

**ANALYSING TECHNICAL EQUIPMENT USE IN THE AUTOMOTIVE
MECHANICS DEPARTMENT AT BBIRA VOCATIONAL TRAINING
INSTITUTE**

BY

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JUNE, 2023.

DECLARATION

I, Nankanja Juliet, do declare that this research dissertation is my original work and that it has not been published and submitted to any institution for any award.

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APPROVAL

This is to certify that this research dissertation titled “Analyzing Technical Equipment use in the automotive Department at Bbira Vocational Training Institute”, was done by NANKANJA JULIET under our supervision. It has been submitted to Directorate of Research and Graduate Training for examination with our approval as the student’s supervisors.

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DEDICATION

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ACRONYMS / ABBREVIATIONS

ATP	Assessment Training Package
BTVET	Business Technical Vocational Education and Training
BVTI	Bbira Vocational Training Institute
CBET	Competence Based Education and Training
DIT	Directorate of Industrial Training
GTTI	Gambia Technical Training Institute
IT	Industrial Training
MOES	Ministry of Education and Sports
MVP	Masters in Vocational Pedagogy
NCAM	National Certificate in Automotive Mechanics
NCDC	National Curriculum Development Centre
OVC	Orphans and Vulnerable Children
PAR	Participatory Action Research
TVET	Technical and Vocational Education and Training
UBTEB	Uganda Business Technical Examinations Board
UNEB	Uganda National Examinations Board
UVQF	Uganda Vocational Qualifications Framework
VET	Vocational Education and Training
VP	Vocational Pedagogy
WBL	Work Based Learning

ABSTRACT

This study analyzed technical equipment and tools used in training automotive mechanics at the Automotive Department at Bbira Vocational Training Institute (BVTI), to the expectations of the world of work. The research was guided by three objectives that aimed at; identifying the tools and equipment in the Automotive Mechanics Department in Bbira Vocational Training Institute; determining the relevance of the tools and equipment; implementing the effective use of the available equipment for effective skills training in the automotive mechanics department. The research was conducted at the Institute and a participatory action research (PAR) design was employed. Methods employed for data collection included: focus group discussions, interviews, observation of processes of operation and procedures followed in the training; and tools like interview guides, questionnaires, camera for evidence collection and a note book were used to record data. Data collected were presented and analyzed according to the objectives of the study to understand the use of technical tools and equipment in vocational training for the world of work. The training approach observed in the automotive department showed that instructors based more on introducing trainees to actual problem solving techniques using the available tools and equipment so that they acquire the necessary competences while ensuring that the syllabus is covered with relevant real life projects that transform the community. The study thus concluded and recommended that further refresher training for instructors and graduates be done to include modern tools and equipment used in the world of work, with the aim of improving the quality of training at the institute.

CHAPTER ONE: INTRODUCTION

1.0 Overview

This study was conducted at Bbira Vocational Training Institute (BVTI), established by Church of Uganda in 1992, with the mission of empowering all categories of people through provision of quality vocational studies and life skills. With this mission, the youths acquire relevant skills and competences that are required in the world of work. This chapter therefore lays a foundation for understanding vocational education and training and vocational pedagogy; and presents the background to the study, which explains how vocational education aims at improving the use of tools and equipment in the Automotive Department at BVTI. The statement of motivation, and situation analysis are explicated, leading to the statement of the problem, purpose of the study, objectives of the study, research questions, significance, scope and definition of key terms used.

1.1 Vocational Education and Training

Technical and Vocational Education (TVE) involves the study of general technologies and sciences in acquiring practical skills, attitudes and knowledge in various occupations and sectors relating to the economic and social life, in addition to general education FGN, (2004). Vocational Education and Training (VET) is designed to prepare learners for specialized occupations and vocations which directly link with a nation's productivity and competitiveness Atkinson, (2013). TVET focuses on delivery of skills and knowledge required for specific trade interest and prepares one for work. Technical Education is a practical approach where learners acquire necessary skills that are needed for a given occupation and jobs through the application of science and technology.

Education generally prepares learners to work in several job specialties such as trade, craftsmen or technicians; and can take place after secondary school level, further education courses, and at higher education level or informal sector through interacting with the apprenticeship system in industrial training and real life projects. Technical education focuses on technology and developments made in computer and digital information to match the evolving technologies of machines and equipment used in vocational education, a case of some African countries, through Ministry of science technology and vocational training Okello (2009). For instance, the government of the Republic of Zambia, developed technical education for vocational and skills training policy to equip and improve technical education and vocational training targeting the requirements of the employment sector, De Regt, (2010).

In Uganda, the education sector policy through various policy initiatives such as the Education Bill 2008, science and education policy, The Republic of Uganda, (2012) BTVET Act 2008, Universities and Tertiary Institutions Act (2001), NCDC Act (2000) and UNEB Act (1983), are mandated to carry out curriculum reforms, testing and evaluation to improve syllabi for school and college courses as well as design and develop teaching aids and instructional materials. The changing policy and regulatory instruments aim at enhancing access, participation, innovation and quality in education delivery using appropriate tools and equipment among others. KWAK & Youngsun (2018) suggest implications for curriculum development and ways of improving science teaching and learning so that students achieve better competency and understand real-world applications of science knowledge. Business Technical Vocational Education and Training, promotes and coordinates business, technical vocational education and training in institutions of higher learning BTVET (2008). The Act provides guiding principles and establishes the institutional framework for the promotion and coordination of BTVET. It also established the

Uganda Vocational Qualifications Framework in addition to providing for the financing of BTVET and other related matters, to ensure provision of tools and equipment required in the acquisition of knowledge and practical skills in Vocational Institutions.

The government of Uganda launched both “skilling Uganda”, The Republic of Uganda, (2012) and the BTVET strategic plan 2011-2020, with the aim of increasing both quality of skills provided and equitable access to skills development in 2014. The focus was on promoting individual income through easy employment for self-sustenance, leading to the establishment of several technical institutions in different parts of the country to train as many candidates as possible in various skills including automotive mechanics among others. This created the need to have appropriate resources and infrastructure to enable the effective teaching and learning in these vocational trades, Seelig & Nichols (2017). Availability of reliable tools and equipment in the department of automotive mechanics, therefore, ensures that these goals are met and by employing vocational pedagogy, the graduates acquire knowledge and skills that are needed by employers in the world of work.

1.1.1 Vocational Pedagogy

Vocational pedagogy is education that ensures the use of effective vocational didactics in the teaching and learning processes to ensure that skills that are taught are applicable in the world of work, Lucas (2014). Training institutions offer vocational education, which is connected with skills and knowledge needed in order to do a particular job and therefore contribute to the TVET skills development and education, Mwangi (2015). For experiential learning and acquisition of hands-on skills in the automotive department, qualified instructors with practical expertise in automotive maintenance and repair guide the trainees on the effective use of the tools and equipment that are available in the department. Effective teaching and learning requires practical

work blended with theory and general education to be appropriately given to learners, Wisler (2009). The researcher believes that this enables the learners to practice the necessary skills that are applicable in the world of work thus improving their knowledge and competences in the basic practices and technologies employed in repair and maintenance. This is because practicing the actual hands-on skill makes the learners significantly improve in their competences and ability to perform a given task.

1.1.2 Background to the study

The international practices and changes in vocational education have continuously been studied in the global society to improve the qualifications of workers, Olga Timofeevna Loyko (2014). This has increased research on the education practices to focus on modernization of training of graduates from vocational schools which significantly impacts their performance in the labor market. Since the 1990s, several African nations have adopted TVET reforms which has led to the formulation of TVET policies to address the issues at hand in the nations, Konayuma (2018).

Atchoarena et al., (2002) observe that the public TVET institutions usually attract a lot of criticism since they sometimes compromise training learners with competencies and skills that should effectively meet the basic requirements of an occupation in the industry and are sometimes not aware of the need for refresher training or upgrading to higher education levels. This is usually evident with fresh university graduates who may fail to occupy job placements due to lack of hands-on experience that is a pre-requisite for employers in factories and industries. It is therefore worthy to note that despite the belief that learners from technical institutions acquire competencies that are required in the world of work, some of their graduates are part of the unemployed in most developing countries. Technical and Vocational colleges train craftsmen, technicians and other skilled work force for industry and offer non formal education training which caters for the less

advantaged youth who have very low participation in the formal education and may fail to attain a given level of education. The researcher observed that the automotive department trains learners at various certificates that include; non formal and Uganda Vocational Qualification Framework (UVQF) certificate for auto mechanic, motor cycle mechanic and welder awarded by DIT. These learners cover up to 85% practical content and 15% theory of the course content. This means that they are able to trigger their creativity and innovation in the application of their knowledge as noted by Leask et al., (2020) that today's experts have to continuously improve their knowledge base.

Uganda's gross tertiary enrolment ration is less than 4% compared to sub-Saharan average of 4.9%, 71.1 percent for the high income countries and 17.8 percent the 1995 world average Musisi, Nakanyike & Nansozi (2003). In order to set up a demand-driven system, the Uganda government decided to reshape the current TVET system by decentralizing it to allow for flexibility in coordinating TVET activities at local levels such as implementation of the skilling Uganda initiative. The Directorate of Industrial Training (DIT) was established to develop Assessment Training Programs (ATP) by setting standards for quality and consistence in the assessment of the skills competencies. Since Vocational Education and Training (VET) institutions provide experience based learning using vocational equipment such as petrol and diesel engine blocks, hydraulic press, drilling machine and tool boxes in the automotive department to meet the requirements in the world of work. This justifies the importance of vocational skills training in the Automotive Mechanics Department. The researcher interacted with the trainees who expressed their interest in learning how to effectively use the available tools in the Automotive Department, which they attributed to the career guidance they receive at the beginning of the course. Such guidance empowers them with the knowledge and expectations of the training they embark on.

Career guidance provided to trainees coupled with their passion and determination motivates the trainees to continue learning the skills as they become aware of the ways of applying them after their studies so that they can earn a living.

1.1.3 Background of Bbira Vocational Training Institute

Bbira Vocational Training Institute is an affiliate of the Church of Uganda that was established in October 1992 to train youth in vocational skills for self-sustainability and it is registered by Ministry of Education and Sports (MoES) under registration number ME/VOC/016 with accreditation from both DIT and UBTEB as examining bodies. The Institute is licensed to offer skills training in automotive mechanics among other trades and trainees are assessed by either Directorate of Industrial training (DIT) for Modular/Non formal, or Uganda Vocational Qualifications framework UVQF and Uganda Business and Technical Board UBTEB for Uganda Community Polytechnic, UCPC (Junior) Certificate or National Certificate before graduating to the world of work. It offers knowledge and skills training in various trades including tailoring, catering, hairdressing, plumbing, electrical installation, building construction, carpentry and joinery, motor vehicle mechanics and also offers business courses. The institute motto is “Learn as you earn” and the mission, “Empowering all categories of people through provision of quality vocational and life skills.”

Over the years, the institute has trained several youth including orphans and vulnerable children (OVC) from Northern Uganda with the support from partners of church of Uganda. Some of the youth received start up tool kits, which enabled them apply the knowledge and skills acquired at the institute to start up their own small scale enterprises for self-sustainability, thus improving their standards of living and transforming the communities where they come from. The Automotive Department trains DIT students, National Certificate students and Junior Certificate

students for a period of two years and three years respectively. Real life projects and Industrial Training are incorporated in the syllabus for National Certificate to introduce the students to the actual practices in the world of work, since the trainees are involved in solving the existing problems identified within the institute and the community while they are still undertaking their studies. The researcher observed that the real life projects done by students in the automotive department include daily maintenance and repair jobs for vehicles and motorcycles for the neighboring community and the institute van, fabrication of compound seats and metallic dust bins, making metallic tables for the institute computer laboratory and axle stands for vehicles being repaired. These have been instrumental in transforming the institute's appearance with improved infrastructure as well as building confidence for the students who enjoy the improved resources provided at the institute. The commitment and expertise exhibited by students during their industrial training, as noted by the administrator, have enabled some graduates secure gainful employment at the end of the course through confirmations at the workplace while others opt to upgrade to diploma levels.

1.1.4 Background of the Researcher

The researcher holds a Bachelor of Science degree in Mechanical Engineering from Makerere University coupled with the practical experience gained in motor vehicle maintenance and repairs from several employment platforms namely Tororo cement limited and Century bottling company. She participated in the setting up and maintenance of industrial fuel dispensing pumps while working with Bimo Fuels Limited and also had the opportunity to travel to West Africa to implement BTVET at The Gambia Technical Training Institute (GTTI) with more engagement in vocational education and training. She then completed a two year diploma in technical teacher education at Nakawa vocational training institute in 2018 and later enrolled for

a masters' degree in vocational pedagogy at Kyambogo University where pedagogical skills and understanding the relevance of various teaching approaches were acquired. This assisted in effective application of teaching and learning techniques for learners to acquire important skills and knowledge that are required in the world of work. She also worked with the department of mechanical engineering as a part time lecturer in 2017 and later joined Bbira vocational training institute, where the expertise and hands-on skills have been utilized in the department of automotive mechanics so as to improve the skills base for the graduates who are introduced to the world of work annually.

The interest in vocational skills and knowledge was triggered by the opportunity to train in a regional vocational institution like The Gambia Technical Training Institute (GTTI) as a TVET implementation coordinator, getting an opportunity to install and commission tools and equipment that are fundamental in vocational skills training upon realizing the gap caused by the theoretical teaching of students. Youth in Vocational Institutions can acquire practical skills that are more applicable in the world of work and they have more chances of starting up small scale business enterprises in several trades such as motor vehicle mechanics, tailoring and fashion design, carpentry and joinery, catering and hotel management, hair dressing and cosmetology, electrical installation, plumbing and building construction if they are given resources and competencies to improve their prosperity, thus improving the standards of living in society. Use of high precision, self-drive, dedication, determination and endurance, my personal goals and principles such as loyalty, enthusiasm and a spirit of teamwork, guide and enable me achieve my full potential. Attaining generality of concepts and explanations through application of general sciences creates an avenue to analyze and impact my environment thus the need to study the proper use of tools and equipment in the automotive department with a view to improve the operations that will benefit

both the trainees, fellow instructors and the institute in general. After reflecting on the requirements of training an effective automotive mechanic for the world of work, the researcher found it necessary to conduct a situation analysis at Bbira Vocational Training Institute.

1.2 Situation Analysis

Situation analysis guides the identification of priorities for the intervention and constructivist forms of grounded theory by emphasizing inquiry, Charmal (2014). Interviews were conducted considering the human interaction with varied responses which required the researcher to adapt changes in the action and to assign responses to problems identified agreeing with Strauss' approach to analysis, Corbin (2015). Thus, relevant information about the teaching and learning in vocational training was gathered from the Automotive Department. Stakeholders including; administrators, instructors and trainees were met at different fora. Views expressed focused on the training and experiences of the instructors, administrators and employers who constantly engage the trainees in the vocational institutes and the world of work by providing industrial training placements and supervision in the various enterprises.

Following the situation analysis, a future workshop / meeting was held, where the researcher outlined the regulations to be followed and requested everybody to actively contribute so as to get as many ideas as possible. Gaps were identified during the brain storming whereby one member noted that; “lack of students’ interest in innovation and research and high teacher / instructor to student ratio affects student centered learning”, while one student commented that “lack of skills training facilities in the workshop and instructors have who fail to demonstrate and operate the modern equipment contributes to the reduced skills acquisition”.

Participants generally agreed that the most pressing issue was the lack of skills training facilities such as adequate tools and equipment at the institute which became the basis of the study.

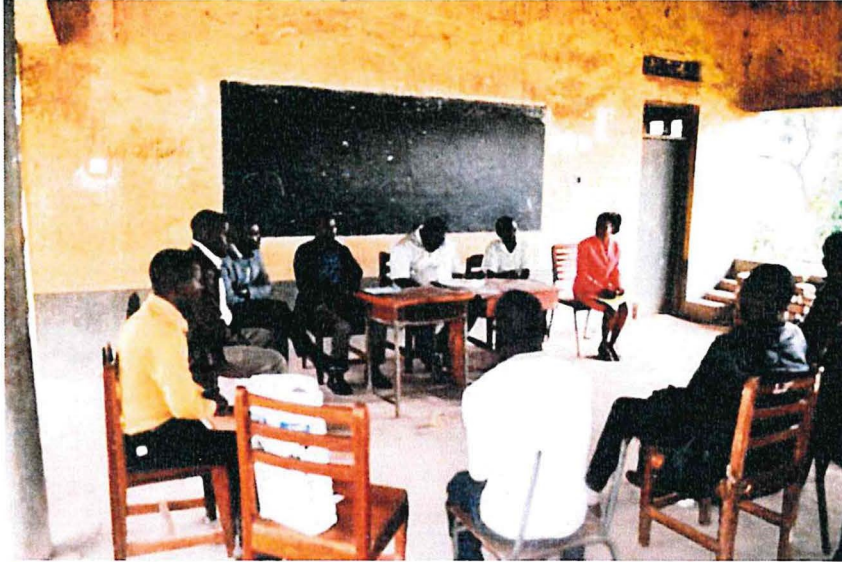


Figure 1: Introductory meeting to future workshop

Source: Photo by Researcher at Bbira VTI November 2021

Since vocational Education and Training aims at acquiring qualifications related to a given profession or art for employment using the forms of education, Cuddy & Leney (2005), it provides the necessary training of appropriate technical knowledge and skills so that students learn how to exercise the art or activity of a profession independently regardless of their training level. Woyo, (2013) further identifies challenges to high demand of quality working staff in the provision of practical lessons to trainees who need hands on experience as opposed to theory. This emphasizes Competence Based Education Training (CBET) and modular Based Training approach to focus on acquiring skills that are relevant for employment. With the view of adapting the current modern and rapid development trends of the economy, it is advisable for vocational institutions to consider adjusting the practical teaching methods so that they meet the demand for the industries that employ graduates. Boateng (2012) notes the need for vocational technical education to

appropriately respond to the development changes in order to maintain their relevance in preparing future generations to be able to take advantage of the opportunities for the kind of workforce needed in today's employment environment.

The BVTI automotive department has incorporated the application of the institute motto "learn as you earn" in the training program where learners interface with real customers during their training and they are tasked to perform maintenance and repair tasks on vehicles and motorcycles with the guidance of their instructors. This helps them to confidently consolidate their skill with tasks such as service and maintenance, tyre change and puncture repairs, battery servicing, clutch and brake repair plus various electrical repairs that are reported by the customers. The modest facilitation received by the students encourages them to withstand the challenges faced and also ensure customer satisfaction for sustainability. The institute benefits through income revenues realized by the department in terms of production plus reduction in cost of training materials since the client provides the materials required for a particular repair job and he/she is charged moderately for the service offered by the students with guidance from a competent technician / mechanic. With the enhancement of the tools and equipment used while training at Bbira vocational training institute, the quality of work done by graduates enables them acquire the skills that are required and applied by the employment sector.

1.2.1 Conceptual Framework

To describe and categorize relevant concepts in the study to define their relationships in the conceptual framework, the researcher incorporates the theory and empirical research which helps to see the required adjustments and qualifications, Rocco & Plakhotnik (2009). It involved understanding the learner characteristics, the institute attributes such as infrastructure and the delivery of skills that are applicable in the world of work as shown in Figure 2.

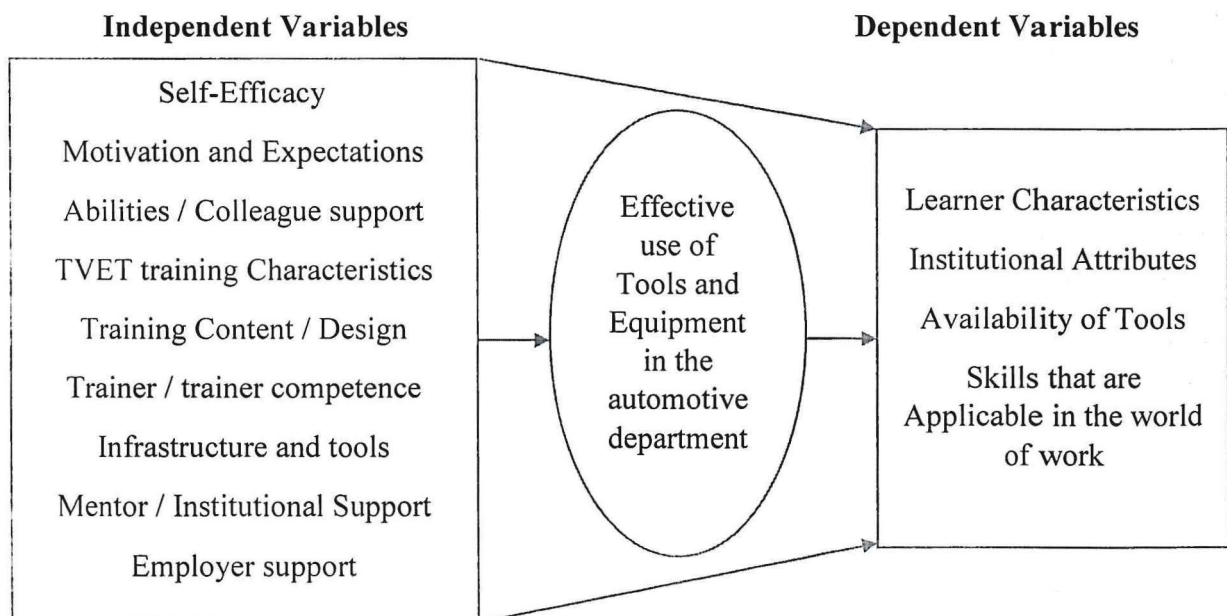


Figure 2: Relationship between effective use of equipment with dependent and independent variables.

Source: Ponnann & Ambalavanan, (2014)

The parameters are interrelated and form a web like network that is used to review the integrated teaching and learning through effective use of the tools and equipment in the department with the aim of achieving the expected skill set for the graduates from the automotive department Ormerod (2008). Learner attributes / Characteristics, training content and expertise of the trainers /instructors enable the teaching and acquisition of the desired knowledge and skills that are required by the employers in the world of work as shown in table 1 below. Mentoring and collaboration with employers throughout the training work processes generally improves the learner characteristics and institutional ability to produce graduates with skills that are useful in the employment environment.

Table 1: Comparison of stakeholders Involvement in Vocational Training

Independent Variable	Dependent variable	Stake holder
Learner Characteristics	Motivation	Trainer
	Self-Efficacy	Trainee
	Expectations	Employer
	Abilities	
Trainer / Education Characteristics	Training design and Education curriculum	Institution
	Training environment	
	Training content and equipment as per the syllabus	Institution Trainer
	Trainer / Instructor's Competence	Instructor
Institution / Organization /Employer characteristics	Mentor Support	Employer
	Colleague Support	Trainee
	Organizational Support	Institution

Students in secondary schools are mainly taught basic theoretical knowledge from text books with limited chances for them to learn the operational and practical applicable skills, hence providing few opportunities for them to practice the competences in the theory taught. This causes a situation in which the level and quality of teaching and learning targeting employment is difficult to get integrated, Smith (2013). As such, the experiments which are usually carried out in an ideal laboratory set up in secondary schools, do not reflect the actual skills needed by employers.

On the contrary, public and private technical vocational schools have the following characteristics:

- They generally emphasize integrity, creativity and practicability of practical capacity, not to only achieve systematic and complete rehearsal of theory/practical lessons which simulate the problem solving approach.
- The approach towards teaching and learning in Vocational-technical schools targets practical application of skills by trainers and students with both knowledge of higher education and skills of vocational techniques which can be acquired through further training. This builds confidence in the trainee's ability to diagnose a problem and relate with the most suitable approach to solve it.
- Vocational-technical institutes emphasize teaching of basic competences and skills that are required for practice in the field within their preferred trades as long as they learn and understand the necessary theoretical and professional knowledge coupled with various soft skills that ensure consistency and compatibility.
- With the influence of traditional education that has existed for a long time, vocational-technical institutes tend to incline towards the traditional educational models where experiments and practice in several courses ignore the hands-on experience for the trainees. For example, the experiments and practical exercises in physics or chemistry may not have direct relation in the world of work although they qualitatively contribute to knowledge impartation and teachers just imitate what the text books say, while students copy notes and prepare for predetermined questions during the assessment/examination period while trainees in vocational institutes engage in real life projects to solve an existing problem in

their community and they are also assessed in both theory and practical aspects by an authorized examination body.

Emphasizing theory in the teaching of the syllabus content may eliminate the practical training thus the failure to reflect the expected characteristics of vocation and technique as noted by Sumarsih & Zakaria (2020). This may indeed lead to vocational-technical institutes becoming a general extension of the secondary education where it is evident that students lack practical skills and ability to interpret work requirements, which do not satisfy the society's demand on technical talents and innovation, mis-aligning vocational technical education from the normal education expectation. Okware and Ngaka (2017) agree that the high cost of training associated with infrastructure, tools and equipment affects the implementation of the desired training goals. Some vocational/technical institutes reduce practical teaching capacity and hands on skills as they train skills to students, a core requirement in training of their knowledge levels and therefore the intended impacts of practical teaching and learning are minimized. However, the automotive mechanics department at Bbira Vocational Training Institute has various equipment that are used to provide practical skills to the trainees offering national certificate and Uganda Vocational Qualification Framework which are assessed by UBTEB and DIT respectively. The equipment in place cater for the day to day workshop needs which are similar to the usual garage set-up among the small and medium enterprises. National Certificate trainees, therefore, acquire skills and are capable of starting up small and medium enterprises without relying on seeking employment since the training program contains elements of general education and life skills.

1.2.2 Statement of Motivation

BTVET providers may not train the students to enable them gain the required current and future skills although the lifelong learning as a longtime learning tool is important. Drucker (2005), notes that illiterates are not those who cannot read or write but are those who cannot learn or retain therefore in vocational skills training, one cannot not perform something when they have not obtained the necessary expertise. However, sometimes the training in secondary schools, Universities and tertiary institutions may contain more theory and little hands-on experience where there is a tendency of theoretically explaining practical skills with gestures and pictures Meijers, (2012). Integration of practical courses / subjects such as engineering drawing, technician science, technology, auto electric, entrepreneurship and life skills, real life projects and industrial training in the vocational course syllabus enables learners have the hands-on experience. Exposure to the use of the most suitable equipment in the servicing and repair works determines the quality and reliability of the vehicles. It is against this background that the researcher endeavored to establish these complexities related to assessing the tools and equipment use so that VET can be improved and promoted by implementing the practical teaching and learning in the department of automotive engineering, thus the need to identify and analyze the use of appropriate resources at the vocational training institutions and workplaces so that knowledge and skills are effectively delivered.

1.3 Statement of the Problem

Vocational Training is intended to provide learners with practical hands-on skills that are required in the world of work. Countries like Japan focus on practical learning to produce excellent employees for the industries, Masuda (1996). In Africa, training institutions are not equipped with facilities / equipment and resources found in the workplace as noted by Nwogu (2011). Poor use of tools and equipment in Bbira Vocational training institute affects the skills acquired since the training workshops do not simulate the actual tools like feeler gauges, drill bits and equipment such as hydraulic jerks, wheel balancers and mobile cranes in the industries /enterprises that provide employment to the graduates who join employment. In this sense, vocational education and technical training institutions play an important role and their reputation as quality institutions which largely depend on ensuring that the industries and the community have equipped workplaces, qualified and motivated workforce and resources. Therefore the study was conducted to analyze the relevance of the available tools and equipment in the Automotive Department so that they are effectively used by trainees to acquire applicable hands-on skills / competences needed by employers.

1.4 Purpose of the study

The purpose of the study was to analyze the effectiveness of vocational training equipment used in skills training of automotive mechanics students / trainees in the department of automotive mechanics at Bbira Vocational Training Institute.

1.5 Objectives of the study

- i. To identify the vocational training equipment in the Automotive Mechanics Department at Bbira Vocational Training Institute.

- ii. To determine the relevance of the vocational equipment in the Automotive Mechanics Department at Bbira Vocational Training Institute.
- iii. To implement the effective use of the vocational equipment for skills training in the automotive mechanics department at Bbira Vocational Training Institute.

1.5.1 Research Questions

- i. Does the institute have equipment for skilling trainees in the automotive mechanics department?
- ii. Are the available equipment relevant to the acquisition of vocational skills for trainees in the department?
- iii. How can the equipment be used effectively for acquisition of skills by the automotive mechanics department trainees to fit in the world of work?

1.6 Justification of the Study

The study was carried out to analyze and assess the available tools and equipment in the department of automotive mechanics, the relevance and adequate use of equipment by trainees as they acquire skills and competences that are needed by employers. The trainees acquire knowledge and practice hands-on skills in the use, repair and maintenance of equipment to improve the equipment reliability and availability in the department. This therefore results into producing graduates from the department who have hands-on skills and experience in the use of proper tools as they carry out mechanical repairs such as servicing motor vehicles and motorcycles, welding of metals and the use of other vital equipment in the mechanical workshop / garage which enables the employers to rely on the competent graduates who join the world of work.

1.7 Significance of the study

Technical Vocational Education Training (TVET) is education and training that provides learners with the necessary knowledge and skills required to do a particular job using appropriate tools and equipment, Reiter-Palmon et al., (2006). The research was carried out to analyze the use of vocational equipment by trainees in the automotive department of Bbira Vocational Training Institute while acquiring skills that are applicable in the world of work. Having adequate access to the equipment in the automotive mechanics department where trainers organize the best workplace environment in terms of materials, workmanship thus improves the quality of training at Bbira Vocational Training Institute. It equally enabled the researcher to apply pedagogical approaches towards the teaching and learning processes by using relevant tools and equipment. Management was able to budget, purchase and monitor the use of the equipment by trainees as asserted by Abromavičienė (2016) thus improving the performance of the automotive department.

1.8 Scope of the study

The scope of the study is presented as geographical scope, content scope and time scope.

1.8.1 Geographical Scope

The research was carried out in the Automotive Mechanics Department at Bbira Vocational Training Institute located at Bulaga 9km along Kampala-Mityana road. The automotive department is one of eight (8) departments at the institute which offers practical skills training to different categories of trainees. The geographical area was chosen due to the need for action research to cause change in the area of operation of the researcher to impact the society.

1.8.2 Content Scope

The research was carried out to determine the utilization of the equipment/training resources in the Automotive Mechanics Department in Bbira Vocational Training Institute. It focused on identifying and assessing the available equipment in the automotive department to know the quality, quantity and operational conditions, and determining their relevance to training offered to the trainees as well as implementing the effective use of these equipment with the aim of improving the quality of knowledge and skills training at the institute.

1.8.3 Time Scope

The research study was done between January 2020 and June 2022. This period extension was due to the unforeseen effects of Covid -19 pandemic which led to the closure of schools and institutions in March 2020 and June 2021 respectively. The closure due to covid-19 disrupted / affected the study for a period of one year without working with the respondents and later resumed when Institutions were re-opened which enabled the research to continue within this time scope.

1.9 Definition of key Terms

The following terms are used to bear meaning in the context of this research:

Automotive mechanic: This is someone with knowledge of repairing a variety of automobile-makes with a major role of diagnosing a problem accurately. The job involves repair of a specific part or replacement of one or more parts as assemblies. An auto mechanic is sometimes referred to as a vehicle technician and is responsible for regular basic vehicle maintenance for safety and reliability purposes.

Trainee: Someone who is undergoing training (normally practically oriented) in a technical field.

Technical Skills: These are competences and knowledge needed to perform certain tasks. They help technicians perform their normal activities of maintenance management, fault identification and repair work. Technical skills refer to the ability to carry out a task in relation to technical roles like IT, science, engineering or mechanics which require experience and training to master, Bathmaker (2013). These skills help technicians in their normal activities of maintenance management, fault finding or repair work. Technical skills often relate to scientific or mathematical tasks and are practical or mechanical and may include use of information technology in design programs or mechanical equipment or tools.

Competence: This is the ability to do something well. The oxford dictionary, Hornby (2019) defines competence as a skill that you need in a particular job or for a particular task. Skills are the expertise or talent and innovation needed to do a job or task, which generally makes one confident and independent while executing a given task. Competences identify the knowledge and skills set to perform basic preventive maintenance on a wide variety of automotive equipment while following scheduling/ repair requirements, recommended manufacturer's guidelines, and using trouble-shooting techniques and proper tool care.

Vocational Education and Training: refers to a training process which focuses delivery of knowledge, skills and attitude required for a specified interest.

Vocational Pedagogy: this refers to an educational program that targets experiential and hands on development work in crafts, trades, occupations and professions.

CHAPTER TWO: LITERATURE REVIEW

2.0: Introduction

This chapter presents scholarly views related to the themes and sub themes regarding the study variables in VET training institutions and workplaces in Uganda. VET in Uganda has undergone major changes since the time of the colonialists. The current VET in Uganda has become a concern of many researchers as many training programmes are challenged with the required skills and job competences demanded by the industry. The chapter is systematically arranged basing on study objectives as features of creativity and innovation in the learning institution, equipment utilization and roles performed by trainees and instructors in promoting skills development notwithstanding the constraints and the measures that can be taken to solve them.

2.1 Theoretical Framework

The study was guided by the activity theory, Vygotsky (1986), a theoretical framework for the analysis and understanding of human understanding through the use of tools and artefacts with the cognitive ability to help in analyzing data, provides a means for achieving the objectives with focus on tools. It views the core within a dialectic process between objectivity, learning and doing individually or collectively using explicit knowledge. Hashim and Jones (2007), considered theoretical frameworks/perspectives to check broad perspectives which can be more easily understood as orientating frameworks indicated in particular goals for research. The intention of these theoretical frameworks does not only provide theoretical concepts for making sense of particular empirical observations, but also indicate the kinds of data and concepts that might be useful. Therefore, the correlation between early exposure to relevant tools and equipment will

indicate the expected competences that can be applied after studies. When these frameworks are expressed at highly abstract levels, qualitative researchers refer to a position of critical or limited realism, contextualism, interpretivism, constructivism, social constructionism, radical constructionism or pragmatism through textbooks on qualitative research such as Cresswell (2018). Flowers and Larkin (2009) view interpretation as an inevitable part of lived experience as quoted by Abromavičienė (2016) aiming for a balance between understanding participants' interpretations unlike descriptive phenomena. The researcher was able to relate responses to results that are drawn from prior theory using a deeper probing of experiences, Leeming (2018) and the application of the theory in qualitative research. The activity theory analyses the level of interaction using tertiary tools in the knowledge creation processes as noted by Scanlon (2005) in evaluating learning theories.

Education reports in Uganda, have for more than 50 years, emphasized the importance of technical education and vocational training for national development, Kasozi (2012) but the area of higher education at a practical level, has not received the adequate attention it deserves unlike university education that has enjoyed prestige and popular support as expressed by James et al. (2009). This has therefore affected the development of the country in terms of innovation and technology and job creation. Ilaiyan and Safadi (2016) argue that the other challenges that TVET institutions across Africa face include, but are not limited to, poor quality in the delivery of TVET programmes compounded despite the fact that TVET is an expensive model of learning as compared to general learning. In addition to this, it is generally accepted that TVET is not suited to actual socio- economic conditions since it does not disregard the informal sector and the poor. Nyankov (1996); Foster (1987) and Reddan & Harrison (2010) affirm that TVET institutions need to restructure their programmes to respond to the needs of the job market, especially integrating

the industry's ever changing needs which require an assessment of the tools and equipment used during the training and the technologies employed in the world of work.

The BTVET Strategic Plan (2012/3- 2021/2) focuses more on increasing equitable and inclusive access to practical skills development and addresses barriers that keep girls and women from pursuing training in key service and productivity areas such as carpentry and engineering. This is done in order to promote capacity building among females for example the National Resistance Movement (NRM) Manifesto 2016 - 2021 commits to remove barriers to girls' education and promote quality education for all, which is still to discover the extent of its success. During the research there was consideration for the gender sensitivity of the activities carried out in the automotive department. A combination of general technical / occupation-specific and entrepreneurship competencies among learners is a major tool in reducing unemployment among the youth, UNESCO, 2001; CPSC (1996). Concerns about the transition challenges faced by new recruits at the workplace are neither new nor restricted to engineering since many studies show only a slight relationship between academic performance and success at work, Simpson, (2004). Theories show that analysis of data is specific to the research objectives requires objective understanding and experiencing the knowledge and skill sets acquired, ILO (2002) using the available tools and equipment and the effective utilization of the training equipment by learners to access quality hands-on experience while in vocational institutions, Ipp & Ojimba (2012).

2.2 Vocational training equipment in the Automotive Mechanics Department

TVET has a theory limit beyond which, the acquisition of skills is affected thus making TVET “theoretical Education” Bjurulf (2018). In a situation where a mechanical workshop barely has a minimum of the required tools and equipment, the process of positive practical skills

acquisition is greatly hampered, more so when the population of the trainees is far bigger than the available equipment facilities. Ogundu, (2009) affirmed that what Africa needs is the problem solving and critical thinking approach that can be developed with the use of functional equipment in the workshop, Audu et al., (2013). Indeed the lack of adequate equipment and workshop tools makes it impossible for learners to receive sufficient training that meets the required standards of employment in industries or related organizations. This statement confirms what the world of work has echoed that the majority of graduates passing out annually are incompetent (ILO, 2002). Technical Vocational institutions require well equipped workshops with the following tools, equipment and materials for demonstration and practical works:

- Cylinder head and valve train repair and diagnosis, Lubrication of engine blocks, cooling systems, Diagnosis of the ignition system and fuel / exhaust system
- Diesel / Petrol Engine overhaul
- Diagnosis and repair of the clutch, transmission and drive axle (drive train).
- Diagnosis and repair of the manual / power steering, wheel alignment, front and rear wheel drive systems (steering system).
- Hydraulic and mechanical brake systems
- Lighting, braking, electronic control systems (Electrical systems).
- Electronic fuel Injection (EFI) and carbureted systems (fuel systems)

Repair works on the above systems involve checking and repairing the condition of the vehicle through inspection and fault diagnosis followed by systematic dismantling for repair and assembling. Testing and Calibration is done after replacement or installation and mechanical / technical advice may be offered to the customer basing on the findings. The proper use of tools

and equipment in repair are therefore a very important aspect of technical vocational education and training and they need to be relevant, good quality adequate tools to sustain the training as noted in the technical manual for maintenance and care of hand tools, *TMS* (1945). Important to note is that the efficiency of the tools greatly depends on their condition. Without functional workshop tools and equipment, the instructor is handicapped since s/he cannot effectively demonstrate a skill, thus technical and vocational Institutions require workshops that have modern tools, equipment and materials for demonstration and practical work that simulates those available in the world of work.

2.2.1 Safety Precautions

Use of hand tools like chisels, hack saws, calipers, riveting guns, punches, scribers, steel rules, drilling machines and grinding machines , bench vices and other supporting tools requires high precision and precaution towards the safety of both the user and the equipment used. The automotive department emphasizes the use of appropriate safety measures and a chart showing safety guidelines is displayed to remind users of the possible risks and dangers and the personal protective equipment (PPE) which are worn by trainees before any practical lesson to avoid any unforeseen accidents. Care for tools and equipment involves regular lubrication using recommended grades of grease and ensuring proper hygiene measures in the workshop.

2.3 Relevance of the vocational equipment in VET

Technical Vocational Education is recognized as an aspect of education which leads to the acquisition of practical and applied skills as well as basic scientific knowledge that will enable an individual to secure employment in a particular occupation for sustainable livelihood, Kombe et al., (2010). These skills cannot be acquired in a vacuum but rather in a well established and

functional workshop with the right tools, equipment and machines for effective implementation of TVET program, Mwangi, (2015). However, the desire to produce competent graduates of TVET programs can be achieved when the facilities are adequate for the programs as demanded by the curriculum of the program in the automotive department which may include welding and fabrication equipment and heavy fixed and mobile equipment for diagnosis and repair and overhaul of the air / brake systems, electrical systems, starting systems charging systems, lighting systems, air conditioning systems, heating and engine cooling systems, electronic controls, devices and systems, hydraulic Systems and exhaust systems. The automotive department follows the workshop practice guidelines outlined in, Emsd (2018) showing the recommended tools / equipment required for a given maintenance / repair activity.

Table 2: Recommended Tools and equipment for maintenance and repair

S/N	Category	Recommended tools
1	Mechanical Works	Set of hand tools (Fixed or portable types) Transmission jack Wheel aligner / tyre balance Oil waste collection and storage facility Tachometer / torque wrenches Air compressor Hydraulic jack (Manually operated) Safe vehicle supporting devices e.g jack stands, wood blocks) Hydraulic crane. And cotton waste / detergent

2	Electrical Services and battery works	Full set of hand tools Protective clothing (gloves, goggles) for adjusting / refilling battery liquid Battery charger and charging area with ventilation Belt tension gauge Battery load tester Electronic analyzer Thermometer, Multimeters (Voltage/Current/ resistance meter)
3	Lubrication Works	Full set of hand tools Protective clothing and gloves Lubricant measuring cups / containers Brake fluid, hydraulic oil, engine oil tester Waste lubricant filter / storage and recycling facility
4	Tyre works	Full set of hand tools Safe vehicle supporting devices e.g jack stands, wood blocks)Tyre changer and Tyre balancer Recycling Facility and waste tyre storage

Source: Practice guidelines for vehicle maintenance Workshops, TMS (1945)

2.4 Implement the use of the vocational equipment

The technical skills, competences and instructional technologies of the trainees greatly influence the implementation of the use of the equipment Smith (2013). The relevance of the available equipment determines the frequency in use as applied to the curriculum and repair needs

in the workshop as noted by Lawal (2012). The goal of this exercise was to be able to decide which training equipment should be reviewed further for its relevance or its contribution toward the training for the requirements in the world of work. Further benefits include;

- Evaluation and assessing existing equipment enables the improved learning outcomes, instructional processes, access to experiential learning through hands on practice and scalability thereby considering the effective use of the equipment.
- The knowledge and skills required for full performance of routine, preventive and cyclic maintenance on a wide variety of automotive and heavy mobile equipment, following and interpreting scheduling requirements and manufacturers' guidelines for all equipment by using trouble-shooting techniques, proper diagnostic equipment.
- Instruction and training of trainees to diagnose and repair components of automotive equipment like engines, transmissions, differentials, ignition systems, charging systems.
- Ability to diagnose and repair vehicle electrical systems, such as lighting systems, electronic control systems. Repair and maintenance schedules for the equipment also allow the reliability and life of the equipment to be assured.

Technical skills involve using the different tools and equipment found in workshops to repair or reconstruct assemblies. Practical technical skills are highly demanded by industries that require employees with technical skills which require fabrication and production works as observed in the automotive department. TVET is designed to produce well trained and qualified craftsmen, technicians and technologists who are employed in the public and private sector who acquire adequate knowledge and skills from training institutions through demonstrations and practical use of the tools and equipment available in the employment world. The mechanical engineers and automotive mechanics graduates who have not been given hands on training in the universities and

institutions of higher learning usually require more orientation and on-job training to familiarize themselves with the general technical practices and knowledge base. This brings the general perception of “*theoretical engineers*” referring to fresh graduates from universities, hence, practical hands-on skills and competences that are acquired through effective use of tools and equipment. The training in vocational institutions creates confidence and triggers innovativeness in the real life projects and design projects undertaken by the learners since they apply the theoretical knowledge learnt to enable them produce tangible products. The practical experience gained during real life projects and industrial training are important for developing the confidence of the trainees in applying the skills learnt during training in the world of work. Vocational institutions therefore need to encourage the use of equipment that simulate the expectations of the employers rather than theoretical training of practical subjects.

Experiential learning in vocational pedagogy generally involves the participation of the learners in the teaching and learning process in the department of automotive mechanics. Therefore using the activity theory and participation ensures the proper use of tools and equipment with safety considerations, thus enabling learners acquire relevant practical skills that are needed in the world of work.

CHAPTER THREE: METHODOLOGY

3.0 Introduction

This chapter presents the research design, procedure, methods and tools employed by the researcher while carrying out the research to gather and analyze information needed to answer the research questions derived from the objectives of the study. It also includes population, sampling size and sampling technique, methods of data collection and analysis, testing the validity and reliability of data and ethical considerations.

3.1 Research design

The study used the participatory action research (PAR) approach since it enables participants articulate their views and express their knowledge through describing and analyzing their own situation and problems, Andrew (2018). Focus groups were formed to facilitate the discussions in order to achieve participation while the qualitative component of the research provided a clear and contextualized understanding of the competences for the work processes of equipment use in the skills training in the automotive department of the institute. This also enabled the researcher analyze the desired outcomes and benefits for both the trainees and institute. Focus groups enable access to participants from a various backgrounds who shared their perspectives and critical views to generate important outcomes, Connelly (2015). A participatory approach was used in a systematic way in which numerical data were used to obtain information in the automotive department, was used to describe, observe and examine the relevance of data collected with the aim of getting new facts during the research.

3.2 Research Procedure and action research in the automotive department

The study employed the action research cycle with a systematic way in which numerical data was used to obtain information in the department of automotive mechanics to describe, observe and examine equipment used. In order to Observe, Reflect, Plan and Act, since action research being cylindrical in nature, it is possible to make changes and adjustments in the next cycle of the research basing on the experience and reflection, as noted by McNiff and White head (2009) shown in figure 3.

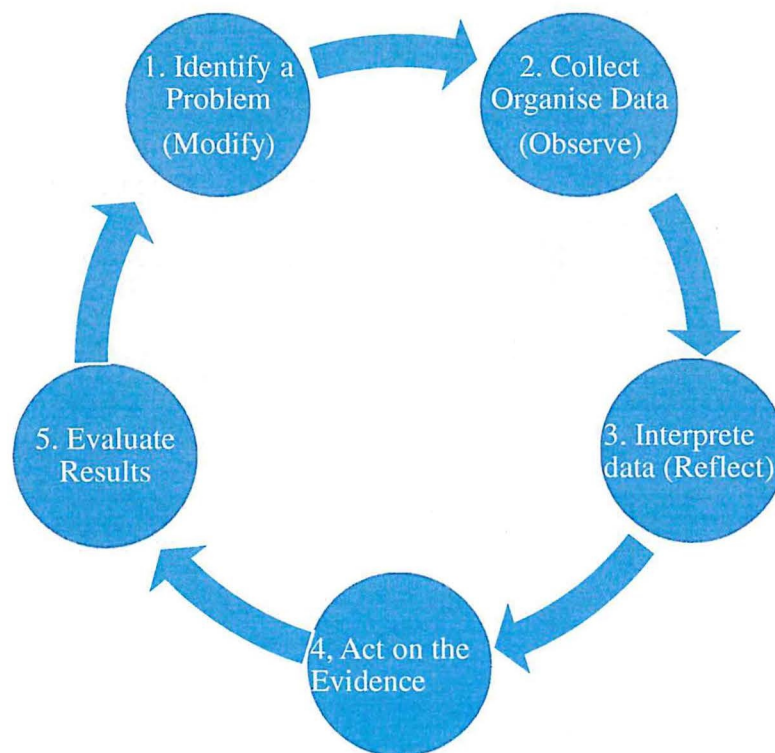


Figure 3: Cycle of Action Research

Source: McNiff and Whitehead 2009

With the cyclic reflective nature of the works of automotive mechanics, the researcher concurs that identifying the problem for repairs, observing several responses through testing, interpreting

the cause/effect of the problem and acting on the evidence by correcting the fault before evaluating by the testing if the fault has been rectified, are significant stages of hands-on training. This requires knowledge and experience to be able to identify the most probable specific skills that a trainee needs in executing daily activities the world of work.

To collect data, an interview guide was used to allow the researcher have a variety of in depth questions without limiting or leading the interviewees' responses together with the other questions that would also arise in the course of the interaction during the interview, Deppermann, (2014). Focus group discussions explored the different activities in the Automotive Department and assessed all the challenged in order to identify the most critical issue that needs intervention and hence the basis for the action research. The administrators provided the information about the plans for the department in line with the institute's mission of "empowering all categories of people through provision of quality vocational and life skills". This also indicated the expected performance of the automotive department in terms of the number of trainees who enroll, their performance in the national examinations as well as their performance as they join gainful employment. The deputy principal was optimistic that the positive interaction with the employers was a good avenue while sourcing for credible industrial training placement for the trainees and consequently, their employment after successful completion of their course.

The representative of employers echoed the need for the curriculum developers to consistently update the training content to incorporate new technologies and called on training institutions and trainers to further engage the industries in the identification of training needs. Interaction with Instructor's revealed their qualifications, experience and expertise and or professional way of handling the trainees to ensure that they learn the automotive skills that are applicable in the world of work. The trainees provided information about their expectations in the

course they are pursuing as well as the skills they have achieved so far. The researcher utilized the knowledge acquired from masters in vocational pedagogy (MVP), which focuses on developing tools and models in vocational training for effective teaching and learning with emphasis on the outcome of training at the institute. Analyzing the work production processes, the teaching approaches of instructors and active participation and involvement of trainees encourage creativity and knowledge acquisition in the automotive department.

3.3 Implementation of activities in the automotive department

The action research was carried out at the institute to ascertain the effective utilization of available tools and equipment in the department as well as validating the suitability of the equipment to effectively enable learners acquire practical skills that are applicable in the world of work. The basic tools such as assorted spanners stored in classified tool boxes were readily available for the daily training, which enabled the trainees acquire the basic skill of identifying the right tools for a specific repair activity through practice.

3.4 Population

The target population of the research included stakeholders of the Automotive Department which included second year national certificate trainees in the automotive department with the analysis of various entry skill competencies obtained during Industrial Training. This helped in determining the different skills levels attained with the equipment used in the program being trained at the institute compared to the work place expectations. Second year students who reported back to the institute during the partial reopening of schools and institutions (due to the covid-19 pandemic), gave their respective feedback. Administrators and Instructors were also interviewed to obtain their individual opinions and ideas about the use of equipment in the automotive

department. Employers' representative, who also doubles as a parent or guardian to a vocational trainee was interviewed to get an insight into their expectations and the experience with the graduates who were previously employed in their enterprises.

Table 3: Categories of Stakeholders

Category	Planned Number of Respondents	Number of Respondents
Administrators	03	02
Instructors	03	02
Trainees	15	06
Employer	03	01
Total	24	11

3.4.1 Sampling and sample Size

Sampling refers to a group of people, objects or items that are taken from a larger population for measurement, which involved selecting a subset of the whole population for practicability. The resulting sample must be representative of the population to warrant accurate generalization, Kheawhom, (2009) hence the planned sample population consisted of fifteen (15) trainees / students, three (3) administrators, three (3) employers and three (3) technical instructors respectively who discussed their views and observations at the future workshop. However, the number of respondents who continued with study during the partial re-opening after the covid-19 pandemic reduced to 11 respondents with the concentration on 06 trainees of second year finalists in the automotive department together with 02 instructors, 02 administrators and 01 employer. This reduction is backed by Creswell (2011) which affirms that with qualitative research, it is typical to study fewer individuals / cases.

3.4.2 Sampling Technique

Purposive sampling technique was used with a small number of eleven (11) respondents, considering age, gender, functional role and ideology of the organization to have an in-depth view of the phenomena as discussed by Shaheen et al., (2016) in planning. The sampling technique enabled the researcher learn and gather in-depth information about the operational issues in the automotive department from the right informants as noted by Patton (2002). The sample population included administrators, employers, instructors / trainers and trainees who are part of the training and skills acquisition program and they are key participants in the teaching and learning process that ensures the acquisition of practical automotive skills using the available equipment in the department and the industries.

3.5 Methods of Data Collection

Firsthand information which was obtained through interaction with the respondents yielded a lot on the operations and training at Bbira Vocational Training Institute as noted by Gorse and Emmitt (1997). Data was got using observation of procedures and practices and interviewing participants. Primary Data were obtained from participants in the automotive department of Bbira Vocational Training Institute. The research data represents the data for the available training facility and their impact on the quality of graduates.

3.6 Tools of Data Collection

The instruments used included a note book/log book, which was used to record data and emerging concerns during the research as described by Dowall (2017), it helped in having orderly records in a chronological order for easy compilation and analysis. Interview guide tool and an

observation guide were used and a camera was used for taking photographs at various stages to illustrate and help in analyzing information at a later time with visible evidence

3.6.1 Observation

Observation is a systematic viewing coupled with considerations of seen phenomenon. Data were collected from the field with the help of the researcher going to the field using the principles and guidelines in practice and training, Cotton et al. (2010). This method was used as the researcher monitored actual practice during lessons to verify the information from the students during interviews. It helped the researcher appreciate the relevance of the equipment used in the automotive department and other controls which are used as teaching aids for trainees to master and practice the technical skills. It provided a lot of accurate information attended by trainees who follow a time table allocating the time for practical lessons. Access to the workshop was granted by the administration which enabled the researcher observe the use of the tools and equipment as well as their maintenance and repair.

3.6.2 Interviews

An interview is a verbal communication between two or more people with the objective of collecting relevant information for the purpose of research, Shrivastava et al., (2013). In qualitative research, interview is a conversation where questions are asked to elicit information as depicted by Namara, (1999) in the guidelines for conducting interviews. Both structured and unstructured interviews were carried out throughout the study. The method helps in exchanging ideas and sharing experiences to supplement other methods of data collection. An interview guide tool provided a set of guiding questions to avoid deviation from the study objectives.

Table 4: Methods and tools used for data Collection

Objective	Method	Tools Used
To identify the vocational training equipment in the Automotive Mechanics Department in Bbira Vocational Training Institute.	Interviews Observation Recording	Interview guide Observation Check- list Note book Camera
Determine the relevance of the vocational equipment in the Automotive Mechanics Department at Bbira Vocational Training Institute.	Interviews Observation Internet research Document Analysis	Notebook Computer / laptop MVP Programme book
Implement the use of the vocational equipment for skills training in the automotive mechanics department at Bbira Vocational Training Institute.	Demonstration Reporting Recording	Demonstration records Camera

3.7 Procedure of Data Collection

The researcher obtained an introduction letter from MVP programme of Kyambogo University, addressed to Bbira Vocational Training Institute, which introduced the researcher, requesting to allow her conduct the study at the Institute. The letter was presented to the management of Bbira Vocational Training Institute stating the purpose and objectives of the study seeking for authorization for conducting the research at the institute which was granted and then appointments were made with the various stakeholders including the Principal/ Deputy Principal, Dean of Students, automotive Instructors, employers in the industry and the trainees in the automotive department. The researcher was invited to attend a Stakeholder's workshop for partner's Capacity building on Vocational Pedagogy (Appendix VII) which contributed to further

understanding and acquisition of knowledge through capacity building on vocational pedagogy in vocational institutions with the challenges of Covid-19.

3.8 Data Analysis

The collected data were analyzed based on the three study objectives in order to answer the research questions which are; Does the institute have equipment for skilling trainees in the automotive mechanics department, are the available equipment relevant to the acquisition of vocational skills for trainees, and how can the equipment be used effectively for acquisition of skills by the automotive mechanics department graduates?

To identify the vocational training equipment in the Automotive Mechanics Department in Bbira Vocational Training Institute, the researcher, in collaboration with the students and instructors, embarked on identifying and compiling a comprehensive list of all departmental tools and equipment/assets that are essential in the skills training of the trainees in the department of automotive engineering at Bbira Vocational Training Institute. The compiled list (appendix X) was shared with administration and it was used in identifying the tools that are in use as well as those that need to be repaired.

To determine the relevance of the vocational equipment in the automotive mechanics department at Bbira Vocational Training Institute, all the available equipment and number of tools (appendix IX) were assessed to analyze their conditions and suitability in the technical skills training to the institute. Purposeful sampling technique was used to determine the availability of equipment to the trainees which indicated their use and relevance in skills required by the world of work. Recommendations for the tools that need to be acquired by the institute were forwarded to the institute's administration so that trainees are able to adopt the new technologies that are

applicable in the world of work due to the new vehicle models being manufactures and imported at the moment.

To implement the use of the vocational equipment for skills training in the automotive mechanics department at Bbira Vocational Training Institute, after determining the relevance of the available tools and equipment, a schedule was developed considering the time allocated for practical lessons and real life project work on the approved departmental timetables, to draw guidelines to workshop rules safety of tools and equipment for proper use and maintenance of the equipment.

3.9 Validity and reliability of instruments

Validity refers to the degree to which an instrument accurately measures what it intends to measure. This research considered three types of validity construct, and criterion validities, Queensland (2000). Multiple iterations of piloting and testing were required and when available, the researcher used already established valid and reliable instruments, such as those published in peer-reviewed journal articles. There was need to re-check validity and reliability of the tools used in data collection before running additional statistical analyses. The data collected from the different respondents were verified through observations and interviewing the parties concerned to confirm that it is reliable information. Instructors who utilize the curriculum for training national certificate students had records for the different worksheets with the specific tools and equipment as well as procedures to be followed to guide the practical lessons taught and the time tables which are displayed in the department verify the same. Trainees demonstrated their knowledge of using the tools and equipment in the department especially spanners, battery chargers and welding machine and their relevance was confirmed by the employers who requested for the same skills and also emphasized cooperation among training institutions and employers in the world of work.

The researcher used photographs as a form of evidence to back the data collected and responses go through the interviews and the observation of the work processes in the Automotive Department.

3.10 Ethical Considerations

Permission to conduct research at Bbira Vocational Training Institute was sought from the administrators upon presenting a letter from Kyambogo University (Appendix IV) and it was granted by the Deputy Principal (Appendix V). The research observed a fair selection of participants without bias, Rahman (2016) and the respondents were informed about the objectives of the study, seeking for their voluntary consent before becoming research participants. Respondents participated on the basis of informed consent which involves researchers providing sufficient information and assurances to respondents taking part to allow individuals to understand the implications of participation and to reach a fully informed decision (appendix: VIII). The principle of informed consent considers a free decision making process to choose whether to participate or not to do so, without the exercise of any pressure or coercion, Saunders & Lewis (2012). All scholars, books, documents, journals were acknowledged through citation and referencing at the end of the report to avoid plagiarism. Consent forms which were signed by every participant are attached in Appendix VII.

The methods used enabled the researcher relate the respondents' views to the observations made using prior theories to analyze the data collected in order to achieve the objectives of the study. Analysis of the data and relating it with the theories therefore justifies the relevance of the use of equipment in the department of automotive mechanics thus improving the quality of skills and competences acquired by the graduates joining the employment world.

CHAPTER FOUR: PRESENTATION AND DISCUSSION OF FINDINGS

4.0 Introduction

This chapter presents the findings of the study in form of narrative text, pictures in addition to observations, and interviews held with stakeholders. The purpose was to find out how the use of equipment in the automotive department of Bbira Vocational training institute contributes to the acquisition of skills and knowledge required in the world of work in Uganda. The action research was carried out with the intention of analyzing and improving the equipment use in the department and therefore the instructors and trainees were involved in the process since they contribute to the teaching and learning process. For systematic flow of the chapter, the presentation and analysis of the findings are in relation to the objectives of the study as reflected in chapter one:

- i. To identify the vocational training equipment in the Automotive Mechanics Department in Bbira Vocational Training Institute.
- ii. Determine the relevance of the vocational equipment in the Automotive Mechanics Department at Bbira Vocational Training Institute.
- iii. Implement the use of the vocational equipment for skills training in the automotive mechanics department at Bbira Vocational Training Institute.

Findings are presented under themes derived from the study objectives, supported with images and records made from the observation and testing of the equipment condition in the asset register (Appendix IX) with a copy submitted to management. This shows the description, quantity and condition of the tools and equipment in the automotive department of Bbira Vocational Training institute.

4.1 Vocational Training equipment in the Automotive Department in Bbira Vocational Training Institute

The trainees offering National Certificate in Automotive Mechanics (NCAM) undergo a two year standardized formal qualification in the education system where institutions redirect their expertise in abstract theoretical knowledge to more Competence based Training through hands-on experience and practice of the duties expected of a trained automotive mechanic. This ensures that trainees practice and appreciate the importance of appropriately using various tools and equipment in the repair and maintenance of motorcycles and vehicles



Figure 4: Practical lessons on motor vehicle repair in automotive department

4.2 Presentation, analysis and interpretation of findings of Objective one

The first objective of the study was to identify the vocational training equipment in the Automotive Mechanics Department in Bbira Vocational Training Institute. The researcher conducted face to face interviews with the instructors and trainees in the department who responded to, as well as reviewing the available documents.

4.2.1 Respondents

The respondents, who consisted of both male and females as shown in table 5, showing gender consideration in the operations of the automotive department by virtue of their professional role, power, expertise / experience and interest in the training outcomes.

The employer stressed the fact that; ‘training institutions should endeavor to train the students by providing basic elementary knowledge and practical skills using the available tools and equipment but there is a significant gap in transforming these skills taught in the changing technologies in the world of work’.

Trainers and institutions are advised to strongly consider coordinating with the industries and factories to orient the trainees in the available industrial machinery through study tours and field visits or supervised periodic industrial Training (IT) attachment. They further advice continued career guidance and interaction with the trainees as they embark on the study to equip them with the expectations from the employers as they begin their journey in vocational education and training.

Table 5: Vocational Experience of Respondents during the research

Category	Number of Respondents		Experience and Practical Skills
	Male	Female	
Administrators	01	01	9 and 13years
Instructors	01	01	4 and 7 years respectively
Trainees	06	00	2 years as trainees
Employer	01	00	15 years
Total	09	02	

The employers noted their concern with the scope and content of the training which is provided by the curriculum in relation to the competence acquired and relevance of the skills required by the industries / enterprise that employ graduates. National accreditation and award of certificates is based on mutual recognition of the competencies that have been achieved and clearly specify clear pathways for further education and training which contributes both to the credibility of the qualifications and the system. Responses from the administration and instructors show that the department strives to train the practical skills that are demanded by employers through engaging trainees in real life projects that expose them to the professional approach to problem identification, diagnosis and repair. The researcher observed that the head of section together with the instructors engage the students in the identification of gaps in the institute or in the community, whereby proposals with the bills of quantities are written by the students, assessed by instructors, and submitted to the management for consideration. The department therefore engages youth in acquisition of practical skills that are applicable in the world of work. With the “learn as you earn” approach, students are able to engage in daily repairs which include, motorcycle and bicycle service and repairs, maintenance of specific engine components, engine diagnosis, overhaul and repair, brake and clutch repair and maintenance, while considering safety regulations and the use of various tools and equipment available in the department.



Figure 5: Instructor demonstrating to Trainees about tools used in a practical lesson



Figure 6: The researcher with the trainees during a real life project practical

It was observed that the abilities of the trainees, training content and organizational support from both the institute and world of work greatly impacted the effective use of the tools and equipment, since their availability and relevance in the department was justified by the skills that were directly applicable in the industries. The administrators and instructors interviewed expressed their commitment and desire to provide hands on skills to trainees since they had also gone through a similar path of training that involved industrial Training (IT) to practice the knowledge and skills taught at the institute. The time table followed in the department incorporates both theory and practical lessons which include, life skills, entrepreneurship, Engineering drawing, Applied mathematics, technician science, technology and auto-electric plus the practical lessons and real life project . Through experience and continuous working with students, one instructor noted that;

A number of students trained at the institute have more interest to learn the practical skills and are self-motivated since they are always eager to learn so that they relate to their expectations of earning a living once they complete their studies.

This was also observed by the students' readiness to prepare for planned practical lessons by identifying the appropriate tools and equipment indicated on a worksheet. One trainee was glad to note that;

He had acquired the skill of identifying the spanner sizes from the tool box and their application immediately after diagnosing a fault on a vehicle, which improved the time taken to carry out the actual repairs instead of randomly guessing tools that are needed for a given job / activity.

The students also engaged in diagnosing faults with the guidance of their instructors and garage technician where they assess work brought by external customers giving them an opportunity to relate the theoretical work taught in class and also engaging in the actual service, dismantling and assembling tasks. A student said that "he had the satisfaction in being part of the team that was involved in the repair of a customer's vehicle" while another was happy that "With the guidance of his instructors and technicians during repair work, he was motivated to have customers trust them with their motorcycles and vehicles since it provided an opportunity to rectify different faults". This also encourages the students to apply the knowledge learnt in life skills and entrepreneurship through customer handling, negotiations and reporting.

Certification offered by the directorate of Industrial Training (DIT) and the Uganda Business and Technical Examinations Board (UBTEB), requires the institute to train Approved Training Packages (ATP) and Syllabus as guided by National Curriculum Development Centre

(NCDC) and therefore recommended tools and equipment are required to deliver the skills and knowledge to the trainees. All Institutions which provide trained/ qualified workers to the world of work follow a designed curriculum that specifies the appropriate content, providing tools and equipment plus other necessary infrastructure as a pre- requisite as noted by Arimonu, (2016). It is, therefore, a mandate of the administrators to have skilled and motivated trainers / instructors to train in the various competencies and ensure effective partnership and collaboration with the employers to ensure that the trainees benefit by getting industrial training attachment while the employers and institutions provide organizational support.

4.2.2 Tools and Equipment

Motor vehicle repair generally involves three sectors such as, mechanical preventive / routine repairs, body repairs and breakdown maintenance. These require the use of any of various hand tools, power tools and machines such as hammer, wrenches, screw drivers and jerk stands commonly found in the automotive department. Air compressor, Jack, jack stands, oil drain, battery charger and jumper, engine hoist, wrench set, full tool box consisting of open, ring and box spanners, screw drivers, pliers and hammer. The tools are tough but they are susceptible to rust and damage caused by exposure and mishandling. Other basic tools and equipment used in the automotive department of Bbira vocational training institute were compiled in the asset register, refer to Appendix IX, submitted to management.

Armature testers, engine block models, Final drive model, battery tester, mallets, taps and dyes, batteries, battery tester, wheel spanners, wire stripper, hand drill, starter motors, vernier calipers, micrometer screw gauges, alternators, valve compressors, feeler gauges, pressure gauge, clamps, table vice, meter rule, flat / round /square files, tool box, tyre lever, axle stand, flat/ star screw drivers, steering rack, drilling machine, welding machine, grinding machine, bending

machine, filter wrench, squares, snip, rail guide, torque wrench, multi-meters, engines, grease gun, riveting gun, compressor, tyres, motor cycles, diesel engine blocks, a petrol vehicle, 3000kW generator for training purposes.



Figure 7: Tools in the automotive department

Other tools used in welding range from welding glasses (auto darkening), welding helmet, chipping hammer, cuff gloves, welding rods and welding machine which are instrumental in the repair and maintenance of institute beds and metallic chairs thus reducing the maintenance expenses incurred by the institute. Consumables used include, engine oil, lubricants, oil filters, air filters, grease, cramps, wheel bearings, silicon, brake fluid, coolant, Automotive Transmission Fluid (ATF) air filter, sulphuric acid, petrol filters, diesel filters and cotton waste among others.

Generally the following were some of the observations made about the tools in the automotive department:

- i. Worn out tool boxes were continuously being used due to continued daily use.

- ii. Some equipment were not enough for training and students were required to learn in groups depending on the work load received or during examinations, delays in execution of work may affect the effective time to repair a fault.
- iii. The department did not have records for borrowing and using tools from the workshop and heavy duty machines had no “Tag out’ or ‘Lock out’ labels in case of malfunction. This creates a risk of harming a trainee who may not have prior knowledge about the condition of the machined and he/she may be injured.
- iv. Some equipment were not in use due to mal-function and could not be repaired due to lack of spare parts since they require obsolete technologies and are therefore not relevant in the current syllabus.
- v. Outdated/obsolete old machines and tools are used at the institute for training compared to those in the industries and factories

Inadequate space for both learners and equipment during the mandatory social distance recommendations made by the ministry of Health and Ministry of Education during the reopening of schools and institutions after the covid-19 lock down. The automotive department was utilizing the available parking and compound space to carry out repairs until management intervened and constructed a garage with a service pit to simulate the actual workshop / garage operations

4.2.3 Equipment Maintenance and repair

Maintenance is an investment that gives more production time which allows for maximum utilization of the tools in the department while maintainability refers to the probability that a failed equipment or system can be restored to its operable condition within a specified down time defined in the handbook of performability engineering and cited by Misra, (2008). Workshops often utilize supplier manuals for the initial installation procedures and maintenance of complex equipment

with automation that may require the maintenance team to improve the quality and quantity of their maintenance techniques. This helps in preventing/eliminating breakdowns and therefore improving the use of fire-fighting equipment. To maintain tools and equipment at maximum efficiency ensures operational safety and reduces down time of training in the department of workshop. Therefore the total effectiveness of the tools and equipment used is determined by the reliability and availability, Sawhney (2010) therefore the effectiveness of equipment used in the automotive workshop can be got from per the expression below;

$$\text{Tools and Equipment Effectiveness} = \text{Reliability} \times \text{Availability} \dots\dots\dots (i)$$

Training Institutions and industries therefore need to adopt systems that need to continuously run hydraulic or pneumatic systems as well as electrical / electronic systems to operate their main activities to avoid unplanned breakdowns and down time which affects production.

4.3 Relevance of the Vocational Training Equipment in the Automotive Mechanics

Department in Bbira Vocational Training Institute

The second objective was to determine the relevance of the vocational equipment in the Automotive Mechanics Department at Bbira Vocational Training Institute. Work based learning is a strong reflection of the potential for employment of youth and therefore the effectiveness of TVET and importance of creating well rounded training in vocational institutes provides a reliable and employable workforce and hence personal growth. Industrial training, (IT) / apprenticeship and on job training should be linked with institution based training where the understanding of the scientific, technological, social, cultural, environmental, economic and other aspects of the society which are analyzed as well as developing competences of trainees to prepare them for occupation fields. Using the equipment in the automotive department, trainees are equipped with

technical skills in motor vehicle repair and they are able to acquire knowledge about the various kinds of spare parts applied in motor vehicle repair. Safety measures necessary in motor vehicle repair is important to both the technician and vehicle user. Soft skills such as communication, diagnostic and problem solving skills as well as customer care and security measures are important to relate well with customers. The relevance of the available equipment was observed in the routine short term and long term repair schedules for the tools and equipment that include lubrication, assembling and dismantling, inspection, adjustment and defect rectification, vibration / sound output records, wear and tear analysis, diagnostic analysis and preventive or predictive maintenance of the equipment. Major repairs, overhauls, renovation and modernization to incorporate modern technologies is applied in the industries in order to improve production and efficiency. This requires experienced specialists who install, setup, align, test and commission the equipment as per the manufacturer's guidelines.

4.3.1 Motorcycle Repair

System diagnosis, Servicing CV joints, replacement of driving shafts, replacing brake shoes, inspection of front axle run out and front wheel bearing, front and rear tyre replacement, chain slack adjustment as per manual recommendations. Battery servicing and CBET assessment was done by Directorate of Industrial Training as shown in Figure 8 for individual trainees.



Figure 8: Practical Training and Assessment for motorcycle repairs

4.3.2 Motor vehicle Engine Diagnosis and Repair

Hands on training is done using an institute training vehicle, where learners practice tyre replacement, routine daily and weekly maintenance checks, Servicing, replacement of brake shoes, dismantling and assembling engine parts, car system assembly diagnosis and others. It was noted that there is a high demand for graduates with extensive knowledge in vehicle repair and welding techniques coupled with strong ability to read and interpret engineering drawings and blue prints. They should also possess excellent oral and written communication skills while applying both mechanical and manual repair and welding practices.



Figure 9: Motor vehicle diagnosis and repair

Some of the real life projects that are done in the automotive department include engine overhaul, fabrication of windows and compound seats as well as making metallic tables for the institute depending on the need and availability of funds and resources for making the required products. This exposes the trainees to the practical experience of the project cycle which includes planning, drawing plans, estimating bills of quantities and the actual execution of cutting the expected measurements while ensuring the safety precautions are adhered to and the quality / durability of the resulting product is put into consideration.

4.3.3 Technologies Used

The amended Road safety and Traffic Act, (2018) where the government policy of not importing vehicles of old models into the country created a need to improve the technologies taught at institutional level in regard to the foreseen repair of the new vehicle models and the department suggested that the institute procures a modern On- board Diagnosis machine (OBD) which enables the technician to effectively assess the status of various vehicle sub- systems for efficient vehicle

diagnosis and repair. Generally, the trainees are equipped with knowledge and skills that enable them compete favorably in the world of work both locally and internationally thus providing job opportunities for the graduates from the department. This calls for the provision of modern workshop equipment and employment of qualified and experienced teachers for effective teaching/training of students in order to achieve the objectives of vocational and technical education. The figure 10 below shows a typical Onboard Diagnostics (OBD) hand held scanner used to connect the SAE J1962 Data Link Connector (DLC) which is found in many cars and a Multi-brand vehicle diagnostics system handheld Autoboss V-30 with adapters for connectors of several vehicle manufacturers.



Figure 10: Various angles of a "Max Scan OE509" and a Multi-brand vehicle diagnostics hand held system Auto Boss V-30

With the effective use of modern tools and equipment during training, students are introduced to better diagnosis techniques and they can therefore actively engage in the repair and maintenance of current vehicle models. There is need to consider the safety of tools and equipment in order to maintain their durability and reliability thus allowing the trainees practice the skills that are useful in the world of work.

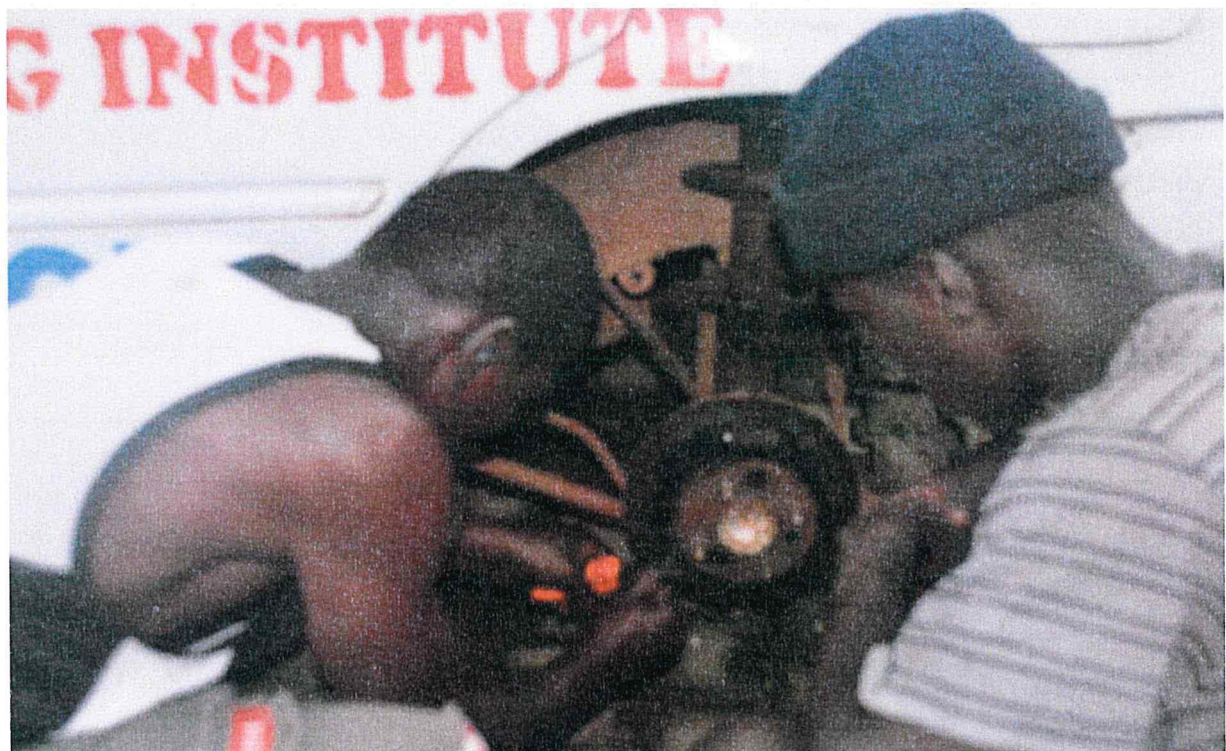


Figure 11: Practical lessons and real life Projects in the automotive department

4.4 Implementation of the use of vocational equipment for skills training in the Automotive Mechanics Department at Bbira Vocational Training Institute

The third objective was to implement the use of the available vocational tools and equipment for skills training in the automotive department at Bbira Vocational Training Institute. It was observed that the available tools and equipment in the automotive department were not clearly identified and described in the equipment register and the therefore, with support from management, engraving of all tools and equipment was done and the equipment register was updated. This also served as a verification of the quantity and state of the equipment which will inform management of the need of acquiring more tools for the increasing number of students in the department. In line with the institute motto “Learn as you earn”, the trainees, under the guidance of their instructors were able to perform actual repair of motorcycles and motor vehicle repairs for moderate customers in the surrounding community, who provide their own service materials. This offers relatively affordable professional services as well as further strengthening the confidence to both the trainees and the customers about the relevance of the skills taught at the institute.

CHAPTER FIVE: SUMMARY CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter presents the summary, conclusion of findings and some recommendations which were identified to help in improving the training/learning process at Bbira Vocational Training Institute, with regards to practical skills acquisition.

5.1 Summary

The research was carried out at Bbira Vocational training institute to analyze the technical equipment use in the automotive mechanics department. The practical skills acquired by the trainees depend on their ability to effectively utilize the available tools and equipment and therefore apply the skills in the world of work. Proper maintenance and repair of the equipment improves their effectiveness and reliability during training. The following were identified for each research objective respectively;

5.1.1 Objective one

To establish the equipment available for training which were found to provide the basic understanding of the skills required but inadequate in the use of technologies to enhance training. With the data collected from the stakeholders, it was noted that mechanics from most institutions of learning including Bbira Vocational Training Institute may have gaps/set-backs as regards the application of the skills acquired during training in the world of work, mainly because of the discourse in the actual tools and equipment available for training compared to the industrial equipment and machinery. The skills gap prevents employers from finding the talent they need Joerres, (2012). The high cost of purchasing and maintaining these industrial tools and equipment

hinder institutions from acquiring the high cost equipment which cannot be converted into business avenues for production as the case for industries that specialize in these trades. Udofia et. al. (2012) noted that imparting of skills to learners requires tools, equipment, machines, workshops and effective utilization of these facilities. There is a significant relationship between workshop equipment for training and the ability of students acquiring employable practical skills since equipped workshops enable competent / experienced teachers / Instructors train effectively.

5.1.2 Objective two

To determine the relevance of the vocational equipment in the Automotive Mechanics Department, the researcher Elagovan (2015) observed that education and training on equipment handling and maintenance contributes to the effective and efficient operation of tools and equipment thus minimizing the challenges associated with interruption of the skills training process due to breakdowns or wear and tear. The machines and equipment are kept in good working conditions after use so that the efficiency and life of the equipment are increased. A trained auto mechanic requires little on-the-job training and can work independently without much additional instruction. Tools and equipment are effectively used by an operator / technician through application of knowledge and the use of manuals while engineers / specialists manage and operate sophisticated equipment and machinery through research, advanced knowledge and technology.

5.1.3 Objective three

Cleaning tools and proper storage are essential to maintain their relevance as well as save time and money by avoiding unnecessary costs of repair and replacement. It is advisable to keep all instruction manuals for tools and equipment at commissioning since they provide the necessary information and specifications required for replacement of parts, tool care, warranty and trouble

shooting. The automotive department tools and equipment were engraved for proper identification and designated storage areas were demarcated to enable quick and effective monitoring. Participation of the students in the identification of the frequently used tools and equipment enables them learn how to easily prepare for a given job and also return the tools to their respective storage positions. The sophisticated equipment however require authorization of the head of department to prevent unforeseen damage and possible accidents in the department. Introduction of record for the use of the tools enabled the instructors and students track the use and also carry out routine stock taking. This captures the intended use for tools / equipment that are needed for a given purpose.

5.2 Conclusions

The availability of technical equipment, tools machines and other technical facilities as well as effective utilization of these facilities in teaching/training of students in institute equips them with employable skills. The effective utilization of the instructional materials accelerates the delivery of the concepts and ensures that students acquire skills. The findings of the study showed that workshop equipment available in the Automotive Department, instructional materials and instructors' experience enable the students acquire employable skills. Participants' views revealed enormous information regarding the availability, relevance and hands-on use of auto mechanic equipment at Bbira Vocational Training Institute, out of which emerged the recommendations for further action

5.3 Recommendations

Equipping learners with modern techniques / up to date technologies in motor vehicle repair in training institutes e.g application of appropriate skills and use software creates a strong technical aptitude thus building confidence and the reliability of the vehicle repairs done in the world of work. Following the discussions with stakeholders and observations by the researcher throughout the study, the following recommendations were made;

1. Modern technical equipment, tools, machines and instructional materials should be made available by the institute to the workshops to enhance the training of students for the acquisition of employable skills and for self-reliance.
2. Well qualified and experienced teachers require refresher training to gain practical expertise which enables the effective teaching / training of students in technical colleges. The re-fresher training enhances their skill and professional knowledge, competency to meet changing technologies in order to facilitate productivity thus ensuring that the students are adequately trained and motivated to acquire the expected skills for their employability and self-reliance.
3. Most importantly, there is need for the institute to have active collaboration and engagement with the industries in world of work that introduce the new technologies to the trainees through industrial training and internship placement. This initiative can be supported by the BTVET department for its effective monitoring.

5.3.1 Areas for further research

This study analyzed the effectiveness of vocational training equipment used in skills training of automotive mechanics trainees. Further research should be carried out to analyze the integration of competence training to assess suitability for skill application in the world of work. This will enable learners to transition from an institutional set up to the intermediate world of work with guidance from skilled industrial supervisors.

Studies need to be done to assess the collaboration and engagement of employers and manufacturing industry in the development of the training syllabus and monitoring of delivery training content to suit the need of the evolving economy and development. The role of government in ensuring that training institutions acquire adequate tools and equipment for effective training of vocational skills may be studied through further research.

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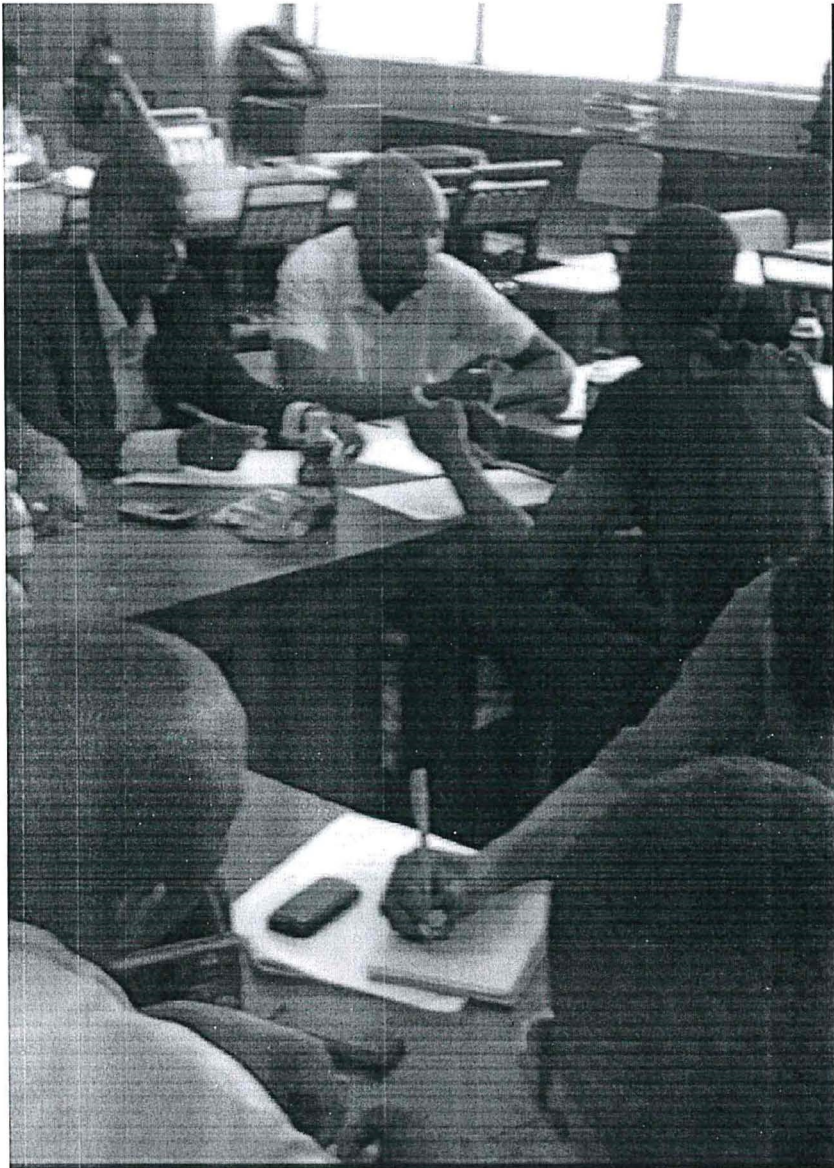
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Appendix 1: Focus group discussions



Appendix II: Work plan


The table below shows the overall project schedules for each activity of the project.

S/N	ACTIVITY	2019/2020					2021/2022				
		SE PT	OC T	NO V	FE B	MA R	NO V	DE C	FE B	MA Y	JU NE
1	SITUATION ANALYSIS										
2	LITERATURE REVIEW										
3	PROPOSAL WRITUNG										
4	PROPOSAL PRESENTION AND SUBMISSION										
5	PROPOSAL SUBMISSION										
6	DATA COLLECTION AND IMPLEMENTATION										
7	COMPILATION AND REPORT WRITING										
8	INTENTION TO SUBMIT										
9	VIVA THESIS DEFENCE										
10	SUBMISSION										

Appendix III: Budget Estimate

S/N	ITEM	RATE (UGX)	QUANTITY	AMOUNT
1.	Reams of Paper	20,000/=	01	20,000/=
2.	Flip Charts	25,000/=	02	50,000/=
3.	Markers	20,000/=	1 packet	20,000/=
4.	Box Files	15,000/=	02	30,000/=
5.	Internet and data for Research		200,000/=	200,000/=
6.	Transport	-	-	150,000/=
7.	Refreshments & meals	20,000/=	10	200,000/=
8.	Communication / Airtime			80,000/=
9.	Printing and Binding documents			70,000/=
10.	Miscellaneous			50,000/=
	TOTAL			870,000/=

Appendix IV: Introduction letter from Kyambogo University


KYAMBOGO UNIVERSITY
P. O. Box 1 Kyambogo, Phone: 041-285001/2 Fax: 041-220464
www.kyambogo.ac.ug
SCHOOL OF ART AND INDUSTRIAL DESIGN
DEPARTMENT OF VISUAL COMMUNICATION
Masters in Vocational Pedagogy Programme

02/ FEB /2022

BBIRA VOCATIONAL TRAINING INSTITUTE
P.O. BOX 6551 KAMPALA

Dear Sir/Madam,

RE: INTRODUCTION OF Ms. NANKANJA JULIET

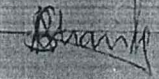
This comes to introduce to you Nankanja Juliet A student
of Masters in Vocational Pedagogy (MVP) Programme at Kyambogo University.

This student bears registration no. 18/U/GMVP/19605/PD and in his/her final
year.

In partial fulfillment for the ward of MVP Programme of Kyambogo University, This student is
expected to conduct a future workshop at his/her workplace.

The purpose of this letter therefore, is to request you to allow
NANKANJA JULIET conduct his/her Research at
the automotive Mechanics department and accord him/her the necessary
support for his/her study.

Looking forward to your usual support.

Yours Sincerely,

Dr. Nabaggala Justine
Head of Department, Visual Communication

Appendix V: Request Letter to Conduct Research

18th March, 2020

The Principal
Bbira Vocational Training Institute
P.O. Box 6551 Kampala (U)

Dear Sir / Madam,

RE: REQUEST TO CARRY OUT RESEARCH AT BBIRA VOCATIONAL TRAINING INSTITUTE.

I appreciate your contribution towards vocational education and training in Uganda.

I am student the Masters of Vocational Pedagogy program (MVP) at Kyambogo University and *carrying out action research*. I would like to have an interaction with you and your staff to collect and analyze data that will impact the delivery of services at the institute.

This is therefore to request you allow me interact with various stakeholders such administrators, instructors and trainees through future workshop to get basic information about the concerns in the training activities. The time allocated for this research is 21st March - 24th Dec 2020.

The findings of this study will be treated with the highest level of confidentiality.

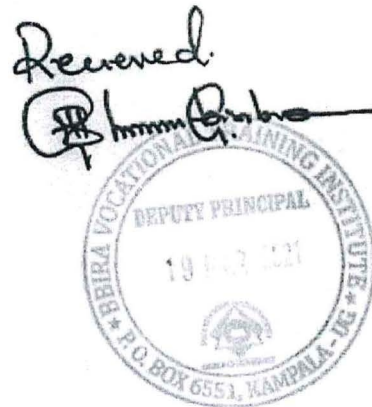
I look forward to your positive response.

Thank you,

Yours Sincerely,



NANKANJA Juliet
RESEARCHER / STUDENT
Masters in Vocational Pedagogy Programme



Appendix VI: Interview guide

INTERVIEW GUIDE FOR TRAINERS, TRAINEES, ADMINISTRATORS AND EMPLOYERS OF GRADUATES

Dear Respondent (Sir /Madam),

I am Nankanja Juliet from Kyambogo University Pursuing a Masters Degree in Vocational Pedagogy. I am carrying out a study entitled; **ANALYSING TECHNICAL EQUIPMENT USE IN THE AUTOMOTIVE MECHANICS DEPARTMENT AT BBIRA VOCATIONAL TRAINING INSTITUTE**

The Specific Objectives for this Study are to:

- i. To identify the vocational training equipment in the Automotive Mechanics Department in Bbira Vocational Training Institute.
- ii. Determine the relevance of the vocational equipment in the Automotive Mechanics Department at Bbira Vocational Training Institute.
- iii. Implement the use of the vocational equipment for skills training in the automotive mechanics department at Bbira Vocational Training Institute.

I am kindly requesting you to provide the necessary information that will be used to improve vocational education in Uganda for the skills required in the world of Work.

The information given will be treated with utmost confidentiality and is for academic purposes only.

Thank you so much for your cooperation.

The study is done as a requirement in partial fulfilment for the award of a degree of master in vocational pedagogy of Kyambogo University.

1.0 General information

1. What is your title and Occupation/ trade?
2. How long have you served in the current position and what duties do you perform at Bbira VTI or Workplace?
3. What is the administrative structure of the automotive department and its role in the Education system of Uganda?

2.0 Logistics about training and equipment in the department / workplace

- (i) Is there a training program followed for training graduates?
- (ii) What are the tools / equipment used in the process of training and how do the trainees use these tools and equipment?
- (iii) Are the trainees given hands-on skills practice during training?

3.0 Stakeholders involved in the training of automotive hands-on skills required of graduates

- (a) What are the competences required by employers of the graduates who use these equipment?

Knowledge, Hard / Soft skills, Attitudes, values, Experience, Qualification

- (i) How relevant are the materials, tools and equipment used in the skills training to the world of work?
- (ii) How does the institute facilitate the various stakeholders involved in the training of graduates in relation to acquisition of automotive skills?
- (iii) Of what relevance is the available knowledge and skills applicable in the world of work?

Thank you for your contribution.

Appendix VII: Invitation to attend Vocational Pedagogy Workshop

Our Ref: VSO/31/08/20

31st August 2020

To _____

Dear Sir/Madam,

Re: Invitation to Participate in a Partners' Capacity Building on Vocational Pedagogy Phase II

MasterCard Foundation Supports VSO Uganda and BRAC Uganda to implement formal and non-formal skills training Project by working with several Institutions. These institutions include; Health training Institutions, Vocational training Institutions, Fisheries training Institute, Meteorological institute and Agricultural College. The program contributes to the Skilling Uganda Strategy. One of the project's objectives, is to continuously support institutions by building the capacity of the instructors to improve the delivery of the training curriculum.

To that effect, VSO-Uganda and BRAC-Uganda cordially invites 2 lecturers/instructors to participate in Vocational Pedagogy phase II training that will last for one and half days. In order to consolidate learning outcomes, the program therefore highly recommends participants who attended the first phase of training to take part in this phase II training.

The venue for the training will be **Hotel International-Muyenga in Kampala**. The training will run for 1 and half days on **7th and 8st Sept 2020 for the first group and from 9th and 10th Sept 2020 for the second group respectively**. The training has been split into two training groups in order to have few participants in each session in accordance with COVID-19 Pandemic MOH social distancing guidelines. The training will start at **8:30am every day**. Participants are strongly encouraged to meet costs of travel and accommodation, which will be reimbursed through mobile money a day after the training.

For further information and direction to the venue contact Chris on 0787530843 or 0759315183.

NB: The hotel will reinforce Ministry of Health COVID-19 safety guidelines such as hand washing, sanitizing, social distancing, and wearing of facial mask, et cetera. Whereas the hotel will provide adequate hand washing facilities and sanitizers, participants are reminded to come with a face mask and wear it at all times during this training.

We are looking forward for your presence and participation. The training program will be issued by the facilitators on day 1.

Yours Sincerely,

A handwritten signature in black ink, appearing to read 'David Lukwago', with a long horizontal flourish extending to the left.

David Lukwago.
Head of People and Operations
VSO Uganda

List of Institutions invited.

Group one from 7th to 8th Sept 2020				
S/N	Name of Institutions	M	F	Total
1	Gulu Institute of Health Science	1	1	2
2	Gulu School of Clinical Officers	1	1	2
3	Kagando school of medical Lab	1	1	2
4	UTC-lira	1	1	2
5	UTC-Kichwamba	1	1	2
6	UTC-Kyema	1	1	2
7	Jinja Vocational Training Institute	1	1	2
8	Bukalasa Agricultural College	1	1	2
9	Jinja School of Nursing	1	1	2
10	Uganda Hotel and tourism Institute -Jinja	1	1	2
Group two from 9th to 10th Sept 2020				
1	St Francis School of health Sciences	1	1	2
2	Nile Vocational Training Institute	1	1	2
3	Lady Valeria	1	1	2
4	Bbira Vocational Training Institute	1	1	2
5	Mengo School of Business & Vocational Training Institute	1	1	2
6	The Cooking School Uganda	1	1	2
7	MTAC	1	1	2
8	Fisheries Training Institute-Entebbe	1	1	2
9	National Meteorological Training Institute	1	1	2
10	Andy Art of Home	1	1	2

Appendix VIII: Informed Consent Letter signed by respondents

Dear Sir / Madam,

RE: CONSENT LETTER

You are kindly requested to participate in the research study analyzing the use of tools and equipment in the automotive department. The study is being conducted by Nankanja Juliet, who is a student of Kyambogo University doing a masters in vocational pedagogy.

Your participation and open discussions with the researcher will involve recording of your opinions during interviews, taking photos and audio recording.

You are requested to voluntarily participate in the study and your choice to participate or not to participate will not affect your current or future relations with the administration of the institute. If you decide to participate and you later feel like changing your mind, you are free to withdraw. Participation in the study might cause fatigue in the course of the study through meetings and further review of processes, requests for emphasis on particular routines and their outcomes and responding to verbal interviews that may need expression of individual opinions but the study will not pose any risk to your safety and wellbeing.

The information you provide will be treated with the highest level of confidentiality it deserves and the researcher will not use your personal information for other purpose outside the research project. Data will only be accessed by the researcher and saved on her computer with a personal password and you will be free to ask questions or reach the researcher on 0775200203 / 0752123081 for any clarifications.

I have clearly read the above information and I feel I understand the study well to make my personal decision to be involved in the study. By signing below, it means that I am agreeing to the terms and conditions described above.

Name of participant: BATAT GERARD

Participant's Signature: Bat

Date: 17/02/2022

Dear Sir / Madam,

RE: CONSENT LETTER

You are kindly requested to participate in the research study analyzing the use of tools and equipment in the automotive department. The study is being conducted by Nankanja Juliet, who is a student of Kyambogo University doing a masters in vocational pedagogy.

Your participation and open discussions with the researcher will involve recording of your opinions during interviews, taking photos and audio recording.

You are requested to voluntarily participate in the study and your choice to participate or not to participate will not affect your current or future relations with the administration of the institute. If you decide to participate and you later feel like changing your mind, you are free to withdraw. Participation in the study might cause fatigue in the course of the study through meetings and further review of processes, requests for emphasis on particular routines and their outcomes and responding to verbal interviews that may need expression of individual opinions but the study will not pose any risk to your safety and wellbeing.

The information you provide will be treated with the highest level of confidentiality it deserves and the researcher will not use your personal information for other purpose outside the research project. Data will only be accessed by the researcher and saved on her computer with a personal password and you will be free to ask questions or reach the researcher on 0775200203 / 0752123081 for any clarifications.

I have clearly read the above information and I feel I understand the study well to make my personal decision to be involved in the study. By signing below, it means that I am agreeing to the terms and conditions described above.

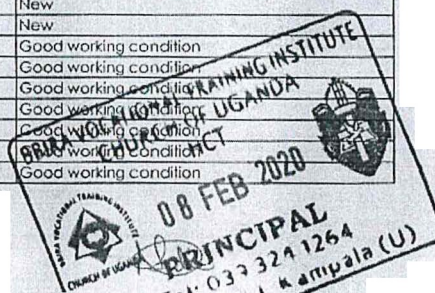
Name of participant: Dnkam YICENT

Participant's Signature: [Signature]

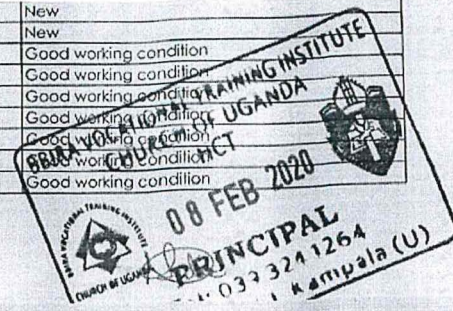
Date: 28/02/2022

Appendix IX: Tools and Equipment in the Asset register for the Automotive Department

MOTOR VEHICLE/AUTOMOTIVE MECHANICS SECTION					
Battery charger - CB-30(eDON)	1 pc		Training	Faulty	
Lead-acid battery (UBL N50-50AH, UBL NS60-45AH)	2 pcs		Training	Only UBL N50-50AH is working (new).	
Lead-acid battery (EXIDF N50, INCQE N70, FB-44B 19L)	3 pc		Training	Faulty	
Vice	3 pcs		Training	Good condition.	
Alternators (1 detachable & 2 non-detachable diodes)	1 pc		Training	Only the detachable one is working.	
Welding machine (Wet-type/oil-cooled)	1 pc		Training	Good working condition	
Battery tester - Analog	1 pc		Training	Good working condition (New)	
Compressor (Marshal, Italy)	1 pc		Training	Working well	
Starter motor	1 pc		Training	Faulty	
Greasing gun (MATO, 4615C)	1 pc		Training	Working well	
Petrol engine	1 pcs		Training	Faulty	
Diesel engine	2 pcs		Training	Not in good working condition	
Cylinder blocks (4-stroke, 4 cylinders)	1 pc		Training	Faulty	
Pressure gauge (Max. 12 bar)	2 pcs		Training	Good working condition	
Engine models (2-stroke, 4-stroke)	2 pcs		Training	Good working condition	
Final drive model	1 pc		Training	New	
Digital multimeters (A830L)	2 pcs		Training	New	
Vernier callipers (VIGEX 200*0.05mm)	2 pc		Training	One is faulty	
Micrometer screw gauge (GT Tools 0.25*0.01mm)	1 pc		Training	Okay	
Screw jerk	2 pcs		Training	Faulty	
Motorcycles - (MXK 125 K55, Honda)	3 pcs		Training	Faulty	
Cylinderheads (4-stroke, 4 cylinders)	1 pc		Training	Faulty	
Torque wrench (KINGROY, germany)	1 pc		Training	Good working condition	
Oil cans (CHETAK)	2 pcs		Training	Okay	
Gearbox - 4 Speed	1 pc		Training	Faulty	
Propeller shaft	2 pcs		Training	Faulty	
Silencer	2 pcs		Training	Faulty	
Filter spanner (Chain type)	1 pc		Training	Good working condition	
Ring squeezer	1 pc		Training	Good working condition	
Differential unit	1 pc		Training	Faulty	
Radiators	3 pcs		Training	Not in good working condition	
Tyres (Tubeless)	4 pcs		Training	Two are faulty	
Hacksaws	2 pcs		Training	Good working condition	
Clamps	1 pc		Training	Good working condition	
Tyre lever	1 set		Training	Good working condition	
Chisels	9 pcs		Training	Good working condition	
Drill bits (HSS)	4 pcs		Training	Good working condition	
Oil filter (Genuine Parts 90915 30002)	2 pcs		Training	Good working condition	
Air filter (OFA 17801-61030, AZUMI)	4 pcs		Training	New	
Fuel filters EFI	5 pcs		Training	New	
Wheel bearings (MAXPART-DAC4382W-3)	10 pcs		Training	Good working condition	
Bearing seals (48*62*7)	16 pcs		Training	Good working condition	
Screw drivers	21 pcs		Training	Good working condition	
Spanner box (No. of spanners counted)	4 pcs		Training	Good working condition	
Extensions (KINGSTAR)	4 pcs		Training	Good working condition	
Universal joints (KINGSTAR)	1 pc		Training	Good working condition	
Sliding T-bar (KINGSTAR)	31 pcs		Training	Good working condition	



Air filter (OFA 17801-61030, AZUMI)	4 pcs		Training	New
Fuel filters Efi	5 pcs		Training	New
Wheel bearings (MAXPART-DAC 4382W-3)	10 pcs		Training	Good working condition
Bearing seals (48*62*7)	16 pcs		Training	Good working condition
Screw drivers	21 pcs		Training	Good working condition
Spanner box (No. of spanners counted)	4 pcs		Training	Good working condition
Extensions (KINGSTAR)	4 pcs		Training	Good working condition
Universal joints (KINGSTAR)	1 pc		Training	Good working condition
Sliding T-bar (KINGSTAR)	31 pcs		Training	Good working condition



Combined spanners (COLI)	16 pcs		Training	Good working condition
Hand files	7 pcs		Training	Good working condition
Empty tool boxes	1 pc		Training	Faulty (broken)
Bearing pullers	5 pcs		Training	Not in good working condition
Welding masks	2 pcs		Training	Good working condition
Hammers	1 pc	COU/VTSB/002	Training	Faulty
Drilling machine	3 pcs		Training	Good working condition
Vee-blocks	1 pc		Training	Good working condition
Axel stands	2 pcs		Training	Good working condition
Squares	4 pcs		Training	Good working condition
Stainless steel rules	1 pc	COU/VTSB/002	Training	Good functional state
Table	1 pc	COU/VTSB/039	Training	Good functional state
Office chair	1 pc		Training	Faulty
Armature testing machine (TI- Transverse LTD)	1 pc		Training	Faulty
Grease MP3 AMPOL	12 pcs		Training	New
Sulphuric acid	4.5L		Training	Okay
Taps and Dies (Fine Carbon)	14 pcs		Training	Not okay
Tapa measure (COLI)	1 pc		Training	Okay
Hydrometer	2 pcs		Training	Okay
Screw Drivers (5X100)	12 pcs		Training	Okay
Screw drivers Elera Germany	72 pcs		Training	New
Harmer MEG 400G Germany	06 pcs		Training	Okay
Screw driver Blue	09 Pcs		Training	Okay

Appendix X: Tools and Equipment in the Automotive Department

MOTOR VEHICLE SECTION ASSET REGISTER 2022

ITEM	QTY	ENGRAVED NO.	FUNCTIONING	NON-FUNCTIONING
Tool box	1pc/8spanners	CoU/BVTI/MVT/036	✓	
	1PC/ Empty	043	✓	
	1pc/ 12spanners	027	✓	
	1pc/ with 13spanners	038	✓	
Box of Fasteners	1ps/ with split pins	034	✓	
	1pc/ with nuts& cyclic locks	035	✓	
	1pc/with nuts	033	✓	
Armature tester	1pc			✓
Engine model	2pcs	006 & 010	✓	
Final drive model	1pc	005	✓	
Mallets	4pcs		✓	
Taps & dies	2box		✓	
Battery taster	1pc		✓	
Wheel spanners	5pcs		✓	
Wire stripper	1pc		✓	
Hand drill	1pc		✓	
Starter motor	3pcs		1pc	2pcs
Vanier caliper	2pcs	008	✓	
Alternators	2pcs			✓
valve compressor	1pc			✓
Pressure gauge	1pc		✓	
cramps	2pcs		✓	
table vice				✓
Meter rule	4pcs		✓	
Files	6pcs		4pcs	2pcs
Tool box	1pc/ with bolts and nuts	026	✓	
Tool box	1 box	003	full	
Pullers	3pcs		2pcs	1pc
Tool box	1pc	004	full	
Tyre lever	2pcs		✓	
Axle stand	1pc		✓	
Screw drivers	12pcs		✓	
Steering rack	1pc			✓
Batteries	9pcs		1pc	8pcs
Drilling machine	1pcs	037	✓	
Welding machine	1pc	022	✓	
Leg vice	1pc		✓	
Grinding machine	1pc	023	✓	
Tool box	1pc/ with 12spanners	040	✓	
Filter wrench	1pc		✓	
squares	3pcs		✓	
snip	1ppc		✓	
Rail guide	1pc		✓	
torque wrench	1pc		✓	✓