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Building Capacity of Teachers and Trainers in Technical and Vocational Education and Training (TVET) in Sudan

Case of Khartoum State

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Submitted by

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Abstract

The purpose of this research was to do applied study to investigate TVET teacher education in Sudan in a bid to rebuild and raise the capacity of the teachers and trainers who are working in the technical schools and vocational training centers in Khartoum state, and to generalize the overall results throughout the Sudan. Specifically, many research questions were addressed to target the main purpose of the study: To what extent the practical components of curriculum are applied in and outside TVET institutions? To what extent the in-service training's programs meet the professional development of teachers and trainers? Is the private sector contributes to the training programs? Which approaches could be implemented to improve the teacher training? To what extent the integration of ICTs in learning and teaching process improves competence of TVET teachers? Is there re-training program for old teachers? Is there need to train teacher in private sector workshop? Moreover: the following concepts are relevant to raising the capacity building of teachers are studied: teacher professional development, capacity building, integration of suitable level of information and communication technology (ICT) to teacher education and the connectivity of training process to world of work.

In order to collect convenient information, the study used the questionnaire and interview as instruments to achieve the objectives of the research. The main population of the study is teachers, trainers, administrators and employers. With respect to data analysis, the study used the SPSS program and the Chi-square to test some hypotheses.

The results of the study showed that essential innovations and reforms on the initial and in-service training programs should be done especially, respect to practical components of the initial and in-service training to reach the professional development for teachers. Since most of interviewees confirmed old curricula of the initial education of teacher and there was no retraining program for the teacher on the job: the linkage of the training to world of work is needed to keep the teacher up-to date. Integration of ICT into learning/teaching process is very important factor because it's one of the modernization requirements; hence if we do not do this now it should be urgent necessity at the near future. Major result of the study the proposed training approach for TVET teachers in Sudan, whereas implementation of this approach depends on three levels: macro- level the political commitment by undertaking

clear national policy and conceptual framework for technical and vocational education and improving the image of teachers, their work conditions and media involvement. Meso-level:(public and private sector): since a moral contribution towards training of TVET teachers should be realized, by providing real opportunity to make a success to this new training approach by means of offering technical support, technical consultation, advanced knowledge, specialized seminars and contributing of all training policies especially the financial cost. Micro-level (TVET institutions): there is vital role of administrators to play to attract best candidates not only students of low grades to TVET domain. For example, integrate simple level technology into curricula. Improve initial and in-service training programs based on training needs assessment. Create good internship, and improving the work environment and incentives for teachers

Zusammenfassung

Der Zweck dieser Untersuchung war, eine angewandte Analyse durchzuführen, zur Untersuchung der TVET Lehrerausbildung im Sudan im Rahmen eines Angebots zum Wiederaufbau und zur Erhöhung der Kapazität der Lehrkräfte und Ausbilder, die in den technischen Schulen und Ausbildungszentren in Khartum arbeiten, und die Verallgemeinerung der Gesamtergebnisse im gesamten Sudan. Insbesondere wurden viele Fragestellungen angesprochen, um das Hauptziel der Studie anzuvisieren: Haben die TVET-Lehrer und -Ausbilder eine Aus- und Weiterbildungerhalten? Inwieweit können die kontinuierliche Weiterbildungsprogramme der technischen und beruflichen Bildung die Anforderungen des Arbeitsmarktes befriedigen? Wie können der Arbeitsmarkt und der private Sektor an den Ausbildungsprogrammen mitwirken? Gibt es ein Umschulungsprogramm für alte Lehrer? Ist es notwendig, Lehrer in Workshops im Privatsektor zu trainieren? Darüber hinaus sind die folgenden Konzepte relevant für die Erhöhung der Kapazitäten von Lehrkräften, die untersuchtwerden: berufliche Entwicklungder Lehrer, Aufbau von Kapazitäten, die Integration einer angemessenen Stufe der Informations- und Kommunikationstechnologie (IKT) zur Lehrerausbildung und die Verbindungsfähigkeit des Trainingsprozesses mit der Arbeitswelt.

Um geeignete Informationen zu sammeln, verwendete die Studie den Fragebogen und das Interview neben der Beobachtung als Instrumente, um die Forschungsziele zu erreichen. Die Hauptpersonen der Studie sind Lehrer, Ausbilder, Verwaltungspersonal und Arbeitgeber. In Bezug auf die Datenanalyse, verwendet die Studie das SPSS-Programm und das Chi-Quadrat, um einige Hypothesen zu testen.

Die Ergebnisse der Studie zeigten, dass wesentliche Neuerungen und Reformen in den Aus- und Fortbildungsprogrammen vorgenommen werden sollten, hinsichtlich der praktischen Komponenten der Aus-und Fortbildung zum Erreichen der beruflichen Entwicklung von Lehrkräften. Da die meisten der Befragten den alten Lehrplan der Erstausbildung der Lehrer bestätigten und es kein Umschulungsprogramm für den arbeitenden Lehrergab, ist die Verknüpfung der Ausbildung zur Arbeitswelt notwendig, um die Lehrer auf dem Laufendenzu halten. Eine Integration von ICT in den Lern-Lehrprozess ist ein sehr wichtiger Faktor, weil es eine Modernisierungsanforderungen ist; daher, wenn wir dies nicht jetzt tun, so sollte das

dringende Notwendigkeit an der nahen Zukunft sein. Hauptresultat der Studie ist der vorgeschlagene Ansatz für die Ausbildung der TVET-Lehrer im Sudan, wobei die Umsetzung dieses Konzepts von drei Ebenen abhängt: Makro-Ebene (das politische Engagement) die Übernahme einer klaren nationalen Politik und eines konzeptionellen Rahmens zur technischen und beruflichen Bildung und die Verbesserung des Ansehens der Lehrer, ihrer Arbeitsbedingungen und die Einbindung von Medien. Meso-Ebene: (öffentlicher und privater Sektor): ein moralischer Beitrag soll zur Ausbildung von Lehrern TVET realisiert werden, indem eine echte Chance zum Erfolg dieses neuen Ausbildungsansatzes geboten wird durch das Angebot technischer Unterstützung, technischer Beratung, fortgeschrittener Kenntnisse, Fachseminare und ein Mitbeteiligung an der Bildungspolitik vor allem an den finanziellen Kosten. Mikro-Ebene (TVET-Institutionen): Eine wichtige Rolle von Administratoren ist es, die besten Kandidaten zu gewinnen, nicht nur Studenten mit schlechten Noten bei der TVET-Domäne. Zum Beispiel das Integrieren eines einfachen Niveaus an Technik in die Lehrpläne. Die Verbesserung der Aus- und Fortbildungsprogramme, die auf der Ausbildung basieren, bedürfen einer Begutachtung. Das Erstellen eines gutes Praktikums und die Verbesserung der Arbeitsumgebung und Anreize für Lehrer.

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Finally praise be to God (before and after) who made it possible and put all the above-mentioned people in my track.

Hashim

Declaration

PhD Dissertation: "*Building Capacity of Teachers and Trainers in the Technical and Vocational Education and Training (TVET) in Sudan. Case of Khartoum State***"** is my own work. I herewith declare that I have produced this research without the forbidden assistance of third parties and without making use of aids other than those specified; notions taken over directly or indirectly from other sources have been identified as such. It is my own responsibility to announce that this study has not formerly been presented in identical or similar form to any other German or foreign examination board and also not undertaken any previous unsuccessful doctorate proceedings.

Hashim. A. E. Ahmed

Dresden, Germany Date: 25.08.2011

Dedication

This thesis is dedicated to my spouse (*Reem*) and kids (*Rwan, Israa* and *Awab*) whom were obliged to be away from their father for long periods and to all my relatives and friends who missed me much.

Hashim

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List of Abbreviations

ADSL	Asymmetric Digital Subscriber Line
ATCs	Artisan Training Centers
ATE	Administration of Technical Education
AU	African Union
B. Ed	Bachelor of Education
B. Sc	Bachelor of Science
BA	Bachelor of Arts
BMZ	German Federal Ministry for Economic Cooperation
CD-ROM	Compact Disk-Read Only Memory
CEDEFOP	European Centre for the Development of Vocational Training
CPD	Continuing Professional Development
e.g.	Latin expression “exempli gratia” means “for example”
EC	European Commission
EFA	education for All
ET	Education Technology
etc	Latin expression “ Et cetera” means “ and so forth”
GDP	Gross Domestic Product
HCVTA	Higher Council for Vocational Training and Apprenticeship
HMI	Her Majesty’s Inspector
HRD	Human Resource Development
ICT	Information and Communication Technology
ILO	International Labor Organization
INSET	In-Service training
ISP	Internet Service Provider
IT	Information Technology
ITS	Industrial Technical School
KMK	Kultusministerkonferenz—Conference of the Ministers of Education and Cultural Affairs

KTI	Khartoum Technical Institute
MA	Master of Arts
MGE	Ministry of General Education
MHESR	Ministry of Higher Education & Scientific Research
NARIC	National Academic Recognition Information Centre
NCVER	National Centre for Vocational Education Research
NCS	National Comprehensive Strategy
NCTTE	National Council for Technical and Technological Education
NGOs	Nongovernmental Organizations
OECD	Organization for Economic Co-Operation and Development
SCVTA	Supreme Council for Vocational Training and Apprenticeship
SKVTC	Sudanese Korean vocational training center
SMEs	Small and Medium Enterprises
SPSS	Statistical Package for Social Sciences
SSA	Sub- Saharan Africa
TEC	Technical Education Corporation
TSS	Technical Secondary School
TVE	Technical and Vocational Education
TVET	Technical and Vocational Education and Training
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEVOC	International Centre for Technical and Vocational Education and Training
VET	Vocational Education and Training
VTC	Vocational Training Centre
WB	World Bank

1. General Introduction

"*Since education is considered the key to effective development strategies, technical and vocational education and training (TVET) must be the master key that can alleviate poverty, promote peace, conserve the environment, improve the quality of life for all and help achieve sustainable development" (UNESCO, 2004a).*

1.1 Introduction

Technical and vocational education with regards to individual occupational preparation in addition to national development is well recognized worldwide today. (TVET) has an important role to play in preparing young people for the jobs of tomorrow (Atchoarena & Delluc, 2002). TVET is therefore considered essential because a country cannot achieve economic and social development without a skilled, productive labor force that can meet the changing requirements of its environment.

In Africa for instance, there is a call for the vocationalization of higher education in particular and the whole educational system in general. The lack of further educational and training opportunities has muted any interests bright and motivated young people may have had toward TVET (kerre, 1997). Technical and vocational institutions are comparatively more expensive to run. Since more equipment, hand tools and to some extent learning/teaching materials are often imported. It is difficult for these developing nations to raise sufficient foreign capital to meet the cost. In the Sudan, the majority of the vocational training centers and some technical schools were established with support or donations from different multilateral and bilateral donors of United Nations organizations and friend countries especially the former West Germany (Washi, 2004). Therefore, these institutions have been deteriorated as soon as the aid and financial support were stopped based political attitudes. Due to this high costs, TVET teacher's education especially at the graduate level is almost exclusively carried out overseas. This has further cause's incompatibilities between trained manpower and the work environment they are eventually bound to serve (UNEVOC, 1997).

In Sudan as in all other African countries, TVET teachers have been recruited traditionally, from artisans, tradesmen, technicians and engineer/technologist whose major training has

been concentrated on technical areas but with fewer being trained as teachers and trainers. It is rare that specialists undertake a diploma in education to prepare for teaching the subject in schools. These modes of recruitment and training have not been without associated problems. In several areas, due to low payment, it has not been possible to attract the right teachers to these areas as most qualified TVET professionals often opt for development in enterprises or self employment where incomes are more attractive (Kerre, 1997). The role of technical and vocational education and training in preparation of manpower for the national development is well acknowledged in Africa today. Never the less, the potential of this aspect of education has not been fully exploited due to a wide variety of constraints. This has left the majority of potential work force unprepared for the world of work. An important step forward in addressing this problem must begin with teacher preparation. Without qualified and well experienced TVET teachers and trainers to plan for and execute TVET programs not much can be realized at the grassroots. There is a need for higher level trained TVET experts to provide the professional academic and research leadership in the field to support policy formulation, planning, development and implementation. In this context, Bird defined a fully qualified technical/vocational teacher as one who is certified in his/her area of expertise, and has appropriate level of pedagogical skill (Bird, 1997).

With regard to TVET teachers in Sudan, there is no recent study to highlight their real situation. A previous study reported the presence of more than 400 vocational instructors in the vocational training centers throughout the country but most of them were untrained (Washi, 2004). The number of teachers in technical secondary schools and their training status remained uncertain. Therefore, this study will focus on the two categories of teachers in Khartoum state. Taking into account the poor status of the laboratories and workshops, this will definitely mean that the situation of the student's training (the output) will not be up to the standards required. Regarding to training process of teachers and trainers of vocational and training centers (VTCs), a training program was available through the former Federal Republic of Germany from 1964-1995 in which approximately 200 trainers were trained. Training was focused primarily on technical and pedagogy training. About half of those who received this training are still working in VTCs, while the rest were qualified for better paying jobs outside the country. Other teachers were trained in Japan,

Italy, Egypt and South Korea with the support of United Nation's vocational training project coordinated through the International Labor Organization (ILO) training center in Turin. In Sudan, it has only been since 1995 that a training institute for vocational teacher/trainer has been available where experienced staff offer course in effective teaching methods for newly recruited vocational teachers/trainers (Washi, 2004). Since 1995 the new recruiters to VTCs have not received advance training abroad in comparison to those old ones.

1.2 Overview of the educational policies

Education in Sudan is characterized by a flexibility that enables it to acquire a renewed vision of growth and development. Recently, the education system was subjected to a wide spectrum of innovations and reforms that affected all aspects of the educational process whether legislative, institutional, pedagogical, or methodological (MGE, 1996).The educational reforms in policy and legislation aim at universalization of education and the achievement of equity through nontraditional practices. The policy stresses the provision of education for vulnerable groups such as women in remote areas. This was demonstrated by the establishment of mobile schools for the nomads, temporary ones for the displaced and special institutions for the handicaps. The policy has also expanded to cover the domain of basic education by the expansion of preschool education (MGE, 1996). The educational administration has experienced further decentralization at grassroots. This is to shorten the administrative shadow, improve efficiency and better use of available resources. The national employment policies have changed thus; the training and employment opportunities have also diminished for graduates in both the public and private sector (Ibrahim, 2001). As a result of these changes, the federal ministry has become of a technical nature, responsible of national functions of common interest such as planning, training curricula, evaluation and foreign relations. All other aspects of the educational process have been delegated to the states. States also participate in the federal functions through their representations in the national council of general education (MGE, 1996)

1.3 Problem Statement

Teachers and trainers who are working in TVET institutions in Khartoum State could be classified into three groups according to the level of training they received. The first group

has not been trained at all, the second group has received inadequate training and the third one has received an early training program and need to be retrained. Therefore, there is an urgent need to conduct a study to investigate the current situation of teachers and trainers with respect to the training process, place of training, qualifications and competencies, condition of laboratories and workshops. The study also will propose new training approach in a bid to build the capacity of TVET teachers in Sudan.

1.4 Objectives of the study

The general objective of this study was to investigate the capacity building of teachers and trainers in (TVET) in Khartoum, Sudan. Specifically, the study aims to carry out this issue under the following objectives:

1. To investigate the practical components of curriculum of initial teacher training programs for TVET Sudan.
2. To investigate the teacher professional development through in-service training
3. To study the competences of teachers and trainers in regard to ICT use.
4. To identify whether the labor market and private sector contribute in TVET training.
5. To propose training approach for TVET teachers in Sudan.

1.5 Research Question

The following research questions guided this study:

- Have the TVET teachers and trainers in Sudan participated in initial and in-service training?
- To what extent the practical components of curriculum are applied in and outside faculty?
- To what extent the in-service training's programs meet the professional development of teachers and trainers?
- Is the ICT considered as a part of the current initial teacher training programs?
- To what extent the integration of ICTs in learning and teaching process improves competencies of TVET teachers?
- Is the private sector contributed to the training programs?
- Is the laboratory and workshop of TVET institution adequate?
- Is there re-training program for old teachers?

- Is there need to train teacher in private sector workshop?
- Which approaches could be implemented to improve the teacher training?

1.6 Study hypotheses

In accordance with the above stated objectives, the study formulated the following hypotheses:

1. The practical components of initial teacher training programs in Sudan do not support much the improvement of the teaching competences.
2. The in-service teacher training programs do not match to the professional-development needs of teacher.
3. Teacher training in Sudan integrates the development of ICT-Skills for improving the teaching competence.
4. The private sector in Sudan does not contribute to promote TVET teacher training programs currently.

1.6 Limitations and justification of the study

The generalization of TVET problems in Sudan cannot be treated as one package, so this study will concentrate only on the teacher training. This field is considered to be the yardstick for the whole process and any developing in this side will lead to good results. Therefore, the study will investigate the teachers and trainers of secondary technical schools and vocational training centers. Recently, teacher training suffered many problems such as: ignorance, lack of funding, shortage of training, and insufficient workshops and laboratories. All these limitations will be considered in this study.

With regard to Khartoum State, there are many industrial technical schools and vocational training centers in comparison to other states in Sudan. The expansion of Khartoum state labor market gives strong rationale for TVET to be tackled and improved particularly raising the capacity of TVET teachers and trainers to meet the rapid transition towards modernization. Situation of TVET in states reflect apparent deficiency and in a substantial need for development. The availability of data and concentration of TVET institutions in Khartoum state, urge most of the TVET researchers to study the state which contains- 6 vocational training centers accounts for about 50%of the whole number (12 VTCs,) throughout the country (Rasmi, 2005). The capital also, has a high proportion of industrial

technical secondary schools (13) in different streams: industrial (8), agricultural, commercial and home economics. These give a very convenient representation of the whole country. Accordingly, this study will be held in Khartoum state and the expected findings can be generalized to the whole country.

1.7 Structure of the study

The study consists of six chapters. The first chapter is an introductory chapter highlighting the general overview, problem statement as well as study objectives, hypothesis and limitations and justifications of the study. Chapter 2 is an overview of the pervious and current situations of the educational system and TVET in Sudan with emphasis on historical background, current situation and reality**,** general characteristics, strategies, policies, plans and main objectives and labor market characteristics. The theoretical framework in addition to recent and pervious of TVET at global levels is presented in Chapter 3. Chapter 4displaysthe study area describes data collection and tackles other methodological aspects of the study**.** It explains in details the study area, population; sample size and target groups, sampling frame and techniques, the formation of research tools and methods necessary for the process of data collection and analyses. Chapter 5 deals with presentation of the results. Chapter 6 shows the study findings, conclusions, and recommendations

2. Background of educational system in Sudan

2.1 Introduction

Education is very important service for the life of human being. The Sudan has long educational history developed from the traditional form (Religious education) to contemporary one. This chapter shows the current educational system in the Sudan from the basic to tertiary education and situation of the vocational and technical education.

2.2 General Education

The educational ladder in Sudan was changed many times, from 4-4-4 to 6-3-3 in 1972, then again to 2-8-3 in 1992 to comprise two-year pre-school level, 8-years basic education level and three years secondary school level (Fig 1). Secondary school level can be academic, technical or vocational education in a bid to reform the educational system to Meet the education needs (ESSA, 2007).

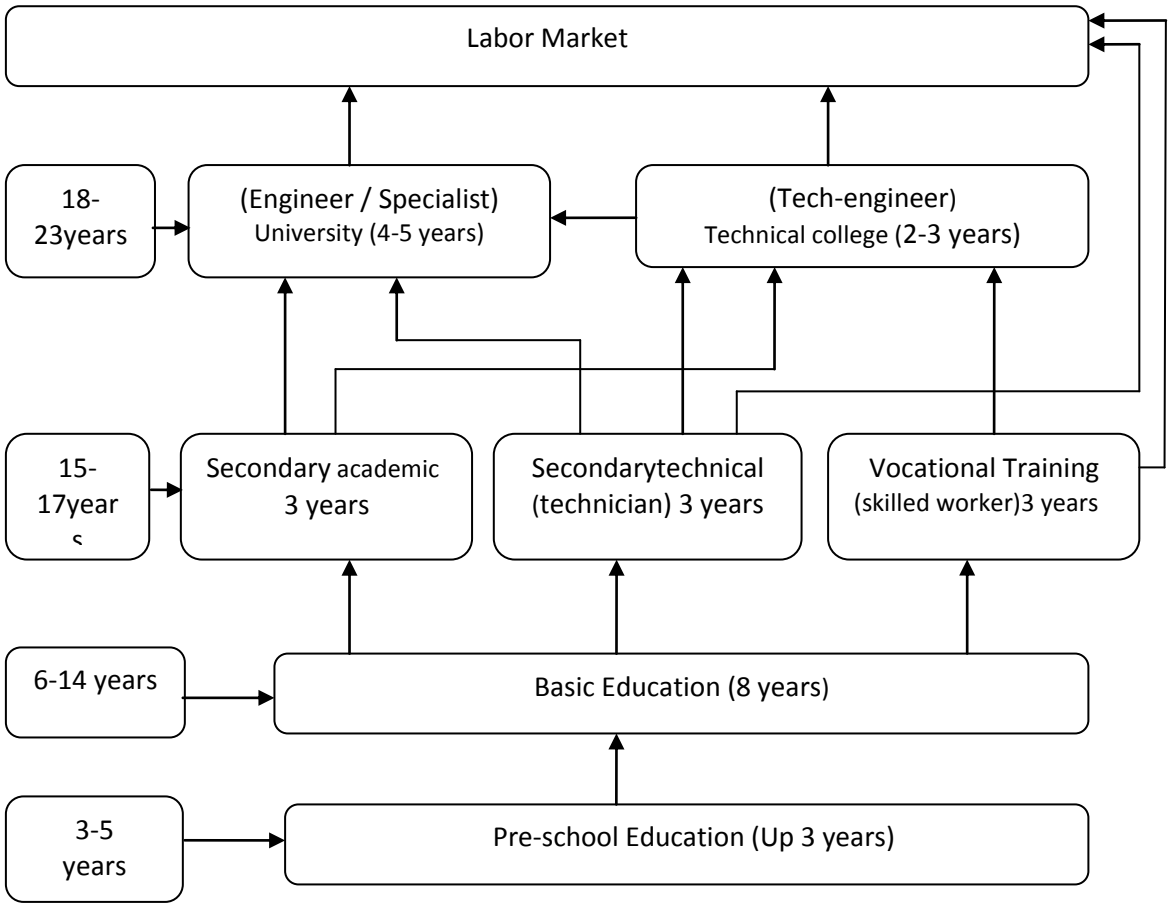

Figure 1: Educational system in Sudan (adopted by the author2008)

Regarding to the basic Education, Children between the ages of 6 and 14 follow an eight-year cycle. This system was introduced to guarantee maximum possible basic education years, particularly due to the high dropout of school at an early age recently. Many problems were appeared due to this educational system. According to one specialists the incorporation of the previous primary level (6 years) within the intermediate level (3 years) to become one stage (the current basic stage of 8 years) has occurred negative role on the educational process; this is because the pupil remains existed at the same place for long time and may cause depression and carelessness. Moreover, a senior pupil of 14 years old existed together in one place with a junior one of 6 years old. No doubt this situation creates many clashes, in different aspects psychologically, socially and behaviorally.At secondary level students can choose between academic and technical/vocational education streams. The academic stream is a three-year cycle leading to the Sudan School Certificate. In the first two years students follow the same curriculum; the third year provides a choice between arts and sciences. Within the science stream students can choose between biology and mathematics.

Technical and vocational schools offer secondary education for students in the following areas:

- Agriculture (11 schools for boys only)
- Commerce (76 schools for boys only)
- Industry (37 schools for boys only)
- Home economics (6 schools for girls only)

These schools cover a mixture of academic and technical subjects. Courses last three years and also lead to the Sudan School Certificate. Successful students may proceed to study applied sciences and technical subjects at the university level (NARIC, 2007a).

2.3 Higher Education

Higher education in the Sudan is comprised all types of post secondary education. It plays an important role in providing the generations with the necessary knowledge, values and skills to bear the responsibility of the overall development and to play their roles in different aspects of life. Moreover, higher education provides the society with the intellectual, professional, scientific, educational, political, cultural and administrative personnel for development.

The first half of the nineties has witnessed the expansion of higher education throughout the Sudan where the number of universities has dramatically increased from 10 in 1990 to 24 universities in 1995(M G E, 1996). Public higher institutions have in turn, increased from 7 in 1990 to 13 in the year 1995. The government of Sudan is concerned with the necessity of expanding higher education to meet community demands and to reach international rates which in some countries reach 60% of those in the age group 18-24. Based on the above statement, the government has formulated an educational policy to admit all successful candidates in the Secondary School Certificate into higher education (M G E, 1996).The intake for higher education expanded several times, planned for admission jumped from 6080 in 1989-90 to 48170 in 1999-2000 with an increase of 692 % (MHESR, 2005*).*The current expansion in higher education has produced social, political and economic benefits by offering more opportunities to students coming from the least developed states. The new university establishments in the states have designated 20% of their seats to students from the same state. Lately this percentage was raised to 50% to encourage more students from the least developed states to pursue their higher education. Women also benefited from the positive bias towards women education since the state's strategy called for the removal of any discrimination against women who were given equal opportunities for higher education and were encouraged to benefit from this privilege. Consequently, the expansion in the intake opened more opportunities for female students in higher education institutes. As a result, the percentage of female students at the higher education level has increased from 37.7% in 1989-90 to 60.9% in 1999-2000 *(*MHESR*,* 2005*).*

2.4 Teacher Education in Sudan

2.4.1 Initial-service training

In the first education system of 4 -years for each stage, the primary school teacher were trained in 2 to 3-years courses. Students were admitted to these courses after completing secondary school. Since 1971(the starting of 6, 3, 3 education system) the training period has been extended to 4-years. Male and female students were enrolled in ten centers with 26 classes and 232 teachers. Pupils/teacher ratio was 4:1 at that time. In 1973, the number of institute had increased to 17 with yearly output of 2000 and enrolment had grown to

reach 8500 students. However, General secondary school teachers were taken and selected from qualified output of higher secondary school to teach directly in general secondary school for 3 to 4 years. Then they are selected for entry in general secondary school teachers training institute where training lasts 2-years. In 1973, there were two training institute one for boys and the other for girls. Higher secondary school teachers are trained at Higher Teacher Training Institute which admit student obtaining high marks in the Sudan School Certificate Examination. The institute awards bachelor degree in education at the end of the 4 – year's courses. This in addition to university graduates who join teaching profession at this level either obtain a certificate of education from post-graduate institution or undergo training courses after they start teaching in secondary schools (UNSECO, 2003).

2.4.2 In-services training

The idea of in-services training was supported by UNESCO in early 1970s. In Sudan the system help in training of primary and intermediate or general secondary school teachers, help in upgrading under qualified teacher and provide them with continues knowledge to follow the knowledge.(Osman, 2005)

In the previous system, evidence show that in-service training recommended to meet the increased demand for primary school teachers arising as a result of the new educational structure. Higher school graduate were given a highly intensive course of two weeks duration and then sent to schools. Similarly untrained teacher were given upgrading courses. Teachers training instructors are given two to one-month sessions courses over consecutive summers followed by in between follow-up program. These courses organized in collaboration with Higher Teacher Training Institute. Many other instructors were trained in these courses in collaboration with newly established In-service Education Training Institute.

In addition, training department of the ministry of Education had drawn program for upgrading of teaching and supervisory personnel, particularly at primary level. The trained personnel at this institute estimated to be 12,510 out of these trainers 25% were headmasters, 20% partially trained teachers 19% sub-grade teachers 37% secondary teachers who received no pedagogic training (Osman, 2005)

2.4.3 Present teacher training and education system

Teacher training is very important as both quality and efficiency of education process depend on well trained and educated teachers.

Educational reforms of 1990s included also the teaching profession, in terms of academic and professional training for basic school teachers, who would only be recruited if they had attended a University degree. The 23 old teacher training institutes become university colleges of education. The teaching staffs enjoy the special services condition equal to the rest of university staff in other college. The University degree or Bachelor of Science (B.Sc.) becomes the required qualification for all teacher at all levels of general education. (SRICE, 1996)

The ongoing development of the education structure necessitates upgrading of teacher to university level. Teachers are trained in University College to improve academically and professionally. There are two types of teacher colleges:

College of basic education teachers:

There are twenty three (23) colleges of this type accepting untrained teachers. These college awarded bachelor degree in education. The minimum education qualification for the appointment of basic school teachers has been raised from secondary pass to Bachelor of Education (B.Ed.) degree. The 4 years course program is presently offered in these 23 faculties of education. Only B.Ed. qualified teachers are being recruited as basic school teachers from 1997 onwards. Along with enhancement in the qualifications of teachers, their salary scale has also been raised (UNESCO, 2003)

College to train secondary school teachers:

There are 20 education colleges of these types. Other university graduate take In-service training courses usually undertakes for training principals and supervisors. There are also short courses oriented for training of junior or new appointed teachers. Technical school teachers have received short course in their specialization they are also trained for having B. Sc in technical education (upgrading through in-service training) (SRICE, 1996).

This policy was adopted in 1994, and, as a result, eight thousand teachers obtained university degree (Bachelor of Education) in 2000. In order to promote the teacher social

and economic status and to enhance his stability, a number of decisions were made and a number of secondary school teachers were re-trained. (Arora, 2003)

2.5TVET in Sudan

Technical and vocational education in Sudan faces great challenges in such a way that most of industrial and agricultural projects; social and medical services and the exploitation of natural resources do not find the qualified technical cadres for their implementation. Moreover, those challenges increased and become more complex because of the rapid technical developments worldwide.

Qualifying of technicians needs several capabilities including establishment of well-equipped laboratories and specialized workshops and qualified instructors/trainers and the review of the curricula in accordance with the needs of the labour market and development (MHESR, 2005).

In Sudan, there are three educational concepts deliberated between educators; regarding to non-academic education. These concepts are:

1. Vocational education
2. Technical education
3. Technological education

The following table illustrates the type, duration, degree/level and practical/theoretical content that differentiate each Level.

Table 1: Different types of education in Sudan

Type	Duration(year)	Degree/ Level	Practical/Theoretical(%)
Vocational Education	2-3	Vocational diploma	70/ 30
Technical Education	3	Technical diploma	60 / 40
Academic Education	3	Sudan School Certificate	30 / 70
Technological Education	2-3	Tech-Engineer	40 / 60
University Education	4-5	Bachelor	20 / 80

Source: (Osman, 1998)

2.5.1 Vocational Education in Sudan

In Sudan Vocational Education and Training (VET) is delivered through a variety of government, nongovernmental agencies, and individuals at central and state levels.

Formal vocational training in Sudan started in 1956, the year of independence, when Khartoum (1) vocational training center was established to upgrade the skills of already employed workers (Washi, 2004). At that time, its activities have been expanded to accommodate vocational test programs and skills measurements to individuals through the traditional vocational training and informal methods. Subsequently, problems of school dropout were posed, and in 1964, the apprenticeship program has been admitted to qualify youth to the level of a skilled worker by the help of German government (Rasmi, 2005).

In the same year (1964), the government of the former West Germany established Khartoum (2) Vocational Training Center and provided modern equipments and laboratories. Most of trainers in the centre have received training in Germany. However, the fund has been stopped by the government of Germany resulting in diminished care or damaged equipments with no maintenance or replacement (Washi, 2004).

Another vocational training center in Wad-Medani city, Sudan was established jointly by the government of Sudan and the United Nations Development Program (UNDP) and the (ILO) as executing agencies in 1970. The year 1970 witnessed the establishment of vocational training centers in both Kosti and Wau cities with efforts and funding of the federal government of the Sudan. Later, both centers received technical assistance from the World Bank (WB) and West Germany (Washi, 2004). The year 1975 witnessed the establishment of Juba city vocational training center with Nongovernmental Organizations (NGOs) and (WB)funds. In 1980, Germany built the vocational training center in Port Sudan city as a turnkey project. In 1983, Malakal city vocational training center was created with a cost- sharing fund from the government of Sudan and Switzerland. In 1990 and 1991, UNDP/ILO and the government of Sudan collectively established the twin vocational training centers of Nyala and El-Obeid cities. In 1994, the government of Sudan established Khartoum (3) vocational training center. The government of Korea has helped to establish the Sudanese Korean Vocational Training Center in Khartoum in 1996 (SKVTC, 2003). Recently in 2002, the government of Italy established Dom Bosco Vocational Training Center in El-Obeid, which is considered as the biggest well-equipped center in western Sudan.

The VTCs distributed throughout the Sudan offer technical training in fields such as woodworking, general electricity, automotive, leatherworks, buildings, carpet weaving, and welding. The target group is the basic education dropout who can be trained in two years. The

training curriculum is composed of 10% general subjects, 20% technically related subjects and 70% practical training. A total of 2000 students were enrolled in VTC during the 2001-2002 academic years, but VTCs are generally underfunded and suffering from shortage of trained staff (Washi, 2004).

Management Structure, Legislation and Activities

The most recent legislation development is the enforcement of the new Vocational Training and Apprenticeship Act that was issued in May 2001 and cancelled in conformity with the former Act of 1974 (Rasmi, 2005). In 2003 the Supreme Council for Vocational Training and Apprenticeship (SCVTA) has been formed as a policymaking body and it replaced the former National Council for Vocational Training and Apprenticeship which has served as an advisory body and to formulate national policies and plans for public service and administrative reform. Transform those policies and plans its programs and projects and coordinate and monitor their implementation. The new council is headed by the Federal Ministry of Manpower (Washi, 2004).

The Council was formed to achieve the following objectives:

- Set up vocational training strategies and policies on a national standard.
- Design and finalize vocational training plans and programs including study of training needs.
- Follow up and approve the different training programs.
- Setting standards and levels for the various occupations through specialized committee's machinery. the committee was responsible for recruitment of fresh graduates from universities and diploma holders from higher institutes
- Encourage scientific research related to vocational training.
- Authorization of the stipulations of in-service working.
- Award certificates and degrees in vocational training in all vocational centers throughout the country (MLPSHRD, 2008).

The council committed new work guidelines calling for transforming vocational training concepts from preparing schools graduates to work as skilled wage earners into a new philosophy based on building capacities and upgrading skills needed to strengthen their capabilities to work for their own accounts especially in rural areas. That is further to special emphasis on urban informal economic sector; a participation in reduction of

unemployment and poverty levels. In order for vocational to contribute substantially to socio economic development and thus help solving the problem of unemployment.

The council is provides variety of training programs and other services rendered for the whole country, these programs are:

1. An apprenticeship program. Which was a pre-service training designed for teenage youths with successful completion of basic education (8 years of schooling). The duration of the study is three years, two years inside the training center, and the third year to be spent in a relevant industry. The curriculum is composed of 70% practical training and 30% theoretical studies (Rasmi, 2005).

2. skill-upgrading courses, which are short courses usually of 3 months duration but possibly less (duration depends on the volume of training gap to be bridged) directed towards already employed workers in both public and private sectors to allow them to cope with advancement of technologies, raise their productivity and improve their product quality.

3. Short courses (3 months) directed to dropouts and out of school youth especially those who live in rural and conflict areas.

4. Women in development programs, which have been recently introduced in the vocational training system. These programs are designed for females with the overall goal of integrating women in the development process by providing for women skills and productive knowledge in tailoring food industry computer and electronics. Duration extend from 2 to 6 month.

5. Trade Testing Activity. This is carried out to certify workers who acquired training through informal or traditional means of vocational training (Washi, 2004). These programs are made for workers to test their aptitude and skills obtained through traditional vocational training programs in order to document and endorse these skills by the Supreme Council for Vocational Training. The test is carried within 3 to 5 days.

6. Mobile training programs

These are programs especially designed for rural population remote areas and displaced person. The duration of the program differs according to the conditions in the area and training needs.

7. Small Enterprise Development Programs

These programs are designed for training craftsmen micro procedures and self employed to promote their design and productive capabilities. The duration-on of the program is agreed upon with concerned authorities (MLPSHRD, 2008).

The major and chronic problem of vocational and technical education in the Sudan is the lack of funding. Government resources are crucial for the development of quality vocational and technical education. Nevertheless, private sector and community financial support is also needed for better human resource development. During the period 1985-1996, only 0.5% of Sudan's GDP was spent on education. There is a great need for establishing means for financing of critical human resource development (HRD) programs (Ibrahim, 2001) as well as the need to build program capacity which will require effective planning and management. Other administrative issues including lack of involvement by employers, workers and other pertinent bodies in terms of needs assessment, training plans, and curriculum revision and design.

New development in vocational-technical education was introduced since 1993. It was designed to guide the federal/ state government system that resulted in the jurisdiction of VATCs being transferred to the states. Many problems have been encountered in operationalizing this transfer, the least of which has been the ambiguous status of the organizational and institutional relationships between state and federal government. In most of the states, the economic situation has not allowed them to manage or finance the VATCs. Thus these centers have become an additional burden to the states (Washi, 2004). This crisis of public finance in all of the countries of Sub-Saharan Africa also led to cuts in operating budgets of public institutions providing Technical and Vocational Education (Atchoarena, & Esquieu, 2002)

Vocational Teachers and Trainers

At first, it is better to distinguish between a teacher and a trainer. A trainer shows you how to do something may be in the workshop or laboratory inside the educational institution or even the firm outside; whereas a teacher leads you along a path of understanding and pointing you down new paths you never knew existed (Mountain, 2005).

Presently, there are over 400 vocational trainers in the Sudan that can be classified into three main categories: the first group is composed of experienced workers who make

about 5% of the total number of trainers. The number included in this group is dwindling as a result of the lack of new recruitment. The second group of trainers includes former graduates of VTCs who constitute about 70% of all trainers. Some of those trainers upgrade their skills via graduate study to qualify for better working positions. The third group consists of university or polytechnic graduates who formulate the remaining 20% of trainers. This employment cadre is not appealing to most Sudanese trainers which led to migration for many of them (Washi, 2004). In terms of teachers training, training program was available through the former federal Republic of Germany from 1964-1995 in which approximately 200 instructors were trained. Training program focused primarily on technical and pedagogy training. About half of those who received this training still working in VATCs, while the rest qualified for better paying jobs. Other instructors were trained in Japan, Italy, Egypt, and South Korea with support from UNs' Vocational Training Projects coordinating with ILO International Labour organization training center in Turin. In the Sudan, it has only been since 1995 that a training institute for vocational-technical instructors has been established and available. In this institute experienced staff offers courses in effective teaching methods for newly recruited vocational-technical teachers (Washi, 2004). The below table shows number and gender of trainers and teachers who are working in the formal vocational training centers in Khartoum state.

Table 2:V.T.Cs in Khartoum and number of trainers according to gender

Center / Gender	Khartoum 2 V.T.C	Chinese Friendship V.T.C	Khartoum1 V.T.C	Khartoum3 V.T.C	Korean V.T.C	Bahry V.T.C	Total
Male	40	44	54	18	17	32	205
Female	12	10	--	1	12	2	37
Total	52	54	54	19	29	34	242

Source: (SCVTA, 2006)

It is worth mentioning that, in Sudan the VTCs services do not cover all the states including those which considered the poorest. Now there are only 8 states that have VTCs service (total of states are 25), and from the 12 VTCs, Khartoum the capital has half of them (6 VTCs) (Rasmi, 2005). That means absence of equity in the distribution of vocational training centers to all states, especially; the states which are historically suffer from poverty and low socio-economic position, that causes regular migration towards the rich states generally, and the capital city in particular. On the other hand, the concentration the

majority of VTCs in Khartoum enhances the existence of development in one place, where it supposed to spread these centers throughout the country to assist people to alleviate poverty there, especially the areas of conflicts and the least developed areas.

Bridging the Vocational Education

The vocational training centers in Sudan play a very important role in absorbing the dropouts of the basic education level by training them for 3 years to become skilled workers in different engineering domains. In the year 1995, the administrators of Technology and Humanity Development in the Sudan University of Science and Technology has decided to give the graduates from vocational training centers a chance to pursue further education, to upgrade V.T.C graduates to achieve the intermediate Diploma in various engineering specializations. Therefore, the Faculty has set up rehabilitation program for one year to fill the gap in the theoretical studies, specifically, in Physics, Chemistry and Mathematics. Thus, this program found remarkable approval, and good number of V.T.C students have been enrolled in it. For instance, 481 students in the year 1995, 653 in the year 1996 and 675 in the year 1997 have enrolled (Ahmed. 1999)

2.5.2 Technical Education

Technical education in the Sudan was started in the early 20th century in 1901 with the establishment of technical secondary schools at Gordon College (later has become University of Khartoum). Such schools were later developed into technical colleges designed to teach engineering, agriculture, electricity and veterinary medicine to cover the government needs for technicians (Bashir, 2006). 1n 1907, the first intermediate technical school was established, hence the technical schools was increased to approximately 28 schools. The year 1954 witnessed the establishment of Khartoum Technical Secondary School and added to it some modern departments such as: architecture, engineering, electricity, welding, mechanics and carpentering. In 1960, a Higher Vocational College was established to absorb graduates from vocational schools. This college has been established with international criteria and standards coupled with a very good educational environment and provided the local and external labour market with qualified engineers in various domains. It was characterized by intensive training programs inside equipped workshops and laboratories.

The technical education in Sudan at that time had an excellent standard, so as the American and British experts' were advised Arabian and African countries who intend to build strong technical education system to seek the help of Sudanese technical teachers. (Bashir 2006), however, after that the situation has been changed after the authority decision to cancel the Higher Vocational College and integrate it into the Sudan University of Science and Technology. The government had also transferred the responsibility of the technical education to the states without sufficient fund, and the deterioration continued until the percentage of technical schools was only 3.8% of the number of academic schools (Bashir, 2006). In early 1970sthe government gave some attention to technical education when the ILO prepared upon the request of the Sudanese government at that time a report of the study of the problems of national development and utilization in the Sudan. Many national experts participated in the workshop to discuss the finding of that report which leads to the preparation, of a comprehensive strategy for development in Sudan. This term witnessed a huge expansion of technical schools reached 28 schools throughout the country introducing 18 schools for occupations and crafts. Moreover, the international organizations and friend countries supported such type of education. However, the insistence of the students to modify the study curricula and to be given a chance to continue schooling to achieve university degree, in addition to transferring some technical institutions to become university lead to more omission and deterioration of such education (Al-Manabir, 2006). Some important policies and decisions considering the social and economics values of the nation and associating general and higher education with economic development needs were made during the higher education revolution. The government's goal is to develop technical and vocational education to form 60% of the total secondary school curriculum and provide more opportunities for higher technical education, as stated in the national comprehensive strategy (NCS), 1992-2002 (Ali, 2000).

Since its establishment, requirements for technical education in Sudan have changed (e.g. the number of years required for completion of various programs has not remained stable or consistent across the country). This situation has occurred primarily because of the pressure exerted by students who want to earn a bachelor degree that would grantee better employment opportunities than do a technical degree. Although many studies and recommendations have pointed out that technicians are the backbone of economic

development, there is an acute shortage of this cadre. This shortage has been mainly due to the lower status of this occupational group in term of salaries and a lack of sufficient funds for technical institutions. Most of those students enrolled in technical education have been forced into the area because of low high schools grades that do not qualify them to enter academic institutions (El-Magzoub, 2000). The figure bellow shows the paradox between students enrolment in secondary technical and general education all states. We can evidently note the high students' enrolment to academic education in Khartoum state comparing to technical education. This situation may attributes to the high density of population and preference of the academic stream.

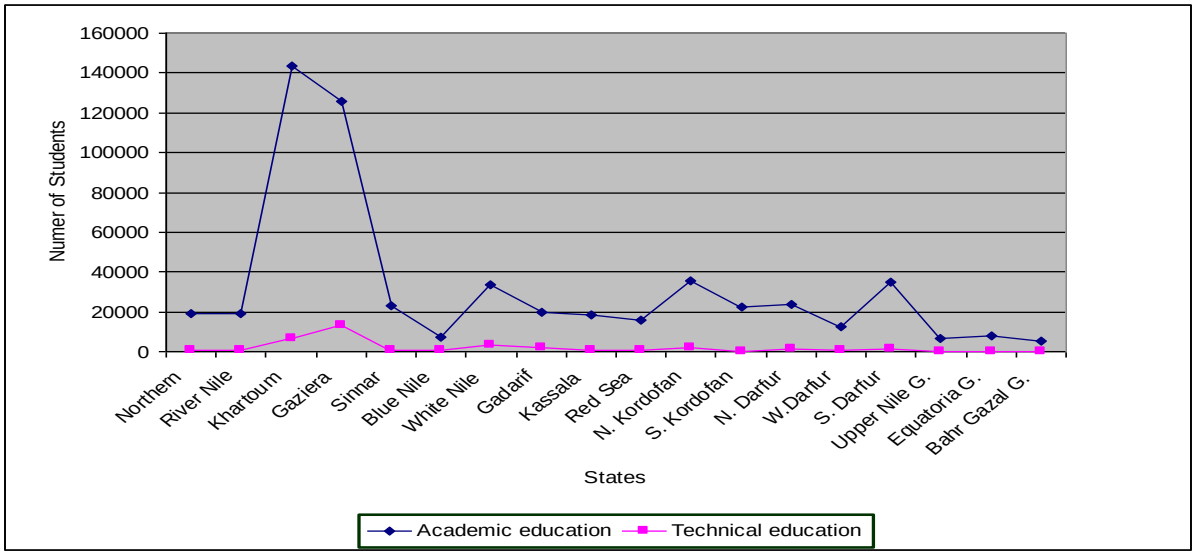

Figure 2: Students Enrolment in Technical & Academic Education (*MoE,* 2007)

At present, there are 33 Artisan Training Centers (ATCs) (not vocational training centers) distributed throughout Sudan. They offer technical training in areas such as woodworking, general electricity, automotive, leatherworks, building, carpet weaving, and welding. The target group is the basic education dropout who can be trained in 2 years. The training curricula is composed of 10% general subjects, 20% technically related subjects, and 70% practical training. A total of 2,000 students were enrolled in ATCs during the 2001-2002 academic years, but the ATCs are generally underfunded and suffer from a shortage of trained staff. They are all operated under the administration of state governments (Washi, 2004). The number of technical schools in Sudan has increased during the period 1989-1998. This increase is not however, corresponding with the increase in enrolment. In fact, there has been a serious decrease in enrolment due to many reasons. One reason is

attributed to the overall changes that have occurred to the education system, starting with a required 4 years of secondary technical education until 1971 when changed to 3 years until 1988. In 1989, the secondary school requirement was re-established at 4 years, but it has since then been changed back to the current 3 years requirement. This instability has been aggravated with the lack of adequate textbooks and references, which has reflected on lower student performance. Moreover, many previous intermediate schools have been transformed into technical schools that do not comply with requirements established for technical schools in terms of workshops and laboratories. Another reason for enrolment problems is the intake policies of most secondary schools. These policies have resulted in distraction of students from technical education. In addition to that, technical schools typically admit students with the lowest academic grades leading to an association between technical education and lower competency. The problems of secondary vocational/Technical schools are compounded by lack of trained staff and shortage of funds needed to operate those schools (*MHESR, 2002).* The tables below compare the student's enrolment figures between general secondary education and technical secondary education in Khartoum state, and number of schools and teachers involved in both types of education, which demonstrates obviously, the bias towards the general secondary education

Table 3: Schools, students and teachers in technical education in Khartoum

Technical Secondary Education in Khartoum State												
School			Student			Teacher						
boy	girl	total	boy	girl	total	Male			Female			Total
						trained	untrained	total	trained	untrained	total	
9	4	13	5154	1630	6784	121	95	216	61	33	94	310

Source: (MoE, 2007) Khartoum-Sudan

Table 4: Schools, students and teachers in academic education in Khartoum

Academic Secondary Education in Khartoum State												
School			Student			Teacher						
Boy	girl	total	boy	girl	total	Male			Female			total
						trained	Un-trained	total	trained	Un-trained	total	
287	436	723	72077	71771	143848	3950	1328	5278	2524	1579	4103	9381

Source: (MoE, 2007) Khartoum-Sudan.

General objectives of technical education:

The main aims of the technical education in the Sudan are:

1. To prepare the students, spiritually, rationally, socially and ethically and provide them with sufficient knowledge and skills to be ready to join the commercial, agricultural and industrial activities

2. To link the plans of technical education with the plans of economic development

3. To give talent students chances to continue studying

4. To increase the productivity to improve the standard of livelihood and developing the national economy

5. To prepare a new generation that appreciate and respect the labour and handicraft (Kheiralla, 1999)

2.5.3 Technological Education

The technological education is considered as a formal type of education for providing suitable skills, practical capabilities and scientific knowledge to make students ready for joining labour market. As well, the technological education aims at preparing technicians for operation, production and maintenance. Therefore, this kind of education is articulated with university level of study duration of 2-3 years schooling lasted of the tech-engineer certificate (see Fig 1), whereas the vocational education was designed to develop skills for talented individuals and it doesn't suppose to meet specific educational standard. On the other hand, the technical education is considered as a level of secondary education below the college standard and belongs to Ministry of Education to prepare educators for especial handicraft (Osman, 1999).

The technological education in Sudan started in 1950 when the Technical Institute in Khartoum was established and aimed at preparing technicians of Engineering in a two years schooling. After that other specialized institutes were established such as; (Shambat) Agricultural institute, and Veterinary Technical Institute, the Higher Institute for Nursing and the Institute of Earth Science and Forestry, which were subsequently attached to the Khartoum Technical Institute (K.T.I). This institute later became of multiple focuses and taught subjects such as commerce, engineering and fine and applied arts. In 1962, the

curriculum was expanded to become four years; and in 1975, it was transformed into the Institute of Technical Colleges which encompassed all the specialized Technical colleges at that time, and finally, in 1990 the need for a higher education institute specialized in technical education in the Sudan upgraded the Institute of Technical Colleges in to Sudan University of Science and Technology.

Technological Education Policies

In 1997, a meeting was held for the technological education committee which decided to achieve five workshops around the present and future of the technological education in the Sudan as follows:

- Conference of present and future of the technological engineering education in August 1998 at Atbara city
- Conference of present and future of the technological education of socio-economic fields in August 1998 at Wad-medani city
- Conference of present and future of the technological health education in October 1998 at Shendi city
- Conference of training and rehabilitation of medical assistant's cadres in November 1998 at Wad-medani city.
- Conference of present and future of the technological agricultural education in December 1998 at Khartoum city (El-magzoub, 1999).

The higher education revolution decided to relate all institutes to suitable universities and modify the academic regulations to give Diploma besides Bachelor, Universities give training opportunities for technicians and professionals.

According to the National Comprehensive Strategy (NCS) concerning the technological education, the following remarks were stressed according to Babiker, 1999:

- Giving more consideration to socio-economic values and connecting the general education with development needs.
- Increasing the technical and technological education to constitute 60% of education.
- Giving priority to technological education to equalize with the academic education in its socio-economic values.

- Establishing more technological institutes to reach 72 institutes at the end of the NCS, taking into account the following points:

➢ The geographical distribution throughout the country.

➢ The admission would be a minimum of 500 students.

➢ The institute would be part of a university.

➢ The domestic education to be encouraged to establish technological institutions and thus the private sectors.

The previous policies give good indicators to technological education and it's important, but the implementation seems very stumble.

Problems Encounter the Technological Education

The technological education remains suffering from non sustainability and instability of study duration due to student's insistence to increase the years of schooling to upgrade the certificate, in spite of all studies which refer to the importance of the Technicians (Osman, 1999). Added to that, many problems face the development of such type of education that can be summarized as following according to (Mohammad et al, 1999):

1. The priority of student's distribution has been given for the academic studies rather than to the technical and technological ones; this policy may thoroughly reduce the competition and aspiration among students of technical and technological field.
2. Weak financial resources that affect the laboratories equipment and field training.
3. There are no clear plans and programs for implementing the technological education.
4. The hierarchy of the technical posts is not clear, thus vast number of the technicians migrate searching for better situation.
5. The instability of the policies of TVE affected the required hierarchy of the national development.

Nowadays, witnessed the emergence of the National Council for Technical and Technological Education (NCTTE) in order to stop deterioration of such type of education. The NCTTE is trying to enacting convenient legislations and create appropriate policies to upgrade its standard and make it more reliable and attractive by creating an independent stream of technical and technological education (Eltuhami, 2007). The first phase of the NCTTE work was diagnostic for the nature of the problems which was found to be:

- Inferiority.
- Absence of central body for organizing, planning and developing.
- Unclear vision in relation to the technical education after the General Education Conference, 1990.
- The affiliation of technical schools to the states (decentralization) in 1993.
- Curricula, specializations and preparations did not cope with the requirements of the labour market.
- Lack of books and references.
- Lack or non-existence of equipment of classrooms, laboratories, workshops and buildings.
- Acute shortage in the qualified and well trained technical teacher.
- The specifications of the buildings do not comply with the specifications of successful educational environment.
- The terms of service do not attract the graduates.

The second phase, the proposed solutions of technical and technological education problems by:

a / providing an effective and unified educational system that link between the technical and technological education.

b/ creating an attractive organizational and functional structure and terms of service.

c/ establishing a unified central body by establishment of the council.

d / realizing coping with the requirements of the labour market.

e/ attracting the private sector to participate and invest in the furnishing of educational and technological training institutions(Eltuhami, 2007).

2.6 ICT in Sudan

ICT policies

In last two decades, Sudan's experience in building and capitalizing on ICT as gateway for custom development is bend mark in the country's history. The institutional, legal and regulatory framework was formed to advance ICT as a strategy for integrating the economy into the global market.

The Sudanese national ICT strategy was formulated in the year 1999. This strategy focuses on five major areas, namely; technology infrastructure, human resource development, software industry development, content (primarily in Arabic), and geo-information (Hamdy 2007).The national policy encourages the use of ICT in developing local policies to ensure the complete integration of ICT in education and training on all levels, including the development of school curricula, teacher training, and managing and organizing educational institutions (Abdelrahman, 2009).

The ICT policy for education was launched in 2002. The Information Directorate and Curriculum Centre and Training Directorate are the entities managing the implementation. In 2004, ICT was introduced in secondary education curricula. A number of computers were installed in schools (around 50% of secondary schools), at an average of 10 computers per school. In schools the connectivity is mainly through dial-up and ADSL. However, in higher education systems, it is through ADSL only. The country is planning to have computers available in all education levels by the year 2015 as agreed to at the ICT summit in Geneva. The ICT curriculum has been introduced at Grade 4. The teachers have been trained on the basics of ICT. Both the government and the private sector provide access to the Internet as a learning resource (Hamdy 2007).

The Ministry of Education has started providing schools and teachers' institutes with computers. An order to import 10,000 or more computers has been placed to provide the rest of the educational institutions with computers. There is an initiative for developing an educational management information system.

In the last two decades Sudan built and capitalized on ICT, and the government has opened up competitive investments in telecommunication. Licensing was granted for newcomers employing advanced technologies, which are hoped to increase the spread of and access to ICT and make products affordable. Although there is an open market in Internet service provision, there is only one ISP - Sudanet[1]. It is planning to open Internet cafes in Khartoum. Development in ICT in Sudan is evident in a substantial expansion of infrastructure and capital investment including management systems and human capital (Elamin, 2004)

[1] banners.noticiasdot.com/termometro/.../aisi/.../aisi_sudan.pdf

Constrains hinder ICT implementation

According to Fatima, (2009) there are many constrains that hinder the best implementation of ICT throughout the country in spite of the promising efforts and policies made by the government and other bodies. These constrains are:

1. Outreach to rural and remote areas still poses a considerable challenge. Poverty, lack of resources, and political unrest puts ICT lower on the priority list of basic needs in most areas of Sudan.
2. Political unrest and civil war hinder nationwide implementation. Skilled, trained staffs that are well acquainted with the ICT tools are very limited. They also tend to prefer the private sector to government positions.
3. Financing and donor interest in Sudan remains limited, especially with the number of embargos that were imposed.
4. There is a huge digital divide between rural and urban areas, especially in relation to computer literacy, and access to telecommunication infrastructure countrywide remain alarmingly low.
5. Arabic electronic content greatly lags behind. Educational material and curriculum need total restructuring and rebuilding. Traditional and longstanding material and curriculum are still in use, which do not comply or meet with the needs of modern society.
6. Female participation in public life in general and education and in the workforce in particular remains fairly low due to longstanding cultural factors and traditions.
7. The political instability in Sudan is a great hurdle that impedes the development process.

2.7Labor market in Sudan

Many factors have negatively or positively affected the Sudanese labour market, specifically the types of scientific specializations, standard of training, skills, and the rate of wages and so on. In general the frame of the labour market consists of main components such as: type of activity, the volume of the establishment, geographical site and the expected growth in the future (Ibrahim, 1999).

Now there is imbalance in the labour market represent by the big overflow of supply in comparison to a big shortage of demand for some specializations. On the other hand, with the increase of the economic growth it will become clear that, the outputs of all educational institutions are not coping with the modern labour market demands of which

the gap between the available technical cadres and substantial need for labour market is still far. This situation made many of the establishments bring foreign labour force to deal with the technological equipments which results in high proportion of unemployment among graduates.

This imbalance in the Sudanese labour market do not only refer to the increasing number of graduates, rather also to the weakness of service and productive sectors which failed to create new job opportunities compatible with the annually rate of workforce growth which is about 4.9 % in comparison to 3 % annual growth of population (Ibrahim, 1999). To summarize the situation of the labour market in the Sudan one can note some remarks: there are many constraints, such as the population transformation, high fertility, and furthermore the increase of women participation in the economic activities in relation to the decrease of job opportunities.

Despite the above mentioned factors, the labour market do not absorbs the new entrants as the unemployment rate is still stabilized at 16.6%.

The second constraint concerning to education outputs which are not coping with the renewal labour market demands, whereas the government over a long term still plays a basic role in employing graduates and to some extent private sector (Ibrahim 1999). The below table, shows the job opportunities of governmental employment among graduates

Table 5: Job opportunities according to types of certificate

Practical Faculty(Bachelor)	Theoretical Faculty(Bachelor)	Diploma
35%	4%	1%

Source: Ibrahim, 1999

The table reveals the big differences in job opportunities among graduates who have a bachelor certificates and graduates from technical and vocational institutions that have a diploma certificate in regard to governmental employment. This situation has affected negatively the social image for such type of education.

The third constraint is regard to the wages which has been decreased owing to the high inflation rate. Moreover, the defect in wage policies that create huge gap between maximum and the minimum wage limitations that was reflected negatively on workers and technicians. Thus, in accordance with the above mentioned analysis, the educational and professional distribution of Sudanese labour force according to the 1996 survey, reflects a

negative profile for the vocational structure, whereas, the post-secondary qualifications form only 5% of the Sudanese labour force compared to 27% in the developed countries (Ibrahim, 1999).

It is worth mentioning that in spite of the higher education revolution outcomes in form of an increased number of graduates annually, the rate of unemployment went up because of unskilled graduates. Therefore the rate of foreign skilled workers is also in rise. There is an urgent demand to concentrate on the technical and vocational education to cope with the globalization challenges.

2.8 Conclusions

Technical and Vocational Education in the Sudan was strongly established during the past decades and resulted in good outputs. This was mainly because most of its institutions were established by aid or support of friend countries and international institutions which provided modern equipments and funded its continuity (programs). Such support was gradually reduced and finally stopped due to political situations on one hand, and on the other hand owing to high the expenses of maintaining such education and training. Hence, the responsibility of these institutions was transferred to the national authorities who failed to provide the necessary budgets for the training and maintenance the workshops and laboratories.

3. Literature Review

"TVET Teachers must be enabled to link closely with the world of work and local/regional communities/society to identify the real training needs and to develop appropriate training programs as well as for youth, adolescents and adults" (Stolte, 2009)

3.1 Introduction

Teachers and teacher education have increasingly been recognized as the most crucial factor of quality in education. According to Morris et al (2007) the goal of teaching is to support student learning. In achieving the inclusive education for all (EFA) goal of 'over-all improvement of quality in education at all levels', diversified innovations in teacher education have been promoted in UNESCO member states, for better initial-service preparation and in-service professional development and building capacity. The dissemination and adaptation of evidence-based successful teacher education innovations in country-specific contexts have been applied as an effective strategy for quality education for all. Globally UNESCO has been mobilizing member states to design and implement viable national teacher education policies within the framework of international normative instruments. It also assists member states in capacity building to address teacher professional development and promote the exchange of knowledge innovative practice and lessons learned (IFTE, 2007).

This chapter describes many issues concerning teacher education development. The term capacity building as highly objective of the professionalism has been explained; also the concept teacher professional development constitutes important step lead to achieve the capacity building. All other components contribute on rising the standard of TVET teachers, like integrating information and communication technologies into initial and in-service training, connecting teacher education to the world of work is considered in order to serve the study purposes on building the capacity of teachers and trainers who are working in the field of vocational and technical education in the Sudan.

3.2 Defining capacity building

While capacity building is a familiar term to planners, policy makers and organizations, it means different things to different people and varied from very general statements to

more specific descriptions, depending on who uses the term and in what context. For example some non-governmental organization(NGO) said: *"We define capacity building as any activities which increase our partner's abilities to carry out or assist others to carry out efforts successfully to improve the lives of the poor,"* Other defines capacity building as *"providing NGO staff with training to run their program effectively,"* (Brown, et al. 2001).

Many international bodies were adopted specific definitions to the term building capacity. The UNDP (2002) offers this basic definition "Capacity can be defined as the ability of individuals and organizations or organizational units to perform functions, solve problems effectively, efficiently and sustainably."Based on this definition, capacity building is the process whereby individuals, groups, and organizations enhance their abilities to mobilize and use resources in order to achieve their objectives on a sustainable basis. Efforts to strengthen abilities of individuals, groups, and organizations can comprise a combination of (i) human skills development; (ii) changes in organizations and networks; and (iii) changes in governance/institutional context (UNDP, 2002).According to Groot and van der Molen(2000)from the workshop on capacity building in land administration for developing countries, held at the Netherlands adopted the following definition on capacity building: *"*The development of knowledge, skills and attitudes in individuals and groups of people relevant in design, development, management and maintenance of institutional and operational infrastructures and processes that are locally meaningful". In this context Stephenson (1992) emphasized that individual capability is an integration of knowledge, skills, personal qualities and understanding that are used appropriately and effectively by individuals to perform various roles in the workplace. Individual capability creates organisational capability. Hamel (2002) defines as organisational capabilities, that is, what makes an organisation unique, and its source of sustained competitive advantage. Generally, the term capacity building is a process that improves the ability of a person, group, organization, or system to meet its objectives or to perform better (Brown, et al. 2001).

3.2.1Professional development and capacity building

Professional development in a broad sense, refer to the development of a person in his/her professional role. More specifically, for instance teacher development is the

professional growth a teacher achieves as a result of gaining increased experience and examining his/her teaching systematically (Reimers, 2003). According to the Australian Council for Educational Research (2007), professional development is recognized as a vital component of policies to enhance the quality of teaching and learning in schools. In other words, professional development has to be considered within a framework of social, economic and political trends and events (Woods 1994). These requirements of professional development are approximately the same instruments needed for raising capacity building which means the ability of individuals, organizations and systems to undertake and disseminate high quality research effectively and efficiently (DFID 2009).The concept professional development is similar to the concept capacity development which focuses on staff development through formal education and training programs to meet the deficit of qualified personnel in the short term (Enemark, 2002). But the term capacity has many different meanings and interpretations depending on who uses it and in what context as it was clarified previously.The two terms play identical role and lead to high quality performance. UNESCO (2004b), talks about how to raise capacity building of teachers in Asia-Pacific region. It confirmed that professional development should help teachers find their own way and needs to be ongoing.

3.2.2 Teacher Professional Development

Professional development in today's world is considered very important issue in human resource management and development in education in equipping teacher to meaningful and effective education that can be delivered to everybody in the community. There are several definitions to this term. According to Glatthorn, (1995), the teacher development is the professional growth a teacher achieves as a result of gaining increased experience and examining his/her teaching systematically. Gabriel – Maggioli(2003) was supported this statement by defining teacher professional development as an ongoing learning process in which teachers engage voluntarily to learn how best to adjust their teaching to the learning needs of their students.

Professional development contents a huge amount of knowledge and experiences. These experiences can be divided into formal experiences (such as attending workshops, professional meetings, monitoring, etc.) and informal experiences such as (reading

professional publications, watching television documentaries related to academic discipline, etc.(Gancer,2000). Glutton,(1995) emphasized the conception of professional development is broader than career development, which is defined as “the growth that occurs as the teacher moves through the professional career cycle” and broader than staff development, which is “the provision of organized in-service programs designed to foster the growth of groups of teachers; so the professional development is considered to be the result of the learning process which is directed at acquiring a coherent whole of the knowledge, insights, attitudes and repertoire that a teacher needs for the everyday practicing of the profession-often indicated as the teacher’s professional knowledge base (Vonk,1991). It is only one of the systematic interventions that can be used for teacher development (Glatthorn, 1995; Darling and Mclaughlin1995). In this regards, Clement and Vanderberghe(2000);Grace (1999) assumed that most effective professional development occurs when there are meaningful interactions not only between teachers themselves, but also between teachers, administrators, parents and other community members.TVET teachers should possess the appropriate personal, ethical, professional, teaching qualities and play an influential part in helping to shape students’ attitudes and aspirations and that they support students at critical stages of their lives (Mehdinezhad, 2008). Good preparation will enable them to operate in, and adapt to, an ever-changing scientific, technological, and social environment (Stolte, 2006). TVET teachers always need to increase their capacity, therefore, besides knowledge of the subject matter, subject-related didactics, educational sciences, and psychology, a teacher also needs diagnosis, evaluation, co-operation and quality development. Duke and Stiggins (1990) name five areas in teacher professional development: improvement of lessons, vocational development, school organization, personal development and career development. The TVET instructor develops from a field-specific expert to a development and education expert through research. It suggests that it is a process that needs supporting and constant upgrading, otherwise called professionalism. Teacher professionalism has predominantly a dual component: knowledge and expertise in the subject or discipline being taught and pedagogical knowledge and expertise on how to teach their subject within socio-economic contexts (Murray 2005). According to Nanga (2007), The TVET teacher should be grounded both in his substantive, pedagogical,

organizational and research domains. He must have field-specific know how, for his teaching job, i.e. knowing amongst others, the ethic codes for his job. These correspond to professional know-how of what is expected of him in his working life (substantive knowledge). Besides possessing this subject science knowledge, he must be grounded in pedagogic methods, manifesting mastery of the learning and teaching process as a facilitator, a motivator, besides displaying the ability to design, implement and evaluate education processes (pedagogic domain).

3.2.3 Teacher professional development and in-service training

With respect to the above definitions, the term " teacher professional development" interfered extremely with the term" in-service training" or "the ongoing training" which denotes according to Eurydice, (1995) all activities and practices intended to broaden teachers' knowledge, improve their skills and to help them assess and develop their professional approach. Reimers(2003) argued that the term in-service training usually consisting of workshops or short-term courses that would offer teachers new information on a particular aspect of their work. While the term professional development of teachers been considered a long- term process that includes regular opportunities and experiences planned systematically to promote growth and development in the profession as fact that teachers learn over time (Cochran-Smith and Lytle,2001; Walling and Lewis,2000).

3.2.4 Impact of teacher professional development

Professional development has a significant positive impact on teacher's beliefs and change in school practices, students learning and on the implementation of educational reforms (Cobb, 2000; Franke et al, 1998; Nelson 1999, p.6). This statement also supported by Wood and Bennett. (2000) and by Kallestad and Olweus(1998) in a study involving Norwegian teachers emphasized that the professional preparation and development have a large impact on defining teachers' goals for their students and these goals in turn affect the teachers' behavior in the classrooms and schools. But to realize that, teachers need to know different kinds of skills, knowledge, dispositions and values which affect their proficiency. These requirements according to Reynolds,(1992); Grosso,(2001);Borko, Putnam (1995) and Shulman (1986) are: General pedagogical knowledge, Subject-matter knowledge, Knowledge of student's context, ability to bridge theory and practice, external

evaluation of learning and knowledge of strategies, techniques and tools to create and sustain a learning environment/community, and the ability to use them effectively.

Effective professional development should be based on curricular and instructional strategies that have a high probability of affecting student learning and students' ability to learn (Joyce and Showers, 2002). Like Howey (1996, p. 150) who defined effective teaching as a process in which teachers make reasonable judgments and decisions about the appropriate tools to use in any particular teaching situation. In addition to these statements, professional development according to Sandra, (2003) should center on subject matter, pedagogical weaknesses within the organization, measurement of student performance, and inquiry regarding professional questions and should:

1. Deepen teachers' knowledge of the subjects being taught.
2. Sharpen teaching skills in the classroom.
3. Keep up with developments in the individual fields, and in education generally.
4. Generate and contribute new knowledge to the profession, and
5. Increase the ability to monitor students' work, in order to provide constructive feedback to students and appropriately redirect teaching (Sandra, 2003).

Härkönen, &Volmari, (2004) confirmed that the most important challenge for TVET is to find ways of meeting teacher needs. This is likely to involve increased efforts to improve teacher professional development and to provide teachers with formal qualifications. Often it is likely to require recognition of non-formal competences teachers have acquired through practical experience. They proposed a form of professionalization of TVET teacher for the future in the below figure:

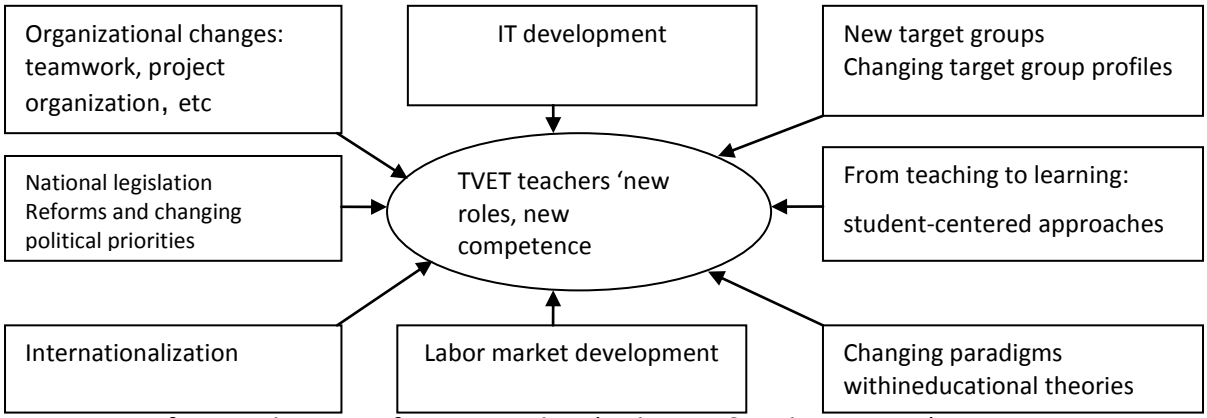

Figure 3: Professionalization of TVET Teacher (Häkönen & Volmari 2004)

3.3Technical and Vocational Education

TVET systems are increasingly becoming recognized by governments as very important to economic development through their focus on skills for the labour market. They are also seen as instruments of social policy, for example to assist those in particular social groups, such as those in poverty, or who lack marketable skills (Basu, 1997). TVET is also recognized as an effective means of empowering young people to engage in productive and sustainable livelihoods (UNESCO, 2005). In this context Lauglo (2009) saw TVET refers to deliberate interventions to bring about learning which would make people more productive in designated areas of economic activity (e.g., economic sectors, occupations, specific work tasks).

3.3.1 Technical and Vocational Teacher

It is remarkable that in many countries (Sudan one of them) vocational education and training has failed to achieve the level of social recognition that is needed to establish a profession. This is reinforced by the fact that teaching has always had problems gaining professional recognition and has been referred to as a semi-profession (Etzioni, 1969). Attracting high-qualified staff into teaching and teacher training in technical and vocational education was a problem for most countries, often because pay and conditions were better in commerce and industry (Hostmark- Tarrou, 1988). Several countries had therefore taken steps to improve the pay, pension, working hours and status of this category of teachers. Some countries operated a pre-recruitment system whereby teachers could be recruited without being fully qualified (Newman 1994).thus; Governments must impose regulations and enforce mechanisms for technical and vocational teacher education. In this context, it was suggested that governments should allow technical and vocational education teachers to undertake consultancies that may raise their capacity building of knowledge and skills, keep them up-to date, and supplement their incomes sufficiently to make them more satisfied with their salaries (Kerre 1997). It is very necessary to emphasize the role of employer in helping to meet the need of effective technical and vocational education and technical and vocational teacher education (UNEVOC, 1997). Yet, in many parts of the world there is a traditional consensus that such education is the responsibility of educational institutions and of the government.

However, its being increasingly realized that, such a narrow concept of those responsible for this area of education, does not meet its needs for the world of work has a very significant part to be done (Quershi, 1997).

Since the objectives of technical and vocational education (TVE) were to raise the standard of general education and to provide professional skills, teacher trainees should be given a more adequate cultural foundation (mother tongue, modern languages, social sciences, etc).there should also be more emphasis on pedagogical skills. It was never safe to assume that competence in a vocational specialization was enough to ensure effective classroom teaching, particularly in catering for the wide range of abilities and backgrounds characteristic of classes today (Banks, 1996).The problem of how technical and vocational teachers could best keep their professional skills up-to-date became more intractable with the increasing pace of technological change. In the extreme case teachers had to be totally re-trained because the profession changed radically or oven disappeared (Newman 1994). One of the best ways to provide in-service training for teachers was to give them direct industrial or commercial training and experience. This also had the advantage of raising teacher's motivation and self esteem. However, such industrial experience should not be too narrowly tied to a particular commercial product, and in-service training should be better linked with initial training. Therefore, it could be better to draw attention to the types of TVET teacher training and their qualifications.

3.3.2 Types of TVET Teachers

Many theories in the context of training TVET teacher and trainer are recognized worldwide, while the term teacher in vocational training and trainer in initial vocational training is used loosely to refer to two large occupational groups: the teachers, who work mainly in technical or vocational institutions, and the trainers, who work in firms or in non-academic training centers (Cordova, et al 1994). In Germany, the teachers who work mainly in technical or vocational schools, while trainers are skilled workers in enterprises, who provide trainees with the knowledge and practical skills required for an occupation (Schneider, et al 2009). According to Hortsch (1999) teachers can be divided into three groups as follows:

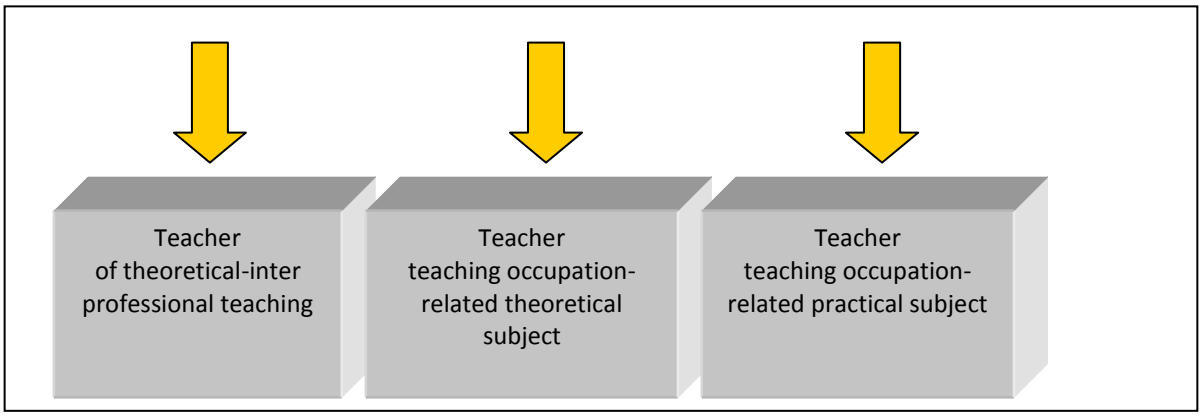

Figure 4: Teachers at Vocational Schools (Hortsch 1999)

1. Teacher of theoretical lessons. This category gives theory and general job-related lessons in classes. The qualification for a teaching appointment of this kind is a course of study followed by an examination for a senior teaching appointment and a two years post qualification teacher training period (Cordova, et al 1994). The teacher here must be capable of imparting knowledge of sciences relevant to the subject being taught to the trainees, precise information on vocational practice is also required to enable the teacher to draw on the occupational experience of trainees and assess practical impact of the vocational theory that is being taught. According to Schneider, et al (2009) those teachers provide young people with the necessary subject-specific theoretical knowledge and with in-depth and extended general education in the context of their future occupation. They teach both vocational subjects (e.g. metalworking techniques, electrical engineering, home economics, and healthcare) and general subjects (e.g. German, English, mathematics, politics, and physics).

2. Teachers of theoretical -inter professional teaching. Teachers have got special professional educational courses aimed at becoming a TVET-teacher – the concurrent Model. Students choose already at the beginning of higher education TVET-teaching as their career and to be a TVET-teacher is the primary and maybe only aspect of these teachers' professional identity. (Moos, L. et al 2006).Their task is to provide young people undergoing in-company training with subject specific practical teaching.

3. Teachers teaching occupation-related practical subject (Hortsch 1999). Those teachers mostly master craftsmen or technicians with additional further training imparting practical skills. They teach in industrial/technical and home economics schools and in business

schools. In vocational schools (industrial/technical schools), state-examined technicians or certified masters are used to teach vocational practice. In home economics schools, specialized teachers teach home economics and crafts. In business schools, specialized teachers are trained to teach word processing and office management (Schneider, et al 2009).

There are many differences between the term teachers and trainers such as:

Teachers are employed in the various vocational schools, while trainers are skilled workers in enterprises; teachers are responsible for the theoretical part of VET, whereas trainers are responsible for the practical part of VET

In Germany, the designation 'trainer' is used in association with in-company training as an umbrella term. Trainers instruct trainees as their main or secondary job. In small or medium sized enterprises with few trainees, training is often the trainer's secondary job. In larger enterprises, training is usually the trainer's main job and they work in training departments. Those responsible for training are of particular importance as they are skilled workers who, in addition to their specialized tasks, take on training tasks in the enterprise's departments, on assembly lines, in commercial and engineering offices or in the service sector. As trainees pass through the enterprise, trainers provide them with the knowledge and skills required in their job (Schneider, et al 2009).

3.3.3 Qualification of TVET Teacher

Teachers should not only have academic qualification and practical real-lifework experience; they must be trained to convert this experience into their teaching concepts (Stolte, 2009).Qualification means the active process of acquiring competence in a discipline and in multidisciplinary contexts, and also the sum total of the all knowledge, abilities, skills that the individual must have in order to successfully carry out tasks and duties (Nanga 2007). Qualification here refers mostly to the education and training of the individual measured through the skill and ability to execute duties (Bjornavold 2000). The qualifications of teachers at technical and vocational schools and training centers are different from those of the general education sector (Schrembs, 2001).In Germany, for instance trainers must have the required technical qualification to train. They must have trained for occupation in which they are to act as trainers or have a comparable

qualification. Moreover, they will only be registered as trainers if they have an examination pass documenting their occupational and work teaching qualifications (CEDEFOP 1995).

According to Grollmann and Rauner (2007) some basic models based on teacher qualifications can be distinguished as follow:

- A model mainly based on the recruitment of practitioners of a certain field of occupational work, who complete additional courses in teaching and training management techniques usually leading to a teaching certificate, which a provides the necessary qualification for work in the education sector.
- A model which is based on sequence of studying the subject matter, e.g. on the B.A. level and the obtaining an appropriate entry qualification to education sector through acquiring general skills in a designated courses program.
- A model which is based on the concurrent study of a subject matter and educational sciences leading to B.A. or M.A. degree.
- A model based on an integrated conception of vocational disciplines, which entail the subject matter as derived from the world of work (Grollmann & Rauner, 2007)

3.3.4 Capabilities of TVET teacher

Chappell and Johnston (2003) advocate that TVET teachers and trainers have multiple identities. They have one identify located in being an industry specialist, with a detailed knowledge of a specific industry, its history, current challenges, equipment and training systems. Once located in a training organization, they can also develop the identity of pedagogical specialist. These two identities differ between public and private sector teachers, whereas the identity of public provider teachers concentrated more in the importance of education and training as a social or public good. On the other hand, it is argued that the focus of teachers in private training organisations is more upon the outcomes for the individual student (Chappell & Johnston, 2003). A number of recent studies build upon understanding of the capabilities required of teachers to operate in these multiple contexts that require a mix of industry specific, as well as more pedagogical capabilities. In terms of skills in integration as well as innovation, Mitchell (2003) provide numerous examples of the creativity of leading TVET teachers, and their capabilities around integration, innovation and clever assessment devices, since teachers want to

develop capabilities that will allow them to respond to what are to be the likely areas of greatest impact upon their professional roles. That is, new technologies, the increasingly competitive training environment, more flexible delivery, training packages, changes to funding, and more industry partnerships. Callan (2005) identified five required capability areas for TVET teaching staff: *expertise in teaching and learning* (e.g. demonstrates an understanding of a range of learning theories and techniques that inform practice, adapts learning and teaching strategies to suit individual students and learners); flexible delivery and assessment (e.g. able to factor on-site assessment to suit the systems of the workplace, has knowledge and skills in forms of flexible delivery, including distances, blended, on-line or work-based learning); learner support (e.g. able to customize learning resources for groups and personalize for individuals, knowledge of a range of behavior management strategies for responding with difficult people); and industry currency (e.g. demonstrates a technical expertise in their subject area, able to partner with industry). Dickie et al., (2004) draws the following areas of capabilities for TVET teachers from the material they reviewed:

• Pedagogical expertise. This includes the capacity to adapt learning and teaching strategies to suit individual learners, pedagogical understanding and access to a range of learning theories and techniques. Increasingly it will also involve understanding and applying new pedagogical approaches – including coaching, mentoring, and facilitating learner-centred, self-directed learning, and learning (often just-in-time) at work

• Learner focus. Some studies identify learner focus as a specific capability. This includes the ability to promote and support self-directed learning, as well as to teaching for technical and vocational education, and enable lifelong learning. However, a learner-focused approach is not the same as learner-centred learning in which the TVET teacher is but one of a range of resources available to the learner

• Client orientation. This involves brokering and relationship-building skills, to enable teachers to provide advice to clients (including learners and enterprises), establish and maintain relationships, network with industry, develop partnerships, and customize training and delivery to meet client needs, and evaluate and monitor outcomes

• Industry currency. Vocational expertise in the teacher's subject area is as critical as pedagogical expertise. This is particularly important as it is highly valued by employers and

learners alike. However, increasing demand for generic skills by employers means that teachers need to be able to balance delivery of technical and industry specific skills with generic employability skills

• Use of technology. This covers knowledge and expertise in using new and emerging technologies, in particular to stay in touch with and advise learners, as well as for flexible delivery. These skills are also important to enable TVET teachers to 'stay in touch' with each other, including via communities of practice and other networks, and can help to combat the isolation many teachers experience

• Personal qualities and attributes. Personal attributes are identified as being absolutely critical for all TVET teachers. Communication skills, a commitment to self-development, a capacity to deal with change, self-directed learning, managing time and managing knowledge are all seen as important.

3.3.5Capabilities and competencies

Capability is more than competence. Competence is defines as what individuals know or are able to do in terms of knowledge, skills, and attitude, the capability is extent to which individuals can adapt to change, generate new knowledge, and continue to improve their performance (Fraser, 2001).Based on this differentiation between capability and competence; Schrembs, (2001) has stated that an instructor has to have a variety of competencies such as:

1. Personal competencies

Instructors are not born as instructors, they have to be trained. Some people might have a particular talent for teaching but most people don't. However, teaching can be learnt. A major prerequisite for this is that a person wants to teach. Someone who is urged to teach can never be a good teacher. Apart from abilities that can be trained, a teacher should have some character capabilities. Some instructor has a well-balanced personality. This will help trainees to build up confidence in the instructor and lead to a good mood in the classroom. He/she should have natural authority and be able to guide young people. Stolte, (2009) has stated others personal competencies such as readiness for change, emotional stability, resilience, diligence, personal commitment and responsibility for own decisions

2. Pedagogical Competencies

This type of qualities can be acquired during the teacher training course. It can be regarded as the contents of a teacher's apprenticeship. First of all a teacher must be able to choose the correct and most important topics of a trade. Not everything can be learnt within the period of training. The second step is to group these topics into logical units and prepare proper lessons with it. Planning and running a lesson requires competencies in the whole field of teaching techniques. He should be able to transfer theoretical knowledge as well as practical skills.

3. Professional Competencies

These abilities include the professional skills. A teacher should have acquired them during his own apprenticeship as a craftsman and his working experience. He/she must be a master of his/her trade. To be a master does mean being a model. It is not enough to be a craftsman but a good craftsman. An instructor should always keep his/her eyes open for changes and developments in his/her trade. Instructors should always be up-to-date and interested in further training and upgrading. It is very necessary to have a wide range of general knowledge too. Finally, there are organizational and administrative duties which an instructor has to do (Schrembs, 2001).In a bid to develop a didactic concept based on occupational performance competence, Nanga (2007) classifies the concept under three sub components:

(discipline-related technical competence), which includes the skills and readiness to accomplish given tasks independently and correctly using suitable knowledge and methods, and to be able to evaluate the outcomes;

(personality competence) referring to the skills and readiness to think over and analyze development chances in the profession, family and in public life, to judge one's own talents to realize them and finally, to set up a life plan for further development; and

(Social competence) referring to the skills and readiness to interact and communicate effectively with others irrespective of their age, sex, educational level, background etc. Other competences such as language competence and methodical competence spread through the three categories. The field-related competence is based on the knowledge, abilities and skills needed to carry out tasks in a particular job. These include facts and

purposefully job-oriented elementary knowledge that need constant updating to keep pace with the changes on the job. Methodic competence on the other hand refers to procedural competence needed in carrying out tasks. It involves the ability and skills in using suitable means to resolve problems, skills to work independently and to transfer experience gained in similar instances. Social competencies are more oriented to societal values and personal behaviors. They relate to the ability and skills to communicate and cooperate with others. Social competences will also mean that workers cultivate the habit of self-critic and responsibility as motivational factors for his actions (Nanga2007). The conference of ministries of cultural affairs (KMK) in Germany proposed more practical competences for TVET teacher, these are:

- coordination of subject science and subject didactic knowledge and arguments in the planning, organization and execution of vocational lessons using appropriate methods, and the
- integration of new ICTs in the didactic design of lessons

(KMK 2004)

3.3.6initial-service training

Initial- service teacher education varies dramatically around the world in such aspects as institutional context, content areas, time allocation and forms of practical experiences for the students (Benz-Peretez, 1995).

Technical and vocational teachers in most countries usually work in technical and vocational training schools or centers, and become specialists mainly as a result of higher education through university or university – related studies. In some cases, they may lack previous professional experience in the relevant sector (CEDEFOP1994). So most of the European countries give particular care and attention to the initial/pre- teacher education; therefore it has been subject to major reforms since the late seventies and eighties (Sander & Dreßler 1994). It could be better to highlight experiments of some countries in this field.

In Denmark, basic vocational teacher training is a consecutive course in pedagogy at vocational colleges, which supplements the technical skills and practical work experience of skilled workers and others wishing to become teachers, the teacher qualification is

obtained through teacher training undergone after the teacher has begun teaching in vocational college and must begin the teacher training program within two years of their appointment (Nielsen2006). The basic idea was to create more continuity in the teacher training process as a whole and to ensure closer co-operation between the delivery institution and the teacher candidates participating in the training who should have acquire skills in:

- Choosing contents, methods and selecting adequate teaching, work and learning organization forms on the basic of the targets and other framework set for the program.
- Analyzing and assessing the qualifications of youths as well as adult participants.
- Planning, organizing, carrying out and evaluating teaching.
- Taking part in the organization of pedagogical innovation and development work

The teaching program at the vocational colleges content of theoretical and practical parts leads to a final examination comprised of two parts:

1. An oral examination based on final project work.
2. A practical test where the candidate plans and implements a teaching sequence and subsequently analyses and evaluates the sequence (Nielsen 2006).

In Austria, the initial teacher education belong either to colleges of teacher education, or to universities and pedagogical institutes. The initial teacher education at colleges of teacher education has excellent financial resources, training schools, co-operating teachers and are very well equipped. But some problems seem to exist in these colleges such as: the length of the programs seems to be very short, curricula too overloaded , too much direct contact teaching, lack of autonomy of the institutions, insufficient qualification of staff in different areas and inadequate role of research(Buchberger1992).regarding the initial TVET education, the candidate first attends special introductory courses at an in-service institute for vocational teachers(*BerufspädagogischesInstitut*), then the prospective teacher proceeds to a teacher training college specializing in technical and vocational education. The full course of training normally lasts three years and ends with a formal examination (CEDEFOP, 1997).

In Germany there is a respected national framework from all the states for the education and examination of teachers stated by the conference of the Ministers of Education and Cultural Affairs (KMK). According to Bauer (2006) this framework was adopted in 1973 and reformed in 1995. The teacher training is basically divided into stages: the first stage is a nine semester course of study at a university, with a total around 160 aggregate hours of weekly attendance ending with the first examination. The second stage is the practical pedagogical training in the form of a preparatory service which takes place in public teacher training college and training schools. The study program at the university contains: 1- the vocational subject in a vocational field including subject-related didactics and 2- a second subject (e.g. mathematics, physics, politics, German, English), and 3- teaching practice at schools for 6 months.

After completing the study program the student teacher must sit to examination which usually consists of the following:

- A dissertation in the first or second subject or in the educational science/vocational pedagogy;
- A written and oral examination in the subject studied, mainly on academic aspect of the subject, but possibly also on subject-related didactics and teaching methodology.
- An examination in educational sciences focused on vocational pedagogy.

After the study at a university teachers go to a second stage of teaching training which is about 18 months preparatory service include teaching in training schools and seminars and all of these lead to second examination which consists of the following parts:

1. A major written paper relating to educational theory, pedagogical psychology or subject-related didactics in one subject;
2. An examination on basic question of educational theory, educational and; Civil service legislation and school administration or sociological aspects of school education
3. An examination on didactic and methodological issues in both subjects;
4. Practical teaching examination involving demonstration lessons in both subjects (Bauer, 2006).

According to Nielsen (2002) there are three main variants/models of university VET teacher training programs existing at the German universities today:

- the teacher model (with an emphasis on pedagogic and didactics)

- the engineer model (with an emphasis on disciplines of science and with marginal pedagogy)
- The professional science model (which integrates a knowledge-based understanding of technology, work processes and didactics).

At some universities, especially in the south-western part of Germany, occupational specific content is basically derived from the corresponding engineering curricula (the engineering model), While a university-level education was established in Dresden based on the industrial revolution a need was created to transcend the experience-based knowledge, skills and attitudes of the craftsman – where learning was made through imitation of the ”Meister” and included social values and ethics – and to acquire more science-based mastering of technology and at the same time learn another form of societal socialization. whereas at a number of northern German universities the occupational specific content is based on the idea of exploring the specific knowledge which is inherent to work-processes on the level of skilled work, so called work-process knowledge (Nielsen 2002).

Practical training in schools:

TVET teachers need practical training to be able to guide students, transition from school to work because culture does not only rely on the cognitive abstractions and artificial idealistic picture of the world (theory) presented in the schools as suggested by scientists(Nanga 2007).

In many countries, the practical training is the most favorably viewed component of teacher education. In Germany for instance, the practical training is considered as a necessary and valuable, though also doubtful, component of teacher education programs (Klinzig 1995). Supervised practice is a central part of the German *studienseminar,* a mandatory, post graduate component of teacher education process, focusing on induction into school life. The time devoted to practice teaching varies greatly between institutions although there is a growing tendency to increase field-based experiences. An interesting view of the practical was expressed by White (1998) who saw it as a “rite of passage” which allows beginner to acquire cultural knowledge about teaching. One of the major strengths of the practicum is its focus on specialized teaching activities, thus

counteracting one of the criticisms of teacher education programs; namely, their concentration on general aspects of schooling and lower regard for specialized activities (Lortie 1995). Distinctions have been made between four different levels of practicum (Furlong et al 1988). Level (a) is direct practice; i.e. teaching experiences in schools. Level (b) is indirect practice; i.e. training conducted in classes and workshops in teaching education institutions. Level (c) is practical principles; i.e. the study of principles of practice. Finally, level (d) is disciplinary theory, the study of practice and its principles in the light of research and theory. Though the practicum tends is to be highly valued by student teachers and practitioners. Respect to TVET teacher, there is an urgent need to the practical training in order to guide student's transition from school to world of work (Nanga 2007). The practical training can be got from practically oriented seminars through the practical lessons in workshops in the teacher college, on the one hand, and from teaching internships in TVET schools under the guidance of experienced TVET teachers through industrial internships, on the other hand. Practical training help the student teacher to better adapt to his working environment and connect with the local as well as international realities. Although doing an internship is consider necessary for the development of personal and reflective experiences in teaching, participating in an internship alone is not enough to prepare student teacher for their later practice; the quality of trainee guidance is determining (Wilson, 1994b).

Connecting teacher training to world of work (Internship):

Most of the best TVET systems in the world are the mixture of on-the job training alongside classroom learning. Student internship should be incorporated into each discipline in TVET, and made an integral part of the curricula. Necessary legislation shall be done to ensure industry's acceptance of internees. Systems to evaluate internship would need to be developed and they should be awarded credit. Institution Management Committees would assist in placement of students in industry/ workplaces. (UNESCO 2009)

TVET teachers and trainers in Sub- Saharan Africa (SSA) are considered as a whole, insufficiently trained for the fulfillment of their respective tasks, often news of them, which are imposed upon them as a result of their contacts with enterprises (UNEVOC 1997). In addition to the consolidation of their technical skills for giving them a command over the

knowledge related to the trades that they have to teach, it is from now on necessary to give them skills in building up such relationships. greater challenge for TVET is to establish closer links with the workplace- i.e., work experience which makes learning more relevant to pupils' future lives, links between teachers and local industry- which strengthens the pedagogic/economic competence component (UNEVOC 1997).The teachers and trainers must be prepared to go out of their school to meet the enterprises. They have not been trained in the teachers' training colleges, when they exist, to fulfill these assignments. In respect to this context teachers have return to industry for internships, participate in company training programs, interview employers and employees about new knowledge and skills in the workplace, and have increasingly seek out advice from business persons on education-related matters (Richard and Sheila, 2006). According to Atchoarena (2002) this type of training of teachers and trainers could be linked to experiments in the involvement of enterprises in the definition of new programs. The trainers would thus be asked to undertake training courses in an enterprise that is directly linked to the contents of the training they dispense for developing the TVET system it is essential to build up capacities for high level teacher and trainer education, TVET teacher education is consider the cornerstone of whole process, so as it is necessary to improve quality of TVET in order to provide learners with the competences and knowledge they need to enter working life, this quality of TVET is closely related to a fruitful cooperation between schools, universities and industries, while competences, knowledge and attitudes of TVET teachers play a decisive role for the quality of TVET provision. The challenge to schools has been, first: to establish closer links with the workplace- i.e., work experience which makes learning more relevant to pupils' future lives, links between teachers and local industry- which strengthens the pedagogic/economic competence component (UNEVOC 1997); second, to deploy more practical problem-solving, initiative building teaching methods, and third; to give greater attention to the acquisition of concrete, measurable, testable skills and competence for both teachers and students (Skilbeck et al 1994:). Partnership between education and business offer opportunities to make education more relevant to life and work; raises standards and levels of attainment, raises enterprise awareness and industrial understanding amongst teachers and students, and informs, develops and counsels, so that individuals are better placed to build and use their skills (Nanga 2007). Vries (1994)

advocates; if we are to link between teacher education and industry, it supposed to create especial kind of teacher education: "*the technology teacher education"* to teach technology as it takes place today. For a technology teacher it is necessary to be well acquainted with the way technology functions in today's industrial reality.

It was generally agreed that there should be stronger links between education and industry. More opportunities should be provided for both teachers and industrial employees to work alternately in industry and education (Newman 1994). To move in and out of teaching was not a bad thing in a highly mobile society. This would in part overcome the problem of how to allow education to keep up with rapid change and specialization in these fields and that of attracting good teachers in competition with commerce and industry. It would also make use of the knowledge and skills of people in transitional situation. (Hostmark-Tarrou, 1988)

Relationship between technology education and industries are increasing, due to the fact that technology education moved away from the craft-oriented approach. Vries (1994) sees Industries were not interested in this approach because it can never be advanced enough to teach the pupils to work with new equipment that can be found in industries. So the direct contact between pupils, teachers and industrialists is necessary to give the pupils and teachers a realistic insight into the possibilities of a future career in industry.

3.3.7 In-service training

Initial-service training cannot, of itself, be expected to prepare teachers fully to meet society's expectations and what students need to learn, especially against the background of a rapidly changing social, economic and educational environment. It has to be supplemented by ongoing in-service training (Walshe, 1998). As Sauter(1996) saw that the growing demand for continuing training and the increasing attendance at continuing training courses also show that initial vocational training alone is no longer a guarantee of job security. There are different names given to in-service education depending on the profile of the beneficiary. When the in-service training constitutes a part of some form of an initial teacher preparation process, it is identified as "Professionalization". Otherwise if it is offering an ongoing development of the teacher who is already a professional in this case it is identified as "Capacity" (Reimers1998)

There is, of course, no shortage of in-service training in many countries particularly the European countries. The abbreviation INSET is widely used to refer to the in-service education and training of teacher. Greenland (1983) divides inset into the following categories:

a. inset for unqualified teachers (mainly certification course);
b. inset to upgrade teachers;
c. inset to prepare for new roles, such as principles or teacher educators;
d. Curriculum-related inset (mainly courses linked to planned curriculum change or refresher courses.

In Germany, the in-service training also belongs to the responsibility of the ministry of education and cultural affairs of the states run at central, regional and local levels. In–service training can also take place within schools or in the form of guided private study. In-service training serves to maintain and extend the professional skills of teachers. It helps teachers to meet the current requirements of their teaching career and to fulfill the educational mission of their school. Attendance of in-service training courses serves to deepen and extend the knowledge and skills in the field of educational theory, psychology, didactics and subject-related studies which the teacher requires as part of his job. The subject matter includes topics relating to general and school education, session on subject-related didactics and studies, courses dealing with key current issues and introduction to new curricula (Bauer, 2006)

In Austria, the continuing training of teachers is regulated by the in-service teachers training institutes which offered courses in the following fields:

- Pedagogy and psychology
- Methodology
- Subject-specific courses
- Issues of topical educational interest, e.g. multicultural education, integration of pupils with special needs, etc (CEDEFOP1997).

ICTs enhance teacher professional development:

Information and Communication Technology (ICT) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on (Fong,

2006).Therefore the teacher should be the main motivator and facilitator of the ICT implementation at schools, and they should be aware of the social change in their teaching activities, and must also be the part of the global change in learning and teaching modification (kaka 2008). It is important to remember that the introduction of ICT may not initially change teacher behaviour; however, with appropriate support and access to relevant technologies, behaviours will change over time. The opportunity to observe colleagues using ICT in new and innovative ways may be instrumental in changing teachers' attitudes (UNESCO, 2004).

In the context of (ICTs), virtually it deals with the software applications and computer hardware, and no doubt it became an essential part of the world of work in today's world. Derek, (2008) assumed that a modern labour market is almost unthinkable without ICT, digital literacy is increasingly considered as an essential competence. In this context Brown, (1992) stated that education must keep pace with these global trends and developments, especially in the area of technical and vocational education and training, also he said a recent evaluation of a staff development program for IT in teacher education noted several factors which affect in-service teacher education and development of schools to use IT to enhance teaching and learning. ICT-based learning requires a high degree of self-organization and motivation while offering learners a high degree of freedom during the learning process.

The reviewed literature shows that teachers must be effective users of information and educational technology, this result was reported by Allen, (2001); Davidson et al, (2000); Dwyer, (1994); Because, it is believed that instructional technology can improve the quality and quantity of teaching and student learning. Sandholtz et al, (1997) described technologies as essential tools of the teaching trade. Shields and Behrman (2000) advocate that the most effective use of technology in classrooms is as tool for accessing information and interpreting, organizing, and representing personal knowledge.

ICT-based learning environments enable TVET to make full use of all available information and communication technologies — from e-mail to video conferencing and application sharing. On the other hand, the same experts Shields and Behrman (2000) stated that if TVET teachers are to become "learning facilitators" in a connected world of universal information access to lifelong learners, then they will be challenged to maintain their own

capacity, they will have to be able to employ ICT effectively both to teach and to learn and They will have to respond to raising standards and be able to adapt their teaching to reflect international best practices. Derek, (2008) emphasized that computer enhanced delivery of education and training is becoming increasingly widespread and can make education and training available to many more people around the world, however in many parts of the world, the use of ICT in TVET is still very limited. The situation in Africa, with respect to ICT, there has been relatively little application of ICTs in the TVET sub-sector either as a teaching tool or to enhance access to programmes (Farrell & Isaacs, 2008)

In the last two decades Sudan built and capitalised on ICT, and the government has opened up competitive investments in telecommunication. Licensing was granted for newcomers employing advanced technologies, which are hoped to increase the spread of and access to ICT and make products affordable. Development in ICT in Sudan is evident in a substantial expansion of infrastructure and capital investment including management systems and human capital (Hamdy, 2007)

ICTs supported building capacity of Teacher:

The UNESCO (2004b) proposed a program of building capacity of teachers to implement ICT in their teaching process throughout the world. The suggested framework for the professional development of teachers consists of four main approaches: Emerging, Applying, Infusing, and Transforming. These approaches were illustrated in the below figure

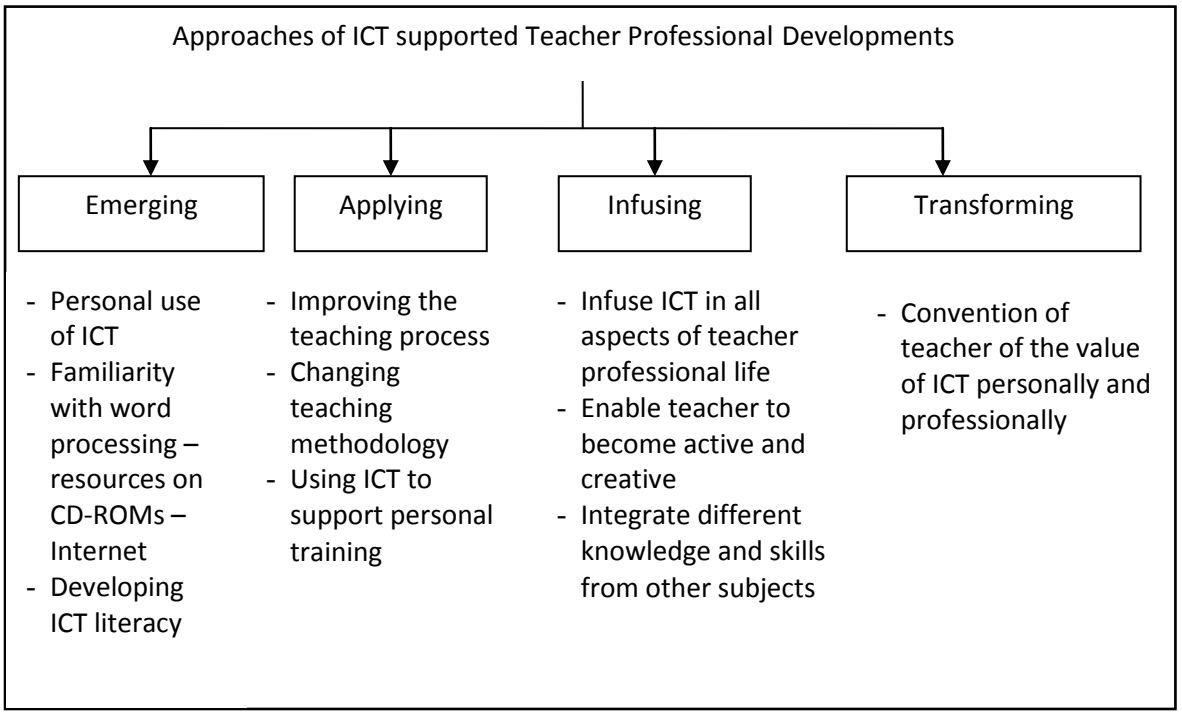

Figure 5: ICT supported Teacher Professionalization (UNESCO 2004b)

- Emerging stage

  Schools at the emerging stage are taking initial steps towards ICT development by proving few computers and teachers begin to explore how best to make use of their new tools and develop ICT literacy skills, by the end of this stage, teachers feel comfortable and at ease dealing with the new technology.

- Applying stage

Once teachers feel confident with using computers and with basic concepts of ICT and general applications software (word processing, databases, and communications), they move to the next step where ICT tools are applied in their particular subject areas and teachers become have ability to assist students to find, compare, and analyse information from the Internet, and from other sources specific to a subject area. Often at the applying stage, school administrators and the school library are also using computers for management tasks.

- Infusing stage

In this stage teachers incorporate ICT into all aspects of their teaching. ICT enables teachers to become active and creative and able to stimulate and manage the learning

of students. The infusing approach often involves teachers integrating different knowledge and skills from other subjects into project-based curricula.

- Transforming stage

By the end of these approaches, ICT tools become such an integral part of teaching and learning, by teachers and students alike, that the whole school experience becomes transformed (UNESCO 2004).

3.4 Evaluation and Appraisal

Some researchers use the two above terms as one concept, other attempts to differentiate between both. For example, Nebesnuick (1990) defines evaluation as follows: the process of conceiving, obtaining, analyzing and communicating information and forming judgments for the guidance of educational decision-making with regard to specified aspects of education.

According to Boyd, (1989) teacher evaluations are often designed to serve two purposes: to measure teacher competence and to foster professional development and growth. A teacher evaluation system should give teachers useful feedback on classroom needs and the opportunity to learn new teaching techniques. About the term "Appraisal" the HMI (1985) says: the heads commented on high levels of professionalism, greater analysis of practice, and a broader educational context against which to make judgements, receptivity to new ideas and a willingness to explore them. Teacher appraisal has many purposes that serve the educational process, these purposes are to:

1. Help teachers to identify ways of enhancing their professional skill.
2. Assist in planning the in-service training and professional development of teachers individually and collectively.
3. Help individual teachers, their head teachers, governing body and local education authorities to see where a new or modified assignment would help the professional development of individual teachers and improve their career prospects
4. Provide help to teachers having difficulties with their performance, through appropriate guidance, counselling and training.
5. Enhance the overall management of schools (Dean, 1991)

Nanga (2007) stated that TVET teacher, just like other teachers fulfil their educational roles through three main societal functions:

- a qualifications function in the transfer of knowledge and skills and abilities, which learners can use later in their university or occupational lives
- a social function with the duty to prepare students to enable them to successfully integrate into the society: and
- a legitimating function in educating for tolerance and democratic ideals.

All teachers and prospective teachers are formally and individually assessed at some points in their teaching career. The most common points are:

-selection into initial teacher training;

-credentialing at the end of teacher training;

-selection for the first or subsequent teaching post;

-credentialing for tenure/ full membership of the profession (Wilson, 1994a).

3.5 Conclusion

After reviewing the international literature about the teacher education, many facts emerged. There is a consensus of equipping TVET teachers with the technical skills and practical work experience, pedagogical, knowledge skills and ICT through the initial and in-service training to facing the rapid challenges of the technological demands of world of work. Assurance of the practical training for the teachers as crucial component of the teaching process because it focuses on specialized teaching activities, it is consider the weakest component in teacher education in Sudan, because most of the teachers in the technical and vocational education field have lack to industrial experience. So as there is an urgent need to connect teacher training with the industry.

4. Research methodology

When looking at which methodology to adopt, it is important that we clearly define what our enquiry is about and why we are doing it (Hughes, 2004).

4.1Introduction

This chapter describes the methodological approach where qualitative and quantitative data are considered to achieve suitable information about the situation of TVET teacher education in Sudan. It begins with the research design, through to the research plan. Emphasis is on the data sources, description of target population and method of analysis adopted for the data collected

4.2 Design of study

In very broad terms, there are many diversified principle methodologies used in educational research today, one of them is the scientific methodology, where the researcher takes an objective or hypothesis and, through the creation of laws or by finding the right answer, aims to find the truth in a given situation. This should provide a model/theory that can be used repeatedly to predict and control events (Hughes, 2004).

This study could be categorized as an applied research through which a case study has been conducted to yield descriptive and explanatory information on the problem under study. Case studies, as defined by Bell (1999), are useful when attempting to clarify what is going on in a given situation. Cohen and Manion (1994) go onto explaining how the case study researcher focuses simply on observing the characteristics of an individual (such as a child, teacher, school) and by doing so aims to make generalizations about other similar individuals. Adelman et al (1976) comments on how case studies are 'a step to action' and provide individuals with a wealth of data to interpret, however collecting a substantial number of observations in this manner can be a time consuming and costly process. According to Cohen and Manion (1994) many educational research methods are descriptive because a descriptive research studies the conditions or relationship that exist; practices that prevail; beliefs, point of views, or attitudes that are held; processes that are going on; efforts that are exerted; or trends that are developing. At times, descriptive

research is concerned with how what exists is related to some preceding event that has influenced or affected the present condition or event.

The field research for this study is took two phases: the first phase began in October 2007 by doing pre-test of the structured questionnaire with randomly selected teachers, and then corrections and modifications have been done before final distribution. The second phase started in October 2008 with designing semi structured interviews for all bodies involved on one way or another along the teacher training process such as: policy makers, key informants and employers to examine their willing/interest to create a mechanism to upgrade the training process.

4.3 Data Sources

Primary data

This research has depended heavily on primary data collected through an structured questionnaire to obtain information from a large group of teachers in both vocational training centers and technical secondary schools that are to some extent have uniform curricula and specializations. Personal interviews are conducted with policy makers, administrators and employers. Observation and discussion with key informants are done. Qualitative and quantitative data are combined in this study. Cohen (1994) stated that: social scientists have come to abandon the spurious choice between qualitative and quantitative data as they are concerned rather with the combination of both, using the most valuable features of each. In this context, Hinton (2004) distinguished between two types of data: quantitative and qualitative. Quantitative data concerns numbers or quantities that were collected using measuring devices such as timers, performance tests or questionnaires. Qualitative data concerns accounts, descriptions and explanations linguistic rather than numeric data.

Tools for data collection implemented in this study are included direct interviews using pre-designed questionnaire and observation for teachers, trainers and administrators, respectively and a survey conducted to some technical schools, vocational training centres in Khartoum state.

The questionnaire is close-ended mostly designed to gather data from teachers in TVET institutions. Only one question at the end is open ended to collect personal opinion. Data collected is on demographic characteristics, the training situation before and during the

job practicing, the environment of work, integration of ICT into curriculum, questions of utilizing the technology in teaching process, the condition of workshops and laboratories and the relationship between the public institutions and private sector regarding training of TVET teachers and trainers and the linkage between TVET institutions and industry to train teachers. Two types of semi open-ended interviews are conducted with TVET policy makers encompassing administrative managers, consultants in relevant bodies, who are interviewed about the criteria of selecting teachers and trainers to TVET, training for teachers, efficiency of workshops and laboratories and the benefits from training in private sector workshops. The other group interviewed were the employers especially in the private sector to examine their interest/partnership to train TVE teachers in their workshops or even to share in the decision making and formulation of training plans. Observation as a tool of data collection is applied when surveying technical schools, vocational training centers and private sector workshops.

Fruitful discussion is done with Key informants about TVET policies, planning, and future outlook, possibilities of involving private sector in the training processes of TVE teachers and trainers and about the major problems facing TVET in Sudan.

Secondary data

The secondary data is collected from internet, reports, and literature and official documents. The Technical Education Corporation (TEC), the Higher Council for Vocational Training and Apprenticeship (HCVTA), Administration of Technical Education (ATE) and the National Council for Technical and Technological Education (NCTTE) in the Sudan were the main sources of data for this study. The secondary data will be used for comparison and interpretation of data gathered from various sources using different means.

4.4 Target Population

The sample population of this study were all teachers and trainers who are working in the vocational training centers and industrial technical secondary schools in Khartoum state during the 2007- 08 school's year. The questionnaire is covered those who teach the theoretical subjects as well as those who just supervise the practical lessons within the workshops(trainers) andteachers who teach occupation-related practical subject. All the teachers in TSSs were males, whereas, females are not represented in such type of

technical schools. There are only two women technical schools in Khartoum teach home sciences, computer, secretariat, food technology and on the like (ATE, 2007). Part of the teachers and trainers in VTCs are women; generally, most of them with long occupational experience and have training courses abroad. Good numbers of administrators, managers and key informants who are involved on one way or another in TVET have been interviewed to give their opinions in related issues such as the criteria of teacher induction, educational policies, initial and in-service training, connection of the training programs to industry and the working environment.

4.5 Sampling frame

Sample and limitation of the study

This study includes only teachers and trainers of technical secondary schools and vocational training centers in Khartoum state and policy makers (administrators and consultants) and employers. Part of the selected population especially teachers dealt to some extent of carelessness wherever they took questionnaire to fill it out. Unfortunately either ignored it or left some fields of the questionnaire unanswered. Some of them didn't give accurate information or they have not taken it seriously. Some administrators' showed less commitment towards time or appointment already determined to interview them. The researcher remained for long time running after them. Employers dealt with the interview with much reservation. Most of them were unwilling to give information about their establishment. Therefore strong effort has been exerted to convince them about the importance/necessity of the study.

Unavailable or poor references/literature concern vocational and technical education in the Sudan are constituted major constraint faced the study.

Sampling technique

A cross-sectional study design is used to randomly select industrial technical and vocational education schools and teachers. According to Levin, K. A. (2006), A cross-sectional study design is used when the purpose of the study is descriptive, often in the form of a survey and the aim is to describe a population or a subgroup within the population with respect to an outcome and a set of risk factors and should be carried out at one time point or over a short period.

Multi stages sampling technique are used to choose targeted schools/centers in the state of Khartoum as follow:

1st stage the selection of Khartoum state (3 administrative units) as an area to conduct this study is attributed to many reasons such as:

- Three big cities constitute the capital Khartoum.
- Have the majority of the technical schools and vocational training centers.
- Accessibility to reach.
- Availability of policy makers, key informants and employers.

2nd stage the selection of technical schools and vocational training centers: Three centers from the total of six vocational training centers represent 50% and three schools of eight industrial technical secondary schools represent 37.5% have been chosen (see table.6) below. The geographical distribution also is considered to represent the three cities constituted the capital (Khartoum, Omdorman and Khartoum North). Other considerations behind this selection have been taken into account, these are:

- Too many technical schools and vocational training centers in Khartoum.
- Homogeneity between these institutions.
- Avoidance of bias to a school against another.
- Accessibility of the selected schools/centers.

3rd stage the selection of respondents. The whole number of teachers and trainers in the selected schools and centers are 144 (table.6 below). The researcher is distributed approximately 120 applications of the questionnaire randomly. Only 95 respondents have filled out the questionnaire; representing 65.3%. According to Hinton (2004) an alternative way of selecting a sample to represent a population is through random selection. In most cases the researcher wants the sample to truly represent the population so he can generalise the findings to all TVET institutions throughout the country. Also Hinton (2004) said: If we have a sample with the same characteristics as the population we will have a representative sample. The sampling procedure is considered the different types of targeted population, namely, trainers, teachers, administrators and consultants. Within these categories the sample have been derived randomly because of some factors such as: the homogeneity of the category and the nature of the programs are to some extent

similar, limited training centers in Khartoum the triangle capital is tackled as one unit. For these entire reasons random sample can represent successfully the whole country.

Instruments used are questionnaire & interview for gathering data to this study are administered firstly in Arabic language (the official language). This is mainly due to the fact that most of the respondents do not speak English or have poor level. The responses are converted to English before the data entry process. The below table presents the number of teachers/trainers in the selected industrial technical schools and vocational training centers in Khartoum state

Table 6: Capacities of teachers/trainers in selected institutes and schools

Institute/ school	teachers/ trainers	%
Chinese friendship training center	41	28.47
Sudanese Korean training center	25	17.37
Bahry vocational training center	17	11.80
Belgium technical secondary school	21	14.58
Omdorman technical secondary school	25	17.37
Ali Alsaed technical secondary school	15	10.41
Total. 6	144	100.0

Source: SCVTA and ATE, 2008.

4.6 Interview

Semi-open ended interviews as a tool of data collection are used for this study. This type of instrument could be suitable to get information from individuals who have good experience. Therefore, some questions required open answers, for example questions to administrators/key informants about criteria of selecting teachers for TVE field, how collaboration between general sector and private sector can be done to train teachers, the possibility of training teachers in the private workshops and so on. Two types of interviews are done with the administrators/key informants and the employers. Seventeen (17) administrators have been interviewed. The interview is divided into three main sections:

A/ Questions on criteria of enrolling beginner teachers into TVET institutions (this section consists of four items).

B/ Questions on in-service training (this section had five items).

C/ Questions on the working environment (this section comprises of three items).

Unfortunately only five employers were showed willingness to fill out the application of interview to give information about training TVET teachers, while good number of them refused to give information about their own establishment and privacy.

4.7 Observation

Observation is used to obtain information on both current and past behaviour of people. Rather than asking respondents about their current behaviour, it is often less costly and/or more accurate if the behaviour is observed. We clearly cannot observe past behaviour, but the results of such behaviour are often observable through an approach known as the case study (Smith, 2010). Observation may be used as the sole means of collecting data or, as is frequently the case, it may be used in conjunction with other means (Smith, 2010). For this study, observation as research tool is used to observe the teaching and learning process inside technical secondary schools and vocational training centers, In addition to workshops in the mentioned educational institutions and in private sector. The researcher gained information through this means that cannot be achieved from any other instrument especially, the infrastructure on public and private sector.

4.8 Questionnaire

A closed-ended questionnaire is designed to get information from teachers and trainers who are working in VTCs & ITSs during the study year 2007-2008. Only one open- ended question is left for the response of the phrase: (other. Specify) for writing any additional information the respondents wanted to add.

Items on the questionnaire covered the following sections:

- Demographic and other background information
- Practical components of initial-service training
- ICT integration
- Job practice and in-service training
- general evaluation

The first section consisted of 6 items; the second one had 8 items; the third section had 7 items, the fourth section had 11 items and the last one had 3.

Respondents:

Distribution of respondents according to educational institution:

More than 120 questionnaires have been distributed to teachers and trainers in three vocational training centers and three industrial technical secondary schools in Khartoum state. Only 95 individuals are filled up forms. The selected vocational training centers and the industrial technical schools respectively are: Bahry, Sudanese Korean training center, Chinese friendship center, Ali Alsaed technical school, Omdorman technical school and the Belgium technical secondary school. The below table shows the targeted schools/institutes by location and number of teachers responded.

Table 7: Schools &centers by site and teachers respondents (n=95)

Name	Type	Site	Frequency	%
Bahry	VTC	Khartoum-north	15	15.79
Korean	VTC	Khartoum city	20	21.05
Chinese	VTC	Omdorman city	15	15.79
Ali Alsaed	ITS	Khartoum-north	10	10.52
Omdorman	ITS	Omdorman city	20	21.05
Belgium	ITS	Khartoum city	15	15.79
Total	6	3 cities	95	100.0

Gender of respondent:

The whole number of the target group is 95most of them are males constituted 89.47% distributed between industrial technical school (ITSs) with percentage 47.37% and vocational training center (VTCs) with a proportion of 42.10%. The rest of the respondents are females they represented only 10.53%. The respondents are presented in the below table according to sex.

Table 8: Respondents by gender (n=95)

Gender	Frequency	%
VTC Male	40	42,10
VTC Female	10	10.53
ITS Male	45	47.37
Total	95	100.0

The females are found only in vocational training centers in limited departments such as: Dressmaking and design and development of women skills. There are no females teacher in ITSs whereas, two technical schools for women are available in Khartoum to teach

subjects considered to some extent suitable for girls such as Food Processing, Dressmaking and Design/Weaving, Technical Drawing and Computer.

Age of respondent:

The table below presents data about age of respondents. They have been classified into five main groups. The teachers under 30 years in VTCs& ITSs are very few represented 10.5% reflecting the fact that the fresh graduates do not prefer joining such type of education. Those of age range 30 to 39 are considered a little bit youth and represent one third of the sample 34.7%. Nearly half of the sample 46.3% represents the category age 40-49 that having considerable experience. Most of the teachers and trainers had approximately training opportunities abroad particularly in former government of West Germany especially the teachers who are belong to vocational education. Only 6.3% of the respondents are of age 50 to 60 years. Currently there is only one trainer exceeded the barrier of the year 65 still practicing the job. The table below shows age of respondents.

Table 9: Age of respondents (n=95)

Age range (years)	Frequency	%
20 to 29	10	10. 5
30 to 39	33	34.7
40 to 49	45	47.4
50 to 60	6	6.3
Above 60	1	1.1
Total	95	100.0

Type of Institution:

In the below table the targeted teachers are distributed into 52.6% to the vocational training centers and 47.4% represented the industrial technical schools, this allocation came by accident. This not means the number of VTCs teachers is bigger than the teachers in ITSs in the study area.

Table 10: Distribution of teachers according to type of institution (n=95)

Number of teachers	Frequency	%
VTC	50	52.6
ITS	45	47.4
Total	95	100.0

Specialization of respondent:

The figure below presents the distribution of teachers and trainers by subject/discipline they teach in both industrial technical schools and vocational training centers. There is no big difference between existed subject/disciplines in the two types of educational institutions except for three (electronics, technical drawing and computer) which are only available in ITSs. Also two disciplines (Dressmaking and design & Development of women's' skills) are not existed in ITSs. They belong to VTCs.

The figure below shows obviously the preferred specializations for teachers and students alike. Auto-Mechanics and Electricity have the priority among all other specializations it is the same situation in ITSs and VTCs. Of the entire number of teachers 21.1% and 14.7% belong to the mentioned specializations respectively. These specializations may be the preferable choices because of easy accessing to labour market in Sudan without waiting for a long time. In addition, it is an opportunity for some teachers to practice occupation at their own time to gain additional income. Only 2 teachers from the air-conditioning, computer and dressmaking and design subjects are filled up the questionnaire representing 2.1% of the whole sample. As well, only 3.2% of the respondents from the field of electronics and technical drawing were participated to the study. Also very few teachers of the theoretical subjects and development of women skills (4 from each stream) are answered the questionnaire. 5.3% of the teachers from the department of carpentry have responded to questionnaire. 6.3% from the specializations of metal fabrication, architecture and welding and 7.4% represented the fitting specialization. The low percentage of participation of some specializations like: air-conditioning, computer, electronics…etc, does not means that it has the inferiority among the teachers or students. This situation is happened by accident when the researcher distributed questionnaire didn't find more teachers/trainers represent the mentioned specialization at that moment, or could attributed to the shortage existed originally of staff members in specific disciplines such as: electronics, computer, carpentry, dressmaking and so on.

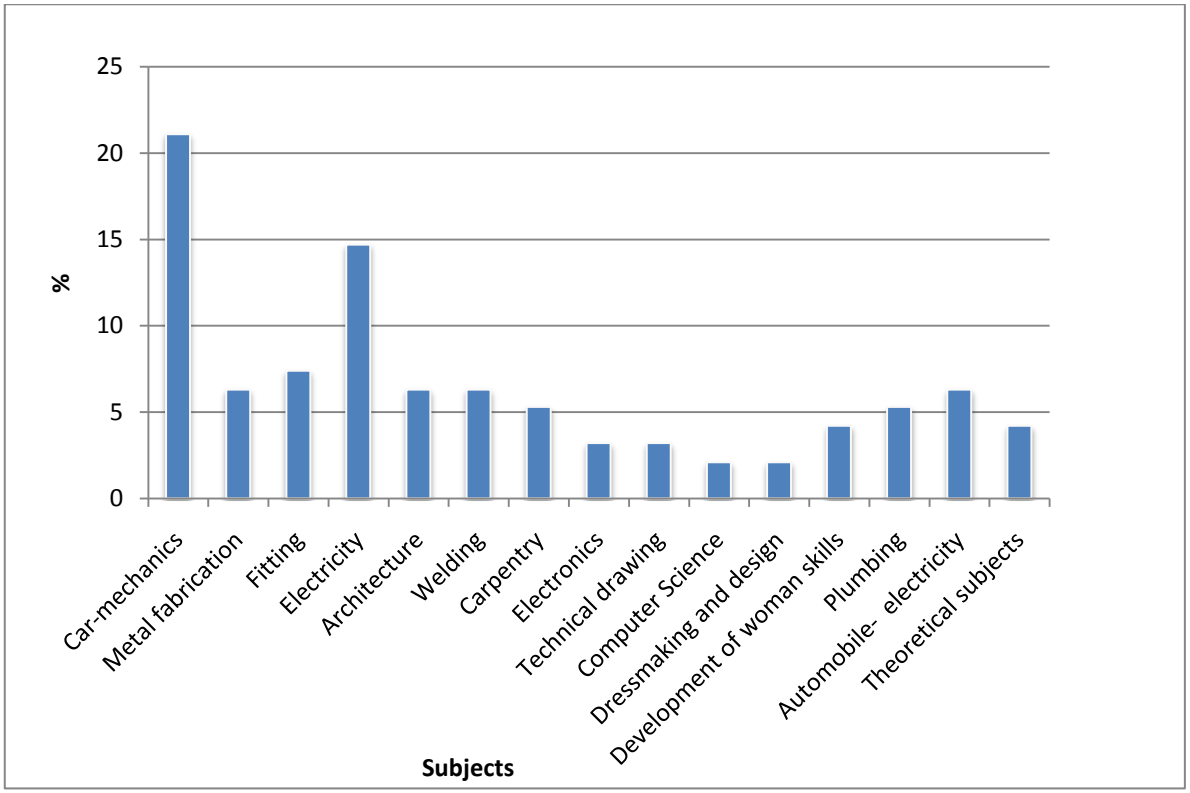

Figure 6: Distribution of teachers by specialization

Teacher status by administrative position:

The below table classified the targeted teachers according to proposition occupied into their institutions. The first group is the teachers (22.1%) who deal with students within the classroom and give the theoretical and general job-related lessonsand some time accompany them to practice the lesson into the workshop; this category of teachers is equipped by pedagogical and vocational knowledge. Few of teachers teach only theoretical subjects like Islamic studies, Geography, languages…etc. the trainers group represented 38.9% are usually supervise students in workshops and labs during the practical part of their curricula. They are generally graduated from VTC and some of them came to these institutes from industrial workshops but lacking of the pedagogical experience. A third group are the head of departments (31.6%) who have considerable experiences in specific fields. Most of them are currently working as teachers and trainers beside their administrative roles. Only 2.1% of respondents work as a deputy in their schools and they insisted to participate and fill out the questionnaire because they were a teachers or trainers some day and have cumulative experience. Only 5.3 percent of the respondents did not specify their positions inside the institute.

Table 11: Distribution of teachers by positions occupied (n=95)

Position	Frequency	%
Teacher	21	22.1
Trainer	37	38.9
Head of department	30	31.6
Deputy	2	2.1
Missing	5	5.3
total	95	100.0

4.9Data Analysis

Data collected from questionnaire and interviews is coded, entered into the computer and analyzed using the Statistical Package for Social Sciences (SPSS) for Windows, version 14 and Excel program to ensure the achievement of the objectives.

Descriptive statistics are used to describe the demographic characteristics of the respondents and to find out the distributions of respondents in the different categories.

Tables and figures of frequencies and percentages are prepared and as well others techniques such as Cross tabulation and Chi-Square test is used to explore relations between variables and to test some hypotheses stated and hence discussed in the subsequent chapter.

5. Results, data presentation and discussion

Before starting with any advanced analysis, it is better to start with some descriptive statistics and simple graphics, to see what is going on in your data! [2]

5.1 Introduction

Results of this study are interpreted using descriptive statistics (frequencies and percentages) so as to give general overview of the study variables. Some of the hypotheses of the study are tested applying cross-tabulation and chi-square test using the SPSS program version 14. The presentation of the data is in two sequences, first: for the data collection, questionnaire (quantitative data)is used for teachers and trainers. Second: for data gathering interviews (qualitative data) are conducted for key informants as well as employers.

The data is arranged under three main themes corresponding to the objectives of the study. First theme is the current situation of training programs (Institutional setup, initial and in-service training programs), secondly, integration of ICTs on teaching/learning process and teachers ICT competence and thirdly, contribution of private sector in TVET teachers training. Also this chapter includes the proposed training approach for teachers and trainers in TVET institutions in Sudan.

5.2. Current situation of the training programs

5.2.1 Institutional setup:

According to responses of administrators interviewed, there are many objectives need to be achieved through the teacher training process in Sudan. One key informant declared that the training plan was set according to the comprehensive strategies of the Supreme Council of Vocational Training and Apprenticeship (SCVTA) that aims to guarantee high quality training for the teacher and makes the teacher always cope with the international

[2] http://www.cs.uu.nl/docs/vakken/wo2/SPSS/spss1.pdf

standard and link the training with new relative things arise in the labour market. Another policy maker emphasized that the main objectives of the training plan determined by the authorities in the Ministry of Education and SCVTA are to raise the capabilities of the teachers, improve the final outcomes of the TVET and identify new styles of training.

Unfortunately, there are no specialized institutes/centers in the Sudan to equip TVET teachers with modern knowledge and keep them up-to date. Based on the researcher's observation there is only one institute for training vocational teachers available presents theoretical information. As the institute suffers from insufficient resources to buy the expensive equipment and material needed for its workshops.

Reasons of work in TVET Institutions:

As shown below in figure 7, administrators gave varied reasons behind recruiting teachers for TVE. 23.5 % of them said the teachers were convinced to work in the education field so they have the interest to become teachers in such type of education, while 52.9 % of the interviewed administrators emphasized the fact that the teaching job is generally unattractive especially in the domain of technical and vocational education and the teachers who were already involved did not find any other suitable occupation. About 23.6 % of the interviewees' emphasized the fact that teachers came to this job to develop their personal skill.

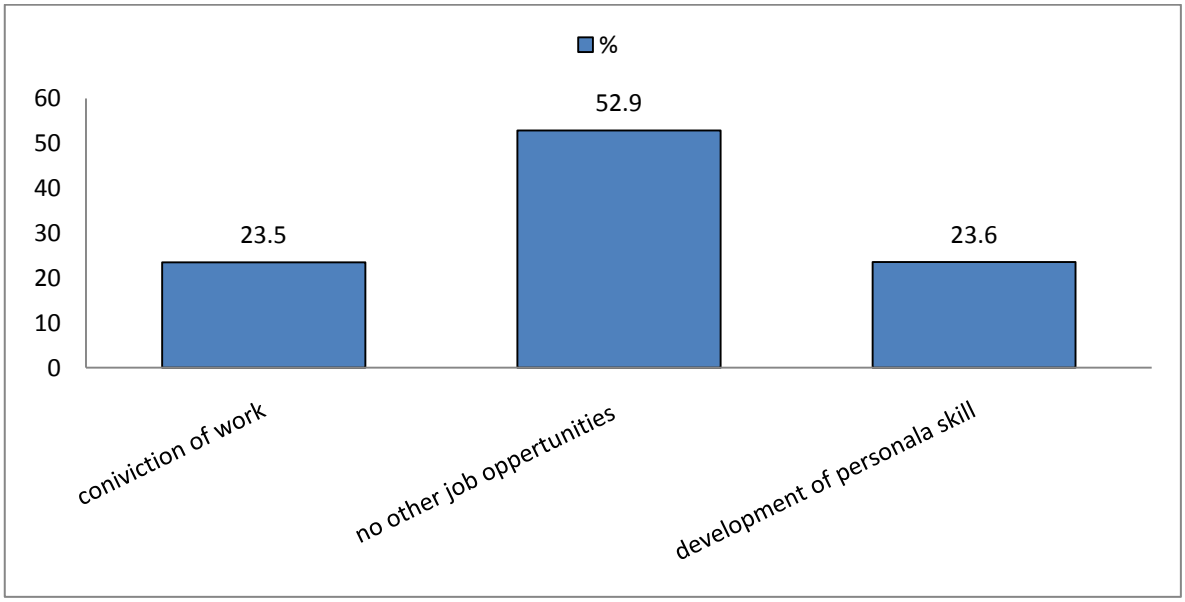

Figure 7: Reasons behind work in TVET domain

Administrators/key informants who answered "*No other job opportunities*" gave realistic answer; so the situation now seems discouraging to polarize young teachers easily to TVET field in comparison to general education. In fact most of the teachers before coming to TVET domain have knocked other doors searching for better job, so they came disappointed to work as teachers in such field. This situation is to some extent similar to most African countries. In this context, NARIC (2007b) reported negative picture about the teacher's status in Zimbabwe when said: Teachers are also suffering at the hands of the dominant state media, who continually publish negative images about the profession and a distinct lack of support from their minister. As a result of the worst political and economic situation the majority of the country's teachers have left for better paying jobs in countries such as Swaziland, Lesotho, South Africa and New Zealand.

Suitable place for training:

The study addressed a question to administrators and teachers to infer opinions of suitable place to train teachers. The majority of the interviewees (76%) confirmed that abroad is the convenient place to train teachers, while 24 % of the administrators think that the suitable place for such training is inside the country.

This result supports the teachers' opinion when they were asked to determine the appropriate place for the training process. About 89.5 % of the teachers' emphasized that the suitable place to do the training is outside the country; while few respondents (10.5%) confirmed the in-country training is suitable for them as shown below.

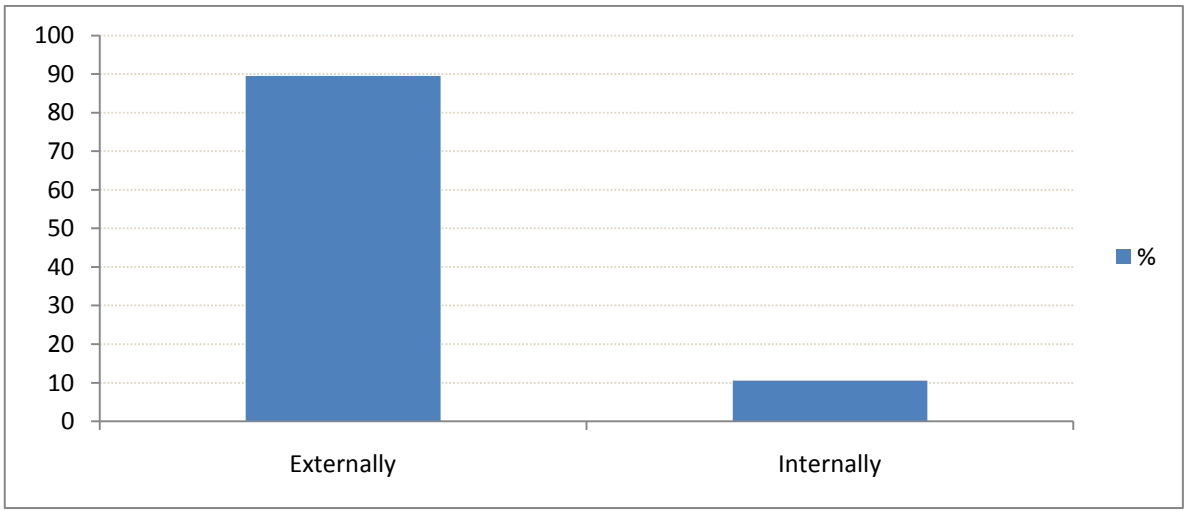

Figure 8: Suitable place for teacher training

There is a consensus that teachers can have good quality of training if they go outside. Many reasons were mentioned such as lack of specialized institutions and qualified lecturers and shortage of training equipment inside the country.

Comparison between workshop/lab in the private & public sector:

When the targeted teachers were asked to compare the condition of the workshops in their own school or institute and the nearest workshop of private sector, they responded as follow: Nearly two thirds (63.2%) of them confirmed that the situation is better in the private sector. This result supported the assumption that the private sector in Sudan is progressive than the public sector. 21.1% of the teachers said that the condition of the workshop in TVET institution is better, while 6.3% of them mentioned that there is no difference between the two. In this context as soon as the researcher addressed similar question to key informants to assess the condition of the laboratories in TVET institutions**,** they agreed with the teachers' opinions. At the same time as for the administrators/key informants 82.4% of them emphasized that good status is in the private sector workshops, and only 13.7% said that the public sector workshop is in good status and yet 3.9% of the administrators stated that there was no difference between the two. Figure 9 below presents the comparison between the condition of workshop/laboratory in public and private sector.

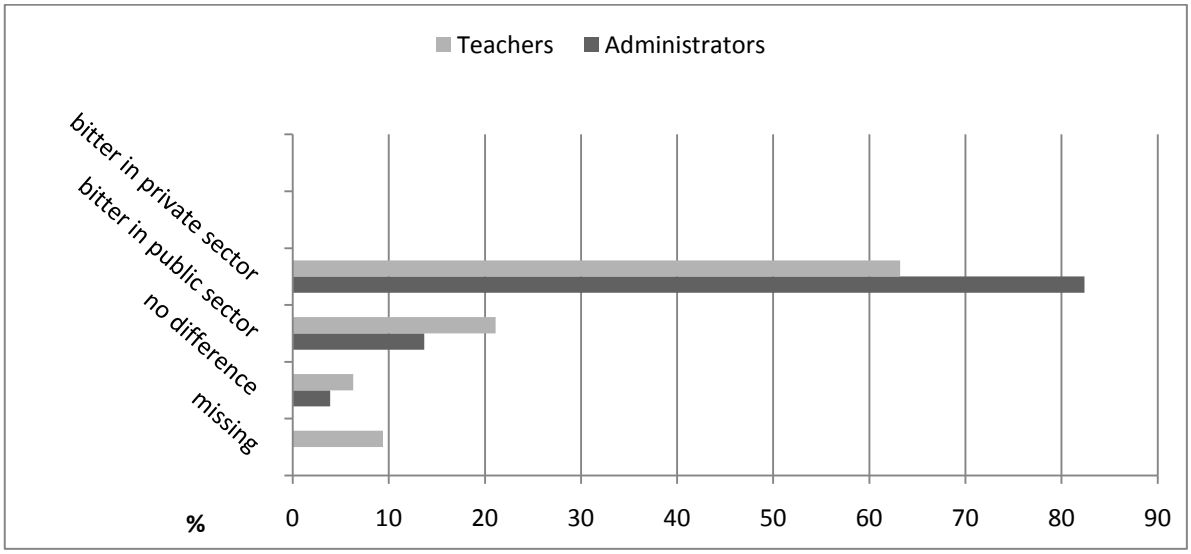

Figure 9: Comparison of workshop/lab in private & public sector

Difference between the TVE teachers and academic ones:

Some administrators compared between the teachers who work in TVET field and others who work in academic schools with respect to better training opportunity. Findings showed that 70.6% of them confirmed that TVET teachers have good chance to upgrade their skills. This result is to some extent true as seen in the previous results of the questionnaire for teachers as good number of them had either internal or external in-service training. Despite of this privilege working in TVET field is considered unattractive compared to the academic one. 17.6 % of the respondents emphasized that the teacher in academics has a better chance for skill's development than the TVET one. It is worth mentioning that the Academic teacher has rare chances to go outside for training, except teachers of the English language are excluded because they had this opportunity since earlier times. Only 11.8 % of the participants saw no difference between the two types of teachers. The answers of administrators/key informants were based on the situation in past years when true opportunities of TVET teachers and trainers were available locally and internationally. This information is showed below in the below table.

Table 12: Differences between TVET and academic teacher

Training opportunity	Frequency	%
TVET teacher has good chance in training	12	70.6
Academic teacher has a good chance	3	17.6
No difference between two	2	11.8
Total	17	100.0

Retraining programs:

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 (A U, 2007).

As shown in the below figure, concerning the recycling/retraining programs for teachers already involved in the teaching job, around 53 % of the administrators and key informants confirmed that there are no recycling programs to upgrade the knowledge of the old teachers, while 47% of them responded positively. The researcher during contacting teachers and trainers in the technical schools and vocational training centers knew that most of them if not all have no retraining programs .This means they are not up-to date.

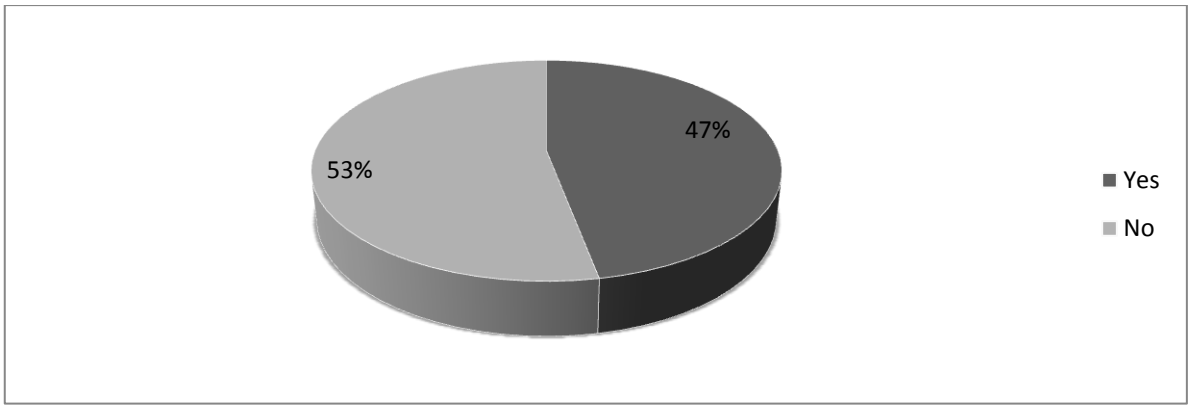

Figure 10: Retraining program

5.2.2 Initial training

Concerning attending the initial-service training, 94.7% of the teachers' participants emphasized that they have received initial service training before practicing the job during their study period in the faculties of education or related institutes of teachers training. They have received vocational and pedagogical knowledge and practical training in some primary schools attached to these faculties. Little part of them enjoyed internship in industry. On the other hand, 5.3% of the respondents reported negative response towards initial-service training. This means a few number of teachers have no pedagogical knowledge/experiences or vocational education. In particular they belong to technical secondary schools; they came to work as teachers from unrelated faculties. All the 94.7% of the respondents graduated from faculties of education or vocational training centers but they need to upgrade vocational and pedagogical skills. Those who have received initial-service training during the period of university/teacher College can evaluate the curriculum components. The study concentrated only on two practical components of the teacher training. These elements were: practical teaching in schools and internship in industry.

Practical teaching in schools:

Most of the teachers and trainers respondents proposed that teacher education programs should pay more attentions to practical knowledge and skills needed in teacher work. According to the two targeted groups, the major purpose of initial-service teacher education courses is to prepare students for school teaching. It seems that there is no suitable balance between theoretical and practical knowledge**.** They emphasized that

appropriate practical training makes students' familiar with materials, teaching methods and programs associated with the curriculum areas. Therefore both teachers and trainers in technical schools and vocational training centers gave high level of rating for the options "average" and "poor" concerning the evaluation of practical teaching programs, while no one said it's excellent. Little proportion of them confirmed its "good". The teaching practice is not regularly planned as necessary requirement for student teacher. It applied in too narrow way when students prepared to graduation they sent to some near schools to practice teaching one time under supervision and assessment of their teachers.

Table 13: Evaluation of practical teaching programs

Type of Institution	Practical teaching in TVET schools			Total
	good	average	poor	
Technical Secondary School	5 12.2%	16 39 %	20 48.8%	41
Vocational Training Centre	4 8%	15 30%	31 62%	50
Total	9 9.9%	31 34.1%	51 56%	91

Note: *four technical teachers from the entirely number (95) have not attended the initial- service training, they came from unrelated faculties.*

Learning methods used in practical teaching:

Concerning the status of learning methods utilized in preparation teachers for the future job, the teachers and trainers in both technical schools and vocational centre gave corresponded response of level "poor" evaluating the methods of instruction, while only one of whole teachers said "excellent". The overwhelming majority of teachers and trainers emphasized poor/passive methods used, while little proportion of them rated good status for the used methods. The teaching methods which conducted inside classes are in traditional style, with an emphasis on lectures and note taking since lessons are organized around traditional subjects, and here mostly the lecturer talks and the students listen without real interaction. According to teachers' viewpoint, there are many useful teaching methods but not applied by teachers/lecturers like class discussion which can offer mutual interaction between student and teacher. It provide pools ideas and experience from group, its effective after a presentation, films or experience that needs to

be analyzed and also allows everyone to participate in an active process. The below table presents evaluation of learning methods used

Table 14: learning Methods

Type of Institution	Methods of instruction				Total
	excellent	good	average	poor	
Technical Secondary School	0 .0%	7 17.1%	14 34.1%	20 48.8%	41
Vocational Training Centre	1 2%	7 14%	22 44%	20 40%	50
Total	1 1%	14 15.4%	36 39.6%	40 44%	91

Duration of practice in schools:

Periods of practical training in schools give students an insight into teaching. Students at school mainly learn basic theoretical knowledge in books, and there is rarely any chance for them to learn practical operational skills unless they carry out practical teaching in vocational-technical schools. The below table shows the opinions of teachers and trainers respect to the period of practical training in the related schools. 11.0% of respondents assured that the training period was very long, while 11.0% emphasized it was to some extent long. The majority of participants or 54.9% confirmed it was quite enough, while 23.1% of them emphasized that it was short and not grant their willing to practice more.

Table 15: duration of training period

Type of Institution	Duration of practice in schools				Total
	Very long	long	suitable	short	
Technical Secondary School	5 12.2%	4 9.8%	24 58.5%	8 19.5%	41
Vocational Training Centre	5 10.0%	6 12%	26 52%	13 26%	50
Total	10 11%	10 11%	50 54.9%	21 23.1%	91

Learning equipment:

Most of the centers/schools visited have real problems particularly in the practical side of the lessons because of deficiency of basic equipments in workshops. There is an obvious pressure on the limited machines and usability has an expiry date as teachers described very clearly. The teachers who rated the quantity of workshops/laboratories as quite sufficient were 11.0%. More than half of the respondents (54.9%) see the training aid was sufficient to some extent, while 29.7% of the targeted teachers confirmed the fact that

workshops were insufficient at all, only few (4.4%) said there are no workshops. The information is presented in the below table.

Table 16: Quantity of learning equipment

Type of Institution	Quantity of learning equipment				Total
	quite sufficient	sufficient to some extent	insufficient	No equipment	
Technical Secondary School	9 22%	18 43.9%	14 34.1%	0 .0%	41
Vocational Training Centre	1 2%	32 64%	13 26%	4 8%	50
Total	10 11%	50 54.9%	27 29.7%	4 4.4%	91

Whilst the teachers and trainers respondents were asked to assess the quality/usability of the laboratories/workshops at their institute, they responded as follows: around 11.0% assumed the condition of workshops/labs was well qualified to train the students. 38.5% rated that the machines were qualified to some extent, while 45.0% confirmed that part of these equipments was working and the other part was completely out of order. Only 5.5 % of respondents stated that the workshops in their institute as completely destroyed.

These results supported the researcher's observation about the poor condition of most vocational centers and technical schools visited. Therefore, once the teachers were asked to compare the fitness of workshops in public and private sector, around 60 % of them emphasized that the status of the private sector was better. No doubt these results have negatively impacted the overall TVET productivity. For example the department of the automobile in some selected institutes trains the students on very old car-engines that are unused in our world today. The information is presented below in table 17.

Table 17: Usability of learning equipment

Type of Institution	Usability of learning equipment				Total
	well qualified	to some extent qualified	some is working and other is stopping	no equipment	
Technical Secondary School	10 24.4%	13 31.7%	16 39%	2 4.9%	41
Vocational Training Centre	0 .0%	22 44%	25 50%	3 6%	50
Total	10 11%	35 38.5%	41 45%	5 5.5%	91

Internship in industry:

The majority of student teachers in Germany hold an occupational qualification in their field, and if they lack this qualification, they have to undergo an internship in an enterprise (Grollmann, 2008). Based on this statement the internship for student teachers and current teachers is consider very important component to supporting the technical or professional learning processes of students and teachers. Unfortunately the bulk of participants to study have not enjoyed the internship before coming to practice the job. Only 40 persons from the entire number went to industry divided to 25 to technical schools and 15 belong to vocational training centers. It's clear from the teachers and trainers' evaluation concerning the internship program in initial teacher training in Sudan is very weak, since the high level rating was given to the option "poor". Both together 65,0% of technical schools teachers and vocational training centers. That means either there is no systematic internship available or existed in random forms. Such percentage emphasized the assumption that the practical side of curriculum components especially the internship is too weak. The below table shows the evaluation of internship, no one said its excellent, rather "good" is very limited rating.

Table 18: Internship in industry

Type of Institution	Internship in Industry			Total
	good	average	poor	
Technical Secondary School	5 20%	5 20%	15 60%	25
Vocational Training Centre	1 6.7%	3 20%	11 73.3%	15
Total	6 15%	8 20%	26 65%	40

Training methods used in internship:

The best TVET system in the world is mixture of internship program alongside classroom learning. Unfortunately the majority of teachers and trainers in Sudan did not enjoy the internship period in industry as mentioned before. The few proportion who were attended such program has real opportunity to improve skills and increase experience working by dealing with modern equipment. Those gave unenthusiastic impression about this period. The below table shows the opinions of teacher of the methods used inside industry concerning their training. Since 55% of the participants attended the internship described

this period as passive, this means it was not offered them real opportunity to deal with the equipment and thus increase their knowledge and skills, while 40% of the respondents emphasized the training methods used during internship were active, they were capable to operate and maintain machines and equipment.

Table 19: Training methods

Type of Institution	training methods used in internship			Total
	Active	Passive	no methods	
Technical Secondary School	8 32%	17 68%	0 .0%	25
Vocational Training Centre	8 53.3%	5 33.3%	2 13.3%	15
Total	16 40%	22 55%	2 5%	40

Duration of internship:

The duration of the internship has very important role in preparing teacher to become qualified civil servant. In Germany for instance, teachers, including TVET teachers have to pass this internship with duration of one to two years before being employed in the related job (Dittrich, 2007). In Sudan TVET teachers spent only two or three months there. Most of the teachers emphasized that the allocated period for internship was very short, that means it was not enough to acquire appropriate skills, while a considerable number of internees described the internship period as suitable to them to have technical experience. The below table presents the evaluation about the duration of internship

Table 20: Duration of internship

Type of Institution	duration of internship					Total
	v. long	long	suitable	short	v. short	
Technical Secondary School	0 .0%	0 .0%	7 28%	1 4%	17 68%	25
Vocational Training Centre	1 6.7%	1 6.7%	7 46.7%	1 6.7%	5 33.3%	15
Total	1 2.5%	1 2.5%	14 35%	2 5.%	22 55%	40

Access to working equipment:

Teachers and trainers who were enjoyed the internship whether in industry or private establishment or even in public institution gave varied evaluation about accessibility and availability to working equipment. Since 50 percent emphasized they mostly access to this working equipment and machines, while only 7.5% said: they are always available. A

considerable proportion (35%) of the internees confirmed that the working equipment were seldom available to them, while 7.5% emphasized the unavailability (table 21 below).

Table 21: Accessibility to working equipment

Type of Institution	access to working equipment in industry				Total
	Always available	mostly	seldom	unavailable	
Technical Secondary School	1 4%	11 44%	12 48%	1 4%	25
Vocational Training Centre	2 13.3%	9 60%	2 13.3%	2 13.3%	15
Total	3 7.5%	20 50%	14 35%	3 7.5%	40

Overall evaluation about quality of initial-service education:

Assessment is an important element in the teaching and learning process that challenges instructors to consider evaluation techniques that meet the learning needs of today's learners (Mehdinezhad, 2008). It is important for teachers to have a clear vision of their roles and responsibilities to provide the best teaching strategies for their students. Again teachers and trainers who are working in technical schools and vocational training centers were gave high level rating for " average & poor" when asked to point out the overall evaluation of the content of the instruction they received. This means that there was a consensus of teachers and trainers, they were not satisfied of the curricula they received in educational institutes and did not improve their profession. There is urgent necessity to review curricula, teaching knowledge and giving more attention for practical training component. Data is shown in the below table.

Table 22: Overall evaluation of initial-service education quality

Type of Institution	Point out your overall evaluation about quality of instruction you received			Total
	good	average	poor	
Technical Secondary School	3 7.3%	22 53.7%	16 39%	41
Vocational Training Centre	4 8%	33 66%	13 26%	50
Total	7 7.7%	55 60.4%	29 31.9%	91

5.2.3 In-service training

There are many types of in-service training such as: structured training courses, seminars, and conferences and exchanged programs with other schools...etc. Quality of the content and academic level of the training will shape the professional development of teachers.

The training process contributes not only to an increase in knowledge of the participant's own area of specialisation but also to an acquaintance with new knowledge and skills in various specific fields and to reflection on the participant's own teaching and working methods (Maiworm, et al 2010). Respect to the status of participation in the in-service program, only 22.1 percent of the respondents said: they did not participate in in-service training, while the overwhelming majority (77.9 %) of the participants confirmed that they participated in the in-service training during practicing their job.The below figure shows the status of participating in in-service training programs

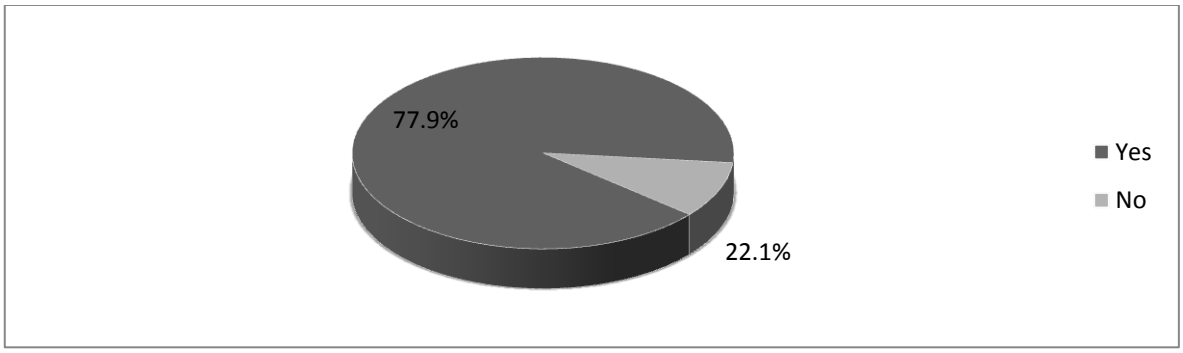

Figure 11: Status of participation of in-service training

Place of in-service training:

Teachers and trainers who participated in the in-service training can illustrated the place, since 76 % of them assured they did it inside the country, while 24% of the participants emphasized that they participated of in-service training programs outside the country. This category of teachers is considered to some extend lucky than the other category who didn't attend this kind of training abroad. Most of them belong to vocational education because the donor countries or the UN agencies when signed the agreement to establish such type of education, it included training of teachers. The group of teachers who had no abroad training was classified to some extent youth. Such training abroad offers good knowledge and experiences. In this context the majority of the interviewed administrators (76%) emphasized that there is necessity to abroad training for teachers when they were asked about the suitable place for the training process. Unfortunately, most of the donor countries have currently stopped funds and training opportunities. The status of in-service training done internally and externally is shown in below figure.

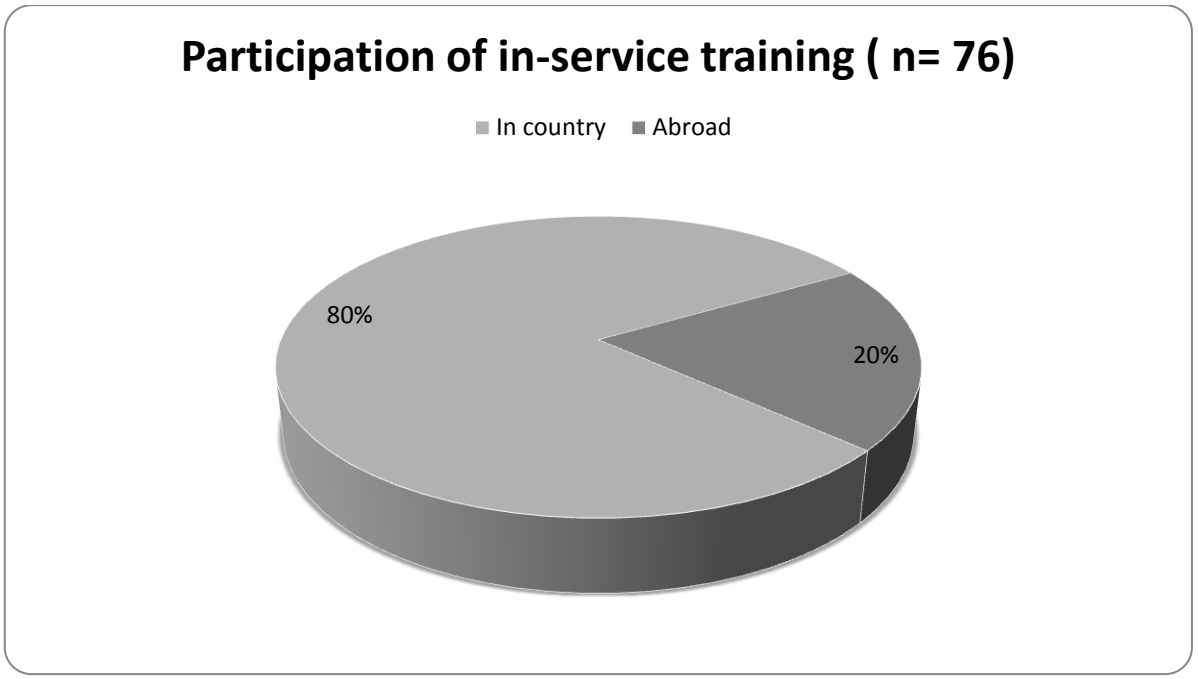

Figure 12: In-service training obtained in and outside the country

Country of in-service training:

Based-on the table below, we can note that part of VTCs teachers (7.4%) have gone to the former Republic of West Germany for abroad training during seventieth and eightieth of the past century. This was because good numbers of the vocational training centers in the country were established and funded by Germany at that time. Egypt also offered many opportunities to train teachers (8.4%). Egypt is a preferable place for authorities to send teachers there. This is due to many reasons such as: low cost, neighbourhood and familiar language and habits. Little number of teachers (6.3%) went to Turkey while few of them (4.2%) did their training in Malaysia, 3.2 % in South Korea and 1.1% went to Jordan and the same percentage did their training in India. The majority of TVET teachers and trainers (65.3%) participated of in-service training inside the Sudan. Those have joined the job starting at the beginning of the ninetieth of past century after the current government was in power since most of the foreign countries stopped donations and aid to Sudan for political considerations thus, and the opportunities for abroad training became limited or rare. Data is presented in the below table.

Table 23: Abroad training by countries

Country	Frequency	%
India	1	1.1
Germany	7	7.4
South Korea	3	3.2
Malaysia	4	4.2
Turkish	6	6.3
Egypt	8	8.4
Jordan	1	1.1
Sudan	62	65.3
missing	3	3.2
Total	95	100.0

Fields of in-service training:

To fulfil the professional tasks of vocational teachers, Grollmann (2008) specified explicit knowledge (knowledge of educational methods, knowledge and teaching of subjects) and formal knowledge of the education system and the educational establishment beside the implicit knowledge of vocational teachers (practical experience in work and teaching, vocational pedagogical skills, etc.). This part of the study reflects the desirable fields for teacher's training. About 55.8% of them wish to be trained in the same specialization they already had to become more qualified and specialists. 20% of them preferred training in education technology and communication skills. Only 2.1 % of the respondents preferred training in school and class administration and pedagogical information as they are more important to them. 6.3% of participants determined the need for training in their field of specialization and in education technology, 3.2% of teachers chose the school administration and education technology and 4.2% selected training in the specialization and school administration as presented below in table 24.

Table 24: Preferred fields of training according to importance

Type of Training needed	Frequency	%
Specialization + Professional studies	53	55.8
School and class administration	2	2.1
Pedagogical knowledge	2	2.1
Education technology(ET)	19	20.0
Specialization + ET	6	6.3
School Administration +ET	3	3.2
Specialization + School Administration	4	4.2
Missing	6	6.3
Total	95	100.0

Importance of in-service training for teacher:

Teachers were asked to specify the importance of the training. At the same time as 90.5% of the respondents stated high positive (very important) this means the majority of teachers emphasized that the training process is so crucial to upgrade and develop their performance whether internally or externally. Only 4.2 % of the participants said the training is to some extent important for the teacher while no one said the training is not important. All international related bodies/ institutions confirmed the importance of the training process. In this regards Stolte (2006) in a conference hold in China argued that TVET teachers should possess the appropriate personal, ethical, professional, and teaching qualities. Good preparation will enable them to operate in, and adapt to, an ever-changing scientific, technological, and social environment. The below figure showed the importance of the training process for teachers.

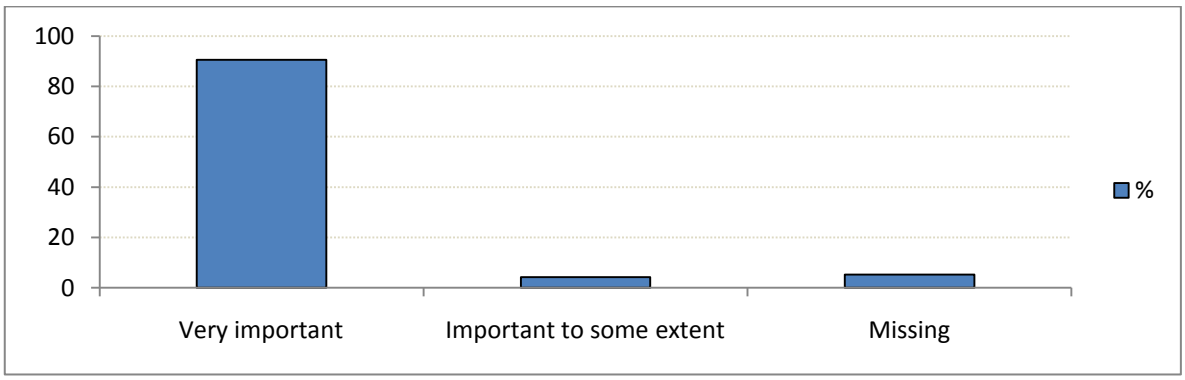

Figure 13: Importance of the training process for teacher

Evaluating the in-service training:

Results showed some significant differences between teachers and trainers in evaluating the in-service training they have had.About51.6% of the participants evaluated the training they had in a quite positive manner. 33.7% of respondents gave inaccurate answer (suitable to some extent) and 7.4% of them showed negative attitude towards the training they had which reflects that no progress in their standard has occurred. 6.3 % of the respondents didn't give any assessment. Only 1.1% of the respondents were not qualified to answer this question because they were still new without in-service training. All categories didn't justify why they gave such answers (very suitable, suitable to some extent, not suitable). Information is presented below in figure 14. Results reflected the contrast between teachers on the assessment process. Some teachers and trainers who

participated in the in-service training argued that there was no real value gained, either due to the less valuable course manner or for faraway training period. They see it will be valuable if these training courses and seminars oriented to actual teaching needs. All of them confirmed periodically refresher courses will contribute in improving the professional development for teachers. So we can say; the in-service training program conducted to TVET teachers in Sudan does not meet the professional development of teachers. According to Cochran, et al (2001)the professional development of teachers is consider a long-term process that includes regular opportunities and experiences planned systematically to promote growth and development in the profession as fact that teachers learn over time. It's the result of the learning process which is directed at acquiring a coherent whole of the knowledge, insights, attitudes and repertoire that a teacher needs for the everyday practicing of the profession-often indicated as the teacher's professional knowledge base (Vonk, 1991).

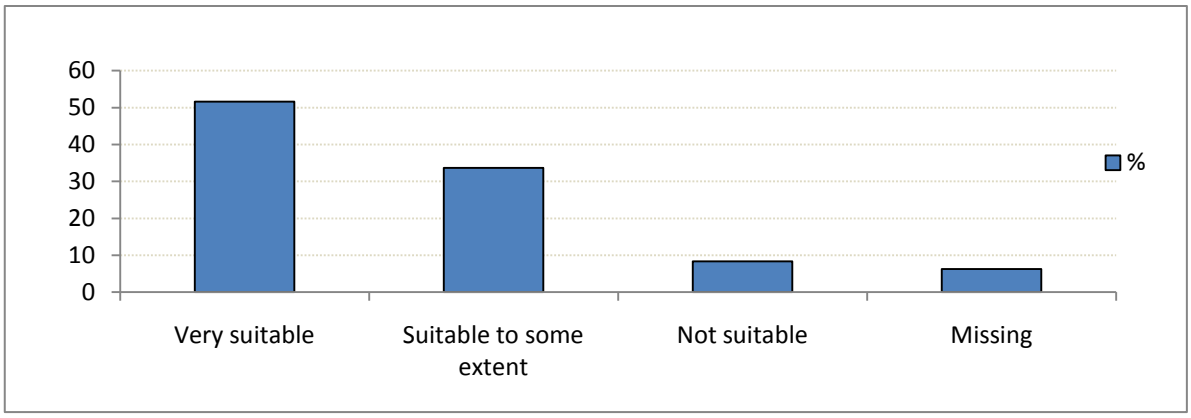

Figure 14: Evaluation of in-service training by teachers

5.3Capabilities of teachers and trainers regarding ICTs

5.3.1 Education Qualification

According to administrators/key informants interviewed, the education qualifications which should be requested from a candidate as prerequisite to become a teacher in TVET institutions be one of the following certificates:

- Bachelor degree
- Technical diploma
- Diploma of apprenticeship.

Besides one of the mentioned certificates; candidate should passes through a personal interview and practical exam. The situation seems to some extent identical to the international standard, since the ILO (2001) determined four types of TVET teachers:

1. Craft instructors who, in most cases, have a certificate or diploma in a specialized craft but have no teacher training.
2. Trained teachers/instructors who have a certificate or diploma in specialized craft/technician area with vary levels of teacher training.
3. Assistant lecturers.
4. Lecturers who have an accepted level of qualification (certificate, degree or equivalent) but do not necessarily possess teacher training qualification.

The teachers who have obtained the diploma of apprenticeship were usually graduated from the vocational training centers and work as trainers in the same branch of education, whereas the teachers who had a bachelor degree or technical diploma work as teachers for theoretical and practical subjects in technical schools mostly.

Basically there are two types of target teachers; ITSs teachers who were mostly graduated from university with a bachelor degree except few of them have only a diploma of engineering (three years) working as teachers/trainers in ITSs, figure 15 below shows in details the distributions of teachers according to their graduation certificates.

VTCs teachers normally graduated from vocational training centers with a diploma certificate represented 60.0% of the entire total of participants. 12.6% have only the Sudan school certificate (those are graduated early: at that time not many have bachelor certificates and can find a job easily). 27,4% have a Bachelor degree, they are working in the industrial secondary school.

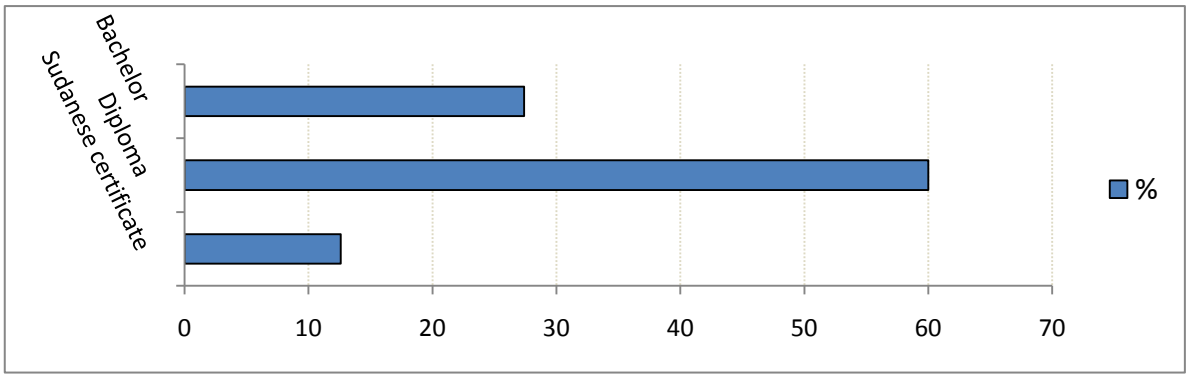

Figure 15: Distribution of teachers by certificate

5.3.2 Experience working

The teachers both in VTCs and ITSs have been grouped according to their years of service in the field of TVET into five groups. The advantage of such classification is to give information about the ongoing training programs.

As shown below in table 25 those who worked within the range of 1-5 years (29.5%) are considered the new generation, many of the teachers joined the job recently, starting from 2003. This means that they have no enough experience to give useful information about the in-service training. Most of them have no in-service training weather internal or external. Those who worked between 6-10years have begun working from the year 1998. They had to some extent good experience. They constituted approximately 24.2%. Those who are in the teaching field for between 11-15 years and have started their job around the year 1993 have considerable experience. Few or 8.4% have work between 16-20 years and have began working from year 1988 and with good experience to evaluate the situation of the two types of education and can suggest solutions to the problems concerning the curricula and training programs for both students and teachers. Considerable percentage of teachers (28.4%) has more than 20 years of experience, the newest one of them started working in the year 1987. Some of them belong to the vocational education and training. The minority belong to the technical education. The long experience entitled some of them to participate in preparing the legislation which led to emergence of SCVTA 2003; Supreme Council for Vocational Training and Apprenticeship as a policymaker body (Washi, 2004). The below table presents the years of experiences

Table 25: Years of experiences

Range of experience by years	Frequency	%
1-5	28	29.5
6-10	23	24.2
11-15	9	9.5
16-20	8	8.4
above 20	27	28.4
Total	95	100.0

5.3.3 Electronic Multimedia

Self development through using available learning resources like multimedia technology including Internet, computer based multimedia and distance education facilities …etc could

be more practical and appropriate way for continuous and effective developments of competent teachers and trainers in TVET system (Rawashdeh, 2003).

What is the situation of TVET teachers in Sudan looks like?

As shown in the figure below (the multimedia status) around two thirds of the respondents or 64 % responded negatively, there are no electronic tools in their educational institutes. That means they normally use traditional methods in their teaching process like chalk, blackboard and books. On the other hand, 28% of the respondents said there are some kind of electronic tools in their educational institutes, but that does not mean teachers use electronic tools in their preparing lessons and in teaching process. The below figure reflects the situation of the multimedia.

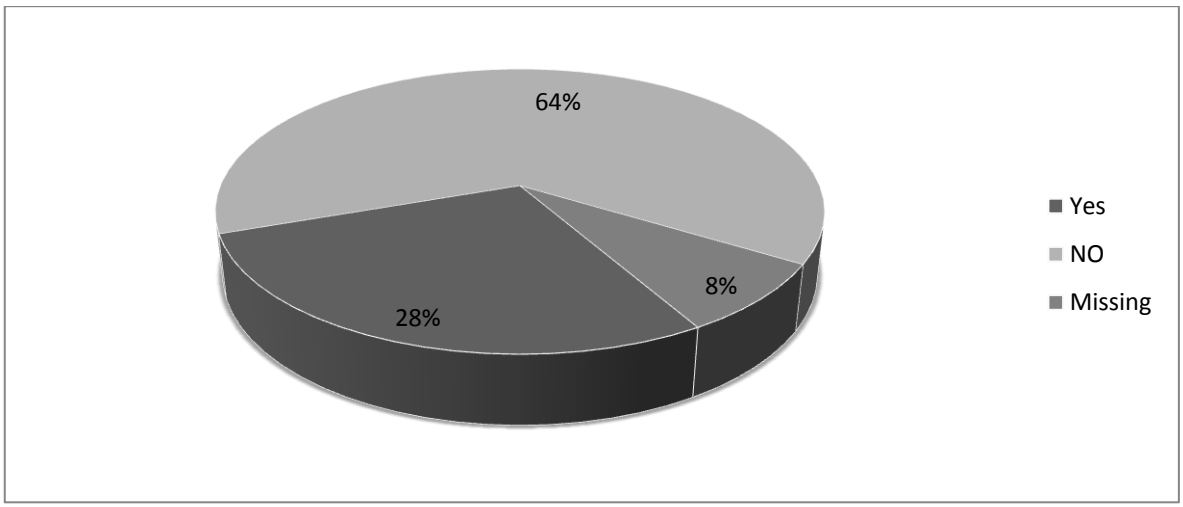

Figure 16: Availability of the electronic tools in institute

Type of electronic tools:

28 % of the respondents emphasized there are electronic tools in their institutes as shown in the figure above. Once they are asked to specify which type of multimedia is available. About 8.2% of the respondents said they have only overhead projector in the institute as electronic tool, 3.2 % of the participants have only a recorder, 9.5% of the respondents said there is a computer in school/center and only 2.1% of the participants said a video device is available. 4.2% of the teachers mentioned the availability of a computer device besides the overhead projector, and 5.3% of the respondents have multi electronic tools (projector, computer and recorder). According to this statement, the Internet as electronic tool is not available in all schools and vocational centers visited. When thinking about power the internet aids whatever subject is taught, to enhance student's learning of the

subject matter, and also furthering their mastery of information technology skills that are fast becoming essential to daily life (Kravitz, 2004). This situation indicates that the teaching process in the industrial schools and vocational training centers in the Sudan is not using modernized tools.

The respondents who did not answer this question are those who confirmed that they have no electronic tools available in their educational institutions. Most of the teachers and trainers in the VTCs & ITSs who did not use the electronic tools existed in their institutes depend only on the traditional methods as mentioned before. The below table illustrates electronic multimedia in TVET institution.

Table 26: Type of existed electronic tools in school/institute

Tools	Frequency	%
Over head Projector	8	8.1
Recorder	3	3.2
Computer	9	9.4
Video	2	2.1
Internet	0	0
Projector + Computer	4	4.2
Projector + Computer + Recorder	5	5.3
No electronic tools	60	63.5
Missing	4	4.2
Total	95	100.0

Use of Computer and internet:

The computer has become a multimedia tool suitable for production and presentation of very sophisticated, engrossing educational materials spanning all subject matter and age level (Kravitz, 2004). The bulk number of teacher respondents or 90 % they didn't use computer in the teaching process. They rated "No" it's an honest response, some of them said frankly, they do not know how to use the computer basically, not to mention the internet. 7 % of them said they have limited knowledge of dealing with specific programs of the computer in preparing lessons like Microsoft Word or Power Point; however the searching in the internet for general information or relevant subjects is remain an imagination work. In this context the situation in Europe is completely different as it shown by a report which confirmed a positive attitude for the teacher in the European countries. It said: An overwhelming majority of teachers in Europe (90%) already use ICT to prepare their lessons (Empirica, 2006). This reality reveals the necessity to train TVET teachers in Sudan and to eliminate their illiteracy of computer use. In such regard one specialist

confirmed that the availability of such technology will enable teachers and trainers to access technical knowledge related to their field of specialization, latest educational pedagogy, interacting with fellow teachers/trainers regarding new concepts, ideas, activities … etc, particularly when establishing networks, and teleconferences in the field of TVET (Rawashdeh, 2003). The information was shown in the below figure.

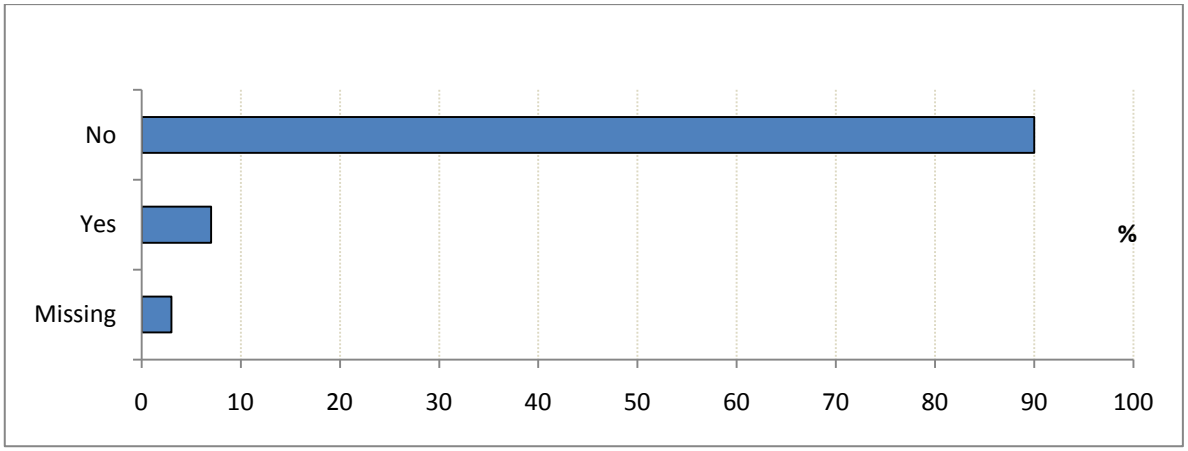

Figure 17: Status of using computer and internet

Integration of ICTs in curriculum in initial teacher training:

Approximately, all the teachers and trainers participated to this study (except 3) emphasized that the general knowledge of computer science has not been integrated to teacher training syllabus applied in all colleges and teacher training institutes. As shown in figure17 above, over 90 percent of the teachers without computer skills due to fact that information and communication technologies are not considered one part of the initial teacher training curriculum. The figure below presents answer of teachers and trainers both in vocational training centers and technical secondary schools in Khartoum state about integration of ICTs in initial teacher education.

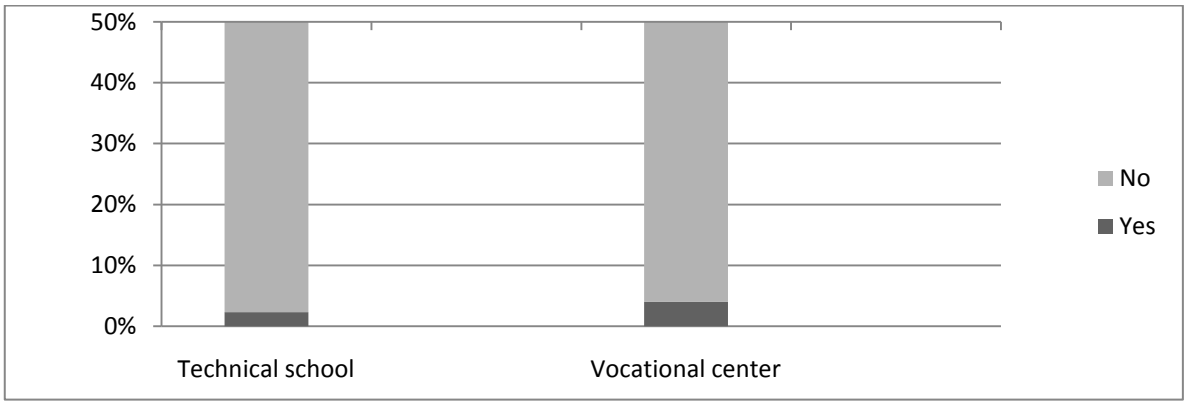

Figure 18: ICTs in initial teacher training.

Since 46.3% of teachers who are working in technical secondary schools confirmed the ICT was not part of the subjects taught, while 50.5 % of teachers and trainers in vocational training centers in Khartoum state gave the same attitude towards the ICTs. Only very few proportion (3.2%) of the respondents said the ICTs were well integrated to teacher training programs. Despite this statement the overwhelming of teachers believe that integration of simple level of information and communication technology like Word Processing, Power Point, and Excel program will modernize the learning and teaching process.

Impact of ICT in learning and teaching process:

The use of technology in a suitable way can improve the learning process. The bulk number of teachers and trainers when asked about the influence of using suitable level of technology like text processing, presentation programs, statistical programs, gave positive attitude towards them. They emphasized good impact on the teaching process despite more than 90 % of them have no computer skills and did not use the internet before because it was not integrated in teacher training programs in the pre-service training. This means the ICT was not part of the curricula they were had during their preparation at the education colleges. Little proportion of teachers and trainers rated “no” that means the new technologies (ICT) have no positive impact on teaching and learning, while a considerable number answered “I don’t know”, they were not sure if the integration of ICTs have good or bad impact in education process. 74.7% of the respondents believe that overall performance will be better if the teaching process enhanced of some kind of technologies. Most of them were confessed on importance of ICTs of all aspect of life in our today’s world and it’s unimaginable without such technology. Good number of them actually began self learning of computer operating system and text processing. The computer literacy will enable them to get access to world of internet. In this context teachers and trainers suggest education curricula and programs should give students opportunities to learn how to use ICT and from time to time the continuing training program includes courses of ICT.

Table 27 below shows positive opinions of teachers towards integration of ICT in both learning and teaching processes.

Table 27: Impact of ICTs in learning and teaching process

Type of Institution	Integration of ICT in learning/teaching process			Total
	yes	no	I do not know	
Technical Secondary School	35 77.8%	4 8.9%	6 13.3%	45
Vocational Training Centre	36 72%	6 12%	8 16%	50
Total	71 74.7%	10 10.5%	14 14.8%	95

5.4. Private sector and teacher training

In the interest of sustainable development, achievement, and the competitive ability of young people, the whole TVET system has to be oriented toward the labour market and the employment system (Trowe, 2006). Vocational schools as partners in training for businesses -make an essential contribution to the qualification of these young specialists (Trowe, 2006).

Many questions were addressed to employers and private sector stakeholders to see if they accept/have the interest to train teachers in their own establishments. 80 % of the targeted employers responded positively: they accept to train the teachers to raise their capabilities, but in the past they did not do that. 20 % of the respondents said: they do not accept to train TVET teachers in their own workshops.

The results in the below figure, shows important fact that the employers in private sector have the interest to work jointly with TVET authorities to strengthen the capacity of the teachers because it will reflect positively on the final output

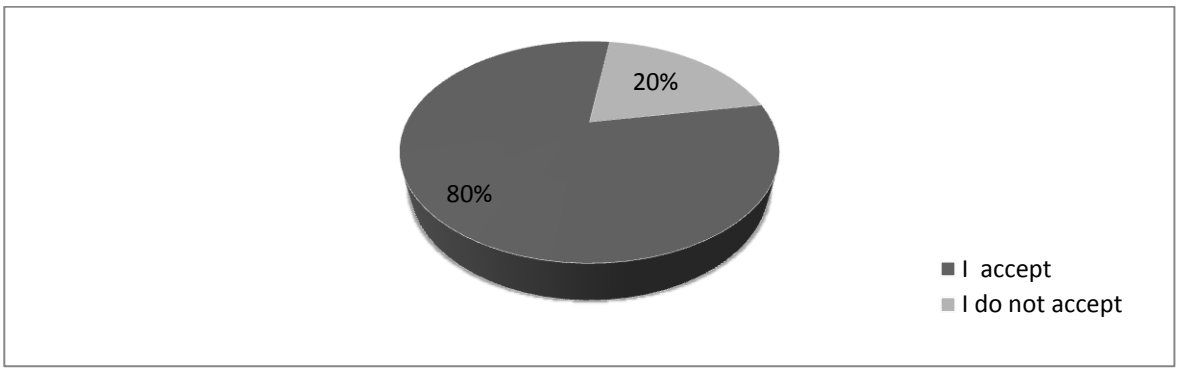

Figure 19: Opinion of private sector of teacher training

5.4.1. Exchange training between private and public sector.

Table 28 below shows attitude of participants towards the process of training exchange between private and public sectors, since the majority of teachers' respondents indicated positive personal view about the exchange of training between public and private sectors. Around 86.3% of the participants confirmed positive reflection of this relationship to the overall output of TVET while 5.3 % of them said there is a negative impact of this partnership to the output. In addition 3.2% of the respondents do not know if this exchange process has a good or a bad impact as seen in the table below, while 5,3% skipped question. Teachers and trainers who emphasized positive impact beyond the exchange training justified that students and teachers will undergo real experience theoretically and practically.

Table 28: Exchange of training process between private and public sector

Opinion	Frequency	%
Positive reflection on TVE output	82	86.3
Negative reflection on output	5	5.3
I don't know	3	3.2
Missing	5	5.3
Total	95	100.0

5.4.2. Assessment of TVET graduates by employers

The researcher requested from employers to give an assessment/feedback of TVET students who did training period. 60% of them evaluated the student's standard as average, while 20 % of them emphasized weak standard, while 20% of them skipped the question. Many employers emphasized that in the normal cases when they receive workforce from TVET institutions they put employees under intensive refresher course in order to make them up to date. The results reflected a very weak performance of TVET output. The assessment of TVET graduates' performance should lead to improvement in the acquired competencies of workers according to certain quality standards defined by industry, and even the mobility of the graduates is seen as a useful indicator of the relevance of the training to the labour market, since internal or external migration of the skilled worker can be seen as a positive indicator in training program assessment. These results may be attributed to varied factors. Of course the poor status of teachers was one of them.

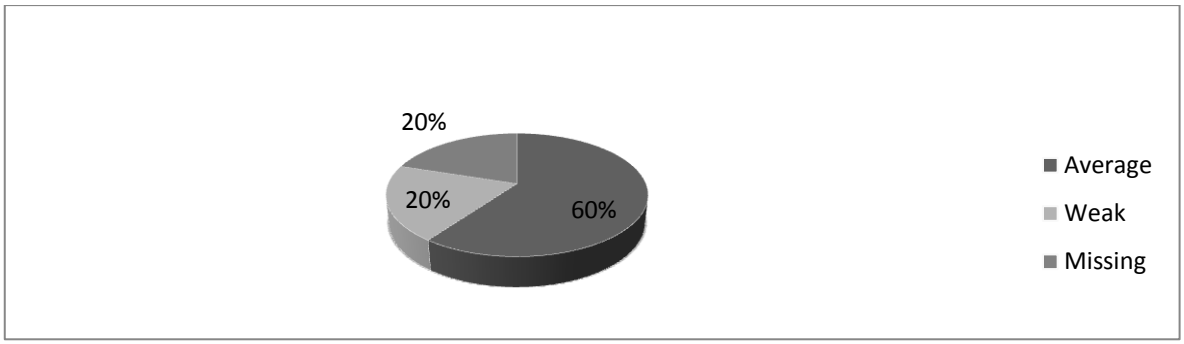

Figure 20: Assessment of TVET graduates by employers

5.4.3. Place of training students

Table 29 below shows that the majority of teachers (82.1%) confirmed that they mostly trained their students in the workshop of school/institute. That means the students have no real chance to be trained in the workshop of the private sector during the study period. Taking into account the poor status of these workshops the picture of the output could be clearly predicted. About 12.6% of the respondents emphasized that the training process was done sharing between the workshop of the institute and the workshop of the private sector together and only 2.1% of participants said that the whole training process of the students achieved at the private sector workshops. 3.2 % of the teachers skipped question.

Table 29: Place of training the students

Place of Training	Frequency	%
In workshop of institute	78	82.1
In workshop of private sector	2	2.1
In both	12	12.6
Missing	3	3.2
Total	95	100.0

The previous results indicated evidently that there is no cooperation/coordination between the private sector and TVET institutions at present to train the students in the private workshops/labs. Besides, the teachers themselves lack the proper opportunity to develop their skills and performance by accompanying the students there. As well this result confirmed the previous result when the majority of teacher emphasized that the situation of the workshop/lab in private sector is better than the ones in the public sector.

5.4.4 Opportunities of training teachers in private sector institutions

Employers who accepted to participate in the interview only five employers cooperated with the researcher as mentioned in the study limitation part in chapter four, as they asked about training students and teachers in their establishments, all of them (100%) confirmed that they only trained students as internship period. However, 80% showed negative attitude towards teachers training. This result illustrated clearly, teachers have no any opportunity to refresh their knowledge or to promote their skills in modern workshops/ labs. Table 30 below gives a comparison of training opportunities between teachers and students in private sector.

Table 30: Training TVET teachers and students in private sector

Teachers			Students		
Response	N	%	Response	N	%
Yes	1	20	Yes	5	100
No	4	80	No	-	-
Total	5	100	Total	5	100

5.4.5Developing training program for teachers

Negative assessment is given to current relationship between public and private sector especially with respect to teacher education collaboration. Since 58.8% of the interviewees described this relationship “very weak”, while 35.3% were emphasized that there is no relationship at all. This situation necessitates making effort to fill up the gap between two sectors. There is a need to create strong relation in near future particularly concerning the student and teacher training, so employers and administrators were optimistic about the future.

Figure 21 below presented information about the necessity of training TVET teachers in the private sector workshops. In this context, all the interviewed administrators and policy makers responded positively or 100 %. This means all of them emphasized high necessity of training TVET teachers in private workshop, while no one stated any necessity at all or to some extent for such training. Many justifications were given to enhance this point of view and realize many things like: Consultation and transference of experience and advanced training in private workshop, advanced knowledge of training process and good opportunity to train student. This result corresponded to the international call for the linkage between TVET institutions and private sector. Kerre (1997) confirmed that there is

a need for collaboration between TVE institutions and enterprises to enable students gain skills and to enable teachers to retool in their own occupations. This relationship creates tangible benefits to both educational institution and the informal/formal sector.

As soon as the researcher addressed the same question to employers to explore their interest to train TVET teachers in the private workshops, they approximately gave similar answer. 80 % of the interviewed employers confirmed high necessity for the training, while 20 % of them saw no necessity to train the teachers in private workshops. Policy makers and employers need political support to sit together to transfer wishes to reality.

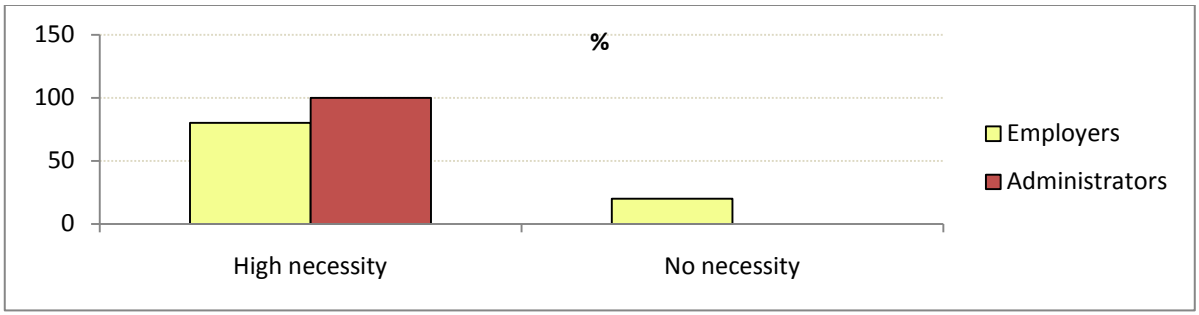

Figure 21: Necessity to train TVET teachers in private sector

Since enterprises are mostly like to be operating within the state of the art technology, they should be included on curricula panels to participate in curriculum development, they can also be used to in-service the teachers/trainers besides donating some equipment for training purposes (Kerre, 1997).Once the interviewees were asked about how the collaboration could be useful between public and private sector in teacher training, Key informants and employers gave together fruitful opinions that could assist developing the level needed of the technical and vocational education in the Sudan generally and raise the capacity of the teachers particularly.

In this context, one key informant suggested that:

> The authorities should build up curriculum based on the existed situation sharing with private sector to be taught in vocational training centers and technical schools and from time to time hold seminars and workshops arranged by the two sectors to evaluate and discuss what is new.

Other employer proposed:

> Incentives should be offered to encourage the private sector to collaborate with the technical and vocational institutions to train the teachers according to the labour market orientation.

5.5Proposed training approach

It is now understood that sustainable development is a process of adaptive management and systems thinking, requiring creativity, flexibility and critical reflection. Through team work- stakeholder dialogue and decision making- and working across disciplines, social groups learn from each other as they consider options and the consequences of these options to the future (Daniella, T. 2003).

the study proposed a new approach for the teachers training in Sudan rely on effective partnership between the private and public sectors and a political commitment to implement this approach (Fig 24) below. The new approach of teacher training based on three levels, the macro, meso and micro.

5.5.1 Levels of training approach

Macro- level (Political commitment)

It is important that the authority should have a clear national policy and conceptual framework for technical and vocational education. According to Lauglo (2009) this policy refers to a set of relatively stable goals and choice of a strategy to reach these goals over a considerable period of time to improve productivity of workforce. A comprehensive understanding need to be developed that articulates the link between vocational and technical education and national planning and development, especially in terms of its importance and outputs. General and higher education should be revised to specify and insure the distinct position of technical education at its different levels. The country should improve the image of teachers, their work conditions need to be looked into in terms of building their capacity. Creation of new regulations and legislations of coordinating TVET teacher training between the public and private sector finally, media involvement to raise the private sector awareness of the importance of the training process for teachers.

Meso-level (public and private sector)

Teachers in vocational education must not only know about teaching; but they must know the industries they are teaching about. Most teachers work or have worked in those industries. As well as their identity as teachers, they have an identity as a chef, a plumber, an information technology specialist or a child-care worker (Palmieri, 2004).

A moral contribution from the public and private sector in Sudan towards training of TVET teachers should be realized, by providing real opportunity to make a success to this new training approach by means of offering technical support, technical consultation, advanced knowledge, specialized seminars and contributing of all training policies especially the financial cost.

Micro-level (TVET institutions)

Teacher training institutions need to rethink their curricula, pedagogies, structures and organizational culture to bring about the expected transformation at the learner level. This requires the initial and in-service training of TVET teachers effectively incorporates these elements (Teasdale et al 2005).In a bid to strengthen the standard of TVET teachers, the recruitment policy toward initial-service education should be changed to attract best candidates not only students of low grades. Integration of the technology into curricula, improvement of initial and In-service training programs based on training needs assessment, clear and determined internship period, improvement of the work environment and encouragement of teachers to attend seminars and workshops that organized together from time to time between public and private sector is needed. The below figure is the proposed training approach. It considered the contribution of the study to improve and develop the standard of the teachers and trainers who are working in the field of TVET in Sudan. It's an ongoing training process for all teachers in order to keep them up to date. The success of training approach depends on the awareness of the government and private sector to secure adequate budget for the training

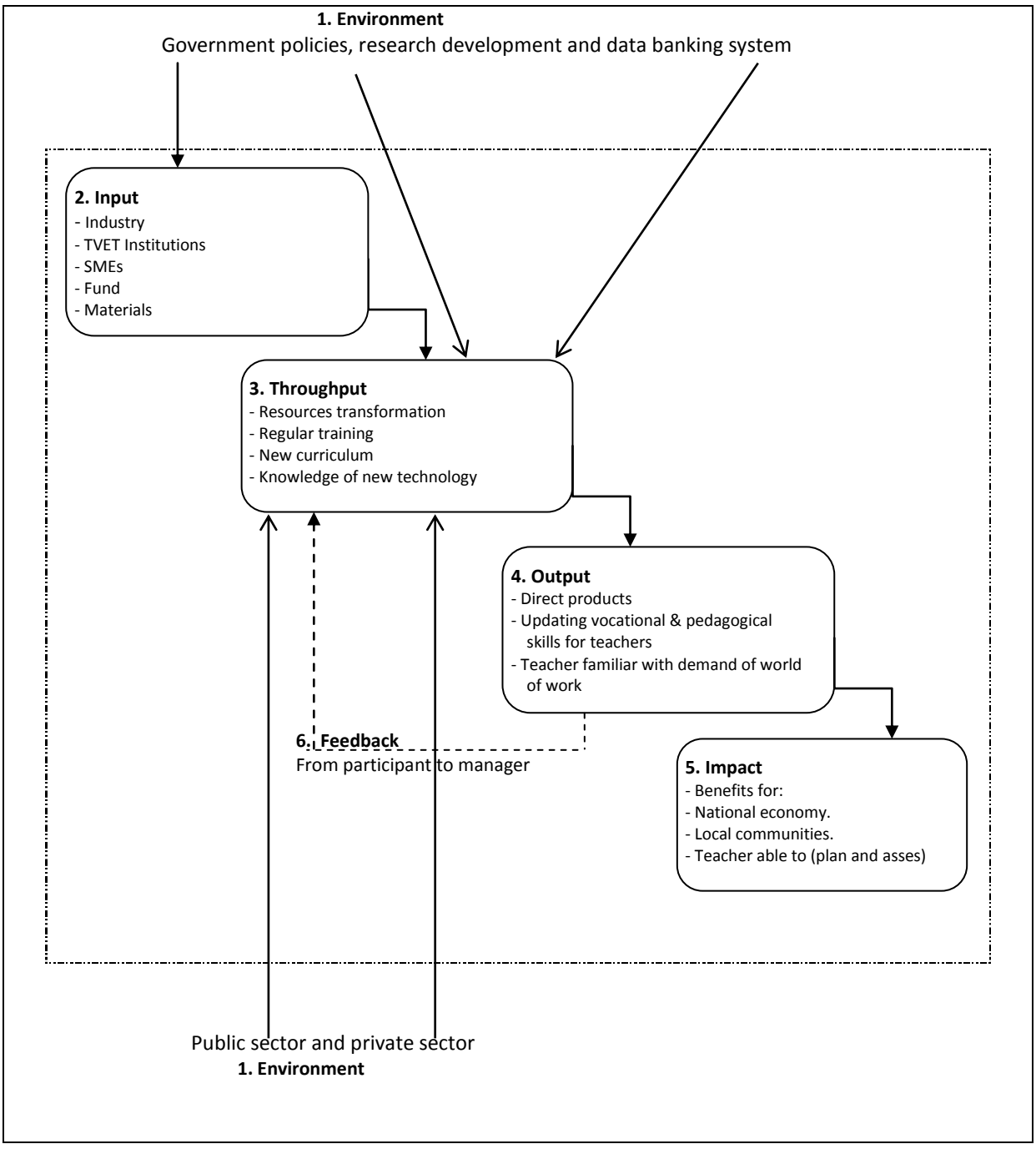

Figure 22: Proposed training approach for TVET teacher and trainer.

5.5.2 Elements of training approach

Environment:

All the elements outside of the system that have the potential to affect all or part of the system[3],these elements are consisting of the government policies, public sector and private sector which are responsible for getting practical experience. This partnership requires coordinating, planning, funding, training and fostering teaching staff and attracting the advanced experience of internal and external experts to participate in training technical and vocational teachers and TVET institutions. This partnership will be based on three pillars: curriculum development, institutional management and industrial training.

Input:

Resources are taken or received from the external environment. The key input resources serve for this approach are consisting of industry, TVET institutions, and even small and medium enterprises (SMEs) and businesses (NCVER, 2007) and other technical assistances like; funds, staff, technology, materials, services and knowledge from all sources (European Commission 2005)

Throughput:

The process of the conversion/transformation of the resources within a system, the aim of the training process here is to standardize TVET teachers and trainers who have not reached standardization in vocational knowledge, skills and pedagogical capacities[4] in other word to improve TVET teachers and trainers' capacities. The throughput involves the alignment of the needs of the TVET teachers and trainers with the retraining interventions as demanded by those sectors of society which would benefit from the provision of new or adapted skills of the TVET teachers and trainers. These should be matched by the support system provided by both the TVET institutions, SMEs and Industries (NCVER, 2007) The process requires regular training (continuing professional development) provided for all vocational and technical teachers and new curriculum on upgrading knowledge of new

[3] *http://en.wikipedia.org/wiki/File:Basic_Open_System_Model.gif*

4www.rcp-platform.com/pdf/WG2report.pdf

technology (ICT), improving vocational skills and innovating vocational teaching methods. The curriculum includes: professional psychology, professional pedagogy, organizing and managing the teaching process, teaching skills, professional teaching methodology, teaching practice, and research methods of professional pedagogical science, vocational curricula development, teaching technology and Information technology application in teaching.[5]

Output:

The work of the system, exported back into the environment. According to the European Commission (2005) the outputs are the direct products and services of an organization or a network of organizations, and the immediate effect of organizational performance. After cycling this approach, many outcomes are expected to be achieved by teachers and trainers. TVET teachers and trainers will have updating vocational and pedagogical skills, and being more familiar with the demands of the world of work and necessary vocational skills and how they will develop in future.

Impact:

Many benefits are realized from the approach of retraining of TVET teachers and trainers in Sudan: the national economy will get benefits; local communities and the teachers and trainers themselves, they will be confident and self-worth, able to plan, develop and assess education and training for the needs of the world of work in cooperation with representatives from enterprises.

Feedback:

A continuing source of information concerning the relationship with the external environment used to make the necessary changes in order to survive and to grow. Härkönen, et al (2004) stated that, feedback from participants supports the positive evaluations from managers; though in some cases participants identify areas in which programs could be improved.

[5] *www.rcp-platform.com/pdf/WG2report.pdf*

5.6. Hypotheses Test

5.6.1. (Hy.1) the practical components of TVET teachers training programs in the initial training in Sudan don't support much the development of the teaching competences.

In regard to this hypothesis table 31 below includes all the answers of teachers and trainers in both technical schools and vocational training centers about some elements constitute the practical side of curricula in the initial teacher education. These elements are: practical teaching in schools, internship in industry, methods of teaching which are playing an essential role of completion the continuing training process and the teacher professional development.

Table 31: Practical components in initial teacher training

Instructional Resource	Teachers & Trainers	excellent		good		average		poor		total
		N	%	N	%	N	%	N	%	
Learning methods	Tech- school	0	.0	5	12.2	16	39.0	20	48.8	41
	Voc- centre	1	2.0	7	14.0	22	44.0	20	40.0	50
Practical teaching in schools	Tech- school	0	.0	5	12.2	16	39.0	20	48.0	41
	Voc- centre	0	.0	4	8.0	15	30.0	31	62.0	50
Internship in industry	Tech- school	0	.0	5	20	7	28	13	52	25
	Voc- centre	0	.0	3	20	5	33.3	7	46.7	15

Learning methods: there are many diverse teaching methods. Successful instructor uses the appropriate method for appropriate attitude. For tertiary education the lecture method is suitable for presenting new material, for summarizing ideas, and for showing relationships between theory and practice. The high rate of evaluation (48.8% & 40%) of methods of instruction utilized in colleges of education was given to option "poor" from teachers and trainers in technical schools and vocational centers respectively. They agreed that very backward methods were used. Just lecturer talks or read from paper and students' type notes. There is no essential interaction between teacher and student.

Practical teaching in schools: the results show very high rating for the option "poor" from both technical schools teachers (48%) and vocational centers teachers and trainers (62%) thus they found the practical teaching is too poor. Some of them emphasized inadequate

chances to practice the practical teaching in the connected schools to their teacher college. Others described the whole process of useless value due to unprepared schools in addition to unavailable subject matter content/syllabus in some technical school so it was difficult to design lesson to be taught.

Internship in industry: whether the image of the component practical teaching in schools is bad, definitely the internship in industry is the worst; because of some factors such as employers themselves are not enthusiastic to accept teachers or student teachers in their enterprises they prefer ready skilled workers to achieve duties. Also employers not undertake to pay for internship trainees. So high rate of evaluation was given both from technical teachers (52%) and vocational teachers (46.7%) to answer "poor"

Based on the above teachers and trainers evaluation of the practical components of teachers education curriculum implemented in teacher training colleges/institutes, the results decline obviously weak or bad status of those elements of curriculum. Accordingly the evaluation of these elements proves the rightness of the hypothesis above.

5.6.2 (Hy.2) the in-service training program does not match to professional-development needs of teacher.

According to Glatthorn, (1995), the teacher development is the professional growth a teacher achieves as a result of gaining increased experience and examining his/her teaching systematically. Gancer, (2000) determined the needs of teacher to achieve the professional development, he said: Professional development contents a huge amount of knowledge and experiences. These experiences can be divided into formal experiences (such as attending workshops, professional meetings, monitoring, etc.) and informal experiences such as (reading professional publications, watching television documentaries related to academic discipline, etc. based on this statement urgent question arise: is the in-service training in Sudan match the professional development of teacher? The answer to this question emerges from opinion of most of teachers and trainers who argued that there was no real value gained from the in-service training attended, either due to the less valuable short courses manner or for faraway training period which concentrates just on theoretical approaches.

5.6.3 (Hy.3) teacher training in Sudan integrates the development of ICT-Skills for modernizing the teaching competence of teachers. But it is not applied properly yet.

Sub-hypotheses:

-ICT competencies is one part of this teacher training curriculum

-The given conditions/infrastructure and the skills of the teachers and trainers do not support the development of ICT skills.

Before testing hypothesis 3, urgent question is arising: Why ICT is important?

Information and Communication Technology (ICT), particularly internet in today's world plays an important role in education sector, especially in the process of empowering the technology into the educational activities (kaka 2008). It is important to remember that the introduction of ICT may not initially change teacher behaviour; however, with appropriate support and access to relevant technologies, behaviours will change over time (UNESCO, 2004). In this regards, the World Bank recognizes the critical importance of effectively utilizing new (ICTs) to meet the growing need for a more sophisticated labour force, manage information systems, and contribute to poverty reduction around the world. ICT in education includes assistance for equipment and facilities, education management and information systems, teacher training and support, capacity building, educational content, distance learning, literacy, education policy, media and outreach (WB, 2009).

It's true, we can find good teacher without ICT skill. It's just enough for a great teacher to be knowledgeable, confident, and able to make learning a pleasant experience and always willing to help his/her students. Regarding the status of current infrastructure of ICT in educational institution in the Sudan, nowadays there is remarkable technological revolution to equip all tertiary and secondary schools with computers labs and encourage improving the computer skills for students and teachers in order to modernize the learning and teaching process. According to Hamdy, (2007) the ICT policy for education was launched in 2002. The Information Directorate a Curriculum Centre and Training Directorate are the entities managing the implementation. In 2004, ICT was introduced in secondary education curricula. A number of computers were installed in schools (around 50% of secondary schools), at an average of 10 computers per school. In schools the connectivity is mainly through dial-up and ADSL. However, in higher education systems, it

is through ADSL only. The country is planning to have computers available in all education levels by the year 2015 as agreed to at the ICT summit in Geneva (Hamdy, 2007).

With respect to ICT position in the initial-service teacher training, both teachers and trainers emphasized that it is not integrated in curricula (see figure 18). On one hand this means ICT is not part of the subjects taught currently, on the other hand teacher's computer skills are very low and infrastructure of classrooms and labs also lack to computer equipment and no accessibility to internet service inside campus. Despite this status teachers show good attitude towards using ICT (see table 25), they believe that the new technology will cover all aspects of life soon or later.

Supporting the possibility of using computer and internet by TVET teachers, the study will tests some variables like education qualification, year of experience and age of respondentsapplying chi-squire test. After testing the relationship between these variables and use of computer, important findings came out that indicate there is no significant relationship between these variables and use of computer. Therefore, anybody can use the computer perfectly irrespective to his education qualification, year of experience and age.

According to Motulsky, (1995) who said when analyzing probability tables with rows and columns, you can use chi-squire test because it's simple to calculate but yield only an approximate P value. To verify the distribution of observed data with expected data Karl Pearson has developed instrument to test the difference between the hypotheses and observed value (Sukumar, 2009). The Chi-square equation is:

$\chi^2 = (O-E)^2 / E$ .Degree of Freedom = (R-1) (C-1). Where:

O = observed frequency. E = expected frequency. R = number of rows. C = number of columns.

For the entire chi-squire test the table value has taken@5% level of significance. To test the goodness of the main hypotheses of the study, to use the chi-square test, four major steps should be undertaken:

1- State the hypothesis by stating the null hypothesis or the alternative hypothesis. 2- Formulate analysis plan to accept or reject the null hypothesis. 3- Analyse sample data to

find degree of freedom, expected value, test statistic and P value, Where P value is probability value. 4- Interpret result[6].

The null hypothesis denoted by H_0

Use of computer and internet and education qualification

Table 32: Use of Computer and Internet and Qualifications of respondent

Use of computer& internet	Education Qualification			Total
	bachelor	diploma	Sudan school certificate	
Yes	**2** 25.0%	**4** 50.0%	**2** 25.0%	**8** 8.4%
No	**24** 27.6%	**53** 60.9%	**10** 11.5%	**87** 91.6%
Total	**26** 27.4%	**57** 60.0%	**12** 12.6%	**95** 100.0%

The above table illustrates the use of the educational technology according to the classification of the education qualification. Teachers and trainers who use the computer and internet in the teaching process (preparing lessons, presentation, searching for relevant issues in internet...etc) only 8.4% of total number represented the three categories (Bachelor, Diploma and Sudanese school certificate). The great ratio (91.6%) of the teachers and trainers lack the basic skills of using the new technology. This result emphasized the utilization of such technology not depend on the qualification just need willingness. The chi-square test was conducted to measure the relationship between the use of computer and internet and the education qualification.

Hypothesis:

$H_{0:}$ There is no significant relationship between use of computer and internet and education qualification

O	E	O-E	(O-E) 2	(O-E) 2/E
2	2.189	-0.189	0.036	0.016
24	23.811	0.189	0.036	0.002
4	4.8	-0.800	0.640	0.133
53	52.2	0.800	0.640	0.012
2	1.01	0.989	0.979	0.969
10	10.99	-0.989	0.979	0.089
Total				1.22

[6] *http://stattrek.com/AP-statistics-4/indepedence.aspx*.

Degree of freedom = 2

Table value = 5.99

Calculated value = 1.22

Inference:

Since the calculated value is less than the table value. So the null hypothesis should be accepted. That means there is no significant relationship between the use of computer and internet and the qualification of respondent. The chi-squire test corresponded the assumption of the previous two way table, thus it is not necessary to have a certificate to use computer or internet.

Use of computer and internet and years of experience:

Table 33**:** Use of Computer and Internet and Years of experience

Use of computer& internet	Years of experience					Total
	1-5	6-10	11-15	16-20	above 20	
Yes	2 25.0%	3 37.5%	1 12.5%	0 .0%	2 25.0%	8 8.4%
No	26 29.9%	20 23.0%	8 9.2%	8 9.2%	25 28.7%	87 91.6%
Total	28 29.5%	23 24.2%	9 9.5%	8 8.4%	26 28.4%	95 100.0%

The above table showed the results of two way table of cross tabulation. The teachers according to their work experiences have weak familiarity of the utilization of computer and internet. Only 8.4% of the respondents used the education technology, while 91.6% of them have no dealing with such technology. When taking a look to the distribution of teacher's experience, we can note evidently that the category of 6-10 years experience has the high ratio (37.5%) of use of computer and internet. they are considered the new generation. The category of 1-5 years experience and the category of above 20 years have the same percentage of computer usage (25%) while the other categories which have a little bit long experiences either without computer using or very low percentage.

The chi-square test was conducted to measure the relationship between the use of computer and internet and the working experience

Hypothesis:

$H_{0:}$ There is no significant relationship between use of computer and internet and years of experience

O	E	O-E	$(O-E)^2$	$(O-E)^2/E$
2	2.358	-0.358	0.128	0.054
26	25.642	0.358	0.128	1.130
3	1.937	1.063	1,130	0.584
20	21.063	-1.063	1.130	0.054
1	0.7579	0.242	0.059	0.077
8	8.242	-0.242	0.059	0.007
0	0.674	-0.674	0.454	0.674
8	7.326	0.674	0.454	0.062
2	2.274	-0.274	0.075	0.033
25	24.726	0.274	0.075	0.003
Total				2.68

Degree of freedom = 4. Table value = 9.49. Calculated value = 2.68

Inference:

Since the calculated value is less than the table value. So the null hypothesis should be accepted. Hence, there is no significant relationship between use of computer and internet and years of experience. Again when testing the null hypothesis the chi-square test showed there was no correlation between long working experience and use of technology

Use of computer and internet and age of respondents:

Table 34: Use of Computer and Internet and age of respondents

Use of computer& internet	Age of respondents					Total
	20 to 29	30 to 39	40 to 49	50 to 60	Above 60	
Yes	0 .0%	5 62.5%	3 37.5%	0 .0%	0 .0%	8 8.4%
No	10 11.5%	28 32.2%	42 48.3%	6 6.9%	1 1.1%	87 91.6%
Total	10 10.5%	33 34.7%	45 47.4%	6 6.3%	1 1.1%	95 100.0%

The data presented in table 34 above revealed that the largest number of teachers (91.6%) had not used the computer and internet and there were no significant differences between them according to their age classification. the first group of age (20-29 years) no one has dealt with computer. The second group (30-39 years) which included 33 teachers only 5 of them have used the computer and internet. Group three (40-49 years) composed of 45 teachers and only 3 of them have skills of computer and internet. The two last groups (50-60 and above 60) did not use computer and internet at all.

The chi-square test was conducted to measure the relationship between the use of computer and internet and age of respondents

Hypothesis:

$H_{0:}$ There is no significant relationship between use of computer and internet and age

O	**E**	**O-E**	**$(O-E)^2$**	**$(O-E)^2/E$**
0	0.842	-0.842	0.709	0.597
10	9.158	0.842	0.709	0.055
5	2.779	2.221	4.933	1.775
28	30.221	-2.221	4.933	0.805
3	3.789	-0.789	0.623	0.103
42	41.211	0.789	0.623	0.009
0	0.505	-0.505	0.255	0.129
6	5.495	0.505	0.255	0.012
0	0.084	-0.084	0.007	0.001
1	0.916	0.084	0.007	0.000
Total				3.49

Degree of freedom = 4

Table value = 9.49 Calculated value = 3.49

Inference:

Since the calculated value is less than the table value. So the null hypothesis should be accepted. Hence, there is no significant relationship between use of computer and age of respondents.

The chi-square results revealed that there is no significant relationship between use of computer and qualification, age and experience of the respondents. But actually the overall results of the study showed a very low status of using the computer and internet in

the teaching process. Such situation in Sudan could be attributed to many other reasons, of course the education qualifications, age and years of experience are not of them.

5.6.4 (Hy.4) the private sector in Sudan does not contribute to promote TVET teacher training programs currently.

To test this hypothesis we have to view the interview of administrators and employers specially the question (*Is the present initial and in-service training programs linked to the labour market demands?*) Figure 23 below presented the results. Since 82% of the administrators' emphasized that the current teacher training is not connected to private sector. While only18% of the administrators interviewed confirmed the current training program was oriented to the business market demands.

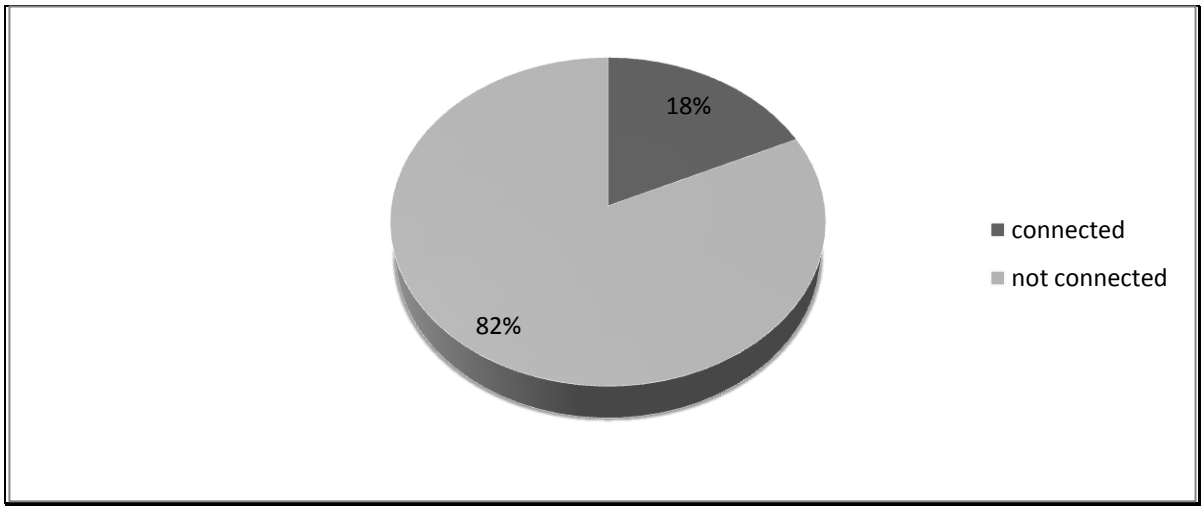

Figure 23: linkage of teacher training to private sector

The above information was confirmed by employers and administrators in figure 24 below when they have been asked about the current relationship between TVET institutions and the private sector. Around 60% of them confirmed that there was no relation between the two. Near 60% of administrators' emphasized no or weak relationship between the private and public sector with respect to teacher training .Only 5.9 % of them emphasized the relation was very strong. 35.3 % of them stated there was no relationship at all between the two sectors.

Both TVET policy makers and private sector administration emphasized that the ongoing training programs for teachers need to be correlated to the labour market orientation

through designed curriculum or specific training approach makes TVET teachers and trainers always up-to date.

These results prove the rightness of assumption of the study: The current training programs have not been designed in accordance with the labour market demand.

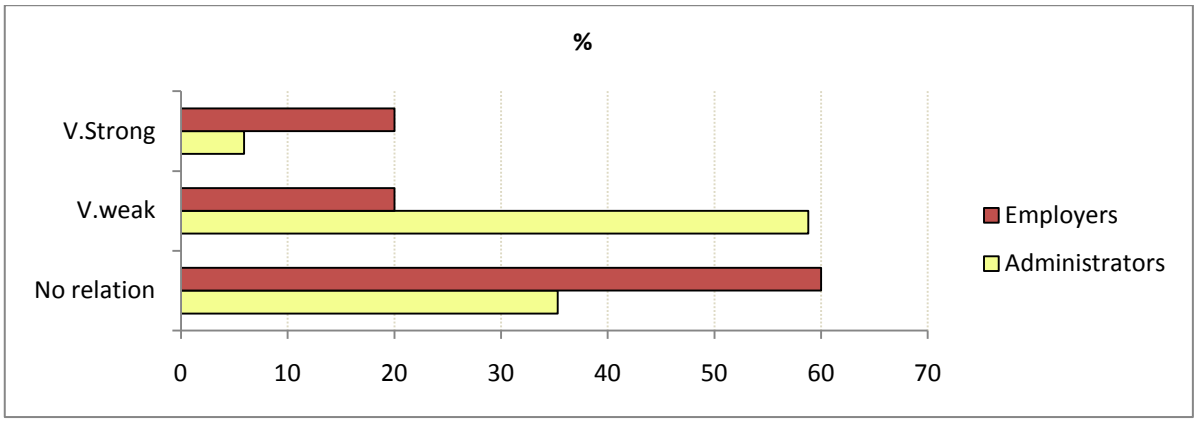

Figure 24**:** Current relationship between TVET and private sector

5.7 Conclusion

Now after the analysis of the teacher's questionnaire and administrators and employers interviews, the defect of TVET teachers training in Sudan could be diagnosed. Therefore the attempt of rehabilitation will come in order to raise the capacity and improve the performance of teachers. Many indications can be noticed throughout this chapter. Poor status of teaching environment quantitatively and qualitatively was stated by teachers and administrators in comparison to private sector. Most teachers have participated in-service training in the past and need retraining programs. The current training needs integrating collective social teaching/learning forms, integrating ICT knowledge and the Internet in the training, and labour market statistics. There is an urgent need to train the teachers in private sector workshops and hold seminars to keep them up to date and make private sector share the training policy in the future. Some hypotheses of the study have been subjected to testing by using chi-square test.

6. Summary, Conclusions and Recommendations

"TVET teachers have to be seen and acknowledged as the professionals they are given their crucial role in sustaining and developing the skills of their nations' workforces, and this means that their status and levels of reward in some societies need to be addressed"(Guthrie, et al.2009)

6.1 introduction

building the capacity of the teachers in the technical secondary schools and the vocational training centers in Sudan, begins with the nature of recruitment, through the arrangement of practical seminars, workshops and internships in the initial-service training, to the organization and participation of teachers in the in-service training. The following steps were filtered from the literature review that serves as the theoretical guide for this research.

Step one deal with the requirements to TVET education that includes education qualification (suitable teaching certificate: Diploma, B.A, and M.A), competence (knowledge, understanding, Pedagogical expertise, etc) and professionalization motivation to work in TVET education. The second step is encompasses the initial-service training, it includes consecutive course in pedagogy (Principal subjects+ Retaining subjects), methods and selecting adequate teaching, work and learning organization forms, vocational subject in a vocational field (including subject-related didactics), basic knowledge of ICTs such as: software management (Words, Excel, PowerPoint), teaching practice at schools and Industrial/enterprise internships practically related seminars in school. The third step is the on-job or the in-service training. This step leads to develop the professional development of teachers by conducting retraining programs for all types of teachers as follows: a- in-service training (INSET) for unqualified teachers (mainly certification course); b- Inset to upgrade teachers; c- Inset to prepare for new roles, such as principles or teacher educators, workshops, professional meetings…etc; d- Curriculum-related inset (mainly courses linked to planned curriculum change or refresher courses). The fourth step is the evaluation and appraisal for the teacher performance

6.2 Summary

Nowadays, the Sudan is witnessing accelerated socioeconomic revolution in all aspects of life after oil extracting and exporting. This new situation needs increasing of productivity in all economic sectors. This is only possible through a skilled work force that has the flexibility to acquire new skills and abilities for new jobs as the structures of economy and occupations change, therefore vocational and technical education and training in Sudan needs to reorient its programs and operations to better fit into the new economic and technological environment. Teachers and trainers will be the cornerstone in the whole process. Unless we rebuild their capacities, this new aspiration could not be achieved.

The study consists of six chapters, the main objective of the study was to investigate the capacity of the teachers and trainers who are working in the technical secondary schools and vocational training centers in Khartoum State by examining their capabilities, competencies and their ICT skills. The researcher believes that one of the weaknesses of TVET overall output in the Sudan refers to the axis of the teacher and trainer. This weakness may be due to the nature of the initial and in-service training program. Chapter1 includes beside the objectives, hypothesis, research questions, limitation and structure of the study.

Chapter two showed some features of the educational system in Sudan. Instability between many educational theories could be observed. The educational ladder is changed several times; from 4-4-4 to 6-3-3 then again to2-8-3.According to the current educational system there is no independent route for the technical and vocational education (Fig 1). These days the national council for technical and technological education which is emerged as a policy making body has designed vocational and technical system to be parallel to the academic ones at present time and to remove it gradually in the future. But until now does not approve by the politicians. This independent route for the technical and vocational education begins with little dose of vocational and technical studies in the basic education level and goes gradually until the university level and then to post university studies (vertical further study).Also the situation of ICT in the Sudan has been portrayed.

Chapter 3 is the literature review deals with the international concepts concerning the study orientations.The term capacity building as highly objective of the professionalism has been explained; also the concept of teacher professional development is constitutes

important step lead to achieve the capacity building. All other components contribute on raising the standard of TVET teachers, like integrating of suitable level of information and communication technologies (ICTs) (Word Processing, Power Point and statistics programs) into initial and in-service training, connecting teacher education to the world of work are considered in order to serve the study building capacity of teachers and trainers who are working in the field of vocational and technical education in the Sudan.

Chapter4 isdescribes the methodological approach where qualitative (interviews& observation) and quantitative data (questionnaire) are applied to achieve suitable information about the situation of TVET teacher education in Sudan. It begins with the research design, through to the research plan. Emphasis is on the data sources, description of target population and method of analysis adopted for the data collected.

Chapter5is mixed of the results and discussion, where data is arranged under three main themes corresponding to the objectives of the study. The first theme is the current situations of training programs (institutional set up, the initial and in-service training programs).Second: are ICTs status and capabilities and competencies of teachers and trainers, and third: the contribution of private sector in TVET teachers training. Also this chapter is includes the proposed training approach for teachers and trainers who are working in TVET institutions in Sudan. Finally: chapter6is the summary of findings, conclusion of study and recommendations.

In 2004 the total number of vocational teachers and trainers in Khartoum state was around 242 (Washi, 2004). This number can be classified into three main groups: the first group is composed of experienced workers who make about 5% of the total number and this category was dwindling as a result of lack of recruitment. The second group is includes former graduates of vocational training centers who constitute around 70% of the entire number. The third category is consists of university or polytechnic graduates who formulated the remaining 20% of teachers and trainers.

The total numbers of the teachers in the technical secondary schools in Khartoum state is 310.Around 58.7% of them are trained and 41.3 % need to be trained (Tab.3).

The field research is administered in three vocational training centers and three industrial technical secondary schools in the study area (Khartoum State). 95 teachers who participated to the study questionnaire are representing the sample size of the study.

Descriptive statistics (frequencies and percentage) are used to analyze the data. Moreover, chi-squire test is used to state the relations between different variables and test some hypotheses of the study.

6.3 Conclusions

The findings of this study revealed that huge innovations of teacher training system in Sudan are needed.

- Regarding the abbreviation "TVET" in Sudan, There are three educational forms. These forms are: technical education, vocational education and technological education. The responsibility of the three types is distributed into three ministries. Ministry of General Education, Ministry of Labour Public Service and Human Resources, and Ministry of Higher Education and Scientific Research respectively. No doubt, such intersection of responsibilities is lead to contradiction of policies and consequently weakens the TVET generally.

- The data is showed to some extent identical responses concerning the suitable place for the training process stated by the administrators and teachers (76% and 74.7% respectively). Both gave priority to abroad training, they assumed that qualitative training is not available inside the country.
- In regard to the quantity and usability of the existed workshops and laboratories annexed to VTCs and ITSs, results showed insufficient and useless machines since most of them stopped working, they are more than 30 years old. Those equipments were mostly donations and/or gifts from friend countries like the former Republic of West Germany, ILO and other UN agencies. Recently, except the Sudanese Korean Training Center which is rehabilitated by the Republic of Southern Korea, no rehabilitation or modernization took place for most of VET institutes. The results also showed that priority is given to the workshops in the private sector when compared to the public ones, since two thirds of the participants confirmed the situation is better in the private sector. Putting in mind the fact that teachers have no opportunity to train in workshops/labs of the private sector, consequently they have low skills standard.
- Very interesting finding from this study regarding the answer to the question "who has better chance to improve his personal skills through the training process? More than

70% of the administrators interviewed emphasized that the TVET teacher has good opportunity whereas most of the teachers and trainers who are working in the field of technical and vocational education have gone outside for training, such situation might not be the available for teachers from other streams. In spite of this reality, recruitment into TVET domain is considered unattractive because of some reasons mentioned by teachers and administrators such as: the inferior vision of society towards this type of education as well as the country policies which devote bias toward academic education.

- A very significant finding about the in-service training process is reflected by most of the interviewed administrators/key informants and teachers who emphasized the facts that there are no recycling programs to update knowledge of old teachers and no plan to keep all teachers up-to date and therefore, does not meet the teacher professional development. Sometimes there were refresher courses in subject didactics, teaching method or class administration and lack to training in scientific subjects and/or specializations and no practical training on modern machines. Some few employers interviewed confirmed this fact. They did not train teachers in their own establishments; they mainly trained students during their internship period. On the other hand, the overwhelming majority of the teachers contributed to the study assumed that they have participated in in-service training inside or outside the country only at the beginning of their working life. Teachers who participated in in-service abroad in the period of the seventieth and eightieth of the past century have good attitude toward the quality of training they had. They gained more benefits; their experience is increased and became more confident at work.
- There is a consensus of teachers and trainers that the practical training during their initial education is too weak. This situation attributes to insufficient methods of instruction, seminars and presentation training, practical teaching and internship in industry. In a bid to increase motivation towards teacher education, TVET in Sudan should improve the integration of practice and theory in the current training. According to Nanga (2007) this can take the form of integrating collective social teaching/learning forms, integrating ICT knowledge and the Internet in the training, besides systematising the structure and organisation of internships. The courses should include basic labour

market statistics to inform the teachers of the employment possibilities opened to TVET students from secondary schools.

- The most remarkable finding of this study is of the usage of computer and internet in the teaching process. In spite of the consensus worldwide about the importance of use of technology in a suitable way to enhance the learning/teaching process; so that teachers can use technology to develop their teaching at least to deal with computer using word processing and other simple programs. In this context, Johnson and John,(1986) ; Nickerson,(1995) advocated cooperative learning not only for the positive effect for ICT on student's performance but also for the positive effect it has on motivation, classroom socialization and attitude toward the subject being learned. Based on this statement the image in Sudan is completely inconsistent. The results indicated that the majority of the teachers (91.6%) have no computer and internet skills, they considered computer illiterates. There is an urgent necessity to equip teachers and trainers with simple doses of new technology to cope with the era of technology.
- According to teachers and trainers statement the ICT is not yet integrated to the curriculum applied in colleges/institutes of education. Also there is no computer laboratory for students and teachers, but currently there is educational strategy to equip secondary schools and institutes with computers and internet service. its expected the teacher training programs include integration of level of ICTs in the near future.
- Concerning teachers' certificates results showed that more than 60% of the teachers' participants have diploma certificate and lacking to university studies, on the other hand, a considerable number of teachers have only the Sudan school certificate (secondary education level), they are and still working as teachers or trainers. These results emphasized that the new generation of university graduates have a little bit reservation to be recruited into TVET field. Therefore most of the administrators and key informants are emphasized the unwillingness of the majority of the teachers and trainers who are working in the field of TVET. Most of them are uninterested to improve their skills and standard.

- The study findings revealed that there is no collaboration between the private sector and the TVET institutions in the domain of teacher training at present. The researcher confidently, assumes such collaboration can be one of the major factors that make teachers up to date. All administrators and employers interviewed agreed with the importance of exchanging experiences between the two sectors for better teacher's performance.
- One of the most positive findings for this study is the approach of training TVET teachers and trainers. If such training approach being undertaken by the authorities in Sudan, no doubt will yield qualitative movement in teacher training, this approach is filtered from experiences of many organizations interested in improving the capacity of individuals and organizations.
- In regard to hypotheses test, for hypothesis 1 "*The practical components of TVET teachers training programs in the initial training in Sudan don't support much the development of the teaching competences*" results show high negative attitudes toward the practical components of curriculum implemented in colleges of initial-service training especially side of internship in industry and practical teaching in schools since results are indicates insufficient integration of theoretical knowledge and practical skills.
- Hypothesis 2, results show the current in-service training program does not support the professional development for the teachers. It does not make much sense because either to less valuable short courses manner or due to for faraway training period which is concentrated just on theoretical approaches.
- Concerninghypothesis3results show that ICT is not one part of the curriculum applied in the initial teacher training. These results are opposite to sub-hypothesis which assumed that ICT competency is one part of teacher training curriculum. The study is used cross-tabulation and chi-squire test to see if there relationship between the use of computer and internet and some variables like: educational qualification, work of experience, and age of respondents or not. All results of the tested chi-squire program revealed that there is no impact of these variables and use of computer and internet. Such skills differ from one individual to other irrespective to his certificate and age and so on. The results of these test come in the following points:

- There is no significant relationship between use of computer and internet and education qualification, the important finding from this sub-hypothesis showed no significant differences between category of Bachelor degree holders, category of Diploma degree and group of Sudanese school certificate holders in dealing with technology whereas few of them (not more than 8%) have used it in preparing lesson. The chi-squire test indicated no significant differences between all types of certificates in using the computer and internet. This means no impact of personal education qualification of use the technology (Tab.30)
- As soon as used the null hypothesis to test the relation between use of computer and internet and years of experience, the result of chi-square revealed that there is no significant relationship. Since the experiences are differ however more than 91% of the targeted teachers have no skills of computer and internet as it is mentioned above and physically they did not use such technology in the teaching process(Tab.31)
- The use of computer and internet is not influenced by the age of respondents. According to teacher groups which are classified due to age, the result showed no significant differences in using the technology. As group (20-29) years no one is used the computer in spite they considered the youngest teachers and came fresh from universities. Group(30-39)only five of them are used the computer, and the group of age (40-49) only three teachers are used technology, finally teachers who are above 50 years old did not use the computer in the teaching process. that meant there is no influence of the age on the computer and internet using (Tab.32)

In spite of the tested results showed there are no significant relationship/correlation, the status of using the new technology (ICT) in the teaching/learning process remain very low. This situation requires more efforts from authorities to build up self confidence among the teachers and trainers who are working in the field of TVET in particular and encourage them to learn about computer skills because the world of technology is changes rapidly and day by day the access to internet become easy.

- Regarding hypothesis 4 "*The private sector in Sudan does not contribute to promote TVET teacher training programs currently*" around 59% of the interviewees emphasized very weak relationship between public and private sector, while 35% confirmed there is no coordination between the two sectors particularly in teacher training. This

assumption is enhanced by 60% of employers who emphasized absence of any kind of cooperation presently.

6.4 Recommendations

- The results show very poor status of teachers and trainers in the field of technical and vocational education in the Sudan. This situation requires reviewing of all policies, conceptual frameworks and regulations governing the students' intake into TVET institutions and teachers training and to involve the private sector in designing TVET policy and legislation.
- The initial and in-service training programs should be innovated. Developing new curricula, linking teacher training process to industry, include more practical elements in initial and in-service training, introduce theory and practice of TVET training process and develop job profiles entrance criteria are needed requirements for TVET teacher training(WB,2006).
- providing a legal framework to ensure quality of/and comparison between different certificates, in the form of content standardisation; and a teacher certification/ accreditation system maybe realised by upgrading and equating the diplomas to bachelor and master degrees is required to generate expertise for higher level personnel at TVET institutions as well as to build up and ensure a sustainable TVET expertise in the country.
- Establishing independent educational route for the technical and vocational studies in the university to graduate TVET teachers. The present teachers either graduated from vocational training centers or came from relevant field of study to be employed as a teacher in the technical secondary school in relevant subject. In this context, the national council for technical and technological education launched a special program starts from the basic level until university and graduate studies, but does not applied until now.
- More attention should be given to implementation the practical side of curriculum during the teacher preparation especially with respect to seminars and presentation training and practical teaching in schools and find appropriate manner to activate the internship period for both student teachers and teachers.

- Student internship should be incorporated into each discipline in TVET and made integral part of the curricula and also necessary legislation shall be done to ensure industry's acceptance of internees.
- Adopting suitable level of ICT as an essential subject in the initial teacher training and teacher professional development, building school computer labs, equipping TVET institutions with appropriate modern technological equipment at least computer and helping teachers and trainers to use practices such technology in their teaching and training, finally making ease accessibility of internet on campus.
- More efforts should be introduced to change negative society attitude about TVET. The role of authority should be more aware towards this issue by changing the educational policies and increase the attractiveness of the job by increasing the wage and improvement of work environment. In addition, the media has a very important role to play in raising community awareness about the importance of vocational and technical education.
- Establishing specialized college/institute as sustainable human resource development for training and retraining teacher and trainer from the field of technical and vocational education and polarize appropriate fund and encourage exchange of international experience.
- Successful, active partnerships between private sector enterprises and TVET service providers depend upon cooperation and engagement of employers. (EU, 2009). Mutual benefits for private sector and TVET institutions are derived from cooperation on everything from curriculum development to training of teachers and trainers and workers (the study proposed new approach for training TVET teacher depend on the partnership between the private and public sector in the Sudan. Fig 22).
- Adopting the training approach which is suggested by this study. The implementation of this approach depends on the attention of the government (the macro-level)by linking the vocational and technical education and national planning and development. This situation needs creation of new regulations and legislations to coordinate TVET teacher training between the public and private sector. Also the collaboration between the public and private sector (meso-level) is needed by means of offering technical support, technical consultation, advanced knowledge, specialized seminars and contributing of

all training policies especially the financial cost. finally efforts of teacher training institutions (micro-level) are requested by rebuilding the curriculum, integrating the technology, improving of initial and in-service training programs based on training needs assessment, accurate internship period, improving the work environment and encouraging teachers and trainers to attend/participate to seminars and workshops.

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Appendix .1 Teacher's Questionnaire

Personal Information

Sex: male ( ) female ( )

Age: 20-29 ( ) 30-39( ) 40-49( ) 50-59 ( ) above 60 ( )

Education Qualification: Bachelor ( ) Diploma ( ) Sudan school certificate ( ) other ( )

Type of institute/school: technical school ( ) vocational centre ( )

Department: ……

Years of experience: ……

(**A) Training**

1. Have you participate to initial-service training? Yes ( ) No ( )

2. If yes, please evaluate the following instructional resources in meeting your needs:

Instructional Resource	excellent	good	average	poor
Learning methods				
Practical teaching in schools				
Internship in Industry				
point out your overall evaluation about quality of instruction you received				

3. Describe the duration of your teaching practice in schools

Very long ( ) long to some extent ( ) suitable ( ) short ( ) very short ( )

4. Assess the quantity of learning equipment

Quite sufficient ( ) sufficient to some extent ( ) insufficient ( ) no equipment ( )

5. Evaluate the usability of the learning equipment

Well qualified ( ) qualified to some extent ( ) some is working ( ) no equipment ( )

6. Evaluate the training methods used in internship

Active ( ) passive ( ) no methods ( )

7. Describe the duration of internship

Very long ( ) long to some extent ( ) suitable ( ) short ( ) very short ( )

8. How do you access to working equipment during the internship?

Always available ( ) mostly ( ) seldom ( ) unavailable ( )

(B) Job practicing

9. Did you participate in in-service training? Yes ( ) No ( )

10. If yes, please specify: in country ( ) abroad ( )

11. Where did you participate the in-service training? (Specify country)……

12. What do you prefer: internal or external training and why?

Internal ( ) why……

External ( ) why……

13. How do you assess the in-service training program?

quite enough ( ) to some extent enough ( ) insufficient ( ) I don't know ( )

14. Specify benefits gained from the in-service training:

new knowledge and experience ( ) new relationship ( )

more confidence in work ( ) good status on life ( )

15. Which field of the in-service training is more important for you?

Study area ( ) school administration ( )

classroom administration ( ) computer and teaching technology ( )

16. to what extent the in-service training is importance for you?

very important ( ) to some extent important ( ) not important ( ) I don't know ( )

17. What is your current position?

teacher ( ) trainer ( ) head of department ( ) deputy ( ) other ( )……

18. Where do you train your students mostly?

in institute workshop ( ) in private sector workshop ( ) in both ( )

19. What are the instructional tools do you use?

blackboard ( ) book ( ) overhead projector ( ) films ( ) other ( )……

20. Are the ICTs already integrated to curriculum in initial teacher training? Yes ( ) No ( )

21. Is there educational multimedia at your institute? Yes ( ) No ( )

22. If yes, what kinds are available?

recorder ( ) video ( ) computer ( ) internet ( ) other ( )……

23. Did you use computer or internet in teaching process? Yes ( )No ( )

24. If yes, which kind of program? .....

Word processing ( ) power point ( ) statistical program ( ) internet use ( )

25. Please evaluate your computer and internet skills

Excellent ( ) good ( ) average ( ) poor ( )

26. Is the integration of ICTs into learning and teaching process modernizes teacher competencies? Yes ( ) No ( )

(C) Personal opinion

27. What is your opinion in exchange training with private sector?

reflect positively on TVET output ( ) reflect negatively on TVET output ( ) I don't know( )

28. What difficulties/obstacles are facing teacher training?

weakness of training program ( ) deficiency of training equipment ( ) shortage of qualified lecturers ( ) other ( )

29. Additional information that you would like to contribute to study completion

……

……

……

Thank you for your cooperation

Appendix .2 Guidelines to Interview with administrators

1. What are the objectives of the training plan of TVET teachers?
2. What are the qualifications required for selecting teachers into TVET?
3. What are the reasons behind working teachers into TVET field?
4. Who has good opportunity in training: TVET teacher or other?
5. Give information about the current teacher training situation.
6. Which place is suitable for the training?
7. Is there re-training program for teachers already trained?
8. Is the present in-service training program designed to comply with labor market demands?
9. Is there necessity to train teacher in private sector workshop?
10. Is there relationship between TVET and private sector in teacher training?
11. Compare workshop / lab on TVET with the private sector.
12. How collaboration between public and private sector in teacher training supposed be?

Thank you for your cooperation

Appendix 3. Guidelines to interview with employers

1. Did you train TVET student in your establishment?
2. Did you train TVET teacher in your establishment?
3. Is there necessity to train teacher in private sector workshop?
4. Is there relationship between public and private sector in teacher training presently?
5. Assess standard of TVET graduate working in your establishment
6. How cooperation between public and private sector will be useful in teacher training?

Thank you for your cooperation

Appendix 4.Table of Chi-square statistics

df	P = 0.05	P = 0.01	P = 0.001
1	3.84	6.64	10.83
2	5.99	9.21	13.82
3	7.82	11.35	16.27
4	9.49	13.28	18.47
5	11.07	15.09	20.52
6	12.59	16.81	22.46
7	14.07	18.48	24.32
8	15.51	20.09	26.13
9	16.92	21.67	27.88
10	18.31	23.21	29.59

Appendix 5.Operationalization of research hypotheses

Hypothesis	Variables	Indicators	Instruments
Hypothesis 1 The practical components of TVET teachers training programs in the initial training in Sudan doesn't support much the development of the teaching competences	Practices in school/laboratory	Training Method	Questionnaire
		Duration	
		Learning equipments	
	Internship in Industry	Training method	
		Duration	
		Access to working equipment	
Hypothesis 2 The in-service training programs does not match to professional-development needs of teacher	Participation rate	Percentage of Participation	Questionnaire
	Benefits gained of in-service training	New know-how	
		Skill improvement	
	Program orientation (contents of training course)	Needs orientation (knowledge of the subject matter, insights, attitudes and repertoire)	Interview
Hypothesis 3 Teacher training in Sudan integrates the development of ICT-Skills for modernizing the teaching competence of teachers. But it is not applied properly yet. **Sub-hypotheses**: - ICT competencies is one part of this teacher	Availability of computer and other multimedia in TVET institutions	Existence and using of educational multimedia at the institute (recorder, video, computer.. other)	Questionnaire
	Accessibility to internet in TVET institutions campus	Availability of internet	
	ICT is well integrated into curriculum	Integration of ICT in teacher training	
	Current competence of TVET teachers and trainers in using ICT	Teachers skills of computer and internet	

training curriculum -The given conditions/infrastructure and the skills of the teachers and trainers do not support the development of ICT skills.	Percentage of ICTs use in teaching process	ICT in teaching process	
Hypothesis 4 The private sector in Sudan does not contribute to promote TVET teacher training programs currently	Miss coordination between public and private sector in designing teacher training curriculum	Participation of private sector	
		Information exchange between TVET and industry	Interview
	Poor relationship between TVET and private sector	Forms of cooperation between TVET and private sector	