training institutions and training providers will continue operating and delivering their programmes in a cost-effective manner.

- **Linkages and partnerships**

Strategy must promote strong linkages and partnerships with the world of work and other stakeholders in the TVET system.

- **Subsidiarity**

Subsidiarity is the concept of encouraging training institutions and training providers to concentrate on the type of training they can best deliver and supporting them to reach their highest potential rather than making them dependent on government or donor support.

- **Moral and ethical values**

Effective vocational training must not only teach technical and business skills but also moral and ethical values like honesty, respect for others, and not defining others as the opposite of oneself.

- **Responsible citizenship**

Training must include elements of good governance and responsible citizenship such as democracy and basic human rights.

- **Conservation**

It is important to include the teaching of subjects that promote the conservation of resources and respect for the environment in the various vocational training programmes.

- **Articulation**

An effective TVET strategy should provide for both vertical and horizontal linkages within the system, such that trainees can enter and leave the training system at a given level and re-enter at another without difficulty.

Main goal and vision of strategy

Taking into account the key strategic issues and guiding principles discussed above, the aim of the strategy may be stated as follows:

Promote skills acquisition through competency-based training with proficiency testing for employment, sustainable livelihoods and responsible citizenship.

The vision of the strategy is to position TVET as a tool for empowering the peoples of Africa, especially the youth, for sustainable livelihoods and the socioeconomic development of the continent.

Strategic objectives

The broad objectives of the strategy are i) to deliver quality TVET, ii) assure employability of trainees, iii) improve coherence and management of training provision, iv) promote life-long learning, and v) enhance status and attractiveness of TVET.

i) Deliver Quality TVET

Training for high-quality skills requires appropriate training equipment and tools, adequate supply of training materials, and practice by the learners. Other requirements include relevant textbooks and training manuals and qualified instructors with experience in enterprises. Well-qualified instructors with industry-based experience are hard to come by, since such categories of workers are also in high demand in the labour market. But they could be suitably motivated to offer part-time instruction in technical and vocational schools.

Technical education is expensive and quality comes at a price. There is no substitute for adequate funding when it comes to delivering quality vocational education and training. In this regard, a training fund can be established to support TVET from payroll levies on employers. Training levies are in effect taxes imposed on enterprises to support skills development. Although the tax level is generally less than 2 percent of the enterprise payroll, the cooperation of employers is necessary for the successful implementation of such a scheme. Training levies are in operation in several African countries, including Cote d'Ivoire, Mauritius, Mali, South Africa, and Tanzania.

Competency Based Training (CBT) can also enhance quality. The concept of competency-based training is not new to Africa. Traditional apprenticeship, particularly as practiced in West Africa, is competency based. A competency is the aggregate of knowledge, skills and attitudes; it is the ability to perform a prescribed professional task. CBT is actually learning by doing and by coaching. It is necessary to incorporate the principles and methodology of CBT into the formal technical and vocational education system.

However, since the development and implementation of competency-based qualifications (involving standards, levels, skills recognition and institutional arrangements) are very costly in terms of training infrastructure and staff capacity, piloting of the CBT approach in a few economic and employment growth areas is recommended, rather than a wholesale reform strategy.

Students should be encouraged to build a portfolio of projects undertaken or items produced as evidence of proficiency and proof of ability to perform prescribed professional tasks. The delivery of quality TVET is also closely linked to the building of strong, professional management and leadership capacity to drive the entire system.

Quality in this document should be defined as "fit for purpose", rather than as measuring up to an ill-defined standard. A decentralised and diverse system as recommended in the strategic policy framework (school-based training, enterprise-based training, and apprenticeship training (non-formal and informal) requires a strong regulatory framework for training curricula, standards, qualifications and funding. A suitable qualifications framework and inspection system will provide the necessary quality assurance and control mechanism within a diverse system.

ii) Assure employability of trainees

Assuring the employability of trainees begins with effective guidance and counselling of potential trainees in the choice of training programmes in relation to their aptitude and academic background. Employability presupposes the acquisition of employable skills that are related to the demands of the labour market. Affordability of training is also another factor.

Who pays for the training of the poor? Poverty is not capital. Therefore, if TVET must help reduce poverty, then a system of support for the poor must be put in place. Such a support system may include the award of bursaries and the offering of services

(like cleaning and farming) by poor trainees to the training provider to offset training fees. Tracer studies which track the destination of graduates in the job market can provide useful feedback for the revision of training programmes so as to enhance the employability of trainees.

iii) Improve coherence and management of training provision

In order to ensure coherence and management of training provision, it will be necessary to establish a national agency or body to coordinate and drive the entire TVET system. Depending on the country, this agency could be under the umbrella of the ministry of education and vocational training or a separate and autonomous body. In either case, the coordinating agency should include representation from all relevant stakeholders, including government policy makers, employers, public and private training providers, civil society, alumni associations, and development partners.

Some countries in Africa have already established National Training Authorities to coordinate and oversee the work of training providers in the formal, non-formal and informal sectors. Training Authorities, through their various specialised organs and occupational advisory committees, have the responsibility to develop national vocational qualification frameworks and proficiency levels as well as standards for validation of training, certification and accreditation of training institutions. National Training Authorities have been formed in countries like:

- **Botswana**: The Botswana Training Authority (BOTA) monitors and regulates vocational education and training in the country;
- **Mauritius**: The Industrial and Vocational Training Board (IVTB), among other things, monitors the needs for training in consultation with relevant authorities, designs and develops training curricula, and provides for, promote, and assist in

the training or apprenticeship of persons who are or will be employed in commercial, technical and vocational fields;

- **Namibia**: The National Vocational Training Board (NVTB) is entrusted with the responsibility of establishing minimum standards of vocational training with a view to regulating and promoting the efficiency of such training, including the development of vocational standards, trade testing procedures and certification arrangements, among others;
- **Tanzania**: The Vocational Education Training Authority (VETA) supervises the development of all aspects of vocational training in the country;
- **Zambia**: The Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA) not only coordinates training demands but also provides technical assistance to both public and private training providers.

Ghana has recently established by an Act of Parliament a Council for Technical and Vocational Education and Training (COTVET) within the country's TVET Policy Framework. The Council is expected to establish an Apprenticeship Training Board to link non-formal and informal vocational training to the formal TVET sector. Private training providers, including NGOs and Church Based Organisations (CBOs) are represented on COTVET.

Strengthening the management and coherence of training provision cannot be complete without a National Vocational Qualifications Framework (NVQF) that ensures the transfer of learning credits and mutual recognition of qualifications within the entire system. The development of a qualifications framework is not an easy task. It involves the active involvement of industry practitioners, teachers, and policy makers. However, NVQFs are critical to the success of articulation mechanisms within the TVET system. In

some countries, the appointment of TVET Coordinators at the district and regional levels may strengthen overall coordination at the national level.

It is necessary to make a distinction between a national vocational qualifications framework and a national qualifications framework that extends beyond vocational qualifications. As an example, Tanzania is developing a 10-level national qualifications framework (NQF), ranging from craftsman qualifications (level 1 – 3) through technician, diploma, and bachelor degree qualifications to master degree (level 9) and doctorate degree award at level 10. It is, however, too early to evaluate the Tanzanian experience or recommend it to other countries.

iv) Promote life-long learning

Lifelong learning has a beneficial effect on the development of a high quality TVET system. This is because the skills of the workforce can be continually upgraded through a life-long learning approach. This also means that learners who have had limited access to training in the past can have a second chance to build on their skills and competencies. Life-long learning also involves the recognition of prior learning, whether in the formal or non-formal system. A National Qualifications Framework can provide the needed coherence of the TVET system through the creation of equivalent qualifications across all the sub-sectors: formal, non-formal and informal.

v) Enhance status and attractiveness of TVET

The last but not least strategic objective is to promote TVET as a tool for economic empowerment in Africa. This will also involve changing perceptions and attitudes of the public about technical and vocational education. For this, the use of role models in TVET and the involvement of successful entrepreneurs in motivation campaigns will be necessary. An embarrassing shortage of role models is one of the banes

of TVET. The use of the electronic media to promote TVET may be particularly effective, as has been shown in Uganda through the TV soap opera “Hand in Hand” and the film. “The Other Choice” in Ghana. Finally, networking among TVET experts can translate into increased visibility and funding for the sector.

CHAPTER THREE

METHODOLOGY

This chapter focuses on the context in which the research was conducted. It also highlights on the subjects under study, actions taken and why they were taken, types of data collection techniques as well as how the various data were collected and analysed.

3.1 Research Context

This study was carried out in partial fulfillment of the requirements for the award of Master degree in Mechanical Technology from the University of Education, Winneba-Kumasi Campus. The study was designed to improve upon the low enrolment of technical programmes, if not to exceed the other programmes, at least to be at par with them in the near future. In the light of this, an investigation was made using the Tumu Senior High/Technical School in the Sisala East district in the Upper West Region: as a case study. Questionnaires were administered for answering in the study area to help evaluate the problem of low enrolment of technical courses the country faces.

3.2 The Subject of the Study

The subject of the study is to obtain the thought, the teachers and the students have about technical courses at Tumu Senior High/Technical School. A sample of classes and teachers were selected for the study in order to obtain easy and fast data for research analysis.

3.3 Actions Taken and why they were Taken

The list of classes at the Tumu Senior High/Technical School were taken and later sampled to obtain a number of classes for the research. The sampling was introduced as a result of large number of some of the classes so as to make the research process proceed faster since the time for the executing of this project was limited and also to make collection of data easier.

3.4 Data Collection Techniques

questionnaires were used to gather data.

Questionnaires*:* For each research question a number of variables were written down for each respondent to react to. The variables were to measure the notion teachers and students have about technical courses at Tumu Senior High/Technical School.

3.5 Procedure of Collection Data and Data Analysis

The questionnaires were distributed to the respondents (teachers and students) of which respondents were two hundred and seventy (270) in number. Two hundred and fifty (250) of the total respondents were students of form 2 of each department of the five programmes the school is running. Distribution of questionnaires for the teachers were obtained as and when they were conducted.

Data Analysis*:* Questionnaires returned from respondents were analysed to obtain how far they answered the research questions. Comments from respondents which answer particular questions were put together and analysed. Statistical presentation was done to give a clear interpretation of data collected.

3.6 Questionnaire Distribution

Combinations of closed-ended and open ended types of questionnaires were distributed to twenty (20) teachers, in which, ten (10) of them were form masters. The researcher selected a class from each department; General Arts 2A were fifty-eight (58) respondents, Vocation 2A sixty-six (66), fifty-six (56) from Business 2A, forty-four from Technical 2A and General Agriculture forty-eight (48). Distribution of the questionnaires was done personally and the collection was also done the same day of distribution for the students and two days after the distribution for teachers.

CHAPTER FOUR

DATA ANALYSIS OF RESULTS/FINDINGS AND DISCUSSION

This chapter focuses on the results of the response of the questionnaires obtained and how they were analysed. These analysis were to help in answering the research questions raised in chapter one.

4.1 Data Analysis of Results

Table 4.1: Overview of the response to the questionnaires distributed.

Respondents	Number of questionnaires	Number of response
General Arts 2A	70	66
Vocational 2A&B	79	77
Technical 2A	30	30
Agric 2A	35	35
Business 2A	33	33
Teachers	20	15
Total	**267**	**256**

Table 4.2: Percentage of questionnaire returned

Respondent	Number of respondent	Total number of	Response%	Representation on pie chart	
		Calculation	Results	calculation	Results
General Arts 2A	66	66/256*100	25.7	$66/256*360^0$	992.8
Vocational 2A&B	77	77/256*100	30	$77/256*360^0$	108
Technical 2A	30	30/256*100	11.7	$30/256*360^0$	42
Agric 2A	35	35/256*100	13.6	$35/256*360^0$	49
Business 2A	33	33/256*100	12.8	$33/256*360^0$	46
Teachers	15	15/256*100	5.8	$15/256*360^0$	21
Total	**256**	**100**		**360**	

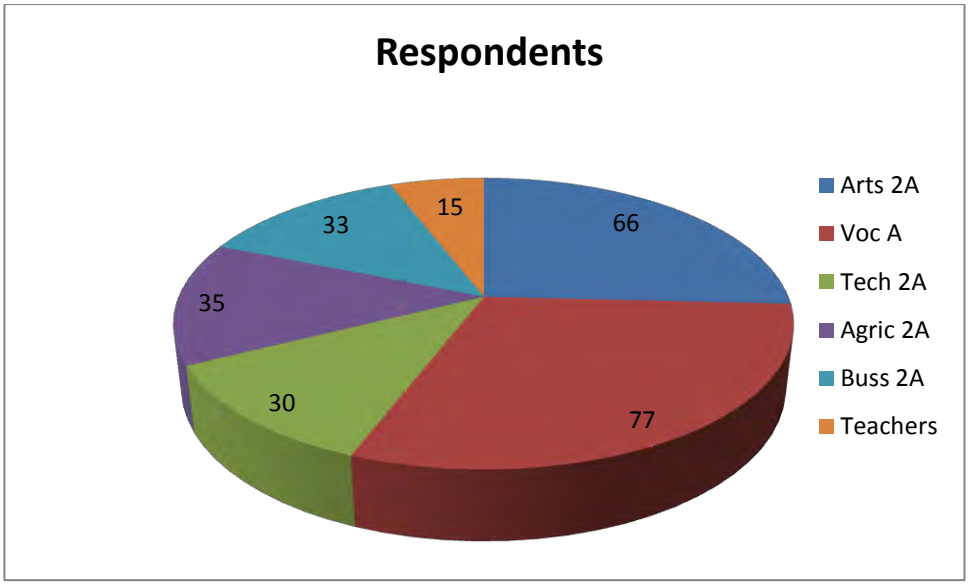

Figure 4.1: Pie Chart Representations

4.2 Research Findings and Discussion

This section represents results of findings and discussion. It deals with analysis of responses from respondents, overall response from the teachers and the various classes and summary of key points from respondents.

Appendix A; (Questionnaires for teachers) attempted to find information and ideas from the teachers in respect of technical course while the appendix B (Questionnaires for students) attempted to find out the thought of students in respect of technical courses.

4.2.1 Responses from Respondents

Appendix A: (Questionnaires for teachers) attempted to find information and ideas from the teachers in respect of technical course.

Table 4.3: Response from Teachers

Items	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
12	-	-	-	5	10
13	-	2	-	8	5
14	-	2	1	7	5
15	1	1	2	6	5
16	1	2	3	7	2

Teachers

Item 12 (Technical courses are for weak students) 10(66.6%) respondents out of 15, strongly rejected item12 while the remaining 5(33.3%) also rejected it. Nobody agreed, strongly agreed or being neutral to item 12.Item 13 (Technical courses are too cumbersome to learn)8 (53.3%) of the respondents disagreed with item 13, then followed 5(33.3%) respondents who strongly disagreed and 2(13.3%) agreed. No respondent strongly agreed or being neutral to item 13. Item14 (Technical courses do not lead to white-collar jobs). Out of the total respondents of 15, 7 (46.6%) disagreed with item14 and 5 (33.3%) of them totally disagreed but 2 (13.3%) of them agreed and 1 (6.6%) remained neutral.Item15(Technical courses are not friendly).

With respect to item15, 6 (40%) disagreed with item15, with 5 (33.3%) of them strongly disagreeing to item 15. However, 1(6.6%) respondents strongly agreed and another one agreed with the other 2(13.3%) remaining neutral. Item 16 (The methods used by technical teachers are not appropriate). Most of the respondents about 7(46.6%) were not supportive as far as item 16 was consent. 2 (13.3%)respondents vehemently disagreed while 1(6.6%) strongly agreed and 2 (13.3%) agreed. the remaining 3 (20%)respondents were not having any idea in respect of item16.

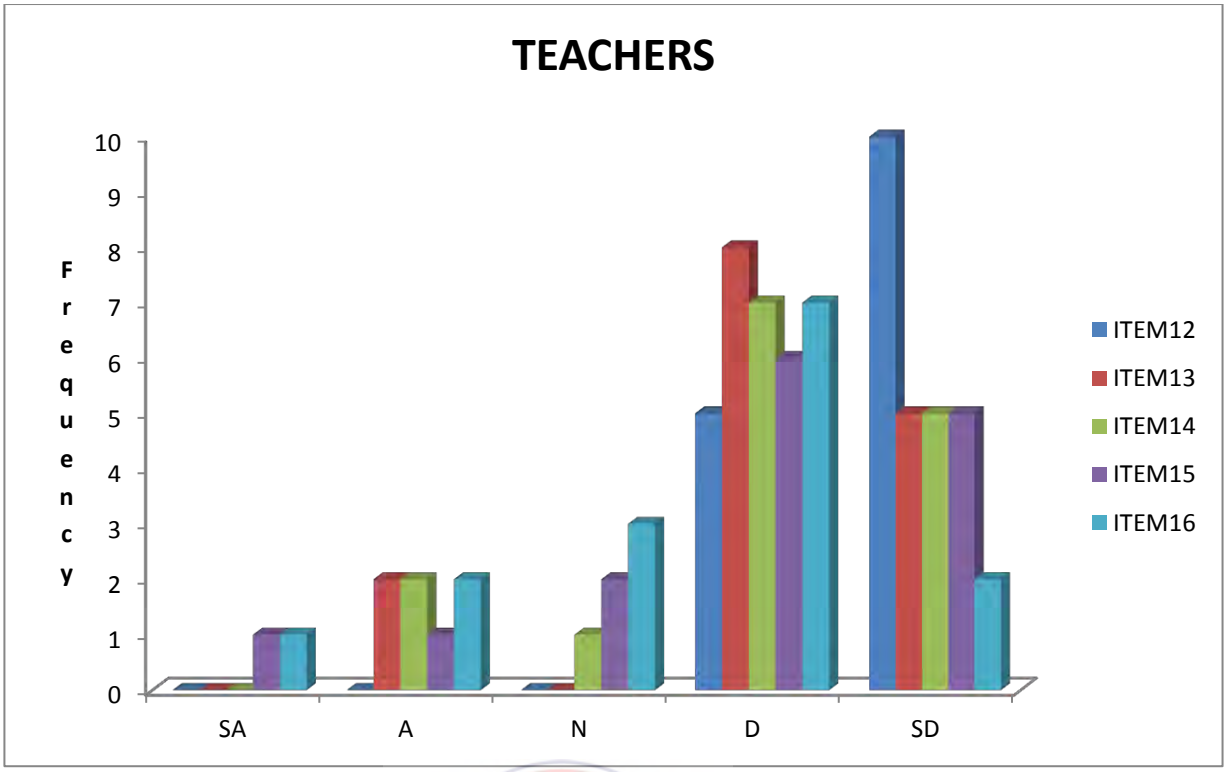

Figure 4.2: Graphical presentation of Teachers' response

Appendix B (Questionnaires for students) attempted to find out the thought of students in respect of technical courses.

General Arts 2A;

Table 4.4: Response from General Arts 2A.

Items	Strongly agree	Agree	Neutral	Disagree	Strongly agree
6	2	4	1	11	48
7	15	24	-	10	17
8	7	5	1	11	42
9	7	20	5	14	20
10	8	6	7	25	20

Item 6-(Technical courses are for weak students):

2 respondents thus 3% strongly agreed with it, 4 respondents representing 6% agreed with item 6, 1 respondent representing 1.5% was neutral and 16.7% amounting to 11 respondents disagreed while 48 respondents constituting72.7% strongly disagreed. The

above interpretation shown that majority of the respondents in the above class has disagreed with item6.

Item 7- (Technical courses are too cumbersome to learn)

15 (23%) respondents strongly agreed with item 7 and 24 (36%) agreed and nobody was neutral but 10 (15%) disagreed while 17 (26%) vehemently disagreed. It is clearly shown that most of respondents agreed with item 7.

Item 8 - (Technical courses do not lead to white-collar jobs)

Shows that 7 (11%) respondents were strongly in agreement with item 8 and only 5 (8%) agreed, one respondent(1.5%) did not take sides whereas11(16%) and 42 (64%) respectively disagreed and strongly disagreed. One can conclude that 80% of the total number of respondents disagreed with respect to item 8.

Item 9- (Technical courses are not friendly)

Five respondents that constituting 8% did not have any idea about item 9 while 14 respondents which represented 21% disagreed on item 9 and 20 that is 30% totally disagreed. In the other hand 20 (30%) respondents have agreed the above item and 7 (11%) totally agreed. The total number of those who were in strongly agreement with item 9 and the total number of those who were in disagreement with item 9 were at par. To categorise the whole responses into agreement and disagreement, one can boldly say, that those in disagreement outweighed those in agreement.

Item 10 -(The methods used by technical teachers are not appropriate)

Seven(11%) respondents did not have anything to say while 20 (30%) strongly against item 10 and 8 (12%) respondents strongly agreed. Six (9%) respondents and 25 (38%) agreed and disagreed respectively. Most of the respondents disagreed item 10. Graphical presentation of the above information.

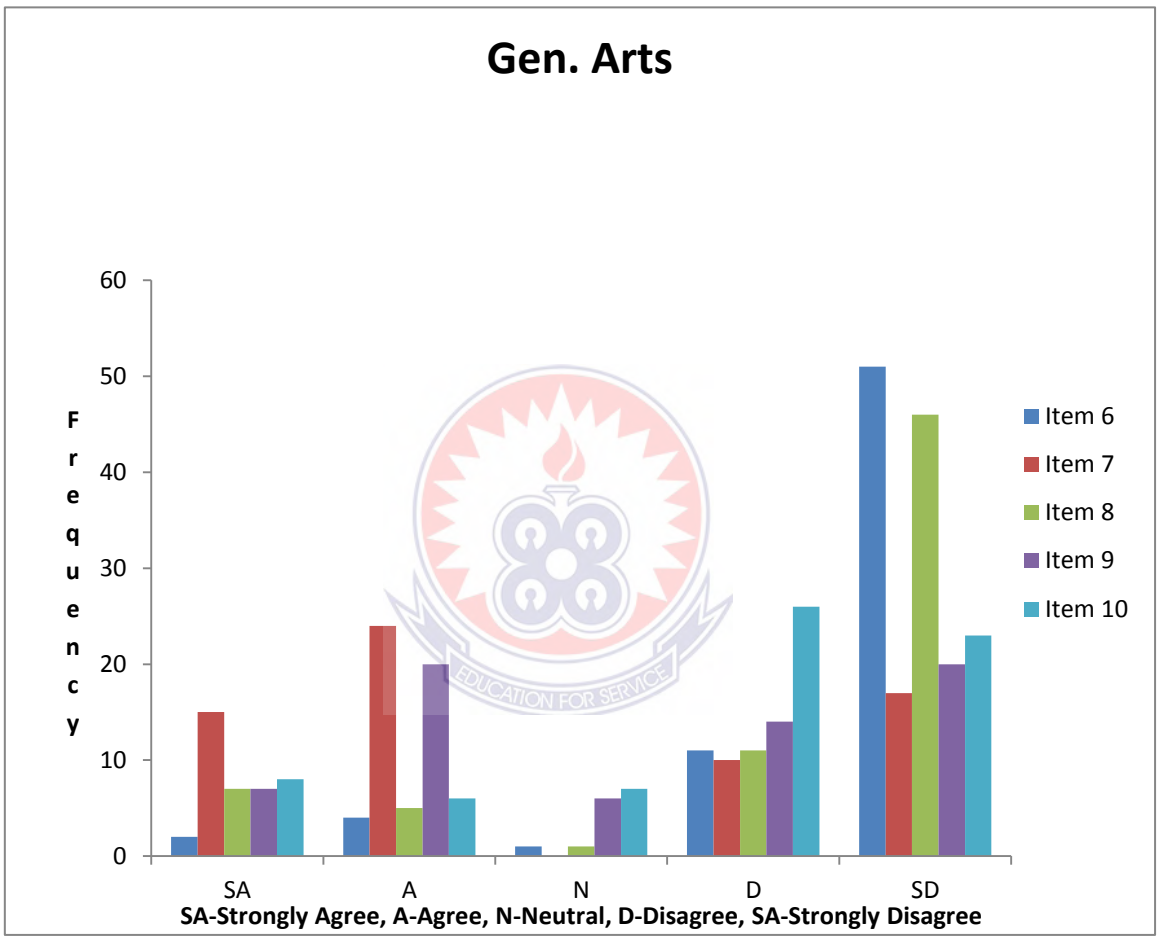

Figure 4.3: Graphical presentation of response from General Arts

Home Economics;

Table 4.5: Responses from Home Economics

Items	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
6	2	5	-	18	52
7	11	14	3	22	27
8	4	9	5	16	43
9	4	11	3	30	29
10	17	14	4	13	29

Item 6- Shows that every respondent in this class responded with 2 (2.6%) strongly agreeing with item 6 while 52 (67.5%) strongly disagreeing and 5(6.5%) agreed but 18 (23%) of them disagreed. Most respondents have totally disagreed with item 6.

With respect to Item 7- 3 (4%) of the respondents did not take stand but 11 (14%) of the respondents strongly agreed with the item 7 and 27 (35%) strongly disagreed. On the other hand 14(18%) respondents agreed and 22 (29%) disagreed.

Item 8- 4 (5%) of the respondents strongly supported item 8, 9(11.6%) only supported, 5(6.5%) were neutral and 16(20.7%) did not support item8 with 43(56%) strongly refusing idea of item 8.

For item 9-29 respondents which constituted 38% of the respondents strongly disagreed with above statement but 4respondents representing 5% also strongly agreed. 3(4%) did not have any idea of item 9 whereas 11respondents that is 14% agreed and 30 (39%) disagreed.

Item 10-13(17%) and 29(38%) disagreed and strongly disagreed respectively. Again, 17(22%) and 14(18%) also agreed and strongly agreed respectively, with 4(5%) being neutral.

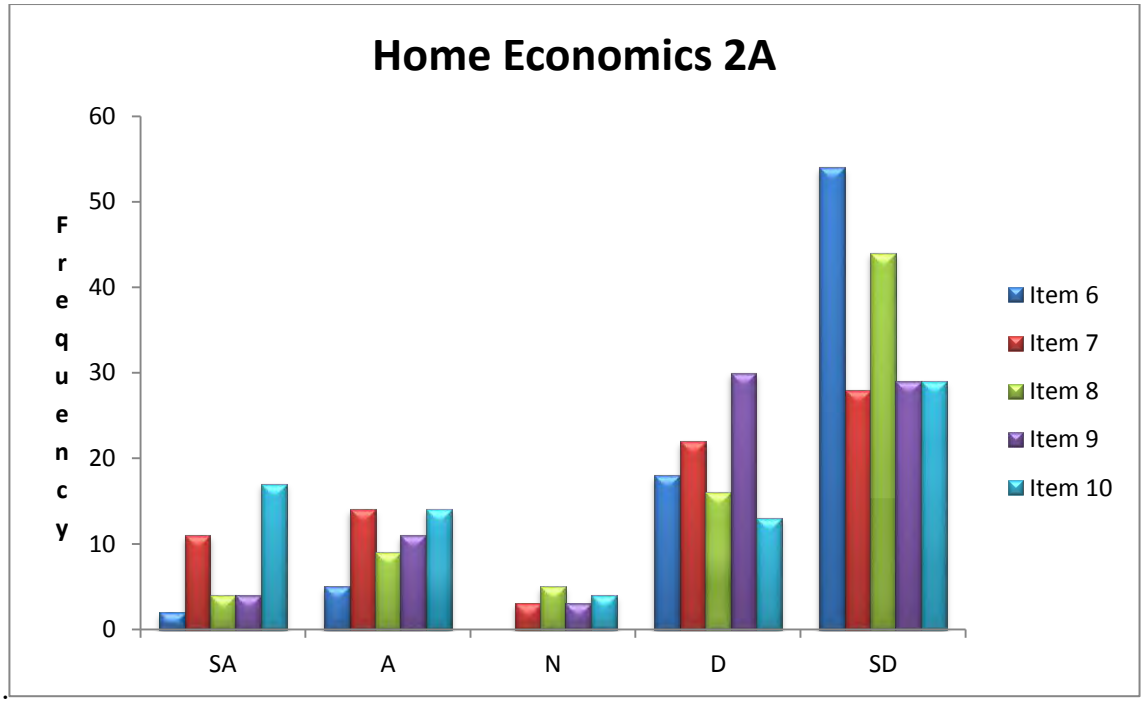

Figure 4.4: Graphical presentation of response from Home Economics

Technical 2A

Table 4.6: Response from Technical 2A

Items	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
6	3	1	-	4	22
7	12	10	3	3	2
8	8	2	1	9	10
9	5	3	8	5	9
10	9	4	3	7	7

Item 6- Clearly indicated that out of the 30 respondents 22 of them strongly rejected item 6 which represented 73%, then followed 4 respondents constituting 13% also did not agree with item 6, but 1(3.3%)respondent agreed with 3(10%) strongly agreeing. Item 7- With regards to item 7, 3(10%) respondents said they have no idea of item7 and another 3(10%) disagreed but 2 (6.6%) indicated that they strongly disagreed

while 10 of them constituted (33.3%) agreed but majority of them summing up to 12(40%) were strongly in agreement with item7.

Item8- Stated that the majority of the respondents were strongly not in support of item 8,they amounted 10(33.3%) and 8(26.6%) also strongly supported item 8 in between the above extremes were 2(6.6%)and 9 (30%) respondents agreeing and disagreeing respectively with 1(3.3%)respondent not taking side.Item9- 8(26.6%)respondents were neutral which means that they know nothing about item9. Their number was at peace with those who strongly agreed and those who agreed put together; 5 (16%) and 3(10%). 5 (16.6%)respondents agreed with 9(30%) strongly agreeing.

Item10- 9(30%) respondents in this class strongly agreed with item10. 4(13%) respondents agreed, 3(10%) were neutral and 7(23.3%) disagreed but another 7(23.3%). Majority of the respondents strongly agreed with item 10.

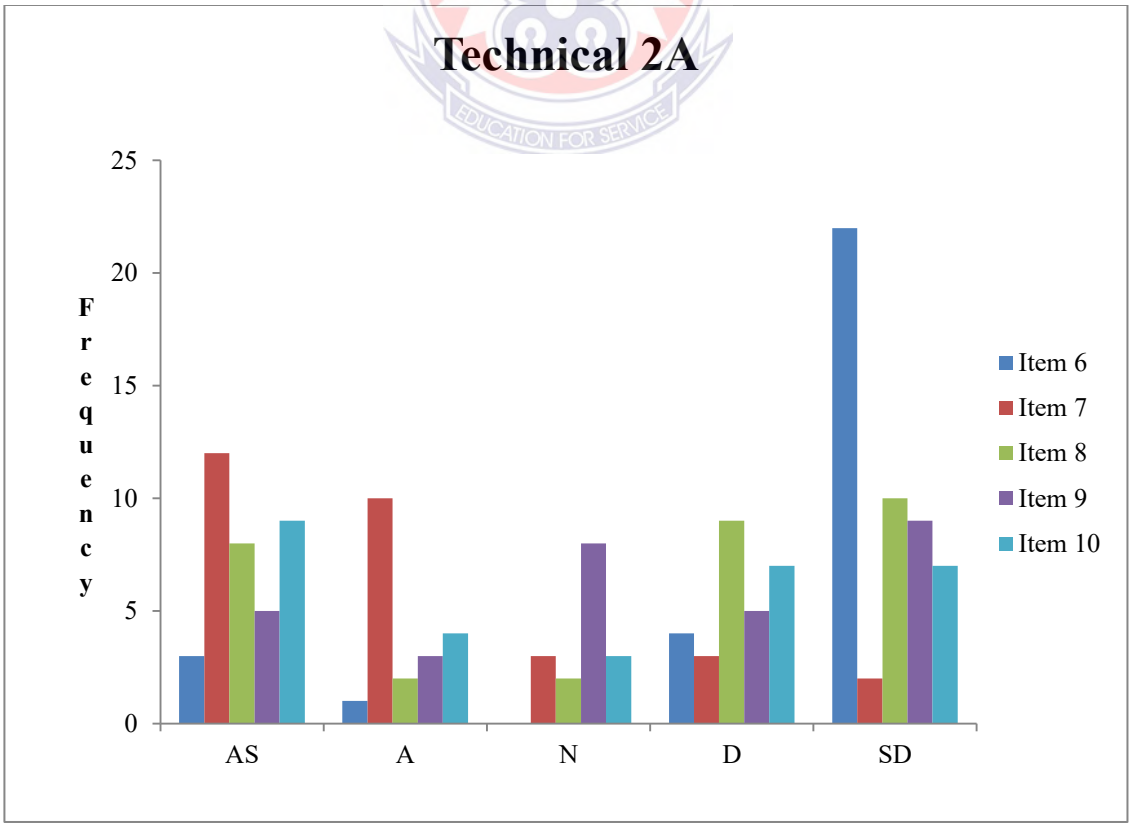

Figure 4.5: Graphical presentation of response from Technical 2A

Agric 2A

Table 4.7: Response from Agric 2A

Items	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
6	-	2	1	5	27
7	1	4	5	12	13
8	2	6	5	6	16
9	3	7	5	10	10
10	6	8	2	8	11

Item 6- In this particular class, nobody strongly agreed with the above item but 2(6%) agreed, 5(14.2%) disagreed. Most of the respondents in this, totaling 27(77%) strongly disagreed with the statement, with a respondent being neutral.

Item 7- Most of the respondents here constituting 13(37%) totally rejected item 7, then followed 12respondents also representing 32% disagreed,4respondents on the other hand agreed that equaled 11.4% and 1(3%) respondent strongly agreed with one respondent at the middle line.

Item8- Indicated that the minority side 2(6%) strongly supported item8 while 6(17%) supported but other 6(17%) did not support but 16(45.7%) strongly did not support with 5(14.2) being neutral.

Item 9- brought to light that respondents who strongly agreed and those who agreed were on the same level with 10(28.5%) each. 5(14%) of the respondents were at the middle line and 7 (20%) agreed.

Item10- At the extreme ends were 8 (22.8%) respondents agreeing with item10 in the other hand the same number of disagreed and six(17%) of them strongly agreed while 11 (31.4%) strongly disagreed with 2(6%) being at the middle belt.

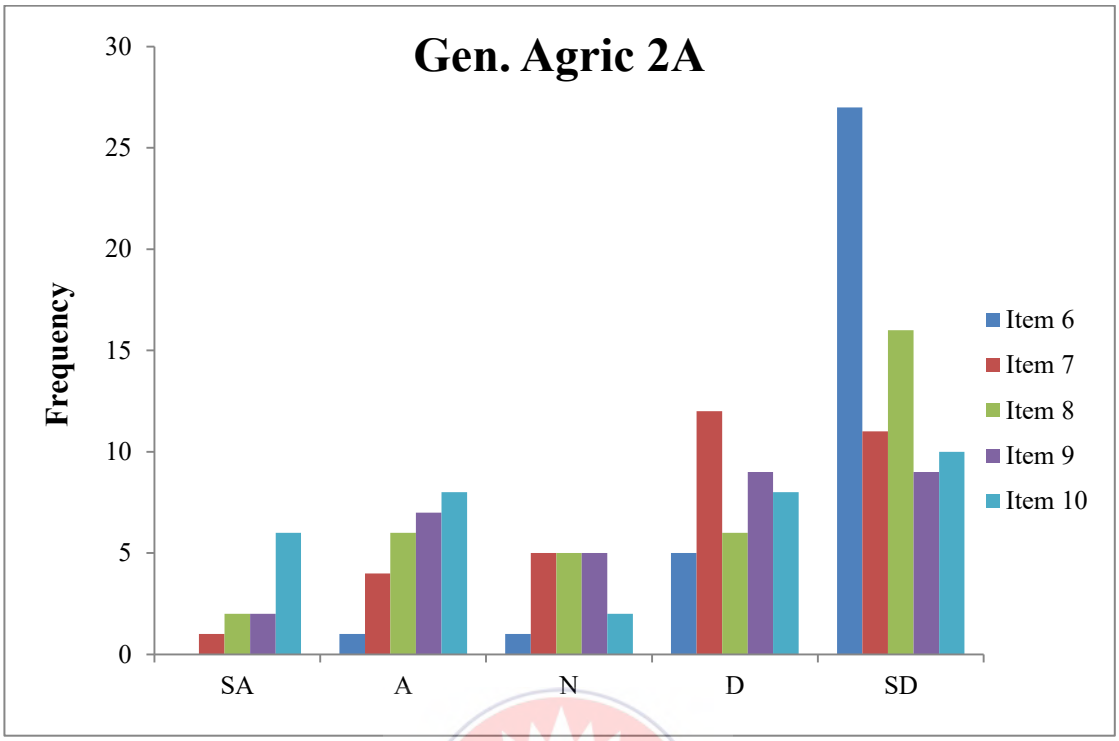

Figure 4.6: Graphical presentation of response from General Agriculture

Business

Table 4.8: Response from Business 2A

Items	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
6	8	1	-	14	10
7	4	8	6	10	5
8	3	4	3	14	9
9	2	2	2	15	12
10	3	3	3	14	10

Item6- In this class all the respondents were having an idea about item 6, nobody was neutral, with 8 (24.2%) of strongly agreed item 6 and 10 (30%) strongly disagreed, one(3%) respondents agreed and 14 (30.3%) disagreed.Item7- In this regard, 4 (12.1%) respondents strongly supported item7 with 5 (15.1%) strongly refuting. 8 (24.2%) respondents supported and 10(30.3%) did not support with 6 (18.1%) being neutral.

Item8- For item8, 3 (9%) respondents strongly accepted while 9 (27.2%) strongly rejected it. 4 (12.1%) accepted it whereas 14 (42.4%) rejected it and 3 (9%) did not have any idea about item8.

Item9- The respondents were 33 in number, the greater number of them of about 15 (45.4%) disagreed item 9 while smaller number of 2 (6%) totally agreed. 12 (36.3%) totally disagreed but 2 (6%) of the remaining respondents agreed and the other 2 respondents did not say anything.

Item10- Out of the 33respondents, 10 (30.3%) strongly condemn item10. Among the remaining respondents 14 (42.4%) only condemn but 3 (9%) agreed, another 3 strongly agreed, the remaining 3 were neutral.

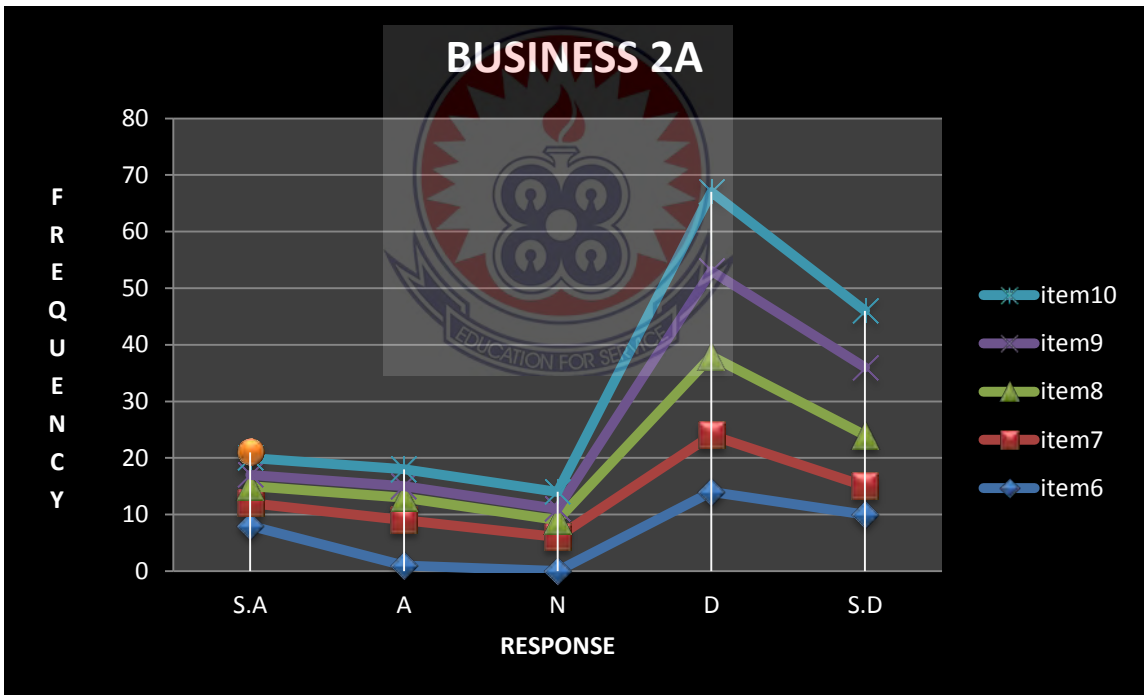

Figure 4.7: Graphical presentation of response from business 2A

Overall Summary of Responses

Table 4.9: Overall response from the teachers and the various classes.

Items	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
6 & 9	15	13	2	57	169
7 & 10	43	62	17	65	69
8 & 11	24	28	16	63	125
9 & 12	22	44	25	80	85
10 &13	44	37	22	74	79

To collate all the findings from the teachers and the various classes, it was found out that, out of 156 respondents, only 15 (5.8%) of them strongly agreed that, technical courses are for weak students. 13 (5%) respondents also agreed to that fact and 2 (0.8%) were neutral. On the other hand 57 (22%) of remaining respondents disagreed with that statement and 169 (66%) respondents strongly disagreed. By unanimous decision one can confidently say that respondents had dismissed the above statement.

In respect of item 7 which said technical courses are too cumbersome to study. 43 (16.7%) respondents strongly agreed with that statements, with 62 (24.2%) of the respondents agreeing, 17 (6.6%) of the respondents did not take any stand as far as the above statement is concerned. However, 65 (25.3%) of the respondents said no to that statement while 69 (27%) strongly said no. Once again the respondents who rejected the statement were the majority. One can then conclude that the statement does not hold water.

Item 8 (Technical courses do not lead white collar jobs), also shown that 24(9.7%) respondents strongly supported that statement. 28 (10.9%) respondents also supported the statement meanwhile 63 (24.6%) respondents did not support but 125 (48.8%) respondents did not support the statement totally with 16 (6%) being idealess.

Item 9 also states that (technical courses are not friendly), 22 (8.5%) respondents of the total number of respondents totally agreed with the above statements with 44(17%)

agreeing to that fact. 80 (31%) disagreed and 85(33%) strongly disagreed with 25 (9.7%) at the middle line.

Item10 (the method used by technical teachers are not appropriate) 22 (8.6%) could not take any decision. 37 (14%) agreed with the above statement while 74 (28.9%) disagreed and 44 (17%) strongly agreed while 79 (30.8%) strongly disagreed.

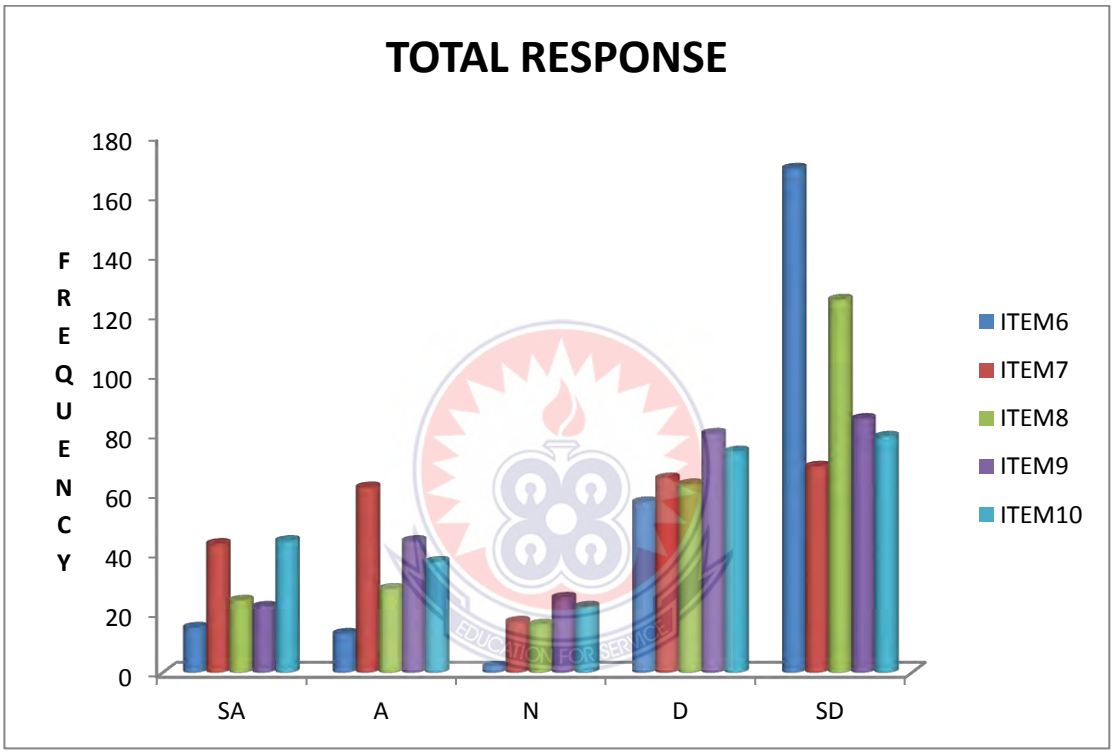

Figure 4.8: Graphical presentation of Total response from General Agriculture

4.3 Summary of Key Points from Respondents

After analysing the whole findings of this piece of work, one could clearly understand that the majority of the respondents disagreed with all the given items (items 6-10)except few of them who agreed. The researcher would like to consider item 7 which states that „technical courses are too cumbersome to learn". Apart from strongly disagree and disagree, the response on the questionnaire being the overall majority side, on the other hand strongly agree and agree were the next highest in relation to item7. This means that some sizeable number of respondents including some technical students attested to the fact that technical courses are too cumbersome to learn.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter outlines the, summary, concluding statements and recommendations that have been made by the researcher. It further focuses on whether the research was completed and what further steps and suggestions the researcher has with regard to the research topic for future research.

5.1 Summary

During and after the research work, judgments were made through the responses of the respondents of the questionnaires administered:

- The respondents vehemently dismissed the misconception that technical courses are for weak students. In other words students who are offering secondary courses can equally pursue technical courses and vice versa.
- The respondents also unanimously agreed that technical courses are not too cumbersome to learn. Technical courses are like other courses students learn.
- The respondents were of the view that technical courses also lead to white-collar jobs and that not only secondary courses lead to white-collar jobs. We have many technicians and engineers who are now ministers, parliamentarians and other office holders.
- The respondents strongly agreed that technical courses are also friendly.
- Appropriate methods are used in lesson delivery by technical teachers, according to the respondents.

5.2 Conclusion

According to this research, it is concluded that both weak and intellectual students can be enrolled at both technical and secondary schools to read any of the technical courses or secondary courses. The technical courses are like other secondary courses and are also friendly. Also technical courses can offer self-employment. The research results/findings also shown that none of the items in the questionnaire administered to the respondents were the reason of the low enrolment at the senior secondary/technical Schools and other technical institutes.

5.3 Suggestions from the Teachers who Answered the Questionnaires

Some of the teachers suggested that, to improve enrolment of technical courses, the following should be done:

- Only Professionally trained teachers who have technical background should be allowed to handle the technical courses.
- Government should provide well-equipped workshops for the technical departments.
- Most of the lessons should be practically-oriented.
- Teaching and Learning materials should be provided by the government.
- Career guidance should be offered to both parents and students at the basic level.
- Subjects that are not relevant to technical courses should be eliminated from their curriculum.
- Technical students should be motivated by providing them with all the drawing accoutrements and practical materials. Also scholarship should be awarded to those who perform creditably well.

- Some subjects in technical courses should be made core subjects at the basic level. For example Technical Drawing and Basic Design and Technology (BDT)

5.4 Recommendations

There is a saying that, *„if a problem is identified, then it is half way solved"*

- The researcher recommends that government and the stakeholders should recognize the fact that the economic crises the nation is witnessing is as the results of less attention given to technical education in the country. To be able to fix the economic hardship the country is facing, the government and the stakeholders should make sure that the enrollment of technical departments of secondary/technical schools and the technical institutions are drastically improved. To improve the enrolment of the above mentioned institutions, the researcher recommended the following:

i. Government, stakeholders and Non-Governmental Organisations NGOs) should establish many technical teacher training colleges and technical Universities of education with well-equipped workshops/laboratories.

ii. Only professionally trained technical teachers should be allowed to teach in the said institutions.

iii. Government, stakeholders and (NGOs) should provide the appropriate Teaching and Learning Materials (TLMs).

iv. Government, stakeholders and (NGOs) should remunerate technical teachers well and motivate the technical students.

5.5 Suggestion for Future Continuation of this Work

The researcher of this work suggests that the following suggestions to who so ever wants to further or continue with this work:

- The research should be carried out at one of the Senior Secondary Schools in the district and beyond. The results from one school may differ from another one because the school offers only secondary courses.
- The research should be carried out at all the senior high/technical schools and the senior secondary schools in the region.

REFERENCES

Adjei-Mensah, I., Ampadu, F. O. & Antwi, D. B., et al., (2001). Education studies book for basic school teachers. Accra: Ministry of Education.

Afonja, A. A. Sraku-Lartey, K. & Oni, S.A. (2005). Engineering Education for industrial Development: Case studies of Nigeria, Ghana, Zimbabwe, Published by the Africa Technology Policy Studies Network, P. O. Box 10081, 00100 General Post Office, Nairobi, Kenya.

African Union, (2007).Strategy to revitalize technical and vocational education and training (TVET) in Africa. Addis Ababa: Final Draft. Bureau of the Conference of Ministers of Education of the African Union (COMEDAF II+)

Agyeman D. K. (1993).Sociology of education for African students. Accra: Black Mask Ltd.

Aktan, B., Bohus, C.A., Crowl, L.A., Shor, M.H., Distance Learning Applied to Control Engineering Laboratories", IEEE Transactions on Education, Vol. 39, No 3., August 1996.

Alam, G.M. (2007).Private HE in Bangla desh: The impact on HE government & legislation. Unpublished phD thesis, University of Nothingham, United Kingdom.

Allsop, T., Attah, R. Cammack, T. & Woods, E. (2010). Mid-Term Evaluation of the EFA Fast Track Initiative – Country Case Study: Ghana. Cambridge: Cambridge Education, Mokoro& Oxford Policy Management.

Amagada, A. & Zidermman, J. (1992). Vocational Secondary Schooling, Occupational choices and earning in Brazil. Washington D. C: World Bank.

Amoakohene, S. K., Adu, S., Buor-Frimpong, S. V. & Tsorgali, M. K. (1998). Technical skills and drawing for teacher training (Bks 1&2). Accra: Unimax Publishers Ltd.

Anamuah-Mensah, J. (2004). Vocational/Technological Education for Accelerated Wealth Creation: Critical Issues Facing the Nation. Paper presented at the 56th New Year School Conference organised by the Institute of Adult Education at the University of Ghana, 30 December 2004.

Atchoarena, D. & Delluc, A. (2001). Revisiting Technical and Vocational Education in Sub-Saharan Africa: An Update on Trends, Innovations and Challenges. Paris: International Institute for Educational Planning, World Bank.

Atchoarena, D. & Esquieu, P. (2002). Private technical vocational education in Sub-Saharan Africa: Provision patterns and policy issues. Revised final report. Paris, France: UNESCO.

Baiden, F. A. (1996). Technical and Vocational Education in Ghana. The development of technical and vocational education in Africa: Case study from selected countries (pp. 81-122). Dakar, Senegal: UNESCO Regional Office.

Bennis, W. & Nanus, B (1985).*Leaders: The strategies for taking charge*. New York:

Bloom, B.S. (Ed.). Engelhart, M.D., Furst, E.J., Hill., W.H., Krahwohl, D.R: (1956). Taxonomy of Educational Objectives, Handbook 1: The cognitive Domain. New York: David McKay Co Inc.

Boateng, C. (2012). Restructuring Vocational and Technical Education in Ghana: The Role of Leadership Development, Employment Counselling Unit, Saskatoon, Canada.

Bortei-Doku Aryeetey, E. Doh, D. & Andoh, P. (2011). Study of Attitudes towards Technical and Vocational Education and Training in Ghana. Centre for Social Policy

Colin, N. P. (1999). Technical and Vocational education for the twenty first century. Prospect, 29(1), 29- 36.

Daughtry, L. H., & Finch, C.R. (1997). Effective leadership of vocational administrators as a function of gender and leadership style. Journal of Vocational Education Research, 22 (3), 173-186.

Dondieu, C. K. (n.d). Guide notes to the study of education, Vol. 1 (New ed.) education T.G. Litant‡, Johan Malmqvist & Sören Östlund.

Finch, C. R., Gregson, J. A., & Faulkner, S. L. (1991).Leadership behaviours of successful vocational education administrators. Berkeley, CA: National Centre for Research in Vocational Education, University of California, Berkeley.

Fingerlined, I., & Saha, L. J. (1989). Education and national development: A comparative perspective. Oxford, UK: Pergamon.

Foster, P. (1965). Education and Social Change in Ghana. London: Routledge and Paul Kegan.

George, K. D. (2014). Projecting Ghana into the real middle income economy: The role of technical, Vocational Education Training. Parliamentary Briefing.

Ghana Education Service (2003). Handbook on lesson notes preparation and teaching learning materials in primary school. Accra: Ghana Education Service.

Ghana News Agency- Government supports KNUST with$12.9m- www.ghanabusinessnews.com/2016/04/26

Government Of Ghana (2007) Ghana"s Education system. Accra.

Graphic Online- KNUST inaugurates modern laboratory-http://www.graphic.com.gh/

Harper & row.

Hayfron-Benjamin, E. (1992). Technical drawing for junior secondary school (bk1). Accra: Educational Press and Manufacturers Ltd.

Huss, J. J. (2004). Technical Skills made easy, an unpublished handout.

International *Journal of Scientific & Technology Research* Volume 2, issue 6, June 2013 issn 2277-8616.

Karl-Frederik Berggren, Doris Brodeur, Edward F. Crawley:, Ingemar Ingemarsson, William (2013). CDIO: An international initiative for reforming engineering Linköping University, Linköping, Sweden**,** Massachusetts Institute of Technology, Göteborg, Sweden & Royal Institute of Technology, Stockholm, Sweden.

Lewin, K.M. (1997). Education and development. Defining the issues. Educational Research paper No. 06. Centre for International Education, University of Sussex.

Lillis, K. & Hogan, D. (1983). Dilemmas of diversification: problems associated with vocational education in developing countries. Comparative Education, 19 (1). 89-107.

Lutz, C. M. (1986).The attributes of a good leader. Vocational Educational Journal, 61(3), 28-30.

Maiga, E. (2013). Making skills development work for economic transformation in Africa: Demystifying the suit and de-stigmatizing vocational and technical educational in Essel O. Q, Agyarko E., Sumaila M. S. and Yankson P. D., (2014). " TVET Stigma in developing countries: reality or fallacy?" European Journal of Training and Development Studies, 1 (1) 27-42 September.

Markin, R. K. (2006). Rapid results notes on pre-technical skills methodology, an unpublished handout.

McWilliam & Kwamena-Poh, (1975). The Development of Education in Ghana. Longman Group Limited.

Ministry Of Education (2005). Teaching syllabus for pre-technical skills. Accra: CRDD.

Ministry of Education, (2010 a). Education Sector Performance Report 2010. Accra: Ministry of Education

Moses, J. Jr., & Liang, T. (1990).Leadership, leadership development, and the national centre for research in vocational education. Berkeley, CA: National Centre for Research in Vocational Education

Moss, J., Jr., Jensrud, Q., & Johansen, B.C. (1992).An evaluation of ten leadership development programs for graduate students in vocational education. Berkeley, CA: National Centre for Research in Vocational Education.

Nartey, L. T. (2006). Methods of Teaching Science for Teacher Training Colleges, an unpublished handout.

News Ghana – two state- of- the- art- laboratories commissioned- http://www.newsghana.com.gh/

Oryem-Origa, S.O. (2005), Vocational Education and Manpower Development, Lagos: Nigeria Vocational.

Pucel, D. J. (1990). The curriculum In A. J. Paulter, Jr (Ed.), *Vocational education in the 1990s: Major issues* (pp. 157-172). Ann Arbor, MA: Prakken publication Inc.

Raphael Azumah Williams (2014), Technical and Vocational Education and Training- What is Ghana"s story? Graphic Online: http://graphic.com-gh/news/education/22437

Reyes-Guerra, O. (1989), „Where are we now? Proceedings,

Sherry K. Amedorme, Kowu Agbezudor and Frederick K. Sakyiame (2014). Converting Polytechnics into technical Universities in Ghana issues to address.

Sherry K. Amedorme, Yesuenyeagbe A. K. Faigbe (2013). Challenges Facing Technical And Vocational Education in Ghana. International Journal of Scientific & Technology research volume 2, issue 6, June 2013.

Strong, M. E. (1990). Administrative leadership in vocational education. In A. J. Paulter, Jr (Ed.), *Vocational education in the 1990s: Major issues.* (pp. 139-156). Ann Arbor, MA: Prakken publication Inc.

Uwaifo, V.O.(2009), "Technical Education and its Challenges in Nigeria in the 21st Century. International NGO Journal Vol 5. (2)Pp. 40-44.

Vibe Ghana- KNUST establishes maiden state- of- art mobile web laboratory- www.vibeghana.com

Wonacott, M. E. (2001) Leadership development in career and technical education. Eric Digest, No. 225. December 22nd, 2003. *www.ericfacility.net/database/ Eric Digest* (ED 347 636).

World Bank policy paper in TVET (1991).

Other Sources

International Journal of Humanities and Social Science Vol. 2 No. 4 [Special Issue – February 2012] 110

International Journal of Humanities and Social Science Vol. 2 No. 4 [Special Issue – February 2012]

The Special Issue on Contemporary Issues in Social Science Centre for Promoting Ideas, USA

The Special Issue on Contemporary Issues in Social Science Centre for Promoting Ideas, USA (Wikipedia, 2013).

APPENDICES

APPENDIX A

Section A

Questionnaire for Teachers, to obtain information about their students

The research topic "The low enrolment of technical courses at the Senior High/Technical Schools in the Upper West Region: a Case study of Tumu Senior High/Technical School" is a dissertation in partial fulfillment of the requirements for the award of master in mechanical technology from the University of Education, Winneba-Kumasi Campus.

You are kindly entreated to respond to this questionnaire guide by circling the letter that corresponds to the answer of your choice. All answers will be treated with optimum confidentiality.

Section B:

Questionnaire for Teachers in Tumu Senior High/ Technical School.

1. Age (a) 21-30 (b) 31-40 (c) 41-50 (d) 51-60 (e) 60+
2. Gender (a) male (b) female
3. Professional qualification [a] cert A[b] BED[c] BSc[d] MED

   [e] others……
4. Academic qualification [a] GCE OL/ SSSCE [b] „A" Level [c] BA [d] MA
5. Department……..
6. Subject……..……
7. Form……..
8. Number of students in your class……

Please select option by ticking (√) the right box.

KEY: SA-Strongly Agree, A-Agree, N-Neutral, D- Disagree, SD- Strongly Disagree.

ITEMS	SA	A	N	D	SD
9. Technical courses are for weak students					
10. Technical courses are too cumbersome to learn					
11. Technical courses do not lead to white-collar jobs					
12. Technical courses are not friendly					
13. The methods used by technical teachers are not appropriate					

14. Please make your own suggestions of how to improve the enrolment of technical courses at Senior High/Technical Schools……

……

……

……

……

APPENDIX B

QUESTIONNAIRE FOR STUDENTS

You are kindly entreated to respond to this questionnaire guide by circling the letter that corresponds to the answer of your choice. All answers will be treated with optimum confidentiality.

1. Age (a) 15-18 (b) 19-25 (c) 26-30 (d) others……..……
2. Gender (a) male (b) female
3. Programme……
4. Aspect if any…….
5. Form……..

To what extent do you agree or disagree with the following statements.

Please select option by ticking (√) the right box.

KEY: SA-Strongly Agree, A-Agree, N-Neutral, D- Disagree, SD- Strongly Disagree.

ITEMS	SA	A	N	D	SD
6. Technical courses are for weak students					
7. Technical courses are too cumbersome or difficult to study					
8. Technical courses do not lead to white-collar jobs					
9. Technical courses are not friendly					
10. The methods used by technical teachers are not appropriate					