

**ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES**

**A COMPARATIVE STUDY OF MATERIAL RESOURCES
MANAGEMENT AND UTILIZATION IN GOVERNMENT AND
NON GOVERNMENT TVET INSTITUTIONS IN ADDIS ABABA**

**BY:
WORKU BERIHUN**

**JULY 2007
ADDIS ABABA**

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**BY:
WORKU BERIHUN**

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Addis Ababa University
School of Graduate Studies

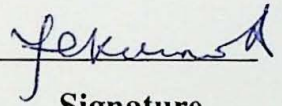
**A Comparative Study of Material Resources Management and
Utilization in Government and Non Government TVET
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By
Worku Berihun

Approved by Board of Examiners

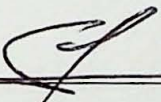
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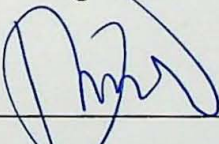
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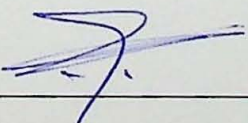
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ACRONYMS AND ABBREVIATIONS

BOFED: Bureau of Finance and Economic Development

EMPDA: Educational Materials Production and Distribution Agency

ESDP: Education Sector Development Program

ETP: Education and Training Policy

GTZ: German Agency for Technical Cooperation

ILO: International Labor Organization

MOE: Ministry of Education

MOFED: Ministry of Finance and Economic Development

NGO: Non government Organization

TVET: Technical and Vocational Education and Training

UNDP: United Nations Development Program

UNESCO: United Nations Education Scientific and Cultural organizations

ABSTRACT

Past studies about the management of educational material resources found that there was different improper utilization and handling of material resources. Such improper implementation of materials management function can lead to resource wastage. The purpose of this study was to investigate the status of material resources management and utilization in government and non government TVET institutions in Addis Ababa. To this end, an attempt was made to look into the major factors that affect the proper management and utilization of material resources.

In order to attain the objectives of the study, a comparative study was employed to identify the similarities and differences between three government and three non government TVET institutions. These training institutions were selected by the purposive sampling technique for government institutions and by availability sampling technique for NGO institutions. The subjects of the study were teachers and students who participate in filling out the questionnaires and Deans and Administration and Finance Heads who were interviewed for fulfilling the study and additionally the researcher has made observation on the sample institutes.

The data were gathered from 116 teaching staffs and 146 students from both institutions. In addition 6 deans and 6 administration and finance head officials were interviewed. The data obtained from questionnaires were analyzed by using statistical tools like percentage, weighted mean, and cumulative mean Chi-square, t-test and Spearman's rank order correlation.

Some of the major findings were the material resources were less adequate in government institutions than NGOs, immediate material resources were obtained in NGOs than government institutions, the quality of material resources were better in NGOs, more idle machines were found in government institutions and the performance of teachers, students and workshop technicians were better in NGOs than government institutions.

In both institutions the time taken for purchasing was very high, but it was severe in government institutions and preparing the proper specification was as such a problem for purchasing. Therefore, prepare proper specifications for purchasing issues, revise the rigid financial rule for delivering immediate materials supply, assign a knowledgeable person for materials management, applying proper maintenance in TVET institutions, assign TVET officials who have a technical background and for effective utilization and management of material resources and creating awareness on the job training is a vital aspect.

CHAPTER ONE

THE PROBLEM AND ITS APPROACH

This chapter deals with the background of the study, statement of the problem, significance of the study, delimitation, limitation of the study, research design and methodology, definition of terms and organization of the study.

1.1 Background of the Study

Education is an important sector for economic, social and cultural development aimed at satisfying the needs, desires and hopes of an individual and society. As stated in the education and training policy (1994:1), “education enables individuals and society to make all rounded participation in the development process by acquiring knowledge, ability, skills and attitudes.”

The government of Federal Democratic Republic of Ethiopia introduced the new Education and Training Policy (ETP) and Education Sector Strategy in 1994 that made Technical and Vocational Education development as one of the priority areas in the education system. The policy and strategy stipulate the provision of middle level technical and vocational training in areas of different sectors to students that have completed the general education (Grade 10). The policy also emphasizes the need to expand technical and vocational training facilities, development of relevant curriculum, raising the standards of trainers etc.

To this end, as indicted in the ETP of 1994, the objectives of TVET program will be to:

- develop self- reliance in solving personal and societal problems;
- develop a reasonable skills in the use of tools, machines and equipment and their maintenance as well;
- enrich trainees knowledge and practical skill through group work;
- develop positive attitudes for safety and manual works;
- develop awareness for optimum utilization of production inputs; and
- enable to work as an employee in any of the specific specialization (ETP,1994: 16)

Having these policy objectives as a framework, one of the strategies in realizing the new education and training policy in the area of TVET is developing relevant curriculum which

suits training needs of diversified areas meeting economy's demand for middle level skilled work force, preparation of training materials and their implementation. And in designing the curricula more emphasis was given to develop practical skills than theoretical knowledge so as to make trainees' confident and productive citizens having the readiness for either self or wage employment (MOE, 2003: 76)

To this effect, both government and non governmental TVET institutions play a vital role in producing these required skilled man power to contribute their own share for the development of the country.

No matter how far the objectives of any training program of TVET are attractive; its success will greatly depend up on the quality and quantity of the resources it has and its commitment to utilize. Further more TVET requires not only planning, organizing and provision of services but also a very considerable amount of resource facilities which enable the training program to realize its intended goals and objectives. Regarding this point (UNESCO, 1992:148) suggests:

How well a TVET program accomplishes its aims, it depends in a large part on the availability of resources the suitability of its buildings and the extent to which its materials and equipments are kept up to date.

Human, material and financial resources play an important role in the development and enhancement of TVET education system. These resources are also essential inputs needed to sustain the life of any organization. The level of the economic development and the government's commitment towards education mainly determine the amount of human and material resources invested in education. However, availability of resources and government's commitment towards education alone are not ends by themselves; but the effective and efficient utilization of existing resources are also essential. This is mainly a question of the resources management in educational organizations. Therefore, in order to promote sound educational development, availability and proper utilization of educational resources are the fundamental issues that need to be taken in to account. Getting educational resources and managing them properly are the major challenges that confront educational managers. Regarding this point; UNESCO (1992: 151) has put this fact as "... one of the challenges of educational managers in developing countries is the meeting of constantly

soaring social demand for education.” Today, many countries are increasing their enrollment rates of school children while the scarcity of educational resources relatively remains constant or decreasing. In connection to this, Sherleker and others (1988: 474) noted the importance of material management as follows:

Materials management is important because we are living in the era of shortages of all kinds of materials. Optimum utilization of available scarce resources and prevention of all types of waste is required by adopting scientific system of management and control of materials.

The scope of material management is one of the issues in management. Different writers see the scope of material management from different angles. Datta (1986:3) for instance, states that the scope of material management is essentially an activity of an enterprise for the procurement and use of materials that is distinctly separated from the process of procurement and uses of human resources. In relation to education, UNESCO (1992: 155) explained material management as concerned with “. . . the planning, acquisition, allocation, distribution and controlling the proper use as well as maintenance of educational materials and facilities in order to realize the objective of the educational system”. Similarly UNESCO (1992: 30) also stated four important functions for sound management that should be undertaken in to consideration at the different levels of decision making. These are: planning, supply and provision, distribution and control of utilization.

From the existing study made, it was indicated that inefficiency of material management is one of the major features of our education system. To cite one example, Haileselassie in Goitom (2002:3) states that inefficiency of material and other resources was an old problem. In this regard, today, it is getting worse. Amare in Goitom (2002:3) also noted that the most critical educational problems in Ethiopia schools were unavailability of instructional materials and over crowdedness of classrooms. In the Education and Training Policy (1994:2-3) materials resources are considered as the major factors for improving quality of education. The new education and training policy (1994:27) has clearly stated the following regarding educational material inputs:

In order to promote the quality, relevance and expansion of education due attention should be given to the supply, distribution and utilization, of educational materials, educational technology and facilities.

The quality of training and the effectiveness of instruction given in the TVET Institutions are largely determined by the efficient utilization of all training facilities and improved methods of teaching. Undoubtedly, this can help to develop the skill and knowledge of trainees and make the training program more lively and meaningful.

Nevertheless, effective and efficient training is not likely to be an easy task in most third world countries like Ethiopia. This is due to the fact that these developing countries do not have all the necessary materials, financial and man power requirement sufficiently at their disposal and even they are not in a good position to utilize the existing resources more wisely and in a proper way.

Consequently, some of the findings and reports indicate that most of the TVET programs are not capable to attain their initial objectives and the expected contributions to the development of the country and fail to meet the demand of the changing labor market as well.

1.2. Statement of the Problem

Technical and Vocational Education and Training is the vital aspect of the education process which contributes to the social, cultural and economic development of the society. To this effect, the Ethiopian government has put in place the comprehensive TVET program to satisfy the economic and social demand for skilled manpower (Bizuneh, 2006:4). Hence, the quality and access of technical education is mainly determined by the availability and utilization of material resources. Some material inputs are crucial while others are used to enhance the overall teaching learning process. It is also true that efficient utilization of available resources mainly depends on the qualified personnel existing in the system. Thus, educational managers are responsible for efficient utilization of materials resources. In material resource management, managers have to perform the planning, acquisition and supply, procurement, production, allocation, distribution proper use and controlling of educational resources.

It is also important to study material management from the point of view of the actual problem existing in our situation. In our country, especially in TVET institutions, it seems

that materials management has not been given due concern. The entire administration of materials resources appears to be left only to the storekeepers or others who do not feel a sense of responsibility or do not have the ability to manage it. Thus, to show the gap what is actually happening and what should happen is an important issue to be studied.

Inefficient utilization of the existing resources has aggravated the existing problems in TVET institutions. Due to this and other features it has become impossible to bring change in the over all education system. This has necessitated the study of material resources. It is only possible to attain the educational objective through proper allocation and utilization of educational resources. Therefore, quality and relevance of education as well as access to education can be attained if and only if educational materials resources are efficiently utilized. Hence the study attempts to find answers for the following basic questions:

1. What are the major problems that the government and non government TVET institutions face in connection with material resources management and utilization?
2. To what extent the guidelines for the material resources management in educational institutions are effectively utilized?
3. What are the similarities and differences between the government and non government TVET institutions in terms of :
 - a. Teaching learning materials and facilities?
 - b. Physical plant facilities and services?
 - c. The utilization of existing material resources?

1.3. Objectives of the Study

1.3.1. General Objectives

The general objective of the study is to assess the major pertinent issues in the perspective of the management and utilization of material resources in the government and non government TVET institutions.

1.3.2. Specific Objectives

- ♦ To assess how the TVET institutions utilize and manage their materials resources;
- ♦ To investigate whether there is a significant difference between government and non government TVET institutions in utilizing and management of materials resources;
- ♦ To forward some visible recommendations based on the findings that may help to improve the utilization and management of materials resources.

1.4. Significance of the Study

The extent to which government and non government TVET institutions possess and utilize materials resources in producing adequately trained youths is the central idea of the research. Since most of this study focuses on the management and utilization of materials resources, thus the researcher wants to take a comparative study of the government and non government TVET institutions in Addis Ababa.

Any training program whether small or big has a purpose to achieve its objective and to continue its existence. However, it requires adequate materials resources. Based on this, the study will have the following contribution:

1. It will give some insights about the current status of TVET institutions in terms of availability and utilization of material resources to achieve their desired end results for those officials and there by to determine lessons that can draw and shared from the findings.
2. It may help to examine the efficiency of government and non governmental TVET institutions and to scan the strengths and weaknesses of management in the provision and training as well.
3. It may also serve as a starting point for other researchers to deal with similar issues in depth by enriching the existing literature.

1.5. Delimitation of the Study

The study was delimited to Addis Ababa to make the problem easy to tackle in view of the limited time and other necessary resources available for the researcher. Besides, the researcher is convinced that findings would help in improving the planning and management of materials resources utilization for the TVET institutions in Addis Ababa. The concentration of TVET institutions is also higher in the city and studying the real conditions is possible where there are adequate samples.

The study also includes the available NGO TVET institutions in Addis Ababa for the reason the researcher wants to compare their material resources utilization with the government TVET institutions.

1.6. Limitation of the Study

In conducting this study, some limitations were encountered. Among these the absence of sufficient literature in the area of TVET in the libraries of Addis Ababa Universities was one of the major shortcomings that the researcher encountered and the reluctance of some respondents to fill and return the questionnaires during data collecting time were also another limitation.

1.7. Research Design and Methodology

The method used to conduct this research was a comparative study. Comparative study was selected due to the nature of the research that it attempts to reveal the existing strengths and weaknesses in obtaining and utilizing material resources in both the government and non government TVET institutions and there by it tried to make the necessary adjustment in line with the prevailing problem. The following population and sampling techniques, variables, and data collection instruments and procedures as well as data analysis were applied during the course of the study.

1.7.1. Population and Sampling Techniques

There are 10 governmental and 3 non governmental TVET institutions in Addis Ababa. Out of 10 governmental institutions 3 (30%) were selected by purposive sampling technique. The technique was selected based on the experience of the institutions and their capacity. And from three non governmental TVET institutions 3 (100%) of them were considered by availability sampling technique.

These institutions have 26 fields of study at Addis Ababa especially in governmental ones. Even if the numbers of fields of study are these much, the researcher is interested to take the areas of Industrial and Construction fields. This was because more materials and resources are available in these areas than others, and also the NGO TVET institutions have these fields of areas only. So to make the comparison more reliable the Industrial and Construction fields of instructors and students were considered in the questionnaire and the Deans and Administration and Finance Heads of both institutions were taken for the interview.

In order to ascertain representation from these sample institutes, out of total population of 458 teachers 30% (137) instructors were considered for the study. The sample teachers are selected by simple random sampling. There were also student respondents with a total population number of 1436. The number was considered only students who were 10+2 and 10+3 (2nd and 3rd year) or graduating class students. This has done purposely to obtain reliable information about material resources utilization. From this amount 12% (172) have been considered for the study by simple random sampling.

Table 1: Sample Institutions by Owner Ship and Sub City

No.	Governmental Institutions		No.	Non governmental Institutions	
	Institutions	Sub city		Institutions	Sub city
1	Addis Ababa Tegbareid TVET College	Lideta	1	SOS TVET College	Akaki Kaliti
2	Entoto TVET College	Gulele	2	Selam TVET College	Yeka
3	General Wingate TVET College	Kolfe Keranio	3	Hope Enterprise TVET Institute	Kolfe Keranio

1.7.2. Data Collection Instruments and Procedures

To obtain reliable and adequate information, three basic instruments were used. These were questionnaires, interview and observation. The questionnaires were prepared in Amharic and English to prevent possible misunderstanding and interpretation on the parts of the respondents. The questionnaires contain mainly close-ended and few open-ended items. Questionnaires were used because of their appropriateness to obtain relevant information, opinions and attitudes from large population with in short period of time. In addition to supplement the study, interview was used to obtain factual information from academic Vice deans and administration and Finance heads of both institutions. More over, to increase the reliability of the information, observation were made on workshops, classrooms, libraries, stores, the institution compounds etc... to see the actual condition of the institution on materials and other facilities.

The data gathering instruments were pilot tested in order to make essential corrections and maintain the validity of instruments before the final study is conducted. When distributing the questionnaires the time convenient for the respondents has been arranged so as to maximize the rate of return.

1.7.3. Methods of Data Analysis

Depending on the nature of the collected data and the hypotheses of the data obtained, different Statistical techniques were employed in this study for data analysis and interpretation. The collected data were coded, tallied and properly organized by preparing tables according to classification in their different categories to give detailed background information about the sample population by using SPSS (Statistics Program for Social Science).

After organizing the collected data from the questionnaires and the interview the following basic Statistical tools were employed to analyze the study. Percentage was used to know the characteristics of the respondents such as sex, age, academic qualification, and experience. It determines the proportions of the total respondents who have the same judgments. The other tools were weighted mean; Chi-square, Spearman's rank order correlation coefficient and t-test were used to identify statistical significant differences, similarities and degree of agreements.

1.8. Operational Definition of Terms

In order to avoid ambiguity and to have clarity and consistency in the study, the following terms are given with operational definition as follows:

Equipment: refers to expendable items which are more or less permanent and have a long life.

Materials management: Is the aspect of management with planning, acquisition, allocation, distribution and controlling the proper use as well as maintenance of educational materials and facilities in order to realize the objectives of the education system (UNESCO, 1992:15).

Material resources: any inputs which are for production as a raw material that are obtained by producing or purchasing or any means.

Non government organizations (NGOs): organized bodies which are not part of government structures.

Technical Training: training which involves the development of specific skills that are needed to perform a particular job or series of jobs.

Training Institutions: public or private institutions or one owned by a non governmental organization to which a pre accreditation or an accreditation license certificate is issued by an appropriate officials.

Vocational Training: activities which aim to provide the knowledge, skills and attitudes required for effective and efficient performance with in an occupation or group of occupations.

1.9. Organization of the Study

The study consists of four chapters. The first chapter deals with the problem and its approach, statement of the problem, significance of the study, delimitation of the study, limitation of the study, the research methodology and the definition of terms. The second chapter presents the review of the related literature. The third chapter consists of data analysis, presentation and interpretation of the data. The summary of findings, conclusion and recommendations of the study are presented in the fourth chapter. Finally, references, sample questionnaires and other relevant documents are attached to the last part of the thesis.

CHAPTER TWO

2. REVIEW OF THE RELATED LITERATURE

This chapter deals with the review of the related literature in the historical background of TVET, the current status of TVET in Ethiopia, the objectives of TVET and the field of materials resource management. Regarding to materials management the discussion focuses on the concepts and definitions of the material resources, scope of managerial functions in relation to material resource management and the proper utilization of materials resources in TVET institutions.

2.1. Historical Background of Vocational Education

Vocational education in its informal form came in to being when man began to live together and started to produce for his basic needs. The primitive people probably used the digging stick, stones, axes and fire to clear the vegetation for hunting and gathering their food supply. Knowledge continued to be passed from father to son verbally and was meager. During this period, the process of learning was spontaneous imitations of skills (Yekunoamlak, 2000:11).

Abrahamson et.al. (1979:19) has also added that as time passed people gradually learned to use fire to cook and melt metals to produce tools. Consequently, this necessitated division of labor, which was non existent in their earlier times. Some people worked as smiths, others carpenters or weavers. The new social development brought different crafts men to form social groups and out of these social groups the guilds of middle age evolved.

2.2. The Emergence of Vocational Training in Ethiopia

Education in its traditional form has a long history in Ethiopia. However, prior to the 20th century the educational system was predominantly religious oriented to serve the man power need of the church and the state. Available sources indicate that there was no significant sign

of vocational training at that time. However, in the time of Emperor Theodros (1855-1868) there has a demand for foreign craftsmen. In 1877, Emperor menilik II was instrumental in bringing few Swiss artisans to Ethiopia (Yekunoamlak, 2000:37).

Modern education was introduced during the regime of Menilik II with establishment of Menilik II School in 1908. During the time of Emperor Haileselassie I schools were fairly expanded. There were about 30 academic schools in the country from 1925 to 1953. (Yekunoamlak, 2000: 37). The first vocational school of Addis Ababa was established by the MoE in 1941 under the name of 'Echolle National des Arts' commonly known as "ENAT". French was used as a medium of instruction in addition to Amharic. Later on, the MoE changed the name of the school to "Technical School" and the language of instruction became Amharic and English (MoE, 1973:30).

With the objective of making the curriculum job oriented so as to produce middle level man power, the concept of comprehensive program was introduced in 1961 to the secondary schools of Ethiopia. The first general secondary school to be converted to comprehensive secondary school was w/ro Sihen School in Dessie. Gradually more schools were converted to comprehensive secondary school. The field and studies offered in these schools were: Productive Technology, Home Economics, Agriculture and Business (Yekunoamlak, 2000:37).

After 1984, the comprehensive secondary schools curriculum started to decline because the program was not efficient. It produced too many graduates and yet they were unemployed. So, by improving some existing comprehensive schools and establishing additional technical schools, the new vocational and technical (10+3) program was introduced. The number of the vocational schools has risen from 4 to 17 and formal training was given in 21 field of specialization. These schools are located in the different regions based on the major economic development of the area (Yekunoamlak, 2000:38).

According to UNDP policy discussion paper in Wonna, (1996:303-306) the 10+3 vocational and technical program was established through external support. Since it was donor driven, it was not effective as it is expected. There is a shortage of qualified staff, machines and spare parts; worst of all, the enrolment rate has declined considerably.

2.3. The Current Status and Development of TVET in Ethiopia

The development of TVET explains the linkage between education and work. Both developed and developing countries, including Ethiopia, have been implementing TVET as one of the strategies for human resource development.

According to MoE (2002:14) development of the TVET sub- sector of education in Ethiopia is still in its infancy stage. It remained a neglected sub sector of education until recently. International comparative data shows that in 1994, the proportion of TVET to academic students at the second level of education in Ethiopia was nine times less than that of the Sub-Saharan Africa as a whole. When compared to Europe, this proportion was 36 times less for Ethiopia.

As indicated in MoE (2006:7) traditionally Technical and Vocational Education and Training (TVET) in Ethiopia has been fragmented and delivered by different providers at various qualification levels. Public TVET institutions under the education sector, concentrating on middle level technical training at post grade ten level, are completed by the employer-based in-house TVET schemes of public and private companies, TVET schools run by (mainly church based) NGOs and an increasing number of private commercial TVET providers. Mean while, in non formal TVET programs public institutions, NGOs, and private schools offer employment-oriented training to various target groups, including school leavers, people in employment, school drop outs and marginalized groups in the labor market.

At the moment there is an indication which shows the deficiency of effectiveness and efficiency in Ethiopian TVET institutions. Studies have shown that many TVET graduates

remain unemployed even in those occupational fields that show a high demand for skilled manpower. Further more, substantial resource wastages occurred as a result of underutilization of equipment in public TVET institutions. In connection to this MoE (2002:15) stated that "...the quality of training remained poor due to: limited funding; lack of appropriate and adequate facilities; insufficient number of qualified instructors; inflexible and outdated occupational standards; lack of adequate functional relationship between training centers and the real world of work; lack of stake holders participation in curriculum design and implementation; and inefficient management".

Additionally, MOE (2006:9) states that the shortage of sufficient corps of TVET teachers/instructors represents the most severe obstacle to TVET development in Ethiopia. The quality of TVET teachers/instructors has suffered as a result of the low reputation of their profession. Most TVET teachers /instructors have relatively low formal qualifications, severely affecting TVET delivery higher qualification levels. Furthermore, technical teachers/instructors are often unmotivated. They did not choose to become technical teachers, but were placed in technical teachers colleges because there were no other options available. Finally, existing TVET teachers/instructors are (mostly) inappropriately practically skilled, i.e. not competent TVET in accordance with the occupational standards. This is a result of a training system that long emphasized theoretical knowledge, disregarding the importance of practice skills and appreciation of the world of work. The above listed problems contribute their own share for the lack of TVET effectiveness and efficiency.

To overcome the multidimensional problems of the TVET institutions, the government and the TVET institutions (like the principals, teachers, workshop technicians, students and the administrative workers as a whole) should have to give due emphasis for proper utilization of the existing material resources. Because improper utilization of material resources will contribute its own share on decreasing the quality of training.

2.4. Objectives of the TVET Training Program

The overall objective of the TVET training is to create a competent, motivated, adaptable and innovative work force in Ethiopia contributing to poverty reduction and social and economic development through facilitating demand-driven, high quality technical and vocational education and training, relevant to all sectors of the economy, at all levels and to all people in need of skills development (MOE, 2006:10).

TVET training can also be used to resolve the problem of unemployment. Some writers in favor of this idea, have tended to argue that the provision of such training and education not only enable trainees to acquire skills in specific occupation that lead to employment in the economic sectors but also enable them to prepare them selves for “self employment” (ILO, 1999:59).

Another writer Kazans (1973:10) states the objectives of TVET training as “... to help the individual to develop desirable and effective work habits and acquire the necessary knowledge and skills of an occupation to either enter and or make progress on it.” Based on this conceptual frame work UNESCO (1992:91-92) has enumerated the central objectives of vocational training as to full fill the shortage of man power needs for the industrial development of the country, to equip young people with practical skills, and to up grade the skill of workers in local industries and enterprises and to keep up-to-date with available technology.

2.5. Concepts and Definitions of Materials Management

Management is a function of involving the responsibility for guiding and supervising the work of others. In any types of organization the fundamental managerial tasks are managing the work and organization, managing human resources and managing production and operations. There are many different activities under these three fundamental managerial

tasks. Materials management is one of these activities which are under production and operations management.

Materials management is basically the most important functional area of any organization to achieve the desired objectives stated for that organization. It covers a much wider field and deals with all aspects of materials supply and utilization as well as costs. It is concerned with the entire range of functions which affect the flow, conservation, utilization, quality and cost of materials. Materials management today is a distinct area of industrial management and plays a very vital role in production and productivity. As stated in Ahuja (1998:342) materials management involves a number of issues like the determination of quality and quantity; purchasing, store issuing and dispatching. Materials management deals with the planning and programming of materials and equipments, market research for purchase, pre-design value analysis, and procurement of all materials including capital goods, raw materials, components and assemblies, stores control, inventory control, transportation of raw materials and materials handling, value analysis, disposal of scrap, surplus and salvage.

According to Ahuja (1998:343), materials management provides tools and techniques, most of which are very simple, to reduce material costs substantially such as inventory control. In addition to reducing material costs, efficient materials management can bring about reduction of foreign exchange requirements by getting the maximum value out of the available foreign exchange or by reducing the value of imports, thus contributing substantially towards narrowing the foreign exchange gap.

Materials being an important and inevitable input, directly affects the profitability of any manufacturing concern. It is observed that irrespective of the size of an enterprise, the expenditure on materials is a major item of the budget. Because of the magnitude of expenditures required in acquiring and controlling materials and their impact on profitability, efficient and adequate materials management and controls is absolutely essential (Ballot,1980:7). Materials management is basically the most important functional

area of any organization to achieve the best results of the intended objectives. As Datta (1986:4) states:

Materials management is thus essentially an activity of an organization for the procurement and use of materials distinctly separated from the process of procurement and use of human skills and labor for the ultimate deployment to attain some predetermined objectives.

Materials management is concerned with those management functions circumscribed in the complete cycle of materials flow like purchasing, production and inventory control, material handling, packing, traffic and distribution. These all related functions are grouped together and put under the direct control of one line manager. All the sections of the materials management strive to attain the fundamental objectives of materials management. It should also be noted that inventory control is an integral part of the materials management and it is confined to the internal control of the production materials (Mahajan, 2002:596). Thus, materials management must have the proper position and status in corporate organization. It must be established high in the corporate structure in order to carry out its responsibilities, which involve the expenditure of huge sums of money and directly affect the long term and day to day success of operations.

Like other functions, materials, management is dependent on the proper personnel to administrative and staffs it. To choose personnel with the proper backgrounds, educations, characters, and personalities is a major factor necessary to build the organization, gain cooperation and perform services to others (Ballot, 1980:11).

2.5.1. Definitions of Materials Management

There are presently as many definitions as there are authors, proponents and materials managers. Different authors define and explain the concept of materials management differently, but their overall concept is not as such conflicting. Each tends to base his/her definition on his/her job or philosophy or relate it to his background. As there is a little common agreement on those areas directly responsible to the materials management function, the variations in definitions are understandable.

Essentially materials management is the process of uniting the activities involved in the acquisition and use of materials employed in the production of finished goods. According to Mahajan (2002:596) materials management has been defined as "...the controlling and regulating the flow of materials in relation to changes in variables like demand, prices, availability, quality delivery, schedules etc..." Another definition by the same author is also given as "materials management is the planning, directing, controlling and coordinating those activities which are concerned with materials and inventory requirements, from the point of their inception to their introduction in to the manufacturing process. It begins with the determination of materials quality and quantity and ends with its issuance to production and meet customer's demand as per schedule and at the lowest cost". Materials management embraces all activities concerned with the materials except those directly concerned with designing or manufacturing the product.

Again Mahajan (Ibid) has defined materials management as it is a term used to describe the grouping of management functions related to the complete cycle of material flow, from purchase and internal control of production materials to the planning and control of work-in-progress, to the warehousing, shipping and distribution of finished product. It differs from the materials control in that the latter term, traditionally is limited to the internal control of production materials. Among the authorities Ahuja (1998:342) defines as follows:

Materials management is concerned with the planning and programming of materials and equipments, procurement of all materials, packaging and packing of materials, stores control and inventory control, transportation of materials and materials handling, value analysis, disposal of scrap, surplus and salvage.

The definition of materials management covers a lot of activities which is accomplished in an organization and given in a wider sense of its function. From all the above definitions of authorities on materials management, the one with a common agreement and with little disagreement is a definition given by Ballot (1980:6) stated as follows:

Materials management can be defined as that coordinated function responsible to plan for acquire, store, move and control materials and final products to optimize usage of facilities, personnel, capital funds and to provide customer service in line with corporate goals.

This definition implies that, materials management is an organized, coordinated control and utilization of materials through out an organization for the acquisition of effective and efficient results. So as materials management has a great impact on the organization's activity, educational institutions should play a great role in managing these scarce resources in a proper way.

2.5.2. Objectives of Materials Management

As materials management covers all aspects of materials, including flow, cost, quality supply, conservation and utilization etc... The prime objective is to supply the user with the required quantity and quality at a constant rate. Ahuja (1998:345) states the fundamental objectives of materials management as follows:

The prime objective of materials management is to supply the user department with the required quantity at a constant rate as well as uniform quality so that production or service rendered is not held up. At the same time materials manger has to ensure the optimum usage of facilities like capital storage space and other aspects of materials management.

Baily and Farmer (1988:14) also put the materials management objectives as a means for minimum prices for materials, for the continuity of supply, consistency of quality, good supplier relations, development personnel and good records.

In educational institutions also materials management has a great role for the attainment of educational objectives and goals, because materials, resources and physical facilities are important factors to bring quality of education. Thus, due attention has to be given to qualitative and quantitative supply and utilization of material resources.

2.6. The Development of Material Resources Management

Materials are useful resources that help to accomplish the activities of every organization. The attainment of objectives requires effective management of these resources. Monks J. G.

(1982:182) indicates that, materials management is a relatively new field and one of increasing importance. At the end of the twentieth century, its significance grows with our heightened awareness of the impending scarcity of the world's resources.

The materials management function through time as it moved from the clerical era to today's strategic era. The future will see a gradual shift from predominantly defensive strategies, resulting from the need to change in order to remain competitive, in which organizations take an imagination approach to achieving supply objectives to satisfy short term and long term organizational goals. In addition to this Baily and David (1984:4) as stated:

The growing management interest through necessity and improved insight in to the opportunities in the materials area has resulted in a variety of organizational concepts. Terms such as purchasing, procurement, supply, materials management and logistics are used almost interchangeably and no agreement exists, on the definition of each of these terms.

Materials management today is a distinct area of organizations management and plays a very vital role to achieve the intended goal of the organization. As it covers a much wider field and deals with all aspects of materials, it is the most important functional areas of any organization.

2.7. Scope of Materials Management

Material resources management has a wider scope. It has been explained by different writers from different points of view. Datta (1986:13-15) states that materials management can not be performed in isolation. It is closely related to other fields of business. In this regard, Datta states out that materials management did not appear in a vacuum. It is closely related to other fields of business. Thus, materials management is an integrated and coordinated activity such as budgeting, purchasing, receiving, production, scheduling, manufacturing, maintenance, inventory and materials quality control, storage, warehousing, shipping, traffic and salvaging. Thus it begins working from the very inception stage of procurement of materials down to the

final distribution. Furthermore, an efficient and integrated materials management programming should aim at cost reduction and waste elimination through control of materials at all stages of production. Finally Datta (1986:10) states the following benefits of integrated materials management in any system. They are faster inventory turn over, greater materials availability assurance, reliable quality, reduced paper work and cheaper communication, improved supplier relations, reduced materials handling costs, and smooth flow of materials.

For most writers the major elements of material resources management deals with planning, acquisition and supply, purchasing, production, allocation, distribution etc... Datta (1986:11) states that management is an activity performed in the form of planning, organizing, integrating, and measuring the effective use of all human and material resources at its command. In short Datta points out management as a planning, organizing, staffing, directing and control of activities.

For Bethel (in Sherlekar and others, 1988: 496) the scope of materials management means: "materials management concerned with planning, directing and controlling the kind, amount, location, handling, movement and timing, the various flows of materials used and produced by business enterprise". Furthermore, Sherlekar and others (1988:496) pointed out four branches of materials management as procurement, storekeeping, inventory, material handling and transportation of materials from the supplier to the customer.

In a similar manner, UNESCO (1992:154) also clearly points out the scope of materials management in relation to the major managerial functions. The scope of materials management consists of planning, acquisition and supply, allocation, distribution and control of the use of material resources. There fore, it is clear that the scope of materials management is vast but according to the scope of this paper the TVET material resources management functions will be discussed as follows:

2.7.1. Materials Requirement Planning (MRP)

An organization in order to satisfy the entire demand for its materials or services to have a programmed plan is inevitable. A planned procedure is used to satisfy the demand for materials and services requirement to each institution. In essence, as materials resources are scarce planning activity is a guideline for effective utilization. Watson (1965:18) defined planning as “the relational application of human knowledge to the process of reaching decisions which are to serve as the basis of human actions.”

The above definition implies that planning enables any body to use rational thinking in order to choose the best decision. In addition to this, planning is also a decision making activity that helps to design the preferable alternative in the use of scarce resources.

The purpose of resource planning in TVET institutions is to ensure that the resources needed for the educational activities are secured in right quality, at the right quantity, in the right place and at the right time. This activity focuses on the responsibilities of education managers to facilitate the task of planning. Regarding this, Dobler and others (1984:116) put these responsibilities as follows:

- ♦ Annual materials budget funds must be budgeted for the total annual purchases of materials. Materials costs are usually estimated by multiplying the standard unit materials for each material.
- ♦ Annual inventory budget funds must be planned to provide for selectively carrying an inventory sufficiently to know what is needed.
- ♦ Technical assistance include in materials plan should be a listing of outstanding suppliers.

A successful planning needs the participation of all concerned bodies. Regarding this UNESCO (1992:8) states that “planning needs participation in decision making at every stage, identification of problems, the study of feasibility, implementation and evaluation.” In TVET institutions, principals, teachers, administrative workers, non teaching staff, students, and the community should participate in material resources planning activity to achieve the desired objectives of the institutions.

2.7.2. Purchasing of Educational Materials

Purchasing refers to the activities required for obtaining the material resources and services that are needed by the organization. Purchasing is the first phase of materials management. Procurement is a function responsible for getting the materials, supplies and equipments of right quality, in the right quantities from the right source, at the right prices and at the right time popularly known as the five R's of the art of efficient purchasing (Mahajan, 2002:600).

Purchasing in any organization has now become a specialized function. Any negligence in the purchase function increases the cost resulting in to decrease in profit. TVET educational materials such as supplies, furniture, equipments, machineries, tools and facilities etc are purchased in institutions because of their importance to enhance teaching and learning process. The primary purpose of purchasing in education is to guarantee the teaching and learning process. In order to fulfill this task the role of the principal and the administrative workers with purchasing department is vital.

There are different definitions given for purchasing by different authorities. In this case Alford and Beatty in Mahajan (2002:600) define that "purchasing is the procuring of materials, supplies, machines, tools and services required for equipment, maintenance and operation of a manufacturing plant". A more comprehensive and broad definition for purchasing is given by Westing, Fine and Zenz in Mahajan (2002:600) as:

"Purchasing is a managerial activity that goes beyond the simple act of buying. It includes research and development for the proper selection of materials and sources, follow up to ensure proper and timely delivery, inspection to ensure both quantity and quality, development of proper procedures, methods and forms, control traffic, receiving, storekeeping and accounting operations related to purchases".

This definition shows that purchasing is not a simple activity performed by any person. For this reason it needs well qualified personnel who can perform the different activities stated as above.

2.7.2.1. Purchasing procedures

The purchasing processes may vary according to the rules and regulations a country follows. Its basic aim is to ensure that what is needed is made available when it is required. The materials to be bought should conform to the established standards and more of instructions. But the procedure for procurement of educational resource materials may vary according to the nature of education. According to Mahajan (2002:603-608) the purchasing procedures include: recognition of the need, selection of source of supply, inviting tenders, processing the tenders, placing the order and follow up, receipt and inspection and approval of payment.

2.7.2.2. Principles, Rules and Regulations of Purchasing in Ethiopian TVET Institutions

Technical and vocational education needs to have the proper quality and quantity of educational materials, supplies, equipments, workshop machines and other need facilities for proper functioning of the teaching learning process. In this case these institutions have to know the general policy guides, principles, rules and regulations that helps them to perform in the right way.

There are different rules and regulations of purchasing principle manuals such as government purchasing rule number 1(1991) which states as:

- ♦ In order to achieve organization's objectives "the five rights" should be considered, in addition to the least price.
- ♦ When the purchase is below 3,000 birr it is possible to buy with the determination of the top manager with out the requisition of the bid committee.
- ♦ When the purchase is more than 30,000 birr the purchase should be held by open tender, except the condition does not allow open tender.
- ♦ When goods and services have the same quality and cost, priority should be given to the domestic product.
- ♦ The bid committee is assigned by the chief principal of the organization selected from different departments of the organization.
- ♦ The notification stays for 20 working days for domestic preference and 45 working days for foreign purchase.
- ♦ More than five hundred thousand for domestic and two million for foreign purchase, approval should be given from BoFED.
- ♦ The duties and responsibilities of the bid committee should be given to the members in a written form.

And a manual of government procurement MoFED in Dereje (2006:32) which describes that for materials and equipments to purchase, to prepare specification; standard and technical backgrounds are necessary criteria for effective purchasing. In relation to this, the procurement training model, MoFED in Dereje, (2006:32) illustrates that for effective and efficient procurement of government organizations including TVET institutions purchasing personnel should need appropriate training in all aspects of procurement.

2.7.3. Storage and Handling of Materials

Storage and handling of materials are responsible for proper storage of material and then issuing it to respective departments on proper requisition. According to Saxena (2003: 81) "...various types of materials are stored in the warehouse. Each material has its own characteristics. Some of them are affected by environmental conditions, the method of storage and the time of storage". The various items such as raw materials, tools, work in process, spare parts, supplies, finished goods, scrap etc... are stored in the store room.

Mahajan (2002:613) has defined storage as "...a function of receiving, storing and issuing of raw materials, tools, spares, consumables etc to the respective department." In the words of Maynard in Mahajan (2002:613), the duties of store keepers are "to receive materials, to protect them while in storage from damage and unauthorized removal, to issue the materials in the right quantities, at the right time to the right place and provide these services promptly and at least cost". Proper utilization of materials results in large amount of saving. Proper storing avoids pilferage and wastage of materials. Thus, scientific and systematic method of store keeping helps considerably in reducing material cost and overheads.

According to Dobler (1977:343) store management is responsible for each type of storage materials through proper identification of materials, efficient physical handling, and protection of materials against spoilage in the warehouse. In addition, the store manager also controls the activity of materials during receiving, issuing and controlling material recorded in the ledger in the systematic manual. Even though, receiving and stores department seems

unrelated they are very important in materials management chain. As of Dobler and Burt (1990:545) “receiving and stores operation provide both service and control function”. When the receiving department is responsible for proper receiving of materials from supplier, the store’s department is also responsible for storing materials in appropriate place in storeroom.

After the receiving department once received the purchased materials according to the standards and specification, the next step is to deliver the materials to the stores department for proper physical storage. According to Dobler (1977:343) stores responsibilities are physical handling, protect the materials against pilferage, unauthorized usage, take care for unnecessary damage, and it also provide efficient service to the users departments. In addition to this, stores manager must develop a systematic way of classifying, marking, locating, and identifying all stored materials, so that they are readily accessible for production and operation system in the organization. And also the store manager must prepare and arrange stock catalogue that is prepared by inventory management group that shows and describes each item carried in inventory. This type of material identification system also facilitates clear internal communication with users of TVET departments.

2.7.4. Inventory control

According to Mahajan (2002:631) inventory control may be defined as “the scientific method of finding how much stock should be maintained in order to meet the production demands and be able to provide right type of material at the right time in the right quantities”. Too much inventory creates a problem on the storage by deterioration, pilferage, damage etc... and low inventory leads to chances of stoppage of production, increase in overheads and disruption in production schedule and delivery promises. There fore, optimum amount of inventory should be maintained in stores (Ibid).

Any organization has the responsibility to safeguard his assets. This includes implementation of measures for the protection of material and detection of losses. One aspect of responsibility is accounting for inventory. Inventory control is responsible for keeping detailed records of

parts and materials used in the material requirements of the organization. As educational materials are essential inputs for running educational activities, these resources need a continuous control to provide information, ideas, methods and valid data required for relevant decision making.

As indicated in UNESCO (1984:36) inventory is not an easy task for the administrator and the planner of instructional materials to measure and quantify costs, however, these difficulties must overcome if budgetary estimations are to be made. Thus, material resource management should consider and require that facilities are designed to safeguard for sensitive or valuable materials in the workshops, warehouse, laboratory, library, etc, from threats such as theft, fire, corruption etc. However, this and other considerations should be described and clearly stated in material management policies and standards applicable to inventory functions.

In the school there should be a control record system in the warehouse. It is possible by this system to determine the item received and disposed. Regarding this UNESCO (1984:14) states that “controlling function intended to assure the efficient use of scarce resources measure effectiveness in achieving the objectives and confirm the continuing relevance of scarce resources of changing circumstances”.

Inventories and materials management are, therefore, most important activities in the school program, a great attention should be given for their accomplishment. In this regard, Candoli and others (1984:219) states that “the school administrator must strive for maximum utilization of school equipment and supplies and prevent the breakdown of the educational process from lack of school supplies by proper inventory control system”.

2.7.5. Surplus Disposal, Salvaging of Obsolete Materials and Waste Reclamation

Scraps are pieces of raw materials during manufacturing process. Scraps are saleable. All scrap materials should be collected, properly segregated and stored in one place as far as possible. Items which are difficult to handle may be sold at their location (Nair, 2003:190).

In many industrial processes, there are often trimmings, off cuts etc... which can not be avoided. In some cases, these are suitable for making other things and for this reason returned to stores. In other cases, they are destroyed or damped and/or collected for sale Datta (1986:254). According to Datta it is just possible that some defective parts and components can be put to use after rework. Even then some have to be scrapped. This similar situation can be seen in TVET institutions that need the management of the scraps to make them more useable.

As of Datta (1986:254) all wastes are, however, cost-centers. But by salvaging them the company at least saves space and not infrequently considerable money is reclaimed. In some cases, industrial waste disposal is company's social obligation. Scraps and wastes are some times referred to jointly, and there appear to be no objection in doing so from the stand point of their disposal.

Obsolete items are those materials and equipments which are not damaged and which have been economic worth but which are no longer useful for the company's operation owing to many reason such as changes in product line, process, materials and so on.

Surplus items are those materials and equipments which have no immediate use but have accumulated due to faulty planning, forecasting and purchasing. However, they have a usage value in the future. In this regard Datta (1986:255) states that "surplus materials may be defined as materials purchased in excess of any reasonable immediate requirement. It exists because anticipated production requirements were not realized or because of the errors on the part of whoever is responsible for placing orders for above requirements. In other words, surpluses exist because of lack of coordination between production and procurement or budgeted production requirements might have gone wrong. In some cases, if storage costs are not excessive and there is also the reasonable ground of it being used in future, it may be desirable to hold it until required.

There are various reasons to have surpluses in TVET institutions besides these Dobler and Burt (1996:603-607) states that, surpluses that result from inefficient use of materials, carelessness and poor purchasing are wastages. The proper management plays a great role in minimizing surpluses. The wear out of technologically obsolete materials should be disposed in time to facilitate teaching and learning activities. Because the materials cycle is not complete until these surpluses are disposed in a right way and time.

For the proper and uninterrupted flow of materials, the materials management personnel or purchasing unit should get the appropriate information about the surpluses. Dobler and Burt (1996:608) put different methods to dispose the materials as use in the organization, return to the supplier, direct sale to another organization, sale to employees, sale to a dealer or broker, donations to educational institutions, some combination of the preceding methods.

Similarly the TVET institutions have such characteristics as mentioned above by the author. So to what extent are the TVET institutions applying the principle regarding waste materials?

2.7.6. Maintenance of Educational Materials and Equipments

Maintenance of materials and spare parts is a term which commonly covers all kinds of supplies necessary to keep production equipment operating to turn out production to the desired quantity and quality at the desired time. All machines are subject to natural wear and also corrosion, which, if not compensated by maintenance service, will sooner or latter, lower down the rated capacity as well as its ability to retain the desired level of product quality Datta (1986:242).

According to (Ibid) both time and cost, adding a new dimension to the problem of feeding the maintenance with timely supply of spare parts, for if the number of hours for maintenance increases beyond certain limit, it will reduce the total number of production hours, which will ultimately affect the productivity of the machine. This implies that in TVET institutions' machines and equipments are available which lend themselves for maintenance. To overcome

such kind of problem a planned maintenance activity should be performed on TVET institutions.

In TVET institutions, the existence of the maintenance facility operation primarily supports the quality of the training given. This is because if most machines and equipments are not idle, then the time allotted for practical activities for trainees will increase, which leads to the quality of training. According to MoE (2005:7) the maintenance guideline interpretation:

Maintenance can also be defined as those activities required keeping a facility in as built condition, so that it continues to have its original productive capacity. And the responsibility of the maintenance department is to ensure that production facility and equipment is available for productive use at minimum cost, for the scheduled hours, operating at agreed standards with minimum waste. Maintenance is not only repairing activity of a facility, but also a total approach aimed at reducing down time. The objective of maintenance is the systematic and scientific up keep of equipments for prolonging its life, assuring instant operational readiness and optimal availability for production at all times.

As the manual of MoE (2005) the major school facilities and maintenance activities include buildings (classrooms, workshops, toilets, canteens, showers, asphalts, playing fields etc), machineries and equipments and so on. However, these educational materials may face three distinct types of failures excluding damage caused by careless handling, storage, improper utilization and handling by the user or change in operation condition. These are:

- ♦ Early failures, due to poor design, material and workman ship;
- ♦ Random failures, which occurs unexpectedly due sudden stress accumulation because over load;
- ♦ Warehouse failures which are caused by ageing.

According to MoE (2005: 56) preventive maintenance shall also be carried out for all school facilities to reduce cost of replacement of equipment; furniture and other facilities. In addition to this educational machineries and equipments of TVET institutions served for many people at large through out the year treated by young students. Due to this and other reasons educational materials need continuous maintenance and serious follow up.

2.8. Resources in Education

Resources are essential inputs needed to sustain the life of any organization. The concept of resources implies a number of things. In the context of education, UNESCO (1992:152) states that any thing in the school or its environment that may be organized for use in the process of teaching and learning is called resources or educational resources.

In TVET institutions, the management of resources is concerned with two major elements. The human and non human: the human element includes teachers, students, parents and other non teaching employers. The non human element includes materials, money, equipment, machineries, tools, instructional supplies, building, facilities and other school properties.

The term resources may also be classified in to different forms. Sherlekar and others (1988:473) stated, people and materials are the two most important resources. UNESCO (1992:153) also classified educational resources in to human resources, material resources, physical resources, financial resources and time resources.

As Barnett (1996:5) all organizations have five different kinds of resources to work with. These are people, equipment, material, money and time. Durbin and others (1989:4) classify resources as human, financial, physical and technological. Other writers also classify resources in different ways with the perspective of various disciplines as human, material, financial and time resource.

It is from this point that these educational resources are scarce and it is also difficult to meet the constantly rising social demand for education. Thus, schools require constant supply and deployment of additional personnel and other educational materials. Besides, new reforms and innovations have to be designed and introduced in order to make education more relevant to the socioeconomic and political aspirations and expectations of the society.

2.8.1. Material Resources Management in Education

A great attention is given to the field of materials management, because materials resources heavily influence many if not all aspects of teaching learning process. Educational Material resources management is defined by Mbamba (1992:155) as follows:

Material resources management in relation to education may be defined as the aspects of managerial functions concerned with the planning, acquisition, allocation, distribution and controlling the proper use as well as maintenance of educational materials and facilities in order to realize the objectives of the education system.

As defined on the above definition materials resource management in education covers a wide area and thus, due attention has to be given by administrators and other members for better functioning of the activities. In addition to this, educational materials are scarce; the management of these scarce resources requires the cooperation involvement of principals, teachers, students, parents and the society. So the major advantage of educational management is to bring about change in the behavior of workers and learners in a manner conforming to the expectation of the society. Educational management is there fore a team effort aimed at facilitating the teaching and learning processes to the improvement of knowledge, skills and attitudes.

Additionally, the school principals should carefully analyze the policy, principles, rules and regulations for effective educational management practices. Sound educational resources management mostly depends on the competency of the principals, teachers, administrative workers and other personnel that call for the careful interpreting of policies, procedures and guidelines to achieve the intended objectives.

Educational resources management is also a challenging managerial activity. It is from this point that Elsbree and McNally (1959:477) show the interaction between the available material resources on one hand and the management aspect on the other hand as being important issues. They also stated that the kinds of materials that exist in school and the manner in which they are administered could have a considerable influence up on the

program of teaching. It is obvious that poor and insufficient material supplies will severely hamper the efforts of teachers. Poor administration of the aspects can vitiate the usefulness of even the most excellent instructional supplies. There fore, it is from this point that one can say that it is the skilled managers at all levels of the education system who can manage the complex educational resources efficiently and effectively. As of MoE (2005: 55) TVET management will have clear objective to manage resources under their control and will be held accountable for the achievement of targets set. They will also make sure that the training programs meet the needs of the local community.

In order to integrate theoretically given subjects with practical activities the availability of workshops are very important. However, it is not only the availability of workshops that will be responsible to the development of skill, it should be born in mind workers produce more efficiently in condition where there is a pleasing and satisfying materials, equipments and facilities with light which is designed for properly fitting to human sight (Hunt, 1958:226).

Further more, if adequate training in different skills is needed in TVET institutions, workshops must be equipped with appropriate materials and equipments that could help to develop the skill of trainees. In this case technical and vocational educations necessitate proper utilization of materials and equipments in the institutions workshops to facilitate skill development in the technical fields of study.

2.8.2 The Need for Materials and Equipments in the Workshops

As the study indicates in developing countries like Ethiopia, the problem lies on inappropriate utilization of materials and equipments in the institution's workshops. The available resources are not properly utilized and get the necessary maintenance. Materials and equipments are the main elements for the achievement of objectives in teaching technical skills and knowledge. That is, like human resources, materials and equipments encompasses many things like text books, periodicals, charts, machines, tools, buildings, supplies, facilities, audiovisual devices etc... (Finch, 1979:153).

For any organization or institution, whether it is school or production sector, the existence of materials and equipments is very important to reach at desired goals. What ever the kind of educational materials and equipments may be, its quality depends up on the extent to which it fulfills the intended purpose. For this reason the variety collection of materials and equipments the better to accelerate the achievement of desired objectives.

Further more, in order to have effective teaching learning environment appropriate materials and equipments are so required. Teaching materials of technical and vocational education according to Finch (1979:174-175), include workshops, text books, periodicals, charts, models, films, slides, raw materials used for practical work and the like. These materials enable the teacher to teach more effectively and students learn more easily.

Above all materials resources should indicate the knowledge, skills and attitudes that students expected to require. That is after some course of training, there must be some sort of behavioral change in students. The adequacy of teaching materials may facilitate the teaching learning process when ever used properly; however, teaching materials can never make up the work of inefficient teacher (Finch, 1979:175).

Thus, students' skill development during their practical activities in technical schools is largely depending on the availability of materials and equipments and effective utilization of these resources. And qualified teachers utilize teaching materials and equipments properly which helps the student in skill development and acquire general knowledge in their fields of study.

2.8.3. Proper utilization of Educational Material Resources

The success of the training process is practically dependent upon how the TVET institutions are capable to manage and utilize their scarce resources effectively and efficiently. Conversely the improper and poor handling and using of materials resources are liable to lead to failure (Candoli and others, 1984:219).

The above statement shows that for the success of the TVET institutions to attain their objectives the proper management and utilization of the resources is an essential factor.

Knight (1993:15) regarding the utilization of resources as stated, TVET institutions have a great duty and responsibility in managing, utilizing, and controlling the human, financial and material resources for a better performance. In addition to this Mbamba, (1992:17) as mentioned the management and utilization of scarce resources in TVET institutions should be the major role played by institutions in order to ensure sustainable development.

Acquisition or purchasing of resources unless supported by some proper use, it will lead to inefficient utilization of institutional resources. To minimize this problem the principals together with the teaching and non teaching staff should create a guideline to serve a mechanism in the effective utilization of materials resources in the TVET institutions. Therefore, proper use of material resources refers to the utilization of material resources effectively and efficiently to accomplish the objectives (Dereje, 2006: 33-34).

Proper utilization of educational material resources like workshop machines, tools and other equipments may depend on the competence of the teachers, administrators, store keepers, workshop technicians and supervisor's commitment in the use of materials (Mbamba, 1992:162). This statement emphasizes that in the proper utilization of instructional materials teachers, administrators and students are also accountable for loss and mishandling of text books, workshop machines, tools and other relevant materials. Therefore, to improve teaching and learning process, resources have to be wisely selected and managed effectively to achieve the objectives of TVET educational institutions.

In this case, the utilization of material resources effectively and efficiently benefits the whole society and helps to achieve the educational objectives in general and individual TVET institutions in particular. So the TVET principals with their teaching and non teaching personnel should create a guide line to serve a mechanism for effective utilization of material resources.

2.9. The problem of Technical and Vocational System in Africa

In developing African countries including Ethiopia, technical and vocational educational system have suffered from a lack of proper utilization of materials and human resources, as well as the individual needs of their respective population. Lack of sufficient qualified personnel, insufficient material resources and human resources are the immediate obstacles for the proper utilization of material resources (UNESCO, 1992:134)

Concerning the problems and obstacles of African countries encountered that hinders the educational development many researches have been carried out by different organizations and individuals. Among these UNESCO (1992:136) point out that "...the shortage of raw materials, tools and machineries in TVET institutions in developing African countries are found to be acute problems in facilitating these schools for practical activities". Further more, the problem aggravated the situation from time to time in developing African countries like Ethiopia, are still remained obstacles to develop students skill performance.

It is not only the shortage of raw material resources that hinder the skill development of students, but the working tools and machines are also found to be obstacles by their very nature, firstly they are few in number compared to the number of students, secondly those which are available are very old and that they will not prepare the students for the modern science and technology.

CHAPTER THREE

3. PRESENTATION AND ANALYSIS OF DATA

This chapter deals with two parts. The first part is the characteristic of the study population. The second part discusses the analysis and interpretation of the data.

3.1. CHARACTERISTICS OF THE STUDY POPULATION

The main sources of information were teachers, students, academic vice deans and administration and finance heads of government and NGO TVET institutions. In this regard from 106 questionnaires distributed for students and 83 for teachers in government TVET institutions 92(86.8%) and 70(84.3%) respectively were filled and returned. On the other hand 66 questionnaires for students and 54 for teachers were distributed in NGO TVET institutions. From this amount 54(81.8%) and 46(85.2%) respectively were filled and returned.

Generally, out of the total 189 questionnaires distributed to teachers and students in governmental TVET institutions 162 (85.7%) were filled and returned. Similarly, from a total of 120 questionnaires distributed to teachers and students in non governmental TVET institutions 100 (83.3%) were filled and returned. On top of this to rise the quality of the data and information interview was conducted with six academic vice deans and six administration and finance heads of the sample TVET institutions.

Table 2: Characteristics of Instructor Respondents

No.	Item	Governmental		Non Governmental	
		No.	%	No.	%
1	Sex: a) Male b) Female	66	94.3	40	86.0
		4	5.7	6	13.0
	Total	70	100.0	46	100.0
2	Age: a) 21-30 years b) 31-40 yrs c) 41-50 yrs d) 51-60 yrs	20	28.6	22	47.8
		26	37.1	15	32.6
		10	14.3	6	13.1
		14	20	3	6.5
	Total	70	100.0	46	100.0
3	Qualification: a) college Diploma b) B.A/ B.Sc. c) M.A/M.Sc d) Ph.D	16	22.8	19	41.3
		52	74.3	27	58.7
		2	2.9	0	0.0
		0	0.0	0	0.0
	Total	70	100.0	46	100.0
4	Work experience: a) 1-5 years b) 6-10 yrs c) 11-15 yrs d) 16-20 yrs e) 21-25 yrs f) 26 yrs and above	12	17.1	21	45.7
		22	31.4	14	30.4
		6	8.6	5	10.9
		10	14.3	3	6.5
		2	2.9	3	6.5
		18	25.7	0	0.0
	Total	70	100.0	46	100.0

As shown in Table 2, the majority of teachers 66 (94.3%) from the government and 40 (86%) from the non government TVET institutions were male. This indicates that the participation of female teachers in the both TVET institutions was low. This situation is much more sever in government TVET institutions.

Concerning the age composition or item 2 of table 2, in government TVET institutions all age categories are available, even if the majority 26(37.1%) were in the age range of 31-40 years. The next higher category was in the range of 21-30 years with 20 (28.6%). There are also teachers with 41-50 years range by 10(14.3%) and 14(20%) in the range of 51-60 years. Regarding the NGO TVET institutions, most of the teachers 22 (47.8%) were 21-30 years old, 15(32.6%) were the range of 31-40 years and 6(13.1%) was in the category of 41-50 years. A very small amount 3 (6.5%) was fallen in the age of 51-60 years. This indicates that the teachers in the NGO TVET institutions were younger than teachers in the government

TVET institutions. This may attribute to the fact that the NGO TVET institutions recruit less experienced teachers and in the case of government institution, teachers may upgrade their education in the summer course and this tends to recruit fewer youngster teachers.

Item 3 of the same table displays the qualification of the teachers in both institutions. In this case from the government TVET institutions, most of them 52 (74.3%) were first degree holders. Only 2 (2.9%) of the respondents had M.A/M.Sc. The rest 16(22.8%) were diploma graduates. On the other hand, in the NGO institutions, majority of them 27 (58.7%) were B.A/B.Sc. graduates. The rest 19 (41.3%) were diploma graduates. There were no respondents with second degree in the NGO institutions. The data reveals that the government TVET institution seems to have better qualified teaching staff than the NGO institutions. This is because the government gave due attention in upgrading the qualification of TVET institution teachers and this upgrading has done on summer courses. According to the education and training policy (1994), the teachers who are intended to teach in TVET institutions are required to have first degree or more qualification level. On top of this, the TVET teachers are required to possess knowledge of the subject matter, work experience, pedagogical knowledge and practical teaching skill (UNESCO, 1973).

Item 4 of table 2, shows the work experience of teachers. Most 22(31.4%) teachers in government TVET institution have 6-10 service years and 18 (25.7%) teachers have served for 26 years and above. The small figure of service year is found in the range of 21-25 and 11-15 years in the amount of 2(2.9%) and 6(8.6%) respectively. Whereas in the case of NGO TVET institutions the majority 21(45.7%) and 14(30.4%) were in the range of 1-5 and 6-10 years of service. There were no teachers in the age range of 26 years and above. Therefore from this it can be deduced that the teachers in the government TVET institutions have a better teaching experience than the NGO TVET institution teachers. This is because in order to secure the pension allowance more experienced teachers are obtained in government institutions than the NGOs.

Table 3: Characteristics of Student Respondents

		Governmental		Non Governmental	
		No	%	No	%
1	Sex: a) Male	80	86.0	44	81.5
	b) Female	12	13.0	10	18.5
	Total	92	100.0	54	100.0
2	Age: a) 15-17	8	8.7	0	0.0
	b) 18-20	72	78.3	29	53.7
	c) 21-23	12	13.0	21	38.9
	d) 24 and above	0	0.0	4	7.4
	Total	92	100.0	54	100.0
3	Educational Level: a) 10+2	40	43.5	29	53.7
	b) 10+3	52	56.5	25	46.3
	Total	92	100.0	54	100.0

The first item in table 3 shows the sex of the student respondents. It describes that the majority 80 (87%) of the students from the government TVET institutions and 44 (81.5%) from the NGO TVET institutions were male respondents. Sex wise, female participation seems low, this might reflect fewer enrollments of females in the TVET education system, and the situation is much sever in the government TVET institutions.

With regard to age composition of students of item 2 of table 2; in government TVET institutions, the majority 72 (78.3%) were between 18-20 years and 12(13%) in the range of 21-23 years. There are also students in the range of 15-17 years with 8(8.7%). There were no students in the range of 24 and above. Similarly, in the NGO TVET institutions, 29 (53.7%) of the students were between 18-20 years and 4 (7.4%) were in the range of 24 and above. The remaining 21 (38.9%) student respondents were in the range of 21-23 years. There were no students below 18 years. This shows that the students in NGO TVET institutions were older than the students in government institutions. This might be due to government institution students may directly join after the completion of grade 10, while those who have quitted and stayed out for some years after the completion of grade 10 joined NGO institutions.

Item 3 of the same table reveals the educational level of the student respondents. In this connection 52(56.5%) and 40(43.5%) of the government institution respondents were trained in 10+3 and 10+2 levels respectively. Whereas 25(46.3%) of the NGO TVET institution student respondents were trained in 10+3 level and the remaining 29(53.7%) of the student respondents were trained in 10+2 level. This indicates that the government institutions were providing training in 10+3 level more than the NGO institutions. This may be due to the government institutions might get the license more easily than the NGO institutions.

3.2 THE ANALYSIS AND INTERPRETATION OF THE DATA

This part of the chapter treats the presentation, analysis and interpretation of the data which are pertinent to the problem.

Table 4: Respondents Response with Respect to the Availability of Educational Materials Management Guideline

No.	Item	Respondent Groups				χ^2
		Government Teachers		NGO Teachers		
		N	%	N	%	
1	In your institution, is there educational materials and equipment management guide line?					36.23
	a) Yes	14	20.0	35	76.1	
	b) No	32	45.7	5	10.9	
	c) I don't know	24	34.3	6	13.0	
	Total	70	100.0	46	100.0	
2	If your response for item 1 is “yes”, then to what extent does the guide line applicable?					4.81
	a) Very high	0	0.0	5	14.3	
	b) High	5	35.7	18	51.4	
	c) Medium	6	42.9	9	25.7	
	d) Low	3	21.4	3	8.6	
	e) Not at all	0	0.0	0	0.0	
	Total	14	100.0	35	100.0	

$\chi^2 = \text{Chi square}$

The respondents were asked to respond the presence of the materials management guide line. In this respect as can be seen from table 4, 24 (34.3%) from the government TVET institution and 6(13%) from the NGO TVET institution they didn't have any idea about the

presence of the materials management guideline. And majority of the government TVET institution 32 (45.7%) and a small number from the NGO TVET institution 5 (10.9%) have said there is no any guide line. Only a few respondents from government 14 (20%) and majority of the respondents from the NGO institution 35 (76.1%) have awareness about the presence of materials management guideline. This implies that materials management guideline has got more awareness in NGO TVET institutions than government TVET institutions. Based on the obtained responses there is a significance difference regarding the awareness of the guideline with these two groups of respondents. The Chi-square test (36.23) at $df=2$ and $\alpha=0.05$ also shows that there is statistically a significance difference between the two groups of respondents regarding the availability of the materials management guideline.

As confirmed from the interview with the deans and Administration and Finance heads of both government and NGO institutions regarding the availability of the guideline some of them respond 'Yes' and some of them said 'No' in both institutions. This shows that even the Deans and Administration and Finance heads of both institutions did not have uniform awareness regarding the guideline. So materials management can be done with out implementing the guideline and suitable to each institution with out following the proper way and it may tend to affect the training program.

In item 2 of the same table, the respondents were responding the degree of application of the materials management guideline in their TVET institutions. In this case from the government TVET institutions they have responded as 5(35.7%), 6(42.9%) and 3(21.4%) the guide line is applicable as high, medium and low respectively. No respondent has responded as the guideline is applied in a very high situation. Similarly the NGO respondents have responded as 5(14.3%), 18(51.4%), 9(25.7%) and 3(8.6%) as very high, high, medium and low respectively. So the guide line in NGO seems got more application than the government institutions. But the Chi-square test (4.81) at $df=3$ and $\alpha=0.05$ shows that there is no statistically a significance difference between the two groups of respondents in the application of the guideline.

3.2.1 The Applicability of Materials Management Function in TVET Institutions

Materials management is the most important functional area of any organization like TVET institutions. As UNESCO (1992:155) explained “educational materials management is the planning, acquisition, allocation, distribution, and controlling the proper use as well as maintenance of educational materials and equipment facilities in order to realize the objectives of the education system”. There fore, considerable focus has to be given by leaders in decision making, planning, provision, utilization and controlling skillfully material resources and physical facilities.

Table 5 below shows the responses of government and NGO respondents on how the managerial functions were performed in their respective institutions. In this case for items 2, 8 and 10 the government respondents have rated fair with mean values of 2.33, 2.29 and 2.11 respectively, but the rest were rated good with mean values from 2.59-3.37. On the other hand about half items 1, 7, 8, 9 and 10 were rated good with mean values of 3.41, 3.46, 3.20, 3.39 and 3.39 respectively and the rest half items of 2, 3, 4, 5 and 6 were rated very good with mean values of 3.63, 3.54, 4.15, 4.20 and 3.76 respectively by NGO respondents.

Even if, on the responses there seems a mean difference all in all, but in items 1, 3 and 7 the mean and the t-test value shows that there is no any significant difference with in the two institutions regarding the listed items. But for the rest items 2, 4, 5, 6, 8, 9 and 10 there is a mean difference between the two institution respondents which implies that for the listed managerial function items the NGOs are better than the government institutions. The t-test at $\alpha=0.05$ also reveals that there is statistically a significant difference between the two institutions regarding the listed managerial functions.

Table 5: Respondents Response with Regard to Implementation of Materials Management Functions

No.	Items	Respondents Group														t-test for equality of means; df=114	
		Gov't teachers n=70							NGO teachers n=46								
		Frequency					Mean	SD	Frequency					Mean	SD	T-obt.	Sig.2 Tail
		1	2	3	4	5			1	2	3	4	5				
1	Planning of educational materials and equipment	6	15	20	19	10	3.17	1.179	7	5	5	20	9	3.41	1.343	-1.021	.309
2	Timely Purchasing of educational materials and equipment	10	31	25	4	0	2.33	.793	0	5	14	20	7	3.63	.878	-8.284	.000
3	Storage of educational materials and equipment	4	15	16	21	14	3.37	1.194	5	5	9	14	13	3.54	1.312	-.730	.467
4	Proper handling of educational materials and equipment	0	21	24	23	2	3.09	.864	2	0	4	23	17	4.15	.918	-6.344	.000
5	Proper utilization of educational materials and equipment	4	15	26	23	2	3.06	.946	0	2	3	25	16	4.20	.749	-6.866	.000
6	Maintenance of educational materials and equipment	8	27	23	10	2	2.59	.970	0	5	12	18	11	3.76	.947	-6.440	.000
7	Inventory control of educational materials and equipment	9	16	10	18	17	3.26	1.390	5	7	9	12	13	3.46	1.345	-.765	.446
8	Disposition of scrap materials and equipment	17	16	37	0	0	2.29	.837	3	8	19	9	7	3.20	1.108	-5.031	.000
9	Disposition of obsolete materials and equipment	10	21	23	16	0	2.64	.993	0	10	14	16	6	3.39	.977	-3.996	.000
10	Disposition of surplus materials and equipment	23	20	23	4	0	2.11	.941	2	9	13	13	9	3.39	1.145	-6.557	.000

Ratings: 0.05-1.50 =Poor, 1.51-2.50=Fair, 2.51-3.50=Good, 3.51-4.50=Very good, 4.51-5.00=Excellent

SD-standard Deviation, N-Number, df-degree of freedom, sig- Significant at $\alpha=0.05$

Regarding the disposition for items 8, 9 and 10 the mean values of the NGO respondents were greater than the mean values of government respondents. But the responses of the interview implies that even some NGO interviewees have said no action is taken, but some of them said they will sell and donate for other organizations. Whereas the government institution interviewees were replied that they will donate for other institutions and they will sell it. This shows that regarding the obsolete, scrap and surplus items there is no uniformity even in the same institutions and as the researcher observed that there are a number of obsolete materials in the shop and scraps will be also damped as a waste especially in the government institutions. From the mean values the NGOs were better than the government institutions, but the researcher's belief is there is no any difference between these institutions and this is a forgotten activity.

The reason of this difference may be due to the number of departments being many and the number of purchasers not more than one, high availability of student vandalism and less perception of students about the resources as if it is not their own, lack of giving proper attention for maintenance by the officials might be some of the reasons in government institutions. Regarding maintenance as replied by from the interview it is not a big problem in NGO institutions because the students and teachers are asked to maintain by them selves, but if it is beyond their capacity the maintenance department can handle the problem which was confirmed from the interview. In this case Selam TVET institution is considered as a role model.

Table 6: Respondents Response with Respect to the Adequacy of the Materials and the Effect of the Training

No.	Items	Respondent Groups				χ^2
		Government Teachers		NGO Teachers		
		No.	%	No.	%	
1	Does your institution provide you with adequate amount of material resources needed to give the training properly?					28.46
	a) Yes	24	34.3	39	84.8	
	b) No	46	65.7	7	15.2	
	c) I don't know	0	0.0	0	0.0	
	Total	70	100.0	46	100.0	
2	If your response for item 1 is "No", then to what extent does the training program negatively affected?					11.35
	a) Highly affected	20	43.5	2	28.6	
	b) Affected	18	39.1	0	0.0	
	c) Moderately affected	6	13.0	3	42.8	
	d) Least affected	2	4.4	2	28.6	
	e) Not affected at all	0	0.0	0	0.0	
	Total	46	100.0	7	100.0	

χ^2 = Chi square

The presence of adequate material resources is a key factor in achieving the objectives of the TVET program. In item 1 of table 6, the respondents were asked to respond for the availability of adequate material resources to give the training. In this regard majority 46(65.7%) of the government TVET institution respondents said there is no adequate material resources and 24 (34.3%) respondents said adequate materials resource is available. While to the contrary 39 (84.4%) of the NGO TVET institution respondents have responded that they can get adequate amount of material resources to run the training program. Only 7(15.2%) from the NGO TVET institutions have said they didn't get adequate amount of materials resource. This implies that the NGO institutions provide a better amount of materials resources than the government institutions; which means there is a difference in obtaining adequate amount of materials resources with in these two institutions.

The Chi-square test (28.46) at df=1 and α =0.05 also implies that there is statistically a significance difference between the two institutions regarding the provision of adequate

amount of materials resources. The reason may be the NGO institutions may have a better budget because of the donation they obtained and relatively their small number of students.

If material resources are not adequate, then it is obvious that the training will be affected. In item 2 of the same table, the respondents were responding the extent to which the training was affected due to shortage of materials. In this regard the government TVET institution respondents respond as 20(43.5%), 18(39.1%), 6(13%) and 2(4.4%) highly affected, affected, moderately affected and least affected respectively. While the NGO TVET institutions respondents respond as 2(28.6%), 3(42.8%) and 2(28.6%) as highly affected, moderately affected and least affected respectively. This shows that the government TVET institutions are highly affected on the training due to the shortage of adequate materials resources than the NGO TVET institutions and there is a significance difference in the extent of the effect on the training in government institutions. The Chi-square test (11.35) at $df=3$ and $\alpha=0.05$ also shows that there is statistically a significance difference on the extent of the effect of the training between the two institutions.

3.2.2 Specification and Purchasing of Educational Materials

Educational materials are essential and crucial inputs for running instructional activities of any level. The effectiveness and efficiency of the education system to a great extent depends on the amount and quality of instructional materials available.

Preparing the specification of educational materials is difficult and not as such easy. Following this purchasing of educational materials resource is the other important materials management function. The function of purchasing embraces the flow of materials from the suppliers to an organization which has the intention of facilitating the attainment of predetermined objectives (Mbamba, 1992:158).

The effective purchasing can be conducted by preparing a suitable specification. This specification should be prepared in advance in the way that best suits to the purchasing activity. In this regard MoFED in Dereje (2006:32) has stated for materials and equipment to

purchase to prepare specification, standards and technical backgrounds are necessary criteria for effective purchasing.

Table 7: Respondents Response with Respect to Preparing of Specification and Approval for Purchasing Activity

No.	Items	Respondent Groups				χ^2
		Government Teachers		NGO Teachers		
		No.	%	No.	%	
1	Does your institution prepare specification for equipment & materials to be purchased?					6.48
	a) Yes	48	68.6	37	80.4	
	b) No	20	28.6	5	10.9	
	c) I don't know	2	2.8	4	5.7	
	Total	70	100.0	46	100.0	
2	If your response for item 1, is "yes ", then who is responsible for this activity?					0.69
	a) The purchasing committee	10	20.8	7	18.9	
	b) The dep't head with his dep't members	34	70.8	25	67.6	
	c) The department head alone	2	4.2	3	8.1	
	d) Specially designed committee	2	4.2	2	5.4	
	e) The vendor	0	0.0	0	0.0	
	Total	48	100.0	37	100.0	
3	If your response for item 1, is "yes ", then who checks and accept the purchased materials and equipment being bought based on the given specification?					4.02
	a) The purchasing committee	16	33.3	6	16.2	
	b) The dep't head with his dep't members	20	41.7	22	59.5	
	c) The department head alone	4	8.3	4	10.8	
	d) Specially designed committee	8	16.7	5	13.5	
	e) The vendor	0	0.0	0	0.0	
	f) If other please specify					
	Total	48	100.0	37	100.0	

χ^2 = Chi square

According to table 7 of item 1, the respondents were asked to state about the preparation of specification in their institutions. In this regard, 48(68.6%) from the government TVET institutions and 37(80.4%) from the NGO institutions have responded that the specifications for purchasing activity is prepared in their institutions. About 20(28.6%) and 5(10.9%) of government and NGO respondents respectively have said that there is no preparation of specification for purchasing. Here the NGO teachers have a better awareness regarding the preparation of the specification for the purchasing activity. The Chi-square test (6.48) at

$df=2$ and $\alpha=0.05$ also shows that there is statistically a significance difference between the two group of TVET institution teachers in the awareness regarding the preparation of specification for purchasing. The reason may be the materials management guideline is more applicable in NGO TVET institutions.

For the same table of item 2, majority of the respondents from both institutions 34(70.8%) from the government and 25(67.6%) from the NGO institutions have suggested that the specification is prepared by the department head and the department members together. And some respondents from both institutions 10(20.8%) from government and 7(18.9%) from the NGO has confirmed that the purchasing committee will prepare the specification. Based on the response of these groups of respondents there is no a significance difference, and the Chi-square test (0.69) at $df=3$ and $\alpha=0.05$ also shows that there is no statistically a significance difference between these two groups of respondents regarding the responsibility of preparing the specifications for purchasing.

The purchased materials and equipment should be cross checked with their initial specifications. This cross checking or approval should be performed in order to get the quality materials based on the given specification. In this regard in item 3 of the same table, the respondents were asked to confirm who is responsible for the approval activity. A majority of respondents 20(41.7%) from the government and 22(59.5%) from the NGO institutions have suggested that this approval is performed by the department head and the department members. From the government institutions some respondents 16(33.3%) and from the NGO 6(16.2%) have said the purchasing committee are going to approve the specification. When the comparison is made for these responses there is no a significance difference between the two groups of respondents. The Chi-square test (4.02) at $df=3$ and $\alpha=0.05$ also describes that there is no statistically a significance difference with these two groups of respondents regarding checking of the purchased materials based on the given specifications.

Table 8: Respondents Response with Respect to the Timely Purchasing of Educational Materials

No.	Items	Respondent Groups				χ^2
		Government Teachers		NGO Teachers		
		No.	%	No.	%	
1	In your opinion, do proper instructional materials and equipment purchased on time?					22.95
	a) Yes	4	5.7	19	41.3	
	b) No	64	91.4	27	58.7	
	c) I don't know	2	2.9	0	0.0	
	Total	70	100.0	46	100.0	
2	If your response for item 1 is "No", then what may be the reason of delay?					6.19
	a) Shortage of budget	4	6.3	5	18.5	
	b) Absence of quality materials in the local market	11	17.2	3	11.1	
	c) Lack of commitment on the officials	15	23.4	10	37.1	
	d) Bureaucracy of the purchasing system	34	53.1	9	33.3	
	e) Others please specify					
	Total	64	100.0	27	100.0	

Significant at $\alpha=0.05$; χ^2 = Chi square

As far as item 1 of table 8 was concerned, the least number of respondents 4(5.7%) from government TVET institutions and 19(41.7%) from NGO TVET institutions have responded proper instructional material resources and equipment were purchased on time. On the other hand majority 64(91.4%) of the respondents from the government institutions and 27(58.7%) of the respondents from NGO institution have said proper instructional materials and equipment did not purchased on time. This action will hamper the training program seriously. In this case the government TVET institutions are much more affected than the NGOs. The Chi- square test (22.95) at $df=2$ and $\alpha=0.05$ also assures that there is statistically a significance difference between these two groups of respondents regarding the timely purchasing of materials resource and equipment.

In connection with this, on item 2 of the same table the teachers were asked to indicate the main reason why the materials were not purchased on time. Accordingly the following responses have obtained from the governmental TVET institution teachers as 34 (53.1%), 15(23.4%), 11(17.2%) and 4(6.3%) for bureaucracy of the purchasing system, lack of

commitment on the side of officials, absence of quality material on the local market and shortage of budget respectively. Some respondents have also suggested on the given free space that lack of preparing proper specification is also one reason that contributes its share for the delay of the purchasing activity. On the other hand the NGO teachers have responded as 9(33.3%), 10(37.1%), 3(11.1%) and 5(18.5%) for the same sequence as above. For the case of government TVET institutions the main reason is the long bureaucracy of the purchasing system, where as in the NGO lack of commitment on the side of officials is taken as the main reason. Even if there is a slight difference in the figure all the listed reasons were considered in both institutions. When comparison is made there is no as such significance difference. The Chi-square test (6.19) at $df=3$ and $\alpha=0.05$ also describes that there is no statistically a significance difference between these two groups of respondents regarding their reasons.

As depicted in table 9 below, there are different items related with the purchasing systems of the instructional materials and equipment resources. In most cases the mean values of the NGO respondents were greater than the mean values of government institution respondents. Even if in most cases there is a mean difference with the respondents of the two groups, statistically there is no a significant difference with these two groups of responses. The t-test at $\alpha=0.05$ also shows that statistically there is no a significant difference between the two groups of responses regarding the listed purchasing issues.

But on items 3 and 5 the mean values of government respondents were 2.73 and 2.71 respectively which have rated good. While these items have rated Very good and good with mean values of 3.74 and 3.46 respectively by NGO respondents. This implies that NGO institutions purchase quality materials than government institutions and the system they follow is more transparent than the governmental TVET institutions. The t- test at $\alpha=0.05$ also reveals that there is a significant difference between the two groups of respondents on quality of purchased materials and transparency of the purchasing system. This may be due to corruption is less in NGO than government TVET institutions.

Table 9: Implication of Respondents on Purchasing Issues

No	Items	Respondents Group														t-test for equality	
		Gov't teachers n=70							NGO teachers n=46							of means; df=114	
		Frequency					Mean	SD	Frequency					Mean	SD	T-obt.	Sig.2 Tail
		1	2	3	4	5			1	2	3	4	5				
1	Effectiveness of the purchasing system	7	17	23	10	13	3.07	1.243	0	12	15	14	5	3.26	.976	-.872	.385
2	Quantity of requested purchased materials	0	10	13	27	20	3.79	1.075	0	1	15	19	12	3.91	.812	-.685	.495
3	Quality of purchased materials	8	21	25	14	2	2.73	1.006	2	0	15	20	9	3.74	.929	-5.452	.000
4	Relevance of purchased materials for the program	0	10	21	27	12	3.59	.940	0	5	10	22	9	3.76	.899	-.999	.320
5	Transparency of the purchasing system	11	17	23	19	0	2.71	1.038	2	2	20	17	5	3.46	.912	-3.951	.000
6	Qualification of the purchasing committee	9	12	20	12	17	3.23	1.342	3	4	15	22	2	3.35	.948	-.523	.602
7	Experience of the purchasing committee	6	11	14	21	18	3.49	1.271	2	2	25	15	2	3.28	.807	.963	.338
8	Continuous follow up of the purchasing process	8	12	20	14	16	3.26	1.304	4	5	19	11	7	3.26	1.124	-.016	.987

3.2.3. Inventory Control and Storage Management

Inventory control is not an easy task for the administrators and the planners for the TVET instructional materials to measure its quantity and costs. However, these difficulties must overcome if budgetary estimates are to be made. Thus, materials resource department should ensure that facilities are designed to safeguard the sensitive or valuable materials in the workshops, warehouse, library, laboratory, etc...from threats such as theft, misuse, fire corruption and so on. More over, store management is responsible for each type of storage of materials through proper identification of materials, efficient physical handling, and protection of materials against spoilage in the warehouse. In addition, the store manager also controls the activities of materials during receiving, issuing and controlling materials record in ledger in a systematic manner.

Table 10: Respondents Response with Respect to Inventory Control

No.	Items	Respondent Groups				χ^2
		Government Teachers		NGO Teachers		
		No.	%	No.	%	
1	Is there inventory control of educational materials and equipment in your institution?					0.57
	a) Yes	45	64.3	32	69.6	
	b) No	5	7.1	2	4.3	
	c) I don't know	20	28.6	12	26.1	
	Total	70	100.0	46	100.0	
2	If your response for item 1 is "Yes", then how often is the inventory control conducted?					0.81
	a) Every year	37	82.2	25	78.1	
	b) Every semester	3	6.7	4	12.5	
	c) Every month	0	0.0	0	0.0	
	d) No response	5	11.1	3	9.4	
	Total	45	100.0	32	100.0	

Significant at $\alpha=0.05$; $\chi^2=Chi-square$

In table 10 of item 1, the respondents were asked to reveal whether the inventory control of materials and equipment is available in TVET institutions or not. Accordingly, the majority 45(64.3%) and 32(69.6%) of government and NGO TVET institution respondents respectively have answered that inventory control is conducted in their TVET institutions. But a considerable number 20(28.6%) and 12(26.1%) from government and NGO respondents respectively have said that they didn't have awareness regarding the inventory

control conducted in their institutions. This leads to the inventory control was not conducted on a certain period of time, rather it might be done when some special circumstances occurred like the store keepers or workshop technicians transferred or leave the work. The Chi-square test (0.51) at $df=2$ and $\alpha=0.05$ describes that there is no statistically a significance difference with these two groups of respondents regarding the availability of inventory control.

As depicted on item 2 of table 10, the respondents were asked to state the period of the inventory conducted from those who said “yes” for item 1. In this case the majority 37(82.2%) and 25(78.1%) of the government and NGO institution respondents respectively have stated that inventory control is conducted on the annual basis. This idea is similar with the ideas of the deans and administration and finance heads which have responded synonymously when they interviewed. From this it is possible to conclude that in both institutions the inventory control was conducted on a yearly basis and there is no any significance difference in the two institutions regarding the period of inventory control takes place as the Chi-square test (0.82) at $df=2$ and $\alpha=0.05$ strengthens this idea.

The inventory control is one of the major functions of the materials management. Based on this fact the respondents were asked to evaluate the inventory control systems exercised in their institutions. As table 11, below indicates all the responses in both groups of respondents fall in the range of good with mean values of 3.19, 2.99, 3.40, 3.11, 3.31 for items 1 to 5 respectively by government institution respondents, whereas by NGO TVET institution respondents these items have got the mean value of 3.22, 2.98, 3.52, 3.35 and 3.17 respectively, but the 3rd item was rated as very good with mean values of 3.52. This shows that, there is no any significant difference regarding the inventory control systems that were exercised in the two institutions. The t- test at $\alpha=0.05$ also strengthens this statement.

Table 11: Respondents Response with regard to the System of Inventory Control Exercised in TVET Institutions

No	Items	Respondents Group														t-test for equality of means; df=114	
		Gov't teachers n=70							NGO teachers n=46								
		Frequency					Mean	SD	Frequency					Mean	SD	T-obt.	Sig.2 Tail
		1	2	3	4	5			1	2	3	4	5				
1	Inventory control systems that are used	7	15	19	16	13	3.19	1.254	8	4	10	18	6	3.22	1.298	-.131	.896
2	Frequency of inventory conducted	11	16	17	15	11	2.99	1.313	9	8	8	17	4	2.98	1.308	.030	.976
3	Participation of the community during inventory	7	12	16	16	19	3.40	1.323	4	7	6	19	10	3.52	1.243	-.496	.621
4	Presentation of report after inventory	8	18	16	14	14	3.11	1.314	2	6	18	14	6	3.35	1.016	-1.021	.309
5	Process of updating inventory records through periodic counts	6	14	17	18	15	3.31	1.257	9	5	9	15	8	3.17	1.387	.564	.574

SD- Standard Deviation, df- Degrees of freedom

Table 12: Respondents Response Regarding Supply of Materials and Storage Management

No	Items	Respondent Groups				χ^2
		Government Teachers		NGO Teachers		
		No.	%	No.	%	
1	Do your students get immediate supply of materials that they need from the stores?					12.55
	a) Yes	41	58.6	41	89.1	
	b) No	29	41.4	5	10.9	
	Total	70	100.0	46	100.0	
2	If your response for item 1 is "No", then what would be the reason?					3.77
	a) The long bureaucracy to get permission for the requested items	7	24.1	0	0.0	
	b) Lack of commitment on the side of officials	6	20.7	2	40.0	
	c) Lack of knowledge on the side of store keepers	7	24.1	0	0.0	
	d) The absence of materials in the store	9	31.1	3	60.0	
	e) if other please specify					
	Total	29	100.0	5	100.0	

Significant at $\alpha=0.05$; χ^2 =Chi-square

To get immediate supply of the available educational material resources and equipment in the stores for teaching learning process, it needs effective and efficient storage management and personnel with the required knowledge.

As depicted in table 12 item 1, the respondents were asked to respond whether there is immediate supply of material resources from the stores or not. In this regard about 41(58.6%) of respondents from the government TVET institutions and majority 41(89.1%) of the respondents from the NGO institutions have answered that immediate supply of materials was obtained from their institutions. But a considerable amount 29(41.4%) of respondents from the government institution and a few 5(10.9%) from the NGO institutions have responded that they can't get immediate supply of material resources from the stores of their institutions. This asserts that NGO TVET institutions have a better supply of materials than the government institutions. The Chi-square test (12.55) at $df=1$ and $\alpha=0.05$ also shows that there is statistically a significance difference between the two institutions with respect to the supply of materials in their stores.

Item 2 in the same table describes the constraints or problems with regard to immediate supply of available instructional materials and equipment in the TVET stores. Regarding this the government TVET institution respondents suggested the given choices in a different figure. Thus 9(31.1%), 7(24.1%), 7(24.1%) and 6(20.7%) responses are obtained for the absence of materials in the store, lack of knowledge on the side of store keepers, the long bureaucracy to get permission for the requested items and lack of commitment on the side of officials respectively. Some respondents have suggested in the given free space that the poor administration and management was also one of the reasons that contribute its own share in the case of delay. Mean while the NGO TVET institution respondents have answered only the two reasons 3(60%) and 2(40%) as the absence of materials in the store and lack of commitment on the side of officials respectively. In addition to on the given free space the reason of delay was given as “one person was managing so many shops and in this case, he/she can be busy”.

Even if the constraints that hinder the immediate supply of materials in the stores seems different in its rate or amount by observing the table, the Chi-square test (3.77) at $df=3$ and $\alpha=0.05$ shows that there is no statistically a significance difference between the two groups of respondents regarding the immediate supply of materials in the stores.

Table 13: A comparison of t-test regarding the Availability of Training Resources

No	Items	Respondents Group														t-test for equality of means; df=260	
		Gov't teachers and students n=162							NGO teachers and students n=100								
		Frequency					Mean	SD	Frequency					Mean	SD	T-obt.	Sig.2 Tail
		1	2	3	4	5			1	2	3	4	5				
1	Availability of workshops	4	12	78	54	14	3.38	.842	0	1	5	27	67	4.60	.636	-12.426	.000
2	Availability of Machineries/equip	12	38	72	30	10	2.93	.982	0	3	12	38	47	4.29	.795	-11.722	.000
3	Availability of Hand tools	2	14	45	73	38	3.87	.842	0	3	16	28	53	4.31	.849	-4.091	.000
4	Availability of Raw materials	9	41	63	32	17	3.04	1.048	4	7	11	22	56	4.19	1.134	-8.338	.000
5	Availability of Teaching aids	4	36	56	53	13	3.22	.963	4	5	12	43	36	4.02	1.025	-6.404	.000
6	Availability of Text books	37	24	49	21	31	2.91	1.400	4	7	16	49	24	3.82	1.009	-5.671	.000
7	Availability of Classrooms	4	20	40	49	49	3.73	1.097	0	15	15	36	34	3.89	1.043	-1.135	.257

Ratings: 0.05-1.50 =Poor, 1.51-2.50=Fair, 2.51-3.50=Good, 3.51-4.50=Very good, 4.51-5.00=Excellent

SD-standard Deviation, N-Number, df-degree of freedom, sig- Significant at $\alpha=0.05$

As indicated in table 13 above, when the cumulative mean value of each group of respondents have seen items 1, 2, 4, 5 and 6 were rated good in government institutions with mean values of 3.38, 2.93, 3.04, 3.22 and 2.91 respectively. Whereas with the same items the NGO institution respondents were rated very good except item 1 which was rated Excellent, with mean values of 4.60, 4.29, 4.19, 4.02 and 3.82 respectively. On items 3 and 7 the rate of response have fallen with the same category which is very good in both cases with mean values of 3.87 and 3.73 for government institutions and 4.31 and 3.89 for NGO institutions respectively.

From table 13 the results of all items except item 7 have shown that, in the availability of the listed items, there is a difference in the two institutions. The t-test at $\alpha=0.05$ also shows this difference in the two institutions. The reason of this difference may be in NGO TVET institutions the numbers of students are very few from the government institutions and this availability is compared with respect to the number of students from the beginning. The other reason of difference may be all these resources need money so NGO institutions have a better financial stand because of the donations they obtained (as explained on the interview regarding the budget they obtained).

As depicted in table 14 below, the respondents were asked to respond the listed training resource items whether they are quality or not. When comparing the cumulative mean for the two institutions, this mean difference is visible. In this case all the government respondents' response lies in the rate of good with mean values of 2.60-3.40, while all the NGOs fall in the very good rate with mean values of 3.68-4.27. This implies that the quality of training resources of NGO TVET institutions is better than the government TVET institutions. The t-test at $\alpha=0.05$ reveals that there is statistically a significance difference between the two groups of respondents regarding the quality of the training resources.

Table 14: A comparison of t-test regarding the Quality of Training Resources

No	Items	Respondents Group														t-test for equality of means; df=260	
		Gov't teachers and students n=162							NGO teachers and students n=100								
		Frequency					Mean	SD	Frequency					Mean	SD	T-obt.	Sig.2 Tail
		1	2	3	4	5			1	2	3	4	5				
1	Quality of workshops	8	35	73	32	14	3.06	.980	0	2	13	41	44	4.27	.763	-10.570	.000
2	Quality of Machineries/equip	8	34	64	43	13	3.12	.993	0	6	17	37	40	4.11	.898	-8.149	.000
3	Quality of Hand tools	4	18	65	59	16	3.40	.902	0	4	27	31	38	4.03	.904	-5.478	.000
4	Quality of Raw materials	7	37	59	51	8	3.10	.954	0	8	15	45	32	4.01	.893	-7.696	.000
5	Quality of Teaching aids	10	21	82	39	10	3.11	.926	2	7	25	34	32	3.87	1.012	-6.220	.000
6	Quality of Text books	42	33	49	24	14	2.60	1.258	7	9	15	47	22	3.68	1.127	-7.026	.000
7	Quality of Classrooms	10	34	58	34	26	3.20	1.130	6	8	13	37	36	3.89	1.163	-4.765	.000

Ratings: 0.05-1.50 =Poor, 1.51-2.50=Fair, 2.51-3.50=Good, 3.51-4.50=Very good, 4.51-5.00=Excellent

SD-standard Deviation, N-Number, df-degree of freedom, sig- Significant at $\alpha=0.05$

This may be due to in the NGO institutions the purchasing activity for these resources keep their quality standard from the beginning, but in the case of government institutions most of the time poor quality materials were purchased. As observed by the researcher the NGO workshops are neat, clean and have a better shop arrangement and generally the workshops are attractive and convenient for work. The observation also includes working area bounded by a visible bold line for the machine operator, the passage for the people and materials bounded by a bold visible line again, the machines and the floor is neat and clean, students have their own shelves and locker for the storage of the project and their working cloth, which lacks in most government TVET institutions, for different operations to be performed different working areas are available, the water supply in the shop is also available and the teachers' office is well equipped with chairs tables and shelves and it is also neat and clean.

Table 15: Respondents Response with Respect to Availability of Idle or Underused Machines

N	Items	Respondent Groups												χ^2
		Government TVET institutions						NGO TVET institutions						
		Teachers		Students		Total		Teachers		Students		Total		
		N	%	N	%	N	%	N	%	N	%	N	%	
1	Is there idle or under used machines and /or equipment in your institution?													37.87
a) Yes	50	71.4	60	65.2	110	67.9	20	43.5	27	50.0	47	47		
b) No	14	20.0	8	8.7	22	13.6	26	56.5	21	38.9	47	47		
c) I don't know	6	8.6	24	26.1	30	18.5	0	0.0	6	11.1	6	6		
	Total	70	100	92	100	162	100	46	54	100	100	100	100	
2	If you say “No”, then to what extent do you think these resources are used effectively?													30.21
a) Very high	2	14.3	2	25.0	4	18.2	7	26.9	10	47.6	17	36.2		
b) High	2	14.3	0	0.0	2	9.1	17	65.4	8	38.1	25	53.2		
c) Medium	6	42.8	6	75.0	12	54.5	2	7.7	3	14.3	5	10.6		
d) Low	2	14.3	0	0.0	2	9.1	0	0.0	0	0.0	0	0.0		
e) Very low	2	14.3	0	0.0	2	9.1	0	0.0	0	0.0	0	0.0		
	Total	8	100	14	100	22	100	26	100	21	100	47	100	

χ^2 = Chi-square

In order to make the training program to fulfill its objectives the limited resources should be used wisely. In this case the respondents were asked to respond whether there are idle or underused machines and/or equipment in their TVET institutions.

As it is depicted in table 15, majorities 60 (65.2%) of the government institution students and 50(71.4%) teachers have answered “yes”. Where as in the NGO respondents half 27(50%) of the students and below average 20(43.5%) of the teacher respondents have answered the same response. This shows that there are many idle or underused machines in government institutions than the NGOs. The combined result also shows that from government institutions 110(67.9%) have answered that there are idle or underused machines, whereas in the NGO institutions the number of respondents were below average 47 (47%). In this respect more idle or under used machines were available in government TVET institutions than NGO TVET institutions. The Chi-square test (37.87) at $df=2$ and $\alpha=0.05$ shows that there is statistically a significance difference in the availability of idle or underused machines between the two institutions. These idle or underused machines are available due to lack of proper maintenance and lack of awareness regarding its operation.

Respondents were also asked to specify their reasons through open ended question in the questionnaire if their response is ‘yes’. In this regard the reasons why these idle or under used machines and/or equipment are available are so many from both institutions. But to list a few:

- ♦ Lack of proper maintenance personnel and shortage of spares;
- ♦ Lack of proper utilization of machines;
- ♦ Lack of operating skill on the side of teachers;
- ♦ Absence of disposition specially on the side of obsolete materials;
- ♦ To be free from accountability if some thing goes wrong on the side of teachers;
- ♦ Lack of raw materials for the specific equipment, etc...

3.2.4 Utilization and Handling of Educational Materials and Equipment Resources

As material management covers all aspects of materials; including flow, cost, quality supply, conservation and utilization the prime objective is to supply the user with the required quantity and quality at a constant rate. The major objectives of plans and schedules are

effective utilization of the organization's prime assets men, money, materials and machines. To minimize inefficient utilization of instructional materials the principals together with the teaching and non teaching staff should create a mechanism in the effective utilization of material resources in the institutions. There fore, proper use of material resources refers to the utilization of material resources effectively and efficiently to accomplish the objectives.

Table 16 below, shows about the performance of teachers, students and workshop technicians about the utilization of material resources in their respective institutions. In this case as it can be seen on the table, in all items except item 1, which was rated very good, were rated good with mean values of 2.91-3.69 in government TVET institutions, while all items except item 1, which was rated excellent, were rated very good with mean values of 3.89-4.51 in NGO TVET institutions. This shows that the NGO TVET institutions were better than government TVET institutions in performance of teachers to prevent damage, skill of teachers to maintain educational materials when damaged, skill of teachers to operate and utilize machineries and equipment, skill of work shop technicians to help in maintaining damaged parts, skill of students in utilizing the existing machineries and equipment, skill of students in utilizing the hand tools and skill of students in utilizing the raw materials properly. The t-test at $\alpha=0.05$ also reveals this significant difference.

This variation in performance and utilization might be due to in government institutions teachers were assigned with out entrance examination, but in the NGO institutions there was an entrance exam both theoretically and practically; this helps to select a better qualified teachers. The other difference is the salary scale; for government institutions the scale is very low, while for NGOs it is far better than the government institutions with additional incentives like medical care, transportation and insurance which are totally absent in government institutions. In the case of workshop technicians the reasons are similar as that of teachers additionally they will get salary increment per annum based on their performance which is stagnant in government TVET institutions. Whereas the reasons for the case of the students may be the NGO TVET institution students are very few in number and due to their limited number they can be controlled properly by teachers which is difficult in the case of government institutions.

Table 16: Response of Respondents on the Performance of Teachers, Students and Workshop Technicians

No	Items	Respondents Group														t-test for equality of means; df=260	
		Gov't teachers and students n=162							NGO teachers and students n=100								
		Frequency					Mean	SD	Frequency					Mean	SD	T-obt.	Sig.2 Tail
		1	2	3	4	5			1	2	3	4	5				
1	Performance of teachers to prevent damage	8	8	51	54	41	3.69	1.059	0	0	7	35	58	4.51	.628	-7.005	.000
2	Skill of teachers to maintain educational materials when damaged	6	38	55	47	16	3.18	1.021	0	2	7	41	50	4.39	.709	-10.409	.000
3	Skill of teachers to operate and utilize machineries and equipment	6	14	68	51	23	3.44	.965	0	1	9	29	61	4.50	.704	-9.546	.000
4	Skill of work shop technicians to help in maintaining damaged parts	17	32	35	56	22	3.21	1.213	0	5	15	39	41	4.16	.861	-9.191	.000
5	Skill of students in utilizing the existing machineries properly	12	39	53	45	13	3.05	1.068	0	6	12	36	46	4.22	.883	-8.295	.000
6	Skill of students in utilizing hand tools properly	10	42	48	49	13	3.08	1.063	0	5	13	48	34	4.11	.815	-8.298	.000
7	Skill of students in utilizing raw materials properly	8	49	61	37	7	2.91	.948	0	6	27	39	28	3.89	.886	-6.839	.000

Ratings: 0.05-1.50 =Poor, 1.51-2.50=Fair, 2.51-3.50=Good, 3.51-4.50=Very good, 4.51-5.00=Excellent

SD-standard Deviation, N-Number, df-degree of freedom, sig- Significant at $\alpha=0.05$

Table 17: Respondents Response with Respect to the Problems Related with the Utilization of Educational Material Resources and Equipment

N	Items	Respondent Groups												χ^2
		Government institutions						NGO institutions						
		Teachers		Students		Total		Teachers		Students		Total		
		N	%	N	%	N	%	N	%	N	%	N	%	
a	Wastage of raw materials are seen in the work shop	11	15.7	10	10.9	21	13.0	12	26.1	14	25.9	26	26.0	15.64
b	Educational materials are stolen from the shop	11	15.7	10	10.9	21	13.0	2	4.3	3	5.6	5	5	
c	Lack of maintenance when needed	21	30.0	27	29.3	48	29.6	9	19.6	11	20.4	20	20.0	
d	Shortage of materials	13	18.6	26	28.3	39	24.0	16	34.8	18	33.3	34	34.0	
e	Educational materials are too old and can't give the desired service	14	20.0	19	20.6	33	20.4	7	15.2	8	14.8	15	15.0	
f	If other, please...													
	Total	70	100	92	100	162	100	46	100	54	100	100	100	

Significance at $\alpha=0.05$; degrees of freedom=4, χ^2 = Chi-square

As illustrated in table 17, respondents were asked to specify the problems that were occurred during the training process in relation with the utilization of the educational materials and equipment. In this regard majority 21 (30%), 14(20%), and 13(18.6%) of the government teacher respondents have responded that lack of proper maintenance when the need arises, educational materials are too old and can't give the desired service and shortage of materials respectively. Regarding the government institution students 27(29.3%), 26(28.3%) and 19(20.6%) have responded that lack of proper maintenance when the need arises, shortage of materials and educational materials are too old and can't give the desired service respectively. These responses have nearly similar perception.

While observing the NGO respondents both teachers and students have responded the same items with the same sequence. Hence 16(34.8), 12(26.1) and 9(19.6) of the teacher respondents and 18(33.3%), 14(25.9%) and 11(20.4%) of the student respondents have said that shortage of materials, wastage of raw materials and lack of proper maintenance respectively. These groups of respondents have exactly similar perception on the appeared problems during the training time.

By combining the same institution respondents (that is, teachers and students) together, the responses obtained from the two groups were a little bit different. The government institution respondents have responded as 48(29.6%), 39(24.0%) and 33(20.4%) for absence of proper maintenance, shortage of materials and the educational materials are too old, whereas the NGOs have responded as 35(35%), 26(26%) and 21(21%) for shortage of materials, wastage of materials in the workshop and the absence of proper maintenance when the need arises respectively. This shows that the problems occurred in relation with the utilization of the educational materials and equipment during the training process is relatively different in each group of respondents. The Chi-square test (15.21) at $df=4$ and $\alpha=0.05$ also shows that there is statistically a significance difference in the occurrence of problem during the training process in relation with the utilization of educational materials and equipment in the two groups of respondents.

Table 18: Factors that Affect the Utilization of Material Resources Properly

No	Reasons	Government Institutions								NGO Institutions						ρ
		Teachers (n=70)		Students (n=92)		CWM	Rank	Teachers (n=46)		Students (n=54)		CWM	Rank			
		Mean	Rank	Mean	Rank			Mean	Rank	Mean	Rank					
1	Misuse of educational materials	4.47	4	4.55	4	4.52	5	4.22	6	4.20	6	4.21	6	0.74		
2	Mishandling of properties by students	5.99	1	4.09	7	4.91	3	5.30	3	4.65	4	4.95	5			
3	Delay in obtaining educational materials	5.41	3	6.17	1	5.85	1	6.28	1	5.37	1	5.79	1			
4	Inconvenient storing	3.51	8	4.16	5	3.88	7	3.22	7	3.50	8	3.37	7			
5	Lack of adequate personnel in materials management	4.26	5	4.13	6	4.19	6	5.22	4	4.78	3	4.98	4			
6	Lack of supervision by officials	3.80	6	5.22	3	4.60	4	5.09	5	5.31	2	5.21	2			
7	Inadequate inventory	3.66	7	3.78	8	3.73	8	2.70	8	3.72	7	3.25	8			
8	Lack of proper maintenance	5.56	2	5.76	2	5.67	2	5.78	2	4.52	5	5.10	3			

Where: ρ -Spearman's rank order correlation coefficient, CWM-Cumulative Weighted Mean, n-number

The data tabulated in table18 reveals the respondents from both the government and NGO TVET institutions under the study whether they had similar perception in ranking the main factors that affect the utilization of material resources or not. Here as the table shows when their separate responses were observed the government students and all the NGO respondents considered delay in obtaining educational materials as 1st and the government teachers have taken mishandling of properties by students as their first choice. And lack of proper maintenance was the 2nd rank for both government respondents and teachers in NGO, but lack of supervision by officials was ranked as 2nd by NGO students. While inadequate inventory is considered as the 8th choice for government students and NGO teachers, whereas inconvenient storing is taken as 8th for government teachers and NGO students. When the cumulative weighted mean was observed for the two groups of respondents delay

in obtaining educational materials was taken as the 1st factor for both groups of respondents but inconvenient storing and inadequate inventory were considered as the 7th and the 8th factors respectively for the two groups of respondents. Lack of proper maintenance is a sever problem for governmental respondents and it was considered as the 2nd factor, whereas for NGO it was taken as the 3rd. Mishandling of properties by students was a big problem in most government institutions due to the huge number of students and this factor has got the 3rd rank, mean while it was ranked as 5th in NGO institution respondents. In general factors that affect the effective utilization of materials resources were ranked more or less similarly in both institutions. The Spearman rank order correlation coefficient ($\rho=0.74$) also shows that there is a strong positive correlation between the two groups of respondents with respect to ranking the factors that affect the utilization of material resources properly.

Table 19: The Major Causes for Material and Equipment Damage

No	Reasons	Government Institutions						NGO Institutions						ρ
		Teachers (n=70)		Students (n=92)		CWM	Rank	Teachers (n=46)		Students (n=54)		CWM	Rank	
		Mean	Rank	Mean	Rank			Mean	Rank	Mean	Rank			
1	Lack of proper handling by students	5.64	1	4.34	1	4.90	1	5.30	1	4.22	1	4.72	1	0.94
2	Lack of utilizing skill of teachers	2.77	5	2.46	6	2.59	6	3.11	5	3.00	6	3.05	6	
3	Lack of proper storage facility	3.87	2	3.40	4	3.60	3	3.46	3	3.76	2	3.62	2	
4	Lack of follow up by administration	2.96	4	3.51	3	3.27	4	3.39	4	3.67	3	3.54	4	
5	Student Vandalism	3.63	3	3.80	2	3.73	2	3.74	2	3.44	4	3.58	3	
6	Lack of proper handling by teachers	2.11	6	3.20	5	2.73	5	2.96	6	3.39	5	3.19	5	

Where: ρ -Spearman rank order correlation coefficient, CWM-Cumulative Weighted Mean, n-number

Again in table 19, the respondents were asked to rank the major causes that were assumed to be the reasons for materials and equipment damage in the TVET institutions. In this regard all categories of respondents both students and teachers had responded the major cause for materials and equipment damage as lack of proper handling by students. This shows

students lack proper usage and handling of properties in both institutions. Student vandalism was considered as the 2nd major cause for students of government respondents and teachers of NGO institutions, but it has got the 3rd rank for teachers of government and students of NGO respondents. Lack of follow up by administration was given the 3rd rank by students of both institutions but 4th by teachers of both institution respondents. Similarly the other ranking has a slight variation. This rank ordering was observed when a separate mean was used.

When the cumulative weighted mean was considered, in almost all cases a similar ranking appears. In this case the first reason for the materials and equipment damage in both groups of respondents was taken as lack of proper handling by students. There are also other similar rankings like lack of follow up by administrative bodies, lack of proper handling by teachers and lack of utilizing skill of teachers which were ranked 4th, 5th and 6th respectively in both groups of respondents. A very small variation was shown on two rankings. Student vandalism was considered in government institutions as the 2nd reason, whereas in NGO it has got the 3rd rank. Similarly lack of proper storage facility has got the 3rd position in government institutions but in NGO it was the 2nd major cause for materials and equipment damage. This shows that there is a similarity in both groups of institutions regarding the causes for materials and equipment damage. The Spearman's rank order correlation coefficient ($\rho=0.94$) also shows that there is a strong positive correlation between these two groups of respondents regarding the main causes for materials and equipment damage.

Table 20: Respondents Response regarding the Damage of Training Resources

No	Items	Respondents Group														t-test for equality of means; df=260	
		Gov't teachers and students n=162							NGO teachers and students n=100								
		Frequency					Mean	SD	Frequency					Mean	SD	T-obt.	Sig.2 Tail
		1	2	3	4	5			1	2	3	4	5				
1	Tables and chairs	22	47	50	29	14	2.79	1.150	36	35	16	8	5	2.11	1.136	4.672	.000
2	Machines in the workshops	11	37	71	33	10	2.96	.977	17	48	23	9	3	2.33	.965	5.118	.000
3	Hand tools in the work shop	16	33	68	24	21	3.01	1.128	18	32	25	20	5	2.62	1.114	2.677	.008
4	computers	37	41	42	24	18	2.66	1.286	25	43	16	4	12	2.35	1.242	1.923	.056
5	Photocopiers	45	36	39	17	25	2.64	1.391	41	12	9	8	30	2.74	1.733	-.535	.593
6	water pipes	55	41	32	17	17	2.38	1.329	42	27	13	6	12	2.19	1.361	1.130	.260
7	Raw materials in the workshops	6	56	58	33	9	2.90	.956	37	33	17	8	5	2.11	1.145	5.981	.000
8	Electric systems	45	53	34	26	4	2.33	1.119	29	44	14	3	10	2.21	1.192	.803	.423
9	Text books	41	62	30	20	9	2.35	1.149	35	36	13	9	7	2.17	1.207	1.179	.239
10	Reference materials	57	65	20	12	8	2.07	1.104	39	36	17	5	3	1.97	1.020	.718	.474

Ratings: 0.05-1.50 =No damage, 1.51-2.50=rarely damaged 2.51-3.50=moderately damaged,
3.51-4.50=Damaged, 4.51-5.00=highly damaged

SD-standard Deviation, N-Number, df-degree of freedom, sig- Significant at $\alpha=0.05$

The above items in table 20 were considered as a few instructional items that have high exposure for damage. The respondents were asked to respond which items have got more damage in their institutions. In this regard as seen in table 20, when the cumulative weighted mean is seen the government institution respondents have rated moderately damaged for items 1, 2, 3, 4, 5 and 7 with mean values of 2.79, 2.96, 3.01, 2.66, 2.64 and 2.90 respectively. For the rest items they were rated below the average that is rarely damaged. In the case of NGO respondents they have rated items 3 and 5 only as moderately damaged with mean values of 2.62 and 2.74 respectively, but the rest items were rated rarely damaged with mean values from 1.97-2.35.

Generally there are differences on the rate of damage and also similarities based on the given responses. In this case except items 1, 2, 3 and 7 for the rest items there is no any difference on the amount of damage that occurred between the two institutions. The t-test at $\alpha=0.05$ also shows that there is no any significant difference. But in the case of items 1, 2, 3 and 7 more damage was happened in government TVET institutions than NGO TVET institutions as their mean value and t-test implies. This implies that the NGO TVET institutions have a better utilizing quality of the existing instructional materials than the government TVET institutions by protecting them from the unnecessary damage. This may be due to the students in the NGO TVET institutions feel a sense of more responsibility than the students in government TVET institutions and they may be in a close control of teachers due to their limited number.

To sum up, in the case of government institutions relatively more damage was happened in hand tools, machineries and raw materials with mean values of 3.01, 2.96 and 2.90 respectively but the least damage was happened for electric systems and reference materials with mean values of 2.33 and 2.07 respectively. In the case of NGO institution respondents relatively the highest damage was happened in photocopiers, hand tools and computers with mean values of 2.74, 2.62 and 2.35 respectively but the least damage was happened on reference materials, raw materials tables and chairs with a mean value of 1.97, 2.11 and 2.11 respectively.

CHAPTER FOUR

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

4.1. Summary

The purpose of this study was to assess the major pertinent issues in the perspective of the management and utilization of material resources in the government and non government TVET institutions. To this end, attempts have been made to provide answers for the following basic questions.

1. What are the major problems that the government and non government TVET institutions face in connection with material resources management and utilization?
2. To what extent the guidelines for the material resources management in educational institutions are effectively utilized?
3. What are the similarities and differences between the government and non government TVET institutions in terms of :
 - a. Teaching learning materials and facilities?
 - b. Physical plant facilities and services?
 - c. The utilization of existing material resources?

The study was employed comparative analysis method and it was conducted in three government and three NGO TVET institutions in Addis Ababa. The sample government institutions were selected by purposive sampling technique, whereas the non government TVET institutions were selected by availability sampling technique. The subjects of the study were 6 academic vice deans, 6 administration and finance heads, 116 teachers, 146 students from both institutions. Accordingly the respondents sampling were carried out through availability and random sampling techniques. The academic vice deans and administration finance heads were selected by availability sampling technique while the teachers and students were selected by simple random technique.

Information from the sample respondents were obtained through questionnaires, interviews and observation of the actual setting. The data obtained was analyzed using percentages, Chi-square, t-test, weighted and cumulative mean and Spearman's rank order correlation. Additionally, the information obtained through interview and observations were presented in completing the data obtained by means of questionnaire. Based on the data analysis the following major findings were obtained.

1. As the finding indicates, the participation of females in both government and non government TVET institutions was very low. The smaller number of female teachers and student participation in TVET institutions implies that these fields of study are left for only males, which needs special attention in creating awareness towards TVET programs to increase the enrolment of females.
2. Regarding the age composition of the teachers, the NGO TVET institution teachers were younger than the government TVET institution teachers. On the contrary, students from NGO TVET institutions were older than students from government TVET institutions.
3. As the education and training policy indicates that the teachers in TVET institutions ought to possess a minimum of first degree. In this case the government TVET institution teachers have 52(74.3%) B.Sc and 2(2.9%) with second degree, while the NGO TVET institution teachers were 27(58.7%) with first degree and the rest were diploma holders. So the government TVET institution teachers were better qualified than the NGO TVET institution teachers. Similarly in the case of students educational level 52(56.5%) from the government and 25(46.3%) from the NGO TVET institution respondents were trained in 10+3 level. The rest were 10 +2 in both cases. This indicates that the government institutions were providing training in 10+3 level more than the NGO institutions.
4. Concerning the year of service of teachers 22(31.4%) from government and 21(45.7%) from NGO TVET institutions were found in the experience of 6-10 and 1-

5 years respectively. Additionally 18(25.7%) from government institutions have 26 years and above years of service, whereas there were no teachers with this years of service in NGO TVET institutions. This implies that government teachers have a better work experience than the NGO teachers.

5. With regard to the availability of the guideline, the government institution respondents were responded as 14(20%) the guideline is available but 32(45.7%) were said it is not available. On the contrary, majority 35(76.1%) NGO TVET institution respondents have responded the guideline is available but a few 5(10.9%) replied that the guideline is not available. So the guideline has got more awareness in the NGO TVET institutions than the government institutions.
6. With respect to the applicability of the guideline, 6(42.9%) said it is applied in average for government institutions whereas 18(51.4%) respondents responded as it is highly applicable in NGO institutions. This implies that the materials management guideline has got a better application in NGO TVET institutions than the government institutions.
7. The managerial activity functions were evaluated and in items 1, 3 and 7 similar responses have obtained in both institutions which mean the listed items have nearly similarities in their mean values and rated in the same category. In this case the government institution respondents mean value were 3.17, 3.37 and 3.26 respectively and the NGO respondents was 3.41, 3.54 and 3.46 respectively. But for the rest items 2, 4, 5 and 6 there was a difference. For government institutions these items were rated good except item 2, which was rated fair, while for NGOs all items were rated very good. Even if for items 8, 9 and 10 about disposition of materials the NGOs were better than the government institutions but as obtained from the interview the responses were almost similar and even the government responses were better. But as observed by the researcher and the researcher's belief is there is no any difference between these institutions and this is a forgotten activity.

8. As the finding reveals that adequate amount of material resources in government TVET institutions were not obtained. To supplement this idea 46(65.7%) of the government institution respondents have assured. On the contrary 39(84.8%) of the NGO respondents respond adequate amount of material resources were obtained during the training time. And due to this shortage of adequate amount of material resources the government institutions training program will be more affected than the NGO TVET institutions.
9. Regarding the preparation of specification; 48(68.6) of the government respondents and 37(80.4%) of the NGO TVET institution respondents have responded the specification was prepared in their institutions. In relation with this the majority of both institution respondents confirm this specification was prepared by the department head with his department members and during purchasing this body tends to check the purchased materials being bought based on the given specification.
10. Concerning the time taken for purchasing activities almost all 61(91.4%) of the government respondents replied there was no timely purchasing. Similarly in the case of NGO respondents more than average 27(58.7%) responded the same response. This implies that the government institutions seem more hampered by delay of the purchasing activity.
11. The findings revealed that there were an inventory control in both institutions with 45(64.3%) from the government and 32(69.6%) from the NGO confirming the presence of the inventory. And the time to held this inventory was on the annual basis for both institutions as the majority of the respondents responded and the academic vice deans and administration and finance heads also confirmed from their interview.
12. Regarding the availability of training resources with respect to the number of students in the government institutions majority of the listed items were rated good with mean values of 2.91-3.38 but availability of the hand tools and availability of

class rooms were rated very good with mean values of 3.87 and 3.73 respectively. On the other hand the NGO respondents have rated availability of work shops as 'Excellent' with mean values of 4.60 and the rest all were rated very good with mean values of 3.82-4.31. The finding obtained through observation shows that there are different workshops for a number of different operations in NGOs, which was absent in government institutions.

13. The information obtained from the respondents regarding the quality of the training resources were rated differently. In the case of government institutions all the listed training resources were rated good with mean values of 2.60-3.40, while the NGO respondents were rated all as very good rate with mean values of 3.68-4.27. As observed by the student researcher the NGO workshops were neat and clean and have a better shop arrangement and generally it was attractive and convenient for work. Here SOS is a good example.

14. Concerning the availability of idle or under used machines and or equipment in the TVET institutions 110(67.9%) from the government respondents and 47(47%) from the NGO respondents have responded that there are idle or under used machines. Actually the rate of amount varies and in government institutions this is a big problem; implying that the existing resources were more utilized in NGOs than government institutions. To this connection, the respondents were asked to respond why these idle or under used machines were available and nearly similar responses have responded in both cases as lack of proper maintenance personnel and shortage of spares, lack of proper utilization of machines, lack of operating skill on the side of teachers, absence of disposition specially on the side of obsolete materials etc...

15. As the finding indicates the performance of teachers, students and workshop technicians in relation with the proper utilization of the available material resources; for all the listed items the government TVET institution respondents responded the rate of good with mean values of 2.91-3.44, except item 1 that is; performance of

teachers to prevent damage, which was rated very good with mean value of 3.69. Similarly the NGO TVET institutions responded for all items except item 4, which was rated excellent with mean value of 4.51, were rated very good with mean values of 3.89-4.50. This shows that in all conditions the performance of teachers, students and workshop technicians of the NGO institutions were better than the government TVET institutions.

16. In the case of the problems encountered during the training process related with the utilization of the educational material resources and equipment were given different choices. Among these in government TVET institutions the reasons were considered as absence of proper maintenance, shortage of materials, too old educational materials, wastage of raw materials and theft taking the sequence, while in the case of NGO institution respondents the response was obtained as shortage of materials, wastage of raw materials, lack of proper maintenance, old educational materials and theft were considered.

17. As the finding reveals, the respondents were asked to rank about 8 factors that were assumed to affect the proper utilization of material resources in their institutions. In this case both groups of respondents considered delay in obtaining educational materials were ranked first with cumulative mean of 5.85 and 5.79 for government and NGO institutions respectively. There were also other similar rankings like inconvenient storing and inadequate inventory which were ranked 7th and 8th in both institutions respectively. The Spearman's rank order correlation coefficient ($\rho=0.74$) was obtained which implies that there is a positive and nearly similar correlation and ranking in both institutions regarding the factors that affect the utilization of material resources.

18. Similarly the respondents were asked to rank the major causes for materials and equipment damage by giving 6 choices in their institutions. As it was obtained from the response by considering the cumulative weighted mean lack of proper handling

by students, lack of follow up by administration, lack of proper handling by teachers and lack of utilizing skill of teachers were ranked 1st, 4th, 5th and 6th respectively in both groups of institution respondents with Spearman's rank order correlation coefficient ($\rho=0.94$) implying that there is a positive strong correlation between the rankings. This shows that the main causes for material and equipment damage were similar in both institutions.

19. Concerning the educational materials and equipment that were frequently got damaged, in government institutions relatively more damage was happened in hand tools, machineries and raw materials, but the list damage was happened on electric systems and reference materials. On the other hand in NGO TVET institutions more damage was observed on photocopiers, hand tools and computers and the least damage was happened on reference materials and tables and chairs.

4.2. Conclusions

In light of the foregone major findings of the study, the following conclusion is drawn.

The quality of TVET program is largely dependent up on the utilization of the existing resources and by having the necessary, quality and adequate material resources and facilities. The findings indicate that in most aspects as the utilization of the existing limited resources, the availability of resources with respect to the number of students, the quality of resources, on the prevention of materials from damage, the performance of teachers, students and workshop technicians the non government institutions were better than the government institutions. The major problems in the utilization of the existing resources was lack of knowledge regarding the available machineries and equipment, the inadequacy of material resources with respect to the number of students, the absence of proper maintenance, the over crowdedness of students in a workshop, the absence of follow up from the administration bodies, Absence of up-to-date machineries and equipment student vandalism, negligence from teachers, lack of qualified teachers were some of the problems in both institutions.

4.3. Recommendations

Based on the major findings and conclusion drawn from the study, the following recommendations are forwarded.

1. One of the factors that affect the proper utilization of material resources is lack of awareness by the TVET institution leaders about the appropriate materials management guideline. So in all institutions to keep the uniformity about material resources management, the regional education bureau prepare a work shop for all government and NGO TVET institutions about how to utilize and manage the existing material resources; and the TVET institutions implement the given guide line properly with skilled and adequate man power.
2. The purchasing activity in most TVET institutions was a big problem. To overcome the problems related with purchasing activities the following recommendations are forwarded.
 - ♦ TVET institutions prepare proper specifications in advance and based on the requested specifications purchase quality materials.
 - ♦ To decrease the excessive time taken during purchasing revise the rigid financial rule and add the number of purchasers in TVET institutions.
3. Ensure regular practice inventory and programmed supervision to alleviate the misuse and avoid duplication of material resources. In addition to facilitate use computer system for store and workshops materials management and to identify all instructional materials and equipment using sample tools or equipment in store and workshops, using photograph for machines and equipment and using fixed code on the equipment and machines body.
4. To make all the idle and /or under used machines to be functional, the close control and follow up of the administration body with each department is very important.

5. The backgrounds of most TVET institution officials are non-technical. This non-technical background hinders them to understand even the simple technical terms and blocks them to give the proper and appropriate leadership. So assigning TVET officials who have a technical background and to this end upgrading the educational level of these people is crucial.
6. The other big problem in most TVET institutions was the absence of proper maintenance. Maintenance is the back bone the TVET institutions because of unskilled students are performing in the workshops and they may knowingly or unknowingly damage the machines. So to solve this problem the TVET institutions must have a maintenance department in skilled man power, a preventive maintenance activity and a scheduled overhaul maintenance program in their institutions.
7. The disposition of scrap, obsolete and surplus materials are necessary. In most TVET institutions these activities are forgotten. Sell the obsolete and scrap materials because it strengthens the internal income of the institutions and additionally use scraps for further preparing a raw materials and it tends to reduce the cost of the newly bought materials.
8. Generally for effective utilization and management of material resources the following recommendations are forwarded.
 - ♦ Creating awareness continuously in the form of on job training for the management, teachers and work shop technicians.
 - ♦ Enrolling manageable class size students.
 - ♦ Proper explanation for trainees in their entry time and teach to feel and develop the sense of belongingness for material resources in the institutions.
 - ♦ To develop interest and got awareness on the side of the trainees' preparing educational visit by the TVET institutions is an important aspect.

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APPENDICES

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
Department of Educational Planning and Management
Questionnaire for teaching Staff

I would like to express my heart full appreciation to you for taking your precious time and completing the following questionnaire. This questionnaire is designed for a research thesis entitled "*A comparative study of Materials Resource Utilization in Governmental and non Governmental TVET Institutions in Addis Ababa*".

The questionnaire is to be filled by the teaching staff of both governmental and non governmental TVET institution instructors of Addis Ababa.

The purpose of this questionnaire is to gather information on the current practice of educational materials and equipment resources utilization and identifying the major challenges and for assessing the similarities and differences regarding material resources utilization in both institutions. Thus, your frank and genuine response will contribute positive findings for the study.

Directions:

- ♦ No need of writing your name.
- ♦ Put "X" mark in the box where necessary.
- ♦ If you can not get any satisfying choice among the given alternatives, you can write your answer.
- ♦ Please give short answers in the space provided where asked.

Note: Please indicate your choice by marking "X" in the blank spaces and/or writing in the space provided.

Personal Data:

1. Name of Institution _____
 a) Governmental _____ b) Non Governmental _____
2. Sex: a) Male: _____ b) Female: _____
3. Age: a) 21-30 yrs _____ b) 31-40 yrs _____
 c) 41-50 yrs _____ d) 51-60 yrs _____
4. Your Academic Qualification: a) College Diploma _____ b) B.A/B.Sc. _____
 c) M.A/M.Sc _____ d) PhD _____
 If other, please specify _____
5. Your Work Experience/ Years of Service in TVET institution:
 a) 1-5 years _____ b) 6-10 years _____ c) 11-15 years _____
 d) 16-20 years _____ e) 21-25 years _____ f) 26 and above years _____
6. Your field of Specialization: _____
7. Your Department at the moment: _____

Part One: Materials resources management in Education

1. In your institution, is there educational materials and equipments management guideline?
 a) Yes _____ b) No _____ c) I don't know _____
2. If your answer to question number 1 is "yes", then to what extent does the guide line applicable for effective materials management and utilization?
 a) V. high _____ b) High _____ c) Medium _____ d) Low _____ e) Not at all _____

3. By concerning the degree of wise performance of materials resources management in your institution in light of managerial functions exercised, please rate the extent to which the managerial functions are practiced in your TVET institution. The numbers indicate:
5=Excellent, 4= V. good, 3= Good, 2=Fair, 1= Poor

Managerial Functions	5	4	3	2	1
Planning of educational materials and equipment					
Timely Purchasing of educational materials and equipment					
Storage of educational materials and equipment					
Proper handling of educational materials and equipment					
Proper utilization of educational materials and equipment					
Maintenance of educational materials and equipment					
Inventory control of educational materials and equipment					
Disposition of scrap materials and equipment					
Disposition of obsolete materials and equipment					
Disposition of surplus materials and equipment					

4. Does your institution provide you with adequate amount of material resources needed to give the training properly?
 a) Yes _____ b) No _____ c) I don't know _____
5. If your response to question number 4 is "No", then to what extent does the training program negatively affected?
 a) Highly affected _____ b) Affected _____ c) moderately Affected _____
 d) Least affected _____ e) Not affected at all _____

Part Two: Purchasing of Educational Materials

6. Does your institution prepare specification for equipments and materials to be purchased?
 a) Yes: _____ b) No: _____ c) I don't know: _____
7. If your response for question number 6 is "yes", then who is responsible for this activity?
 a) The purchasing committee _____
 b) The department head and the instructors of the department _____
 c) The department head alone _____
 d) Specially designed committee _____
 e) The vendor _____
 f) If other, please specify _____
8. If your response for question number 6 is "yes", then who checks the purchased materials and equipments being bought based on the given specification?
 a) The purchasing committee _____
 b) The department head and the instructors of the department _____
 c) The department head alone _____
 d) Specially designed committee _____
 e) The vendor _____
 f) Others, please specify _____
9. In your opinion, do proper instructional materials and equipments purchased on time?
 a) Yes: _____ b) No: _____ c) I don't know: _____
10. If your answer for question number 9 is "No", then what may be the reason of delay? (You may tick more than one choice).
 a) Shortage of budget _____
 b) Absence of quality materials easily on the local market _____
 c) Lack of commitment on the concerned officials _____
 d) Poor purchasing system (its long bureaucracy) _____
 If other, please specify _____

11. To what extent the following purchasing issues are met in your TVET institution?
The numbers indicate: **5= Excellent** **4=V. good** **3=Good** **2=Fair** **1=Poor**

Items regarding purchasing	5	4	3	2	1
Effectiveness of purchasing system					
Quality of purchased materials					
Relevance of purchased materials for the program					
Transparency of the purchasing system of the educational materials					
Qualification of institutions purchasing committee					
Experience of the purchasing committee members					
Continuous follow up of the purchasing process on the side of principals					

Part Three: Inventory Control and storage Management

12. Is there inventory control of educational materials in your TVET institution?
a) Yes _____ b) No _____ c) I don't know _____

13. How often is the inventory control conducted in your institution?

- a) Every month _____ b) Every Semester _____ c) every year _____
d) Not at all _____
e) Please, specify if other _____

14. How do you rate the following inventory control items for proper handling of materials and equipments management? The numbers indicate: **5= Excellent**, **4=V. good**, **3=Good**, **2=Fair**, **1=Poor**

Items regarding inventory control	5	4	3	2	1
Inventory control systems that are used					
Frequency of inventory conducted					
Participation of the institution's community during inventory					
Presentation of report after inventory					
Process of updating inventory records through periodic physical counts as the basis of control					

15. Do your students get immediate supply of materials that they need from the stores?
a) Yes _____ b) No _____

16. If your response for question No. 16 is "No", then what would be the reason? (You can mark more than one alternative).

- _____ a) the process to get permission for the requested item entails long bureaucracy
_____ b) lack of commitment on the side of officials
_____ c) lack of knowledge on the side of store keepers
_____ d) the absence of materials in the store

If other, please specify _____

Part Four: Proper Utilization and Maintenance of Educational Materials

17. How do you rate the degree of availability of the following materials resources to carry out the training program in your institution with respect to the number of students? The numbers indicate:
5=highly available, **4=Available**, **3=Moderate**, **2=Less available**, **1=Not available at all**

Items regarding availability of material resources	5	4	3	2	1
Workshops					
Machineries and/or equipments					
Hand tools					
Raw materials					
Teaching aids					
Text books					
Class rooms for lecture					

18. How do you rate the quality of materials and equipments in your institution workshops? The numbers indicate: **5= Excellent, 4=V. good, 3=Good, 2=Fair, 1=Poor**

Items regarding quality of material resources					
Workshops	5	4	3	2	1
Machineries and/or equipments					
Hand tools					
Raw materials					
Teaching aids					
Text books					
Class rooms for lecture					

19. How do you rate the efficiency of teachers, students and tool persons of the institution regarding the proper utilization and handling of materials and equipments? The numbers indicate: **5= Excellent, 4=V. good, 3=Good, 2=Fair, 1=Poor**

Items regarding efficiency and skill					
Performance of teachers to prevent damage of instructional materials and equipment	5	4	3	2	1
Skill of teachers to maintain educational materials and equipments in the workshops when damaged					
Skill of teachers to operate and utilize the existing educational materials and equipments in the workshop					
Skill of tool person/technicians to help in maintaining damaged parts					
Behavior of students in utilizing the existing materials and equipments properly in the work shop: like a) machineries b) hand tools c) raw materials					

20. In your institution, are there any idle or under used machines, equipment and tools (material resources)?

a) Yes _____ b) No _____ c) I don't know _____

21. If your response for question no. 20 is "yes" then, what do you think the reason? Please, specify:

22. If your response for question no. 20 is "No" then, to what extent do you think are the available materials resources in your institution used effectively?

a) Very high _____ b) High _____ c) Moderate _____ d) Low _____ e) Very low _____

23. Which of the following factors do you think affect the utilization of materials resources properly in your institution? Please put them numerically in order of their importance (from 1 to 8) by writing no.1 to the 1st factor, no.2 to the next factor, no.3, 4, 5, 6, 7 and 8 for the least factor.

- _____ a) Misuse of educational materials (facilities, equipments, machineries etc...)
 _____ b) Mishandling of properties by students
 _____ c) Delay in obtaining educational materials (in purchasing)
 _____ d) inconvenient storing
 _____ e) lack of adequate personnel
 _____ f) lack of supervision by the concerned officials
 _____ g) inadequate inventory
 _____ h) lack of proper maintenance

24. What problems did occur during the training process in relation to educational and materials and equipment resources handling in your workshop?

- _____ a) wastage of educational resources are mostly seen regarding raw materials in the workshops,
 _____ b) sometimes educational materials are stolen from the workshops
 _____ c) there is no proper maintenance given when the need arises
 _____ d) shortage of materials in quantity
 _____ e) the educational materials are too old and can't give the desired service

If other, please specify, _____

25. Which instructional materials and equipments are frequently damaged in your workshop? Rate the seriousness of damage in the table. The numbers indicate:
5=highly damaged, 4= damaged, 3=moderately damaged, 2= rarely damaged, 1= No damage at all

Material resources

	5	4	3	2	1
Tables and chairs					
Machines in the workshops					
Hand tools in the work shop					
computers					
Photocopiers					
water pipes					
Raw materials in the workshops					
Electric systems					
Text books					
Reference materials					
If other, please specify:					

26. Please rank the following items by giving number from 1 to 6 for the following reasons that are assumed to be the major causes for material and equipment damage? (Give the first rank for the major cause, 2 for the next major ... and 6 for the least of all).

a) Lack of proper handling by students

b) Lack of utilizing skill of teachers

c) Lack of proper storage facility

d) Lack of follow up by administrative bodies

e) Student Vandalism

f) Lack of proper handling by teachers

If others, please specify, _____

27. What do you suggest about the proper utilization and management of material resources? Please Specify, _____

አዲስ አበባ ዩኒቨርሲቲ
የድህረ ምረቃ ት/ቤት
የትምህርት ዕቅድና ሥራ አመራር ትምህርት ክፍል
በተማሪዎች የሚሞላ መጠይቅ

ይህ ቃለመጠይቅ በአዲስ አበባ ከተማ መንግስታዊ በሆኑና ባልሆኑ የቴክኒክና ሙያ ተቋሞች የማሰልጠኛ መሣሪያዎችን አጠቃቀም በሚመለከት የቀረበ መጠይቅ ነው። ስለዚህ እርስዎ የሚሰጡት ምላሽ ለጥናቱ መጎልበት አዎንታዊ ገፅታ ስላለው በእርስዎ ግምት ትክክለኛውን መልስ በመስጠት ይተባበሩኝ። ይህም ቃለመጠይቅ የሚሞላው በሁለቱም ተቋም ተማሪዎች ይሆናል።

የመጠይቁ ዋና ዓላማም በሁለቱ ተቋሞች ዙሪያ ያለውን አንድነትና ልዩነት እንዲሁም በሁለቱም ተቋሞች ያሉትን ችግሮች የሚዳስስ ሲሆን እርስዎ ከሚሰጡት ምላሽና አስተያየት በመነሳት ለወደፊቱ ምን መደረግ አለበት የሚለውን የእርምጃ እርምጃም ለመጠቀም ነው።

ስለዚህ ይህንን መጠይቅ በሚሞሉበት ሰዓት ምንም ዓይነት ችግር የማያስከትል መሆኑን ተገንዝበው ትክክለኛውን መልስ ለመስጠት ይተባበሩኝ። ስለትብብርዎ በቅድሚያ አመሰግናለሁ።

መመሪያ

- ስም መጻፍ አያስፈልግም።
- በትክክለኛ ምርጫ ፊት ለፊት የ (X) ምልክት ያድርጉ
- ከምርጫዎቹ ለእርስዎ የሚስማማ ምርጫ ከሌለ የርስዎን መልስ በጎን በኩል ይፃፉ።
- ባዶ ቦታ በተሰጠበት ጥያቄ የእርስዎን አስተያየት ይስጡ።

ሀ. የግል ሁኔታ መግለጫ

1. የተቋሙ ስም _____
- ሀ. መንግስታዊ ተቋም _____ ለ. መንግስታዊ ያልሆነ _____
2. የታ፡ ሀ. ወንድ _____ ለ. ሴት _____
3. ዕድሜ ሀ. ከ15-17 _____ ለ. 18-20 _____ ሐ. ከ21-23 _____ መ. ከ23 በላይ _____
4. የት/ደረጃ ሀ. 10 + 3 _____ ለ. 10 + 2 _____
5. የሚማሩበት የሙያ መስክ _____

ለ. የማሰልጠኛ መሣሪያዎችን አጠቃቀም በሚመለከት የቀረቡ ጥያቄዎች

1. በኮሌጁ ሥልጠና በምትወስዱበት ወቅት የዕቃ አቅርቦትን በሚመለከት ፈጣን ምላሽ ከዕቃ ግምጃ ቤት ታገኛላችሁ?
ሀ. እናገኛለን _____ ለ. አናገኝም _____
2. ለተራ ቁጥር አንድ መልሳችሁ “አናገኝም” ከሆነ ምክንያቱ ምንድነው?
_____ ሀ. ዕቃውን ለማግኘት ረጅም የቢሮክራሲ ውጣ ወረድ ስለአለ
_____ ለ. ከጎሳፊዎች ቁርጠኝነት ስለሚጎድል
_____ ሐ. ከግምጃ ቤት ሠራተኞች የዕውቀት ማነስ የተነሳ
_____ መ. ከመምህራችን ቸልተኝነት የተነሳ
ሌላ ካለ ይጥቀሱ። _____

3. ከዚህ በታች የተዘረዘሩት የመማሪያ ማስተማሪያ ዕቃዎች ከተማሪው ቁጥር አንፃር ሲታይ ስልጠናውን ለመስጠት ምን ያህል በቂ ናቸው? ቁጥሮቹ

5= በጣም በቂ 4=በቂ 3= መካከለኛ 2= አነስተኛ 1=በጣም አነስተኛ

የመማሪያ ማስተማሪያ ዕቃዎች	5	4	3	2	1
• ወርክሾፖች					
• ማሽኖች					
• የዕጅ እቃዎች					
• የጥሬ ዕቃዎች					
• የማስተማሪያ ግብአቶች (teaching aids)					
• መዕሀፍቶች					
• የመማሪያ ክፍሎች					

4. ሥልጠናውን ለማካሄድ በኮሌጆችሁ ያሉት የመማሪያ ማስተማሪያ ዕቃዎች ጥራታቸው ምን ይመስላል?

5= በጣም ዘመናዊ 4=ዘመናዊ 3= መካከለኛ 2= አሮጌ 1= በጣም አሮጌ

የመማሪያ ማስተማሪያ ዕቃዎች	5	4	3	2	1
• ወርክሾፖች					
• ማሽኖች					
• የዕጅ እቃዎች					
• የጥሬ ዕቃዎች					
• የማስተማሪያ ግብአቶች					
• መዕሀፍቶች					
• የመማሪያ ክፍሎች					

5. በኮሌጆችሁ ውስጥ የመምህራንን፣ የተማሪዎችንና የወርክሾፕ ቴክኒሺያኖችን በመማሪያ ማስተማሪያ ዕቃዎች አጠቃቀምና አያያዝ ላይ ስላላቸው ችሎታ ያለዎትን አስተያየት ይግለፁ፡፡

5= በጣም ከፍተኛ 4= ከፍተኛ 3= መካከለኛ 2= ዝቅተኛ 1= በጣም ዝቅተኛ

ብቃትና ችሎታን የሚመዘኑ ነጥቦች	5	4	3	2	1
• የመምህራን የመማሪያ ዕቃዎችን ከጉዳት የመከላከል ብቃት					
• በሾፕ ውስጥ የማስተማሪያ ዕቃዎችን የመምህራን የመጠገን ችሎታ					
• የመምህራን በሾፕ ውስጥ ያሉ የማስተማሪያ ዕቃዎችን የመጠቀም ብቃትና ችሎታ					
• የወርክሾፕ ቴክኒሻኖች የመማሪያ ዕቃዎችን ከጉዳት የመከላከል ብቃት					
• የተማሪዎች ፀባይ የመማር ማስተማር ዕቃዎች በአግባቡ ካለ ብክነትና ሳያበላሹ በመጠቀም ዙሪያ					
ለምሳሌ፡- ማሽኖችን					
- የእጅ መሣሪያዎችን					
- የጥሬ ዕቃዎችን					

6. በእናንተ የማሰልጠኛ ማዕከል (ኮሌጅ) ውስጥ ያለጥቅም የተቀመጡ ወይም መስጠት ከሚገባቸው ጥቅም በታች አገልግሎት የሚሰጡ የማሰልጠኛ መሣሪያዎች አሉ?
 ሀ. አዎ _____ ለ. የሉም _____ ሐ. አላውቅም _____
7. ለተራ ቁ. 6 መልስዎ 'አዎ' ከሆነ ምክንያቱ ምንድነው?
 አባክዎን ይግለፁ:: _____

8. ለተራ ቁጥር 6 መልስዎ "የለም" ከሆነ የማሰልጠኛ መሣሪያዎችን ምን ያህል ትጠቀሙባቸዋለችሁ?
 ሀ. በጣም ከፍተኛ ለ. ከፍተኛ ሐ. መካከለኛ መ. ዝቅተኛ ሠ. በጣም ዝቅተኛ

9. በኮሌጆችሁ የአሉትን የመማሪያ ማስተማሪያ ዕቃዎች በአግባቡ እንዳትጠቀሙ የሚያደርጉትን ከዚህ በታች የተቀመጡትን ምክንያቶች በቅደም ተከተል አስቀምጡ:: 1 ቁጥር በጣም ከፍተኛ ሲሆን ሁለት ቀጥሎ ይሆናል:: የመጨረሻው ቁጥር ደግሞ በጣም በዝቅተኛ ደረጃ ያለ ይሆናል ማለት ነው::

- _____ ሀ. የመማሪያ ዕቃዎችን ያለአግባብ መጠቀም (Mis use of materials)
 _____ ለ. የመማሪያ ዕቃዎችን ያለአግባብ በተማሪዎች መያዝ (መገልገል) (Mis handling materials)
 _____ ሐ. የመማሪያ ዕቃዎችን በወቅቱ አለመገኘት (አለመድረስ) የግዢ ችግር
 _____ መ. ያልተመቸ ወይም በደንብ ያልተያዘ store
 _____ ሠ. በንብረት አስተዳደር የሰው ኃይል እጥረት
 _____ ረ. በሚመለከታቸው አካሎች የሱፐርቪዘርን (ቁጥጥር) ማነስ
 _____ ሰ. በቂ ያልሆነ ቆጠራ
 _____ ሸ. የጥገና አለመኖር

10. በኮሌጆችሁ በሰልጠና በአላችሁበት ወቅት የመማሪያ ማስተማሪያ ዕቃዎችን ስትጠቀሙ (ከመጠቀም አንፃር) የታዩ ችግሮች ምንድን ናቸው?

- _____ ሀ. የጥሬ ዕቃዎች ብክነት መኖር
 _____ ለ. የመማሪያ ማስተማሪያ ዕቃዎች መሰረቅ
 _____ ሐ. የተበላሹ መሣሪያዎችን አለመጠገን
 _____ መ. የመማሪያ ማስተማሪያ መሣሪያዎች በሚፈለገው መጠን ያለመኖር
 _____ ሠ. የመማሪያ ማስተማሪያ መሣሪያዎች በእርጅና ምክንያት ተገቢውን አገልግሎት ያለመስጠት
 ሌላ ካለ ይጥቀሱ_____

11. ከዚህ በታች ከተዘረዘሩት የመማሪያ ማስተማሪያ መሣሪያዎች ውስጥ በኮሌጆችሁ በአብዛኛው የሚበላሹት የትኞቹ ናቸው? ቁጥሮቹ

5= እጅግ በጣም ይበላሻሉ

4= በጣም ይበላሻሉ

3= ይበላሻሉ

2= አልፎ አልፎ ይበላሻሉ

1= ምንም ዓይነትም

የመማሪያ ማስተማሪያዎች ዓይነት	5	4	3	2	1
• ጠረጴዛና ወንበር					
• ማሽነሪዎች					
• የዕጅ ዕቃዎች					
• ኮምፒውተሮች					
• ፎቶ ኮፒ ማሽኖች					
• የውሃ መስመሮች					
• በሾፕ ውስጥ ያሉ ጥሬ ዕቃዎች					
• የኤሌክትሪክ መስመሮች					
• መፅሀፍቶች					
• የማጣቀሻ ዕህፎች					
ሌላ ካለ ይጥቀሱ					

12. የማሰልጠኛ መሣሪያዎችን ብልሽት ምክንያት በማድረግ ከዚህ በታች የተዘረዘሩትን ለብልሽቱ ምክንያት ይሆናሉ የምትችሉትን በቅደም ተከተል አስቀምጡ። 1 ቁጥር በጣም ከፍተኛ ሲሆን ሁለት ቀጥሎ ይሆናል። የመጨረሻው ቁጥር ደግሞ በጣም በዝቅተኛ ደረጃ ያለ ይሆናል ማለት ነው።

----- ሀ. ከተማሪዎች የአያያዝ ችግር የሚመጣ ብልሽት

----- ለ. ከመምህራን የአጠቃቀም ችግር የሚመጣ ብልሽት

----- ሐ. ከአቀማመጥ ችግር የሚመጣ ብልሽት

----- መ. ከአስተዳደር የክትትል ማነስ የተነሳ የሚመጣ ችግር

----- ሠ. የአጥፊ ተማሪዎች መብዛት (ከዚህ የሚመጣ ችግር)

----- ረ. ከመምህራን አያያዝና ቁጥጥር ማነስ የሚመጣ ችግር

ሌላ ካለ ይጥቀሱ-----

13. በኮሌጃችሁ በስልጠና ወቅት በመማሪያ ማስተማሪያ መሣሪያዎች አጠቃቀምና አያያዝ ዘመናዊ ያሉትን ችግሮችና የመፍጥት ሂደት ሂሳብ የሚሉትን ቢጠቅሱልኝ።

ችግሮች፡- -----

የመፍትሔ ሃሳብ፡- -----

Structured Interview Question Guidelines

1. Is there a guide line about material resources management in your TVET institution? If yes then, how it is implemented?
2. Who participate in the planning of the educational materials and equipment resources for your TVET institution?
3. What are the sources of educational materials and equipment budget for your TVET institution?
4. Is there an allocated budget for material resources in your institution from the government?
5. If your response for Q.no.4 is "yes" then, what proportion does your TVET institution spend for the procurement of material resources and how much is spent specifically for each item?
6. What are the procedures and systems followed in purchasing equipments and /or materials in your institution?
7. How are purchasing requests endorsed and approved?
8. Do you conduct inventory control in your institution?
9. If your response for question no.8 is "yes" how often does your institution under take inventory control?
10. How do you conduct maintenance activity?
11. Is there a written guideline or policy with regard to the disposal of obsolete, surplus and scrap instructional materials and equipments? If yes then, how it is implemented?
12. What measures does your institution take regarding surplus, obsolete and scrap materials and equipments?
13. What are the problems and factors that hinder the effective utilization of material resources?
14. What are the major reasons for materials damage in TVET workshops?
15. What do you suggest and recommend for the effective utilization and management of educational materials and equipments in TVET institutions?

Rank Order Calculations

Table 18:

Items	Gov't ranked	NGO ranked	d_i	d_i^2
1.	5	6	-1	1
2.	3	5	-2	4
3.	1	1	0	0
4.	7	7	0	0
5.	6	4	2	4
6.	4	2	2	4
7.	8	8	0	0
8.	2	5	-3	9
			$\Sigma d_i^2 = 22$	

$$\rho = \frac{1 - 6(\Sigma d_i^2)}{N(N^2 - 1)}$$

Where: ρ = Spearman rank order correlation coefficient

d_i = difference of the ranks

N = Number of items

Σ = Summation of the rank difference squares

$$\therefore \rho = \frac{1 - 6(\Sigma d_i^2)}{N(N^2 - 1)} = \frac{1 - 6(22)}{8(64 - 1)} = \frac{1 - 132}{504} = 1 - 0.26 = \underline{\underline{0.74}}$$

Table 19:

Items	Gov't ranked	NGO ranked	d_i	d_i^2
1.	1	1	0	0
2.	6	6	0	0
3.	3	2	1	1
4.	4	4	0	0
5.	2	3	-1	1
6.	5	5	0	0
			$\Sigma d_i^2 = 2$	

$$\therefore \rho = \frac{1 - 6(\Sigma d_i^2)}{N(N^2 - 1)} = \frac{1 - 6(2)}{6(35)} = \frac{1 - 12}{210} = 1 - 0.06 = \underline{\underline{0.94}}$$

Chi-Square calculations

Table 4:1

	Yes	No	I don't	Total
Gov't:	14(29.6)	32(22.3)	24(18.1)	70
NGO:	35(19.4)	5(14.7)	6(11.9)	46
Total:	49	37	30	116

$$df=2, \chi^2_{critical}=5.99$$

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e}$$

Where: f_o = observed frequency, numbers without bracket
 f_e = expected frequency, numbers in bracket
 χ^2 = Chi-square

Expected (f) = $\frac{63 \times 70}{116} = \frac{4410}{116} = 38$; Use the same calculation to obtain the rest expected figures.

$$\therefore \chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(14-29.6)^2}{29.6} + \frac{(35-19.4)^2}{19.4} + \frac{(32-22.3)^2}{22.3} + \frac{(5-14.7)^2}{14.7} + \frac{(24-18.1)^2}{18.1} + \frac{(6-11.9)^2}{11.9}$$

$$= 8.22 + 12.54 + 4.22 + 6.40 + 1.92 + 2.93 = \underline{\underline{36.23}}$$

Table 4:2

	A	B	C	D	Total
Gov't:	0(1.4)	5(6.6)	6(4.3)	3(1.7)	14
NGO:	5(3.6)	18(16.4)	9(10.7)	3(4.3)	35
Total:	5	23	15	6	49

$$df=3, \chi^2_{critical}=7.82$$

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(0-1.4)^2}{1.4} + \frac{(5-6.6)^2}{6.6} + \frac{(6-4.3)^2}{4.3} + \frac{(3-1.7)^2}{1.7} + \frac{(5-3.6)^2}{3.6} + \frac{(18-16.4)^2}{16.4} + \frac{(9-10.7)^2}{10.7} + \frac{(3-4.3)^2}{4.3}$$

$$= 1.4 + 0.54 + 0.39 + 0.16 + 0.67 + 0.27 + 0.99 + 0.39 = \underline{\underline{4.81}}$$

Table 6:1

	Yes	No	I don't	Total
Gov't:	24(38)	46(32)	0	70
NGO:	39(25)	7(21)	0	46
Total:	63	53	0	116

$$df=1, \chi^2_{critical}=3.84$$

$$\therefore \chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(24-38)^2}{38} + \frac{(39-25)^2}{25} + \frac{(46-32)^2}{32} + \frac{(7-21)^2}{21}$$

$$\chi^2 = 5.16 + 7.84 + 6.13 + 9.33 = \underline{\underline{28.46}}$$

Table 6:2

	A	B	C	D	Total
Gov't:	20(19.1)	18(15.6)	6(7.8)	2(3.5)	46
NGO:	2(2.9)	0(2.4)	3(1.2)	2(0.5)	7
Total:	22	18	9	4	53

$$df=3, \chi^2_{critical}=7.82$$

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(20-19.1)^2}{19.1} + \frac{(2-2.9)^2}{2.9} + \frac{(18-15.6)^2}{15.6} + \frac{(0-2.4)^2}{2.4} + \frac{(6-7.8)^2}{7.8} + \frac{(3-1.2)^2}{1.2} + \frac{(2-3.5)^2}{3.5} + \frac{(2-0.5)^2}{0.5}$$

$$\chi^2 = 0.04 + 0.28 + 0.37 + 2.4 + 0.42 + 2.7 + 0.64 + 4.5 = \underline{\underline{11.35}}$$

Table: 7.1

	Yes	No	I don't	Total
Gov't:	48(51.3)	20(15)	2(3.6)	70
NGO:	37(33.7)	5(10)	4(2.4)	46
Total:	85	25	6	116

$$df=1, \chi^2_{critical}=3.84$$

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(48-51.3)^2}{51.3} + \frac{(37-33.7)^2}{33.7} + \frac{(20-15)^2}{15} + \frac{(5-10)^2}{10} + \frac{(2-3.6)^2}{3.6} + \frac{(4-2.4)^2}{2.4}$$

$$= 0.21 + 0.32 + 1.67 + 2.5 + 0.71 + 1.07 = \underline{\underline{6.48}}$$

Table: 7.2

	A	B	C	D	Total
Gov't:	10(9.6)	34(33.3)	2(2.8)	2(2.3)	48
NGO:	7(7.4)	25(25.7)	3(2.2)	2(1.7)	37
Total:	17	59	5	4	85

$$df=3, \chi^2_{\text{critical}}=7.82$$

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(10-9.6)^2}{9.6} + \frac{(34-33.3)^2}{33.3} + \frac{(2-2.8)^2}{2.8} + \frac{(2-2.3)^2}{2.3} + \frac{(7-7.4)^2}{7.4} + \frac{(25-25.7)^2}{25.7} + \frac{(3-2.2)^2}{2.2} + \frac{(2-1.7)^2}{1.7}$$

$$\chi^2 = 0.02 + 0.02 + 0.02 + 0.02 + 0.23 + 0.29 + 0.04 + 0.05 = \underline{0.69}$$

Table: 7.3

	A	B	C	D	Total
Gov't:	16(12.4)	20(23.7)	4(4.5)	8(7.3)	48
NGO:	6(9.6)	22(18.3)	4(3.5)	5(5.7)	37
Total:	22	42	8	13	85

$$df=3, \chi^2_{\text{critical}}=7.82$$

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(16-12.4)^2}{12.4} + \frac{(20-23.7)^2}{23.7} + \frac{(4-4.5)^2}{4.5} + \frac{(8-7.3)^2}{7.3} + \frac{(6-9.6)^2}{9.6} + \frac{(22-18.3)^2}{18.3} + \frac{(4-3.5)^2}{3.5} + \frac{(5-5.7)^2}{5.7}$$

$$= 1.05 + 1.35 + 0.58 + 0.75 + 0.06 + 0.07 + 0.07 + 0.09 = \underline{4.02}$$

Table: 8.1

	Yes	No	I don't	Total
Gov't:	4(13.9)	64(54.9)	2(1.2)	70
NGO:	19(9.1)	27(36.1)	0(0.8)	46
Total:	23	91	2	116

$$df=2, \chi^2_{\text{critical}}=5.99$$

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(4-13.9)^2}{13.9} + \frac{(19-9.1)^2}{9.1} + \frac{(64-54.9)^2}{54.9} + \frac{(2-1.2)^2}{1.2} + \frac{(0-0.8)^2}{0.8}$$

$$= 7.05 + 10.77 + 1.51 + 2.29 + 0.53 + 0.8 = \underline{22.95}$$

Table: 8.2

	A	B	C	D	Total
Gov't:	4(6.3)	11(9.8)	15(17.6)	34(30.2)	64
NGO:	5(2.7)	3(4.2)	10(7.4)	9(12.8)	27
Total:	9	14	25	43	91

$$df=3, \chi^2_{\text{critical}}=7.82$$

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(4-6.3)^2}{6.3} + \frac{(5-2.7)^2}{2.7} + \frac{(11-9.8)^2}{9.8} + \frac{(3-4.2)^2}{4.2} + \frac{(15-17.6)^2}{17.6} + \frac{(10-7.4)^2}{7.4} + \frac{(34-30.2)^2}{30.2} + \frac{(9-12.8)^2}{12.8}$$

$$= 0.84 + 1.96 + 0.15 + 0.34 + 0.38 + 0.91 + 0.48 + 1.13 = \underline{6.19}$$

Table: 10.1

	Yes	No	I don't	Total
Gov't:	45(46.5)	5(4.2)	20(19.3)	70
NGO:	32(30.5)	2(2.8)	12(12.7)	46
Total:	77	7	32	116

$$df=2, \chi^2_{\text{critical}}=5.99$$

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(45-46.5)^2}{46.5} + \frac{(32-30.5)^2}{30.5} + \frac{(5-4.2)^2}{4.2} + \frac{(2-2.8)^2}{2.8} + \frac{(20-19.3)^2}{19.3} + \frac{(12-12.7)^2}{12.7}$$

$$= 0.05 + 0.07 + 0.15 + 0.23 + 0.03 + 0.04 = \underline{0.57}$$

Table: 8.2

	A	B	C	D	Total
Gov't:	37(36.2)	3(4.1)	0	5(4.7)	45
NGO:	25(25.8)	4(2.9)	0	3(3.3)	32
Total:	62	7	0	8	77

$$df=2, \chi^2_{\text{critical}}=5.99$$

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(37-36.2)^2}{36.2} + \frac{(25-25.8)^2}{25.8} + \frac{(3-4.1)^2}{4.1} + \frac{(5-4.7)^2}{4.7} + \frac{(0-0)^2}{0} + \frac{(0-0)^2}{0}$$

$$= 0.02 + 0.02 + 0.3 + 0.42 + 0.02 + 0.03 = \underline{0.81}$$

Table: 12.1

	Yes	No	Total
Gov't:	41(49.5)	29(20.5)	70
NGO:	41(32.5)	5(13.5)	46
Total:	82	34	116

$$df = 1, \chi^2_{critical} = 3.84$$

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(41-49.5)^2}{49.5} + \frac{(29-20.5)^2}{20.5} + \frac{(41-32.5)^2}{32.5} + \frac{(5-13.5)^2}{13.5}$$

$$= 14.6 + 2.22 + 3.52 + 5.35 = \underline{12.55}$$

Table: 12.2

	A	B	C	D	Total
Gov't:	7(6)	6(6.8)	7(6)	9(10.2)	29
NGO:	0(1)	2(1.2)	0(1)	3(1.8)	5
Total:	7	8	7	12	34

$$df = 3, \chi^2_{critical} = 7.82$$

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(7-6)^2}{6} + \frac{(0-1)^2}{1} + \frac{(6-6.8)^2}{6.8} + \frac{(7-6)^2}{6} + \frac{(9-10.2)^2}{10.2}$$

$$= 0.17 + 1 + 0.09 + 0.53 + 0.17 + 1 + 0.01 + 0.8 = \underline{3.77}$$

Table: 15.1

	Yes	No	I don't	Total
Gov't:	110(97)	22(42.7)	30(22.3)	162
NGO:	47(60)	47(26.3)	6(13.7)	100
Total:	157	69	36	262

$$df = 2, \chi^2_{critical} = 5.99,$$

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(110-97)^2}{97} + \frac{(22-42.7)^2}{42.7} + \frac{(30-22.3)^2}{22.3} + \frac{(47-60)^2}{60} + \frac{(47-26.3)^2}{26.3} + \frac{(6-13.7)^2}{13.7}$$

$$= 1.74 + 2.82 + 10.03 + 16.29 + 2.66 + 4.33 = \underline{37.87}$$

Table: 15.2

	A	B	C	D	E	Total
Gov't:	4(6.7)	2(8.6)	12(5.4)	2(0.6)	2(0.6)	22
NGO:	17(14.3)	25(18.4)	5(11.6)	0(1.4)	0(1.4)	47
Total:	21	27	17	12	2	69

$$df = 4, \chi^2_{critical} = 9.49,$$

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(4-6.7)^2}{6.7} + \frac{(2-8.6)^2}{8.6} + \frac{(12-5.4)^2}{5.4} + \frac{(2-0.6)^2}{0.6} + \frac{(2-0.6)^2}{0.6} + \frac{(17-14.3)^2}{14.3} + \frac{(25-18.4)^2}{18.4} + \frac{(5-11.6)^2}{11.6} + \frac{(0-1.4)^2}{1.4} + \frac{(0-1.4)^2}{1.4}$$

$$= 1.09 + 0.51 + 5.07 + 2.37 + 8.07 + 3.76 + 3.27 + 1.40 + 3.27 + 1.40 = \underline{30.21}$$

Table: 17

	A	B	C	D	E	Total
Gov't:	21(29)	21(24.1)	48(40.8)	39(42)	33(26)	162
NGO:	26(18)	18(14.9)	18(25.2)	29(26)	9(16)	100
Total:	47	39	66	68	42	262

$$df = 4, \chi^2_{critical} = 9.49$$

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(21-29)^2}{29} + \frac{(26-18)^2}{18} + \frac{(21-24.1)^2}{24.1} + \frac{(18-14.9)^2}{14.9} + \frac{(48-40.8)^2}{40.8} + \frac{(18-25.2)^2}{25.2} + \frac{(39-42)^2}{42} + \frac{(29-26)^2}{26} + \frac{(33-26)^2}{26} + \frac{(9-16)^2}{16}$$

$$= 2.21 + 3.56 + 0.40 + 0.64 + 1.27 + 2.06 + 0.21 + 0.35 + 1.88 + 30.6 = \underline{15.64}$$

NB: For all cases: $\alpha = 0.05$

Group Statistics

	Respondent's Category	N	Mean	Std. Deviation	Std. Error Mean
Quality of Workshops	Government	162	3.06	.980	.077
	Non-government	100	4.27	.783	.076
Quality of Machines and/or equipment	Government	162	3.12	.993	.078
	Non-government	100	4.11	.898	.090
Quality of Hand tools	Government	162	3.40	.902	.071
	Non-government	100	4.03	.904	.090
Quality of Raw materials	Government	162	3.10	.954	.075
	Non-government	100	4.01	.893	.089
Quality of Teaching aids	Government	162	3.11	.926	.073
	Non-government	100	3.87	1.012	.101
Quality of Text books	Government	162	2.80	1.258	.099
	Non-government	100	3.68	1.127	.113
Quality of class rooms	Government	162	3.20	1.130	.089
	Non-government	100	3.89	1.183	.116

Sample T-Test

Independent Samples Test

		Levene's Test for Equality of Variances	
		F	Sig.
Quality of Workshops	Equal variances assumed Equal variances not assumed	802	.371
Quality of Machines and/or equipment	Equal variances assumed Equal variances not assumed	600	.437
Quality of Hand tools	Equal variances assumed Equal variances not assumed	053	.818
Quality of Raw materials	Equal variances assumed Equal variances not assumed	2.561	.111
Quality of Teaching aids	Equal variances assumed Equal variances not assumed	3.545	.061
Quality of Text books	Equal variances assumed Equal variances not assumed	5.053	.025
Quality of class rooms	Equal variances assumed Equal variances not assumed	154	.695

Sample T-Test
Independent Samples Test

		t-test for Equality of Means			
		t	df	Sig. (2-tailed)	Mean Difference
Quality of Workshops	Equal variances assumed	-10.570	260	.000	-1.214
	Equal variances not assumed	-11.202	248.142	.000	-1.214
Quality of Machines and/or equipment	Equal variances assumed	-8.149	260	.000	-.993
	Equal variances not assumed	-8.346	225.813	.000	-.993
Quality of Hand tools	Equal variances assumed	-5.478	260	.000	-.629
	Equal variances not assumed	-5.474	209.385	.000	-.629
Quality of Raw materials	Equal variances assumed	-7.696	260	.000	-.911
	Equal variances not assumed	-7.816	220.270	.000	-.911
Quality of Teaching aids	Equal variances assumed	-8.220	260	.000	-.759
	Equal variances not assumed	-8.091	195.674	.000	-.759
Quality of Text books	Equal variances assumed	-7.026	260	.000	-1.081
	Equal variances not assumed	-7.212	227.233	.000	-1.081
Quality of class rooms	Equal variances assumed	-4.785	260	.000	-.692
	Equal variances not assumed	-4.734	205.269	.000	-.692

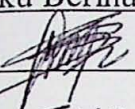
Sample T-Test
Independent Samples Test

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
Quality of Workshops	Equal variances assumed	.115	-1.441	-.088
	Equal variances not assumed	.108	-1.428	-1.001
Quality of Machines and/or equipment	Equal variances assumed	.122	-1.233	-.753
	Equal variances not assumed	.119	-1.227	-.758
Quality of Hand tools	Equal variances assumed	.115	-.655	-.403
	Equal variances not assumed	.115	-.655	-.402
Quality of Raw materials	Equal variances assumed	.118	-1.144	-.678
	Equal variances not assumed	.117	-1.141	-.681
Quality of Teaching aids	Equal variances assumed	.122	-.999	-.519
	Equal variances not assumed	.125	-1.005	-.513
Quality of Text books	Equal variances assumed	.154	-1.384	-.778
	Equal variances not assumed	.150	-1.377	-.786
Quality of class rooms	Equal variances assumed	.145	-.979	-.406
	Equal variances not assumed	.146	-.981	-.404

Declaration

I, the undersigned, declare that this thesis is my original work and not presented for a degree in any other university and all sources of materials used for this thesis has been duly acknowledged.

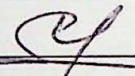
Name: Worku Berihun

Signature: 

Date: July 20, 2007

This Thesis has been submitted for examination with my approval as a university advisor.

Name: Yalew Ingidayehu (Ph.D)

Signature: 

Date: 23/07/2007