ENHANCING SKILLS ACQUISITION IN MOTOR REWINDING FOR ELECTRICAL INSTRUCTOR TRAINEES AT JINJA VOCATIONAL TRAINING INSTITUTE, UGANDA

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15/U/14597/GMVP/PE

A DISSERTATION SUBMITTED TO THE GRADUATE SCHOOL IN PARTIAL FULFILMENT FOR THE AWARD OF MASTERS IN VOCATIONAL PEDAGOGY OF KYAMBOGO UNIVERSITY

DECEMBER, 2017

APPROVAL

This research report has been written and submitted for the Master's degree of Vocational Pedagogy under our supervision;

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ACKNOWLEDGEMENTS

I extend my heartfelt thanks to the Norwegian Government through the NORHED Scheme Program for the sponsorship of students from Uganda; this scholarship made it possible for me to study.

I am indebted to my supervisors; Dr. Elizabeth Kyazike, Dr. Jacob L. Oyugi and Mr. Ali Kyakulumbye for their dedicated effort, encouragement and academic guidance during the hard times of undertaking this research.

I also extend my sincere appreciation to my mentors; Ms. Dinavence Arinaitwe, Mr. Chris Serwaniko, Dr. Nabaggala Justine, Dr. Elizabeth Opit, Prof. John Baptist Matovu, Ms. Joan Kekimuli, Ms. Lucy Ajambo, , Mr. Moses Ediedu, Mr. Tusiime Edwin Wycliffe and Ms. Aurelia Atukwase .

Further appreciation goes to the Principal of Jinja Vocational Training Institute. I also wish to acknowledge the Coordinator and Administrator of the NORHED project at Kyambogo University for granting me the opportunity to pursue the Master's degree in Vocational Pedagogy.

I also appreciate the contribution of my colleagues; Tiniye Daniel, Olema Vicent, Assaja Abraham John, Nansubuga Lydia, Nuwaga Joan, Mutebi Ronald, Muzito Tenywa Moses, Kikoyo Ben, Mwesigwa Joseph and SSesanga Hussein with who we struggled. Though short-lived; it was significant in my research project.

Finally I would like to thank all the stakeholders (the administration, teaching staff and student) who took time off their busy schedule to participate in this research project.

May the almighty God bless you all!

DEDICATION

This work is dedicated to my beloved spouse, son and daughter; Miss Naigembe Lydia, Musoke Male Victor and Nakalyango Noelyn Divine respectively.

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LIST OF ACRONYMS

BTVET:	Business Technical Vocational Education and Training
CBET:	Competence based education and training
CITTE	Certificate in Technical Teacher Education
DITTE:	Diploma Instructor and Technical Teacher Education
DVTI:	Diploma in Vocational Teacher Instruction
FW:	Future Workshop
ICT:	Information Computing Technology
JVTI:	Jinja Vocational Training Institute
MoES:	Ministry of Education and Sports
MVP:	Masters in Vocational Pedagogy
NCDC:	National Curriculum Development Center
NOMA:	Norwegian Masters Abroad
PAR:	Partcipatory Action Resaersh
PBL:	Problem based learning
TIET:	Teacher Instructor Education Training
TVET:	Technical Vocational Education and Training
UVQF:	Uganda Vocational Qualification Framework
VET:	Vocation Education and Training
WOW:	Word of Work

ABSTRACT

The action research project aimed at enhancing skills acquisition in motor rewinding and for Diploma in Instructor and Technical Teacher Education (DITTE) electrical engineering instructor trainees at Jinja Vocational Training Institute. To achieve the above aim, the project was hinged on four core objectives namely; to examine the challenges of skill acquisition in motor rewinding and, identify strategies for enhancing skills acquisition in motor rewinding, implement possible strategies as well as evaluate the intervention strategies in enhancing skills acquisition in motor rewinding. The project employed action research through participatory approach design. The study sample comprised 32 participants who included 5 administrators, 4 instructors, 23 DITTE instructor trainees in electrical engineering. Data was collected using focused group discussion, participatory observation, interview, documentary review and future workshop as a tool to identify the research problem. The data collected was coded and presented under themes following research objectives. The researcher together with stakeholders analyzed the challenges hindering skills acquisition in motor rewinding and motor starter. The findings revealed that inappropriate teaching of practical work (skills acquisition), inadequate teaching and learning materials, inadequate field tours, and inadequate time for practical training were the key challenges to skills acquisition in motor rewinding. In order to counteract these challenges, a number of strategies were implemented and these included: real life project in motor rewinding, in house training, cost sharing on training materials and more time allocated for the motor rewinding project, four instructors and twenty-three instructor trainees were trained as a result of implementing the above strategies.

CHAPTER 1.0: INTRODUCTION

1.1 Overview

This chapter presents the background to the study focusing on vocational pedagogy as a discipline, instructor and technical teacher training, and Diploma in Instructor and Technical Teacher Education (DTTE) program. The study specifically focused enhancing skills acquisition in motor rewinding and motor starter. In addition the chapter also presents situation analysis, motivation statement, and statement of the problem, purpose of the study, objectives of the study, scope of the study, justification of the study and significance of the study.

1.2 Vocational pedagogy as a discipline

Vocational pedagogy is a field of knowledge oriented towards trades, occupation and professions. The central aspect of vocational pedagogy is an understanding of human learning and the integration of hands, mind and heart in the learning situation (Mjelde, 2008, p 6).

It is observed that vocational pedagogy, unlike general education, employs learning strategies that are focused on hands on training. Learning in this case is intended to equip a person with specific skills in the industry. These include; creativity, critical thinking, innovativeness, interpersonal skills, communication skills. Skills are required by the learners in order to fit in the world of work. Mjelde, (2008) observed that there are three players in vocational education and training namely: school, workplace and the employee. Work collaboratively in provision of apprenticeship and institutional based training there by facilitating

the learner in developing the required expertise in a particular trade. Who revealed that the vocational school is to prepare students for tasks they will encounter in their work life and these tasks should support the aims, organizational development and improve efficiency at work (Edward, 2008). I observed that vocational pedagogy conform to the same arrangement as where learning is conducted from school and work place. From my personal experience, school learning at Masters in Vocational pedagogy include attending to facilitation, conducting group discussion, conduct research on issues at hand while at work place, learning consist of research expedition. During research expedition we engage in observing the work processes and we interview work place employees on aspect under study. Upon return from the field expedition, the data collected is analyzed, presented in houses for comparison and thereafter a mini report is documented and presented. This is done with the guidance of mentors and facilitators.

Furthermore, 'Learning by doing' is characteristically the way in which vocational pedagogy is described though this is one side of the coin side since there is no one definitive notion of vocational pedagogy (Wheelahan, 2010). In addition to learning by doing, vocational pedagogy is also hinged on experience learning, problem solving and group learning among others. More so, MVP student engage in action research which is a good example of 'learning by doing'. Under this individual or group of people identify a problem which involves diagnosing the status quo, planning and taking action in order resolve the problem. To ascertain whether problem has been resolved, evaluation is

conducted where all the action points are reviewed to ascertain what worked and what failed. This process is repeated in case the problem was not resolved thus the cyclic model of action research.

1.3 Background of Instructor and Technical Teacher Training in Uganda

The training of Instructor and Technical Teacher is an integral part of Technical Vocational Education and Training (TVET) whose quality determines the quality of TVET graduates (Uganda, 2012). This is because teacher training is a cross-cutting function that serves the needs of all technical departments of the Ministry of Education and Sports (MoES). Teacher education aims to broaden the student teacher academic knowledge and to deepen his/her knowledge of the teaching subjects as well as his/her understanding of the developmental stages and needs of the child. Secondly, teacher education also aims to produce competent, honest reliable, and responsible teachers (Uganda, 1992). However, these efforts have been realized to these effects due to; incompetent instructors with skills gap, inadequate instructors, and inappropriate method of delivery that still being encountered in teacher education. Challenges in teacher education are not new phenomena as this has also been cited in history. It is therefore important to review the brief history of Teacher education so as to give foundation to this discussion.

The technical teacher training course was introduced in Kampala Technical Institute in 1954. The course offered at the time was at certificate in Technical Teacher Education. It was thereafter closed down until 1973 due to lack of qualified personnel to teach the subjects for technical education (Okello, 2005).

It was in 1973 that the course was reintroduced at Kampala Technical College and this continued to offer the same certificate course (Okello, 2005). The closure of the only course in teacher training implied that there was no more training of the teachers therefore the institution continued to absorb the same untrained teachers. To date this situation has not changed since there are many instructors who are still incompetent pedagogically and technically. Okello (2005) further point out that Diploma in Technical Teacher Education was introduced to offer two year diploma course at Uganda Polytechnic Kyambogo. The polytechnic could not offer a postgraduate diploma in Technical Education due to the lack of staff capable of handling the programme. Okello (2005) observed that technical education tremendously in the 1990s and early 2000 gained owing to the liberalization of education in Uganda. Many private technical institutions were opened up during the period between 1990 and 2005.

In his presidential campaign manifesto, Y.K.Museveni (2001) also proposed to lift technical education and giving this kind of education some prominence. He proposed the building of community polytechnics in all sub counties in Uganda with objectives to provide foundation for training craft persons, technicians and other related skilled individuals to meet demands of industry, agriculture and commerce as well as the trading of business, technical and vocational skills. Before these community polytechnics could open, government had to make sure that there were enough instructors on the ground. In September 2001, eleven community polytechnics instructors' colleges were opened to train the instructors (technical teachers). This was indeed a great boost

to Technical Teacher training in Uganda, which had lacked such personnel for long. The only technical teacher training institution in Uganda had been Uganda polytechnic Kyambogo, which had very limited space for this enormous job.

In October 2002, an alarm bell rung by the Education report, calling for the rationalization of these colleges in the medium term. There was a fear of training many teachers, yet the community polytechnics had not yet opened. These teachers would be redundant on the street without job. This fear led to closure of ten community polytechnic instructors' colleges, except only one was left at Abilonino in Apac District now called Kole District of Northern Uganda. This only college that remained was still affiliated to Kyambogo University and thus offering same courses that is DTTE and CTTE. It is observed that Kyambogo University has been a major provider of instructor training. At its inauguration as University, bachelor degree in technical teacher education was among new programmes offered with an intention to boost the number of the graduate teachers and instructors for vocational/technical institution. Later this programme was closed in 2010 due to the contradiction in management between faculty of education and faculty of engineering. This has resulted into reduced number of graduate instructor/technical teachers.

Currently, five more institutions all affiliated to Kyambogo University offer instructor training at a diploma level. These institutions implement a harmonized curriculum which incorporates training in pedagogy, general and trade courses in various disciplines. Before the harmonization process, instructor training programme (DTTE, DVTI, CTTE and CVTI) offered training mainly in

pedagogy and its graduates would be ill-equipped in trade specific content and skills. Therefore, the harmonization process was intended to raise the competence level of VET trainers who would then contribute to skilling other Ugandans (Uganda, 2012).

In addition to National Instructor's college Abilonino, Jinja Vocational Training Institute (JVTI) is one of the vocational institutions housing DITTE programme. It was built by the Uganda government in collaboration with the World Bank under the 2nd International development agency (IDA), Education Project which became operational in 1982. The JVTI's primary objective was to develop capabilities, attitudes and abilities of individuals by providing them with the required occupational skills. The institute offers DITTE programme in Civil engineering, electrical engineering, metal fabrication, auto mobile engineering, tailoring and garment, electronic engineering.

1.3.1 Background to Diploma Instructor and Technical Teacher Education programme

During November, 2011 the department of Teacher, Instructor Education and Training (TIET) in the ministry of education and sports, in conjunction with the Japanese International Cooperation Agency (JICA) and Nakawa Vocational Training Institute organized workshops. The workshops sought to harmonize the Certificate in technical teacher education (CTTE), the Certificate in vocational training instruction (CVTI), the diploma in technical teacher education (DTTE) and the diploma in vocational training instruction (DVTI) programmes into one national instructor/teacher training a diploma programme. The training

programme would train instructors and technical teachers of technical schools, farm schools, community polytechnics, technical institutes and vocational training institutes (Kyambogo,2011).

This programme was called Diploma in Instructor Technical Teacher and Education (DITTE). The harmonization was called for due to the BTVET policy direction on "skilling Uganda" (Kyambogo,2011). The course was designed to conform to competence based education and training (CBET) principles since there was a need to uplift the status of TVET instructors and technical teachers from the redundancy of certificate levels. In order to achieve the aims, training and assessment emphasizes theory and practical training.

The harmonized diploma programme was designed with technical content up to national diploma in engineering as well as pedagogy and general course content. The harmonized programme is expected to reduce on the disparities in the different programmes and establish a standardized training model. The objective of this programme is to produce instructors for the BTVET sub-sector who have command of knowledge and skills of conducting training, integrating science, technology and skills. The specific objectives of the programme are to enable learners: To carry out training needs assessment in their local areas, plan training in their fields of specialties, prepare and conduct theory lessons, separate and conduct practical lessons, prepare teaching or learning aids ,evaluate theory and practical lessons, self evaluate their performance and plan future practice, counsel and give guidance to learners, provide entrepreneurial skills to learners, organize and monitor trainees practice in the industry (Kyambogo,2011).

1.3.2 Background to Diploma in Instructor and Technical Teacher Education in Electrical Engineering

The curriculum of the instructor trainees in electrical engineering is one of the DITTE programmes whose focus is to train competent technicians in the field of electrical. As earlier on mentioned, the programmes also conform to CBET where both theory and practical are emphasized. The aim of the curriculum is to facilitate the acquisition of practical skills needed for self-reliance of an individual and national development (Kyambogo, 2011).

The beneficiaries of the curriculum have the comparative advantage of being employable and employers of labor in both education and engineering. This is because the content as constituted in the programme comprises of both electrical engineering practical skills and technical education content. The programme seeks to address the following objectives: To perform simple electrical installations; perform simple motor rewinding; carry out complex electrical installations; install a solar PV system and repair electrical equipment; advance in higher education, research and development, demonstrate entrepreneurship skills for job creation, draw and interpretation of electrical circuits and drawings, repair and maintain electric equipment, erect, install and maintain transmission and distribution of electrical overhead power lines and underground cabling.

1.3.3 Background to motor rewinding and motor starter project as course unit

The course unit of motor rewinding introduces the trainees to the principles and practices of motor rewinding. The key activities in the course include: handling tools used in motor rewinding; identifying materials used in motor rewinding, trouble shooting and diagnosing faults. The competence on completing the course are; explain the term motor winding, carry out motor tests, remove motor winding , record motor data, insert insulators, make winding frames, insert coils in the slots, connect motor coils, inspect, test motor and assemble motor (Kyambogo,2011). The conditions surrounding motor rewinding project hinder acquisition of the stated competences and associated skills. This is because there are few instructors who are competent in handling the course. More so, the cost burden involved in the course makes its implementation difficult and thus those who manage to do it do so in groups. For example, ten students can rewind one motor which limit their competence acquisition. Other challenges in skills acquisition in motor rewinding include: inadequate training material, limited time for the training and institutions being reluctant towards course implementation among others. Motor rewinding is a challenging course on DITTE electrical programme not only for JVTI but also for other instructor training institutions. JVTI like many other DITTE center is not an exceptional as regards motor rewinding. It is observed that in academic year 2015/2016, the whole class of DITTE electrical engineering year two failed motor rewinding project.

This was a result of the failure of trainees to defend their motor rewinding project since all the seven members had rewound one motor for matter the students were unable to master the skills involved and so could not defend the work done.

Despite of the governments' effort to bridge the gap between school based training and work as reflected in BTVET strategic plan 2012, the scenario such as that experienced in motor rewinding course in JVTI is a setback. It is clearly emphasized by the Government of Uganda through Ministry of Education and Sports (MoES) BTVET Strategic Plan 2012/13 to 2021/22 entitled "Skilling Uganda" that there is a paradigm shift in skills development in the country. It emphasizes creating of employable skills and competencies relevant to the labor market rather than educational certificates as was before (BTVET, 2012). In due regard, attainment of competent labour force amidst such challenge is still far from the reach. Yet as Abban (1996) pointed out, the paradigm shift towards practical skills training with TVET in Africa is increasingly being reshaped to make it more attractive, efficient and effective. One of the most important features of TVET, as recognized by African governments, is its orientation towards the world of work with the curriculum emphasizing the acquisition of employable skills.

1.4 Situational Analysis

The researcher carried out work process analysis using the garage model. Garage model refer tool is an organization's ability to survive and prosper depending on its capability to provide the best possible products or service at the lowest possible cost. This organizational effectiveness, in turn, depends on the efficiency of its work processes. Garage model as a tool with the stakeholders and identified the work process activities; task involved and competences required for producing well qualified trainers in electrical engineering at JVTI. The work process analysis was used because it would prompt out several issues of instructional concerns from all the participants. The general work process of instructor trainees in electrical engineering includes: admission, planning learning activities, planning and organizing field work conducting training, assessment of tasks, projects, industrial training, school practice, evaluation and graduation. During meeting with stake holders, we decided to concentrate on key activities pertaining the teaching and learning of DITTE electrical engineering student hence excluding admission, evaluation and graduation.

Planning and organizing learning activities: Diploma in Technical Teacher Education (DITTE) department at JVTI schedule teaching and learning activities according to Kyambogo University calendar which is by semester system. Then, the individual instructors prepare schemes of work, lesson plans, work sheets, assignment sheets and information sheets. In addition they also organize field work and projects. Activities such as field work or project are perceived by the institute as being expensive yet instructor trainees are always motivated and

interested to participate in these activities. This leaves a gap since the instructor trainees are denied a chance to interact with modern technology at world of work.

Industrial training and school practice: is a cumbersome process. Therefore this is left for individual students to take care of. In addition the period given for industrial training is very short to make one acquire relevant skills. This leaves gaps in practical competences applicable to the world of work. For instructor trainers to perform the above tasks, they are required to formulate appropriate scheme of work, lesson plan, information sheet, assignment sheets and worksheets. Competences attained during industrial training include the following; observe safety, selection of materials, identify tool and equipments, operate machines, install and maintain machines.

Conduct teaching: teaching involves application of appropriate mode of delivery; observing professional ethics while carrying out this activity. It is a requirement for instructors to select adequate and appropriate resources to be used in teaching and learning processes.

For effective teaching and learning, instructor trainees are required to be knowledgeable and skilled in the subject matter, control class, relate to learning in friendly manner, and attend to individual differences in learning. More so effective use of instruction resources is also paramount. In addition is to integrate information technology and computing (ICT) in teaching and learning processes as a new problem based learning to delivery. It is observed that most of instructors in Diploma in Instructor and Technical Teacher Education are part timer who still employs teacher centered methods of teaching. Furthermore there

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are delays in acquisition of training materials which affect proper practical training. These factors compromise the mode of delivery reflected in insufficient practical training. This situation is worsened by lack of ICT integration in teaching and learning processes. Teaching requires following competences: computer skills, handle ICT gargets, knowledgeable of the study matter, communication skills, interpersonal skills, counseling and guidance and student centered approach.

Assessment of learner's tasks: Under this aspect continuous assessment was employed for all courses however, it is observed that instructors give high or lower score in course work, as they do not bear to conduct remedial test to cater for low marks scored and others give high due to various remedial tests, assignment and practical training. This is attributed to lack of monitoring tools by Kyambogo University. This evidenced in contradicting final mark obtained by trainees in their final examination. For instance, a trainee may score 38 out of 40 in course, then he/she score 12 out of 60 in the final Exams, giving a total of 50 out of 100 percentage. The competences are detailed in Table 1.

Table 1: Summary of the work processes involved in teaching

Work process	Tasks involved	Competence required
Admission	▪ Selection by JVTI and TIET representative ▪ Shortlist of successful applicants. ▪ Issue out of admission letters. **Orientation** ▪ Registration of new learners. ▪ Interpretation of school rules and regulations ▪ Introduction of staff and students leaders to the new entrants.	▪ Use of Information and Communication Technology (ICT) skills ▪ Good communication skills ▪ Analytical skills ▪ Career guidance and counseling ▪ Skills Interpersonal skills. ▪ Records management skills. ▪ Administrative skills.
School practice and industrial training	▪ Soliciting or placement of trainees ▪ Supervising trainees ▪ Prepare supervision tools ▪ Supervision report writing ▪ Assess reports	▪ Counseling and guidance ▪ Mentoring ▪ Select material ▪ Identify tools and equipment ▪ Observe safety ▪ Communication skills ▪ Interpersonal skills ▪ Install and machines ▪ Scheming, lesson planning, work sheet, assignment sheet
Teaching and learning process	**Planning and organizing** ▪ Preparation of schemes of work and lesson plans ▪ Preparation of lesson notes ▪ Conduct teaching and learning ▪ Organizing industrial field study tours ▪ Preparation of instructional materials	▪ Interpersonal skills ▪ ICT skills ▪ Knowledge of the subject matter ▪ Communication skills ▪ Management skills
Assessment and evaluation of learners	▪ Set test items ▪ Conduct formative assessment ▪ Administer class work assignments ▪ Design projects assignments ▪ Summative assessment ▪ End of course exams ▪ Final projects ▪ Setting and administering exams	▪ Knowledge of the subject content ▪ Communication skills ▪ Professional ethics ▪ Time management skills ▪ Item writing skills ▪ ICT skills

1.4.1 Future Workshop Procedures Carried Out

A Future Workshop (FW) according to Jungk and Muller (1987) is a tool used for problem identification in a given setting. In line with the research project, the future workshop was planned and scheduled for 24th November, 2016 at 9:00 am, in dining hall at JVTI as shown in figure 1. During the future workshop, only five phases were critically observed; preparation phase, critique phase, fantasy/utopia phase, reality phase and implementation and evaluation.

Figure 1: **Staff and trainees sharing experience during the plenary session at the future workshop while MVP researcher guides the session**

1.4.1.1 Preparation phase

During the preparation phase, the researcher came up with a programme guide (see Appendix A) that was to be followed during the future workshop. The identified participants were invited by posting on memo on all notice boards for the workshop as planned. The room and local facilities for the workshop were

established by the researcher; writing materials were purchased (Pens, papers, markers and manila papers) and refreshments provided.

1.4.1.2 Critique phase

The critique phase started with discussing critical challenges faced during the teaching and learning process in JVTI as seen in Table 2. The leading question was what are the challenges affecting teaching and learning processes? However, the teaching and learning challenges were brainstormed during group focused discussions and during stake holder's future workshop. Challenges were grouped according to short term, medium term and long term. Basing on the time available and resources, the stakeholders agreed to focus on solving short term challenges. The short term challenges included; improper teaching of practical work, absenteeism by both students and instructors, ineffective assessment of practical work, inadequate training materials, inadequate study trips, low syllabus coverage in some course units and poor methods of delivery. The short, medium and long term challenges are (Table 2).

Table 2: ***Summary of the challenges identified by the participants in the critical phase of the future workshop***

SHORT TERM	MEDIUM TERM	LONG TERM
• Inappropriate teaching of practical work (skills acquisition). • Ineffective assessment of practical work. • Absenteeism by lecturers and trainees • Inadequate teaching and learning materials. • Inadequate study trips. • Poor methods of teaching and management of project • Low syllabus coverage in some course units	• Inadequate furniture's • Refresher courses for staff • Limited co-curricular activities • Indiscipline among learners • Expired fire extinguishers • Limited space • Poor planning and budgeting	• Inadequate staff • Poor remuneration of instructors • Delay of results by Kyambogo University. • Outdated curriculum • Inadequate accommodation. • Staff development • Tools and Equipment • Inadequate training facilitates • Poor collaboration between Institute and world of work. • Inadequate funding

Source: Primary data from critique phase of future workshop

1.4.1.3 Fantasy phase

In the fantasy phase also known as utopia, participants tried to work out an imagination, to draw an exaggerated picture of the future possibilities of the problems identified in the critique phase. All the ideas were collected and put in an "idea store", regardless of their practicability. The challenges were fantasized and we turned all the negative ideas to be positive. Stakeholders imagined that every situation was possible and resources were available to address the gaps in

this Utopia phase of the future work (FW) at JVTI. For example how many motors can stakeholder rewind if finances are available?, trainee can say 10 motors for that matter, the stakeholder suggest all the possible solutions to the challenges regardless of finance However, this was not an ideal situation because stakeholders could not implement and compelled us to move to the reality phase of the future workshop.

1.4.1.4 Reality phase

Stakeholders are administrators, head of departments, instructors, electrical instructor trainees. Stakeholders agreed to revisit all the challenges with their possible solution so as to reach a consensus on what is possible to implement with the resources available. These challenges were ranked depending on what is most pressing and attainable in short term. The ranking are (Table 3).

Table 3: ***Ranking the challenges using pair wise matrix***

	Inappropriate teaching of practical lessons(skill acquisitions)	Inappropriate assessment	Poor methods of delivery	Inadequate teaching and teaching materials.	Inadequate study trips	Low syllabus coverage in some course units.	Absenteeism by trainees and Instructors	Tally	Rank
1		1	1	1	1	1	1	7	1st
2			3	2	2	2	1	3	3rd
3				3	3	3	4	5	2nd
4					4	3	5	2	4th
5						4	5	2	4th
6							6	1	5th
7								0	6th

Primary data: Future workshop

To get the most pressing challenge, researcher used a pair wise matrix were inappropriate teaching of skills acquisition was ranked one. It was against this background that stakeholders agreed on "enhancing skills acquisition for instructor trainees electrical at JVTI on motor rewinding and starter.

1.4.1.5 Implementation of Action Research

In the implementation phase an action research was design where the challenges with possible workable solution were stated, stakeholders' implemented solutions following an action work plan. At is at this point that the roles of trainees, instructors and administrators were clearly agreed upon to enable

efficient, effective, management of resources and monitoring. My role as a researcher was to follow up on action implementation by the responsible persons, track on what is being implemented and what is not working well.

1.4.1.6 Follow up on implementation of action work plan

Evaluation was conducted to ascertain whether there was any change in skills gained in motor rewinding. In addition to that, evaluation was conducted to determine the success or failure of solutions sated in reality phase that were intended to solve the problem. Consequently, the researcher had to use the action research cycle shown in figure.

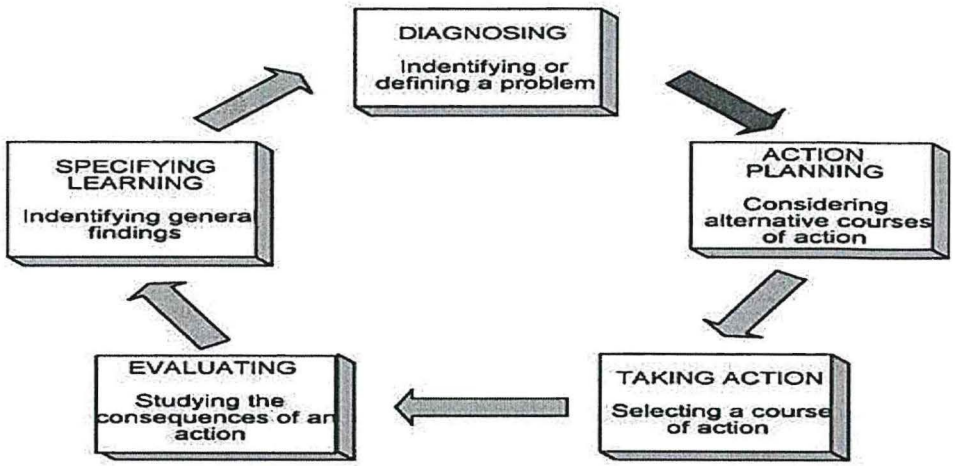

***Figure 2*: Detailed Action Research Model (adapted from Susman 1983)**

It is observed that action research is a cyclic process, so if there is no enhancing on challenges presented in (appendix A), the cycle continues until when there is enhancement in situation. However, due to limited time frame the researcher and stakeholders could implement only one cycle of the action research.

1.5 Motivational statement

The researcher holds a Bachelor of Technical Teacher Education in Electrical Engineering. The researcher train instructors at Jinja Vocational Training Institute (JVTI) and is able to work as part of a team, time conscious, result oriented, self motivated, quick grasp of issues responsive to change ready and willing to learn, persistence to see a job .The government is renewing efforts to promote technical vocational education and training (TVET), make it more attractive, effective and efficient with curriculum which emphasizes acquisition of employable skills. Through to its final and precise conclusion and thrives on challenges. The researcher, his working experience of seven years in power distribution projects, commercial and domestic installation which has empowered me to gain competences in electricity as a Trade. The researcher has seven years' experience in training instructors which has enabled me to build confidence in my teaching profession. In addition the researcher attended Active Teaching and Learning (ATL) strategies achieved as professional development in teaching and learning processes. This empowered the researcher to change the way he used to teach. Despite the skills attained in ATL, there are a number of challenges the researcher still encounter during my teaching and these include: field expedition, inappropriate teaching of practicals, integrating ICT in teaching. Vocational pedagogy, being focused on learning in work and learning in schools is believed to equip one with competences needed in overcoming challenges encountered in my teaching practice. The researcher can attest that MVP has equipped me with competences such as: developing training programs for work

based learning in the industry, training vocational and technical instructors in the didactical practical work and analyzing work processes using garage model. Furthermore, the researchers' ambitious and zeal to reduce gaps in skill acquisition amongst instructor trainees; this encouraged me to take on motor rewinding and to achieve that aim.

1.6 Statement of the Problem

Despite the various interventions by TIET to ensure the DITTE programmes contributes to skilling Uganda, a gap has been identified on the implementation of DITTE electrical engineering programme. This is evidenced by high rate of failure in the motor rewinding project of DITTE electrical engineering examinations of 2015/2016 academic year. The situation is attributed to inadequate real life project works and inadequate competences in relation to skills acquisition to trainees. This resulted into motor rewinding project being taught more theoretically than practically and yet producing a competent electrical technician for the world of work is one of the aims of teacher education. Prompted me to carry out this research project with a bid to lay strategies with the trainees, instructors, head of departments, administrators to solve the problem of skills acquisition in order to effectively prepare the learners for the competitive labor market.

1.7 Purpose of the research project

The purpose of this research project was based on outcomes of future workshop to enhance skills acquisition in motor rewinding for the Department of electrical engineering at JVTI so that learners can acquire skills relevant in the world of work.

1.8 Objectives of the research project as obtained from future workshop

Basing on the purpose of the research project the research has the following objectives that were obtained from future workshop

(i) To examine the challenges of skill acquisition in motor rewinding

(ii) To identify strategies for enhancing skills acquisition in motor rewinding

(iii) To implement possible strategies for enhancing skills acquisition in motor rewinding

(iv) To evaluate the intervention strategies in enhancing skills acquisition in motor rewinding.

1.8.1 Research questions

(i) What are the challenges hindering skills acquisition in motor rewinding?

(ii) How can we enhance skills acquisition in motor rewinding?

(iii) Which strategies can we use to implement the solutions for enhancing skills acquisition in motor rewinding?

(iv) What are the intervention strategies in enhancing skills acquisition in motor rewinding?

1.9 Justification of the research project

The justification of the research project to reduce on the skill gap between Jinja vocational training institute (JVTI) and world of work as trainees will be prepared well with employable skills through effective practical training.

The project aim imparting skills and knowledge necessary to consolidate synthesize and apply the ability to use head, heart and the hands towards innovation, modernization and improvement of quality of life (Uganda, 1992).

The learners will actively engage in their learning and make important choices during the project. Lastly, learners will tackle real problems and issues that have importance to people beyond the classroom.

1.10 Significance of the research project

The research project reduced the gaps of adaptation from school to world of work. After attaining competences in motor rewinding at the institute, trainees experience the same practice at world of work.

Policy makers such as; Ministry of Education and Sports (MoES), directorate of industrial training (DIT) for quality assurance.

Researchers and academicians for further research as documentary review.

The research project was to boost up the collaboration between the world of work and Jinja Vocational Training Institute

1.11 Scope of the research project

The scope is subdivided into content scope, geographical scope and time scope.

1.11.1 Geographical scope

The research project was conducted in Electrical Department at Jinja Vocational Training Institute located in Jinja municipality, factory village, Jinja district in Busoga region.

1.11.2 Content scope of the research project

The research project constituted examining the challenges, identify strategies, implementation of possible strategies and evaluate possible strategies for skill acquisition in motor rewinding and to effectively familiarize learners for the world of work.

1.11.3 Time scope

The Action Research (AR) process at JVTI started in November, 2016 to September, 2017. It took a period of eleven (11) months.

1.12 Definition of operational terms

Skill Acquisition is the science that underpins movement learning and execution and is more commonly termed motor learning and control (Williams & Ford, 2009).

An electrical motor is a device that has brought about one of the biggest advancements in the fields of engineering and technology ever since the invention of electricity.

A motor is an electro-mechanical device that converts electrical energy to mechanical energy

Competences refer to knowledge skills, attitude, attributes, values, norms, beliefs required to perform work safely and to standard.

Competence based education and training is a methodology used to deliver technical and vocational education and training that focuses on skills, norms, attributes, attitudes, experience and knowledge.

Motor rewinding is the process of removing the burnt coils or windings of the motor and replacing them with the new coils of the same data.

Pitch is a coil span or is number of slots with in a coil

Set is number of pitches in the motor for example 6,12,18,24

Pole pitch is the distance between the centres of two adjacent opposite pole pitch is measured in terms of slots.

Series is the number of wounded turns with their end and start.

Wire gauge is the diameter gauge

Future workshop is tool for problem identification and data collection

CHAPTER 2.0: LITERATURE REVIEW

2.1 Introduction

This chapter presents an analysis of scholarly views in relation to the problem under the study, learning theories, challenges of skill acquisition and strategies in addressing challenges.

2.2 Challenges for skills acquisition

Among the challenges identified was:-

2.2.1 Inadequate teaching and learning resources

Inadequate teaching and learning resources: BTVET institutions lack instructional material and infrastructure such as lecture rooms, teacher's houses, workshops, tools, equipments, books and libraries. Yet BTVET is practically oriented and its success is dependent on the availability of teaching materials, tools, machines and equipments. If these are greatly lacking in the institutions, the graduates from them will not have the competencies directly required in the labor market (Okinyal 2006). The researcher submission is that JVTI being among the BTVET institution suffers from inadequate training material due to under funding by government. This makes the instructors rely on improvisation hence less skills being imparted to the trainees. Relating to personal experience when the researcher was training at Kyambogo University department of electrical, we hardly had practical lessons due to lack of training materials. Likewise, at JVTI practical training was not effectively conducted due to inadequate training materials like copper wire, press paper for motor rewinding. Inappropriate

budgeting and planning. In all these cases, the researcher observed skills gap among the trainees. This had great impact to the trainee's competences as they graduated as incompetent in motor rewinding skills. Further still, during the researcher school practices; the researcher observed that technical institutes conducted courses in which they physically lacked workshops, equipment and tools.

In connection to the above, UNESCO (2004) identified the two major objectives of TVET as the urgent need to train the workforce for self-employment and the necessity to raise the productivity of the informal sector. According to UNESCO, lack of resources has led to reduction in the volume of training provided in public institutions. These affect the critical objectives of providing training and raising production in specific areas such as motor rewinding. Considering the expensive nature of TVET as a form of education, it is vital that an expanded system with necessary and adequate facilities and equipment will lead to the usefulness of the system.

2.2.2 Technological change

Technological change: Learning environments that seek to evolve by integrating or implementing new technologies and technology-based pedagogies with old ones usually find less resistance from the current system, as this is the least disruptive of the approaches (Groff, 2013). Groff points out that technology are of course essentially eye-catching to most individuals; however, it is especially so to young minds, particularly since they have only known a digital world. The researcher submission is that due to technological change in the world

today, the world has become a global village to the extent that everything is dynamic. In order to counteract this, it requires instructors to have sober mindsets of updating their professional profile and practices at the world of work. This situation has limitations for Ugandan case, given a few small and medium scale industries, factories, unemployment rates and lack of adequate policy of ICT integration in teaching and learning to emphasize. This is in line with King & McGrath (2004) who argued that with TVET being more diverse because of the changes in the labor market; it should be able to integrate the youth into world of work. To enable them acquire competences relevant to the world of work.

2.2.3 Unskilled instructors

Unskilled instructors: given the nature of Uganda's education system, a graduate with a bachelor degree in Technical Teacher Education in electrical engineering can be employed by education service commission without any prior hands on experience. In the world of work, such graduates are found not to deliver to the expectations of clients. It is observed that teacher trainers who poses practical skills are in most cases not pedagogically trained (Arinaitwe, 2011). A similar view is also shared by Uganda private vocational institutions UGAPRIVI (2004) which pointed out that some teachers in instructor training institutions use trial and error methods of teaching (Friere,1996). Under normal circumstances, the community expects instructor training to be conducted by doing for mastery of knowledge, norms, attitude, skill and experiences. This was linked to instructors who are not practicing electrical engineering, thus resulting into incompetent graduate instructors.

2.2.4 Lack of collaboration with world of work

Lack of collaboration with world of work fortunately in Master of Vocational Pedagogy (MVP), the researcher enjoyed collaborating with work places like Kakira sugar works, Nile vocational training institute, and Jinja vocational training institute. These organizations played vital roles in my teaching and learning due to practicum experiences shared at their work places compared to when the researcher attended the undergraduate course. The collaborations with workplaces also offered us a chance to learn experientially by trying ideas attained at MVP to real work situations. This is supported by Dewey (1997) cited in (Arinaitwe, 2011) who points out that a man living alone would have little or no chance to reflect upon his past experience to extract its net meaning. However, most VET institutions do not have collaboration with work places due to lack of policy documents and good relationship with the industries. UNESCO-UNEVOC (2012) point out that TVET would fail to generate qualified skilled workers necessitating industries to invest in in-house training or take the risk of hiring unskilled workers, liable to producing low quality products. This would ultimately impact wider society, with consumers absorbing the failings of unproductive TVET institute through higher prices for goods due to inefficient workers. Such a situation would render negative impact in terms of both human resource development and the national economy. TVET institutions are also unable to understand the needs of industries, and subsequently lack an awareness of how to approach and engage with them.

2.2.5 Inappropriate method of delivery

Inappropriate method of delivery: currently instructors in Vocational/Technical institute still apply traditional methods of teaching, that is, teacher centered approach such as lecture method. This means the teacher is being treated as custodian of all the knowledge. This does not leave gaps for knowledge discoveries by trainees. It also destroys critical thinking in which learners remain passive receivers and it denies them chance to construct knowledge. Such traditional methods contradicts Lave and Wenger (1991, p.14) idea of legitimate peripheral participation. They assert that the individual learner acquires the skill by actually engaging in the process, under the attenuated condition of legitimate peripheral participation. This process of skills attainment is highly interactive and productive. These inappropriate methods of teaching are indicated as capacity gaps in education constraining the performance of education and sports sector in Uganda. This is also shared by national development plan (Uganda, 2010, p. 218) that, the teaching methods are old fashioned and books are not only inadequate but even those that are available are not always used effectively. This has led to poor delivery by teachers, poor performance, besides learners cannot construct knowledge.

2.2.6 Underfunding of Technical Vocational Education and Training (TVET)

A substantial funding gap exists in meeting the BTVET strategic plan hence affecting training delivery (BTVET, 2012). This is reflected in small budget allocation to technical or vocation institutions under MoES, Uganda, to facilitate skills acquisition.

2.3 Strategies in addressing challenges

In an attempt to address the identified challenges, the following strategies can be adopted in instructor training and VET at large.

2.3.1 Collaboration between institutions and industries

Collaboration between institutions and industries: if the linkage between TVET institute and industry is implemented well, it empowers instructor training through the acquisition of practical skills, positive professional attitudes and gradual development of teacher understanding of working within the industry. As TVET institutes depend upon the industry for accessing the latest technology and practices, the level of types of skill currently required will be met. Therefore, an effective relationship ensures that TVET curricula and teaching methodologies are relevant and up to date (UNESCO-UNEVOC, 2012). This would be of help to reduce skills gap amongst trainees. Regardless of the existing situations surrounding the current collaboration between schools and workplaces, the BTVET strategic plan 2012/13 – 2021/2 entitled "Skilling Uganda" still emphasizes a paradigm shift from school-based training to flexible, workplace oriented environment and from government to public/private partnership. So if strategy is embraced, it is looked at a means of bringing school closer to workplace. The dual learning arena could enhance each other in provision of VET in Uganda thus production of competent personnel.

2.3.2 Active Teaching and Learning (ATL) project

Active Teaching and Learning (ATL) project was initiated and implemented to equip the instructor trainers' with participatory and collaborative strategies of teaching and learning (ATL manual, 2013) in order to encourage student centered approach. ATL involves the use of teaching and learning methods and techniques which maximize opportunities to develop learners' competences. This leads to increased interactions between teachers and students, amongst the students themselves, as well as between students and the materials. The kinds of methods and techniques to be used in order to promote active learning are: problem based projects, learning stations and contracts, group work, brainstorming, case studies, role play, and simulations (ATL manual, 2013).

Furthermore, the potential benefits of learner-centered pedagogy can be framed in economic terms. As countries diversify their economies and seek to become more competitive in the global economy, they look to the schools to equip youth with new sets of skills. Rather, students need to learn how to communicate effectively in decision-making teams and to solve problems that arise in these more flexible environments (Tabulawa, 2009). The skills associated with learner-centered pedagogy, such as 'learning how to learn' and communication to co-construct knowledge, are those sought by an increasing number of employers around the world.

2.3.3 Project-Based Learning

Project-based learning offers a wide range of benefits to both students and teachers. A growing body of academic research supports the use of project-based learning in school to engage students, cut absenteeism, boost cooperative learning skills, and improve academic performance (George Lucas Educational Foundation, 2001). For students, benefits of project-based learning include: increased attendance, growth in self-reliance, and improved attitudes toward learning (Thomas, 2000). Academic gains equal to or better than those generated by other models, with students involved in projects taking greater responsibility for their own learning than during more traditional classroom activities (Boaler, 1997; SRI, 2000). There are also opportunities to develop complex skills, such as higher-order thinking, problem-solving, collaborating, and communicating (SRI, 2000; Rails back, 2002). For many students, the appeal of this learning style comes from the authenticity of the experience. Students take on the role and behavior of those working in a particular discipline. For teachers, additional benefits include enhanced professionalism and collaboration among colleagues, and opportunities to build relationships with students (Thomas, 2000).

2.3.4 The Experiential Learning

The experiential learning process involves a number of steps that offer student a hands-on, collaborative and reflective learning experience which helps them to "fully learn new skills and knowledge" (Haynes, 2007). Although learning the content is important, learning from the process is at the heart of experiential learning. During each step of the experience, students will engage

with the content, the instructor, each other as well as self–reflect and apply what they have learnt in another situation. The following describes the steps that comprise experiential learning as noted by Haynes (2007, Para. 6) and UC Davis (2011).

The experiencing or exploring "Doing": the trainees performed hands on motor rewinding and they shared their own experiences with little or no help from the instructor. Examples include; rewinding motor to the finished product, giving a presentation, problem-solving, and carrying out tests on re-wounded motor. A key aspect of experiential learning is what the student learnt from the experience rather than the quantity or quality of the experience. Bjerknes (2002, p.8) supports these activities when she argues that experience is built through interaction between the individual and the environment and is enhanced when an individual acts together with others at least in a social context.

Sharing or reflecting: Trainees shared the results, reactions and observations with their peers. Trainees also got other peers to talk about their own experience, share their reactions and observations and discuss feelings generated by the experience. Freire (1996, p.14) considers this learning as a way of discovering oneself and the potential to learn with in motor rewinding. In this respect, trainees if empowered are capable of making their own internalization and analysis of the motor rewinding and make use of it as they interact with others. The sharing equates to reflecting on what they discovered and relating it to past experiences which can be put into future use.

Processing or analyzing: Trainees discussed, analyzed and reflected upon the experience on motor rewinding. Trainees also discussed how the experience was carried out, they identified the problems and issues emerged as a result of the experiences of motor rewinding. Trainees discussed how specific problems or issues of motor rewinding can be tackled and addressed.

Generalizing: the trainees were able to connect the experience with real world. For example, they found trends or common truths in the experience of motor rewinding, and identified "real life" principles that emerged especially when re -wounded motor, tested and functioned successfully. They were able to connect their learning experiences to the real motor at world of work.

Application; the trainees were able to apply what they learnt in the experience to a similar or different situation. From the experiential learning perspective, McKenzie (2005) points out that learning that facilitates the exploration and utilisation of the diversity knowledge and perception in an individual. Also, trainees could discuss how the newly learnt process of motor rewinding can be applied to other situations. Trainees discussed how issues raised can be useful in future situations and how more effective behaviors can develop from what they learnt. The instructor should help each trainee feel a sense of ownership for what was learnt.

2.3.5 Workshop or workplace learning

According to Mjelde (2006), workplace as a working and learning arena has a long tradition in vocational education. The relationship between practical life and vocational school is very important. The combination of vocational trades

taught in school workshops with subsequent apprenticeship makes the school workshops the major arena of learning in vocational education. Mjelde also stresses that, the vocational teacher takes on as a mentor to his trainees and would be consulted by employers who want good apprentices. She reveals the difference between the holistic and additive learning theories and then shows how the vocational teachers develop a work plan that will be implemented so as to bridge the existing gap. Mjelde observes that the characteristic background of a vocational teacher is a practice-based world from a sector of working life that is outside the education system. The vocational teachers themselves have been vocational students and apprentices' and therefore have undergone workplace learning and mastered their specialty in learning by doing.

2.3.6 Cost sharing

Cost sharing; Asian development bank (ADB, 2009) points out that with cost sharing, institutions will become more responsive to clients and that students will be more concerned about value for money. Under a regime of institutional grants from governments, incentives are available for higher education institutions to focus on bureaucratic and political interests. Similar view was shared as moving toward market-oriented provision of higher education is consistent with the global trend of market based provision of services (Tiongson 2006). It is also argued that fee-paying students are likely to be more conscientious. In general, consumption of "free" goods is often wasteful. In my personal submission I also support cost sharing in TVET institution due to underfunding of all activities in TVET by government. This would enable smooth running of activities and boost

institute financially. Training materials will be assured due to the available financial contributed by stakeholders.

CHAPTER 3.0: METHODOLOGY

3.1 Introduction

This chapter presents the methodology employed in the project and it encompasses methods used in data collection and data analysis procedures. It also states the research design and strategies, population sample and size, sampling strategy, methods and instruments used in the data collection of the study, data collection procedure, and ethical considerations of the study.

3.2 Research Design

Participatory action research (PAR) approach was employed in the project. Qualitative research method involves collecting, analyzing and interpreting data of qualitative in nature. According to Greenwood (1993) PAR has been described as a form of action research in which professional social researchers operate as full collaborators with members of organizations in studying and transforming those organizations. They further point out that PAR is an ongoing organizational learning process, a research approach that emphasizes co-learning, participation and organizational transformation. This is in line with Cohen and Up Hoff (1977) views that people get involved in decision-making process, implementing programs, sharing benefits of development programs and evaluating the efforts to such programs.The choice to undertake an action research project conforms to Bassey's (1998) view that action research enables the researcher to understand, evaluate and then take actions to cause change in a situation there by improve educational practice. Similarly, Hopkins (2002) maintains that 'Action Research

combines a substantive act with a research procedure whereby a person attempts to understand while engaged in a process of improvement and reform. Bell (1999) comments on the practical, problem-solving nature of Action Research which she believes makes this approach attractive to practitioner-researchers. She also highlights the fact that Action Research is directed towards greater understanding and improvement of practice over a period of time. Reason (2001) outlines the purpose of Action Research as the production of practical knowledge that is useful to people in the everyday context of their lives. She further argues that Action Research is about working towards practical outcomes, and also about creating new forms of understanding, since action without understanding is blind, just as theory without action is meaningless. Views were relevant in that researchers and stakeholders worked together in overcoming the challenges to the research project.

3.3 Implementation of Action production objective

This research project employed a five stage action research model by Susman (1983) cited in O'Brien (2001). The stages are: diagnosing the problem, action planning, taking action, evaluating which involves studying the consequence of an action, and specifying the learning. However, since the problem had already been identified and analyzed through the future workshop described in a situation analysis in chapter one, at this stage only the implementation activities were highlighted. The action points as agreed upon were further studied to allocate tasks to participants. This involved stating the

students' roles, instructors' roles and the researcher roles together with the stipulated time frames as illustrated in the action plan Table 4.

Table 4: ***Showing the action plan employed in the implementation***

Activity	Responsible personnel	Duration Schedule
Examine challenges of skill acquisition in motor rewinding and	Student, administration and instructors	01/10/2016 to 31/12/2016
Give strategies for skill acquisition in motor rewinding and	Student, administration and instructors	03/01/2017 to 31/03/2017
Implement the possible strategies for enhancing skill acquisition in motor rewinding and	Student, administration, instructors and researcher	02/04/2017 to 28/05/2017
Evaluate the possible strategies for enhancing skill acquisition in motor rewinding and	Student, administration, instructors and researcher	02/06/2017 to 28/06/2017
Mocks, viva presentations.	Administration, researcher, researcher supervisors	01/07/2017 to 30/08/2017
Submission of Thesis	Administration, researcher, supervisors	01/09/2017 to 05/10/2017
Graduation	Administration, researcher, Supervisors	03/11/2017 to 15/12/2017

Source: Primary data

At the implementation stage, we hired experts in motor rewinding since the researcher personally was not capable of facilitating the activities; he had specialized in line construction, electrical installation. Experts from the world of work conducted practical training through in house training in motor rewinding. Practically, they demonstrated and took the researcher, instructor trainees electrical and instructors through motor rewinding. These processes involved core

steps which included: dismantling the motor, recording operation or construction motor data, stripping and preparing slots, preparing of the bent slots, insulating slots, making winding formers or frame, coil winding or forming, connecting of coils, inspecting, vanishing and assembling. During implementation data was collected using and documented for purposes of reflection. Data was analyzed, interpreted and reflected upon in stakeholders' workshops for planning new strategies for sustainability.

3.4 Research population

The population size of DITTE was 147 trainees composed of 105 males and 42 females in all trades, 23 students for DITTE year 1 and year 2 electrical engineering, six (08) instructors, head of departments (6) and five (05) administrators. However, the research project target population comprised of 32 participants in the following categories: 23 students for DITTE electrical engineering, six (06) instructors, head of departments (5) and five (05) administrators.

3.4.1 Population sample size and sampling techniques

Using Krejcie and Morgan (1970) table of sample size determination, the researcher arrived at the sample size of 32 participants as indicated in Table 5.

Table 5: ***Composition of the study participants (population, sample size and sampling technique)***

Category of population	**Target Population**	**Sample Size**	**Sampling technique**
Instructor trainee electrical Students yr1	15	15	Purposive
Instructor trainee electrical Students Yr 2	8	8	Purposive
Instructors	6	4	Random
Head of department	3	2	
Administration	5	3	
Total	**37**	**32**	

Source: Primary data

The key sample participants in this study were 32 as indicated in the Table5. The research study employed purposive sampling technique for all the population samples in order to access knowledgeable people with in-depth knowledge about the aspects under study. Being action research coupled with the researchers experience, the target population was the people experiencing the problem. For that matter, instructors and DITTE electrical students for first year and second year were selected. This also applies for administrators and motor experts from the world of work. In support of this is Patton (1990) who points out that purposive sampling enables the researcher to purposefully select a wide range of variation on dimensions of interest, documents unique or diverse variations that have emerged in adapting to different conditions.

3.4.2 Sample Size

A sample is "a smaller (but hopefully representative) collection of units from a population used to determine truths about that population" (Field, 2005). The research project had a sample size of 32 respondents for both interview and Focus Group Discussion (FDG) methods that involved 23 trainees, 04 instructors and 05 administrators as Table 5 show.

3.4.3 Sampling Techniques

The researcher used purposive sampling which is not a mutually exclusive category of the sampling technique rather many other non probability techniques are purposive in nature. In purposive sampling the sample is approached having a prior purpose in mind. The criteria of the elements who are to include in the study is predefined (Alvi, 2016).The trainees, instructors and administrators who were the key informants were purposively selected using purposive sampling technique to aid the researcher in ensuring that the required information is gathered from the right respondents. This enabled the researcher to collect relevant information relating to the high rate of failure of motor rewinding and challenges hindering skill acquisition. In addition the researcher used random sampling to select instructors, administrators and head of departments to avoid bias in selection.

3.5 Methods of data collection

The following were the methods of data collection employed while collecting information and evidence for the study.

Table 6: ***Summary of data collection methods and tools***

Method	**Tool**
Interview	Interview guide
Participatory Observation	Camera, checklist
Focused Group Discussion (FGD)	FGD Guide
Documentary review	Checklist, log book, computer

3.5.1 Interview methods

Interviewing is a way to collect data as well as to gain knowledge from individuals. Kvale (1996) regards interviews as an interchange of views between two or more people on a topic of mutual interest, sees the centrality of human interaction for knowledge production, and emphasizes the social situations of research data. An interview is a direct face-to-face attempt to obtain reliable and valid measures in the form of verbal responses from one or more respondents (Key, 1997).

Here face to face interviewing were conducted where the researcher posed some questions to the participants especially the administrators about challenges of hands on training, their feeling towards it, possible solutions and the feedback that was recorded in the log book.

3.5.2 Participant Observation

Participant observation involves the researcher to observe the situation and to note down what is being observed. This method was to enhance the fact that the phenomenon was observed in its natural setting. This was used due to its

reliability and accuracy, reduction of reluctance on the side of respondent plus the high response rate, and also made the researcher clarify some questions. However, the method was costly and time wasting, and it was also subjected to the researcher's disruptions, yet stakeholders must also try not to distort the interpretations (Cohen & Manion, 1994). If the researcher is "a genuine participant in the activity being studied" then the researcher is called a participant observer (McMillan,1996).

3.5.3 Focused Group Discussion

Focus group discussion is a participative method that involves a homogenous group of respondents in the discussion of issues of common concern through a moderator (Mbabazi, 2007). Challenges in teaching and learning as an issue for discussion were introduced, followed by guiding questions and the ideas and opinions of individual and group respondents were noted in the minutes as the exercise of research continues. The meetings were organized majorly after classes which is convenient for both the students and lecturers. In the meetings, the participants were to discuss the challenges of skills acquisition in motor rewinding and sequential control, suggest possible solutions and how these solutions can be implemented for the world of work.

3.5.4 Document analysis

Document analysis is a way of collecting data from existing documents (Evaluation research team, 2009). The documents may be internal to a program or organization or may be external. Method was helpful to enable me understand the

history, philosophy, and operation of TVET and also reveal the difference between formal statements of TVET program purpose and the actual program implemented at JVTI.

3.6 Instruments for collecting data

The following were the instruments used for collecting data.

3.6.1 Visual in Participation (VIP) cards

VIP cards refer to tool used by stakeholder to generate ideas to solve identified challenge.

For VIP cards questions were posed to the participants on a projector and feedback were obtained by students through writing their responses on the card distributed to them. Visual in Participation (VIP) was used to collect the students' views about the causes and possible solutions to the low practical training in the department.

3.6.2 Cameras

For academics, smart phone cameras used to gather information during field research, augment presentations, and connect to a wider audience through the myriad of communities online. Scholars in fields as different as clinical medicine and art are using Smartphone technology to not only aid in research but also to share their findings with people document information during who would not otherwise be engaged with their academic research (Pelckmans, 2009). Therefore in this research smart phone cameras were used to collect the evidence of the research through taking photographs and videos of stakeholders.

3.6.3 Future workshop

Future workshop was used to critically analyze skill acquisition training as the area of concern. This was of help to the stakeholders to establish the most pressing gaps and lay strategies to address them. Future workshops are a good tool for tackling complex problems where many, often seemingly contradicting views, have to be fitted together. (Lauttamäki, 2014)

3.6.4 Log book

Log book was used for keeping record of what happens, why and where ideas developed and of the research process itself. The researcher's log book was helpful when compiling the project report. The reflective process involved in writing a diary contributes to the professional development of the researcher (Koshy, Action Research for Improving Practice, 2005).

3.6.5 Validity and reliability of instruments

According to Millar (2008), validity refers to the quality that a procedure or an instrument used in a research is accurate, correct, true, meaningful and right. Reliability on the other hand refers to the consistency of a research procedure or instrument. In other words, it is the degree of consistency demonstrated in the study. Thus, reliability implies stability or dependability of an instrument or procedure in order to obtain the same information. This is in agreement with Kahn (1986) who asserts that whatever is done should be done consistently (Kahn, 1986). Four sets of data collection tools like future workshop, log book, visual in participation cards, interview guide were designed by the researcher during the

situational analysis on work process activities at JVTI. The tools later presented to the key stake holders, who provided their guidance in relation to collecting relevant data aimed at answering the study question set. After collecting the data, expert opinion from the module coordinators was sought to ensure accuracy and consistency of the data collected. Following the interviews and group focused discussion from the situational analysis; the researcher analyzed the data collected and comments that were generated during the interview on aspects that seemed unclear to the participants. Adjustments were made in line with what was relevant to the work process.

3.7 Data collection procedure

Data was gathered using the introductory letter from Kyambogo University and future workshop model as a tool for problem identification which involve five phases: preparation, critique, utopia/fantasy, reality/implementation phase and evaluation as its well explained in situation analysis in chapter one. A work plan for the implementation was designed (Appendix A).

3.8 Data analysis

The data analysis was presented according to the study objectives. Data under each objective was presented in themes. Data under each theme was interpreted and discussed in the respective project research objectives. The schematized data frequencies (Creswell, 2003) that were got from interview findings were coded, edited and arranged and analyzed. The data obtained was

manually tabulated with responses from respondent which were used in the decision making, comprehensive interpretations and other related inferences

3.9 Ethical considerations

To address the ethical issues, the researcher presented an introductory letter from the faculty of Vocational Studies, department of Art and Industrial Design of Kyambogo University to the respondents at Jinja Vocational Training Institute. The information obtained from participants was kept confidential to be used for study purposes. Real names and identities of participants were confidential and unrecognizable. Our meetings allowed every one's idea was considered. Respondents were left to retain the independence of their minds and free decision making process.

Recording responses and photography during the interviews and focus group discussions was done under the permission of the participants to avoid fear and suspicions through written requests.

The researcher also ensured privacy of the information given since it was for academic purposes and therefore the privacy of the participants was guaranteed. This is because the information provided by respondents was in no way revealing their identity. No one was to be victimized because of his/her view. All participants were requested to be honest when giving their views (Resnik, 2010).

3.10 Limitations of the Study

The researcher faced a limitation of financial constraint when conducting the research project as he incurred costs in transport, accessing and downloading

articles and printing that were beyond his planned budget.

Limited time by the stakeholders affected the study since the participants could be too busy. They had a fixed schedule of meeting the researcher and this delayed the work of this research.

Participants at JVTI may have not believed that the research project was only for academic purposes and thus could have concealed part of the required information. This could have undermined the quality of the findings of this research.

3.11 Delimitation of the action research project

The study covered a department of the Vocational Training Institute yet the problem maybe across. This led to the in depth analysis of motor rewinding.

The researcher obtained responses from key stakeholder. The key stakeholders responded actively to the activities of the action research project and contributed positively to its success.

The researcher borrowed money from friends and microfinance organizations in order to solve expenses which were incurred during action research project.

CHAPTER 4.0: ACTION IMPLEMENTATION RESULTS AND EVALUATION

4.1 Introduction

In this chapter, the researcher presents and describes data that is relevant to improving skill acquisition for electrical instructor trainee. The major participants during the course of data collection were trainees, instructors and administrators of JVTI. Being qualitative in nature, this research permitted data descriptions and interpretations to be based on the researcher's reflection, students', instructors' and administrators' responses, observations and perception of what happened during the course of the research. The presentation of the results of this research successively followed the objectives of the study as reflected in chapter one of this report.

4.2 Challenges hindering skill acquisition in motor rewinding

Challenges presented in themes of short term challenges as agreed by key stakeholders as: inappropriate teaching of motor rewinding (skills acquisition in motor rewinding), inadequate contact hours for practical training, inadequate field tours and inadequate training materials being core gaps in motor rewinding and . One of the DITTE electrical student expressed his dissatisfaction that *".....the instructor told? us to wait we are soon to receive training materials for motor rewinding*"

In agreement stakeholders decided to adopt practical strategies to address the challenges in motor rewinding.

4.3 Implementation of possible strategies for enhancing skills acquisition in motor rewinding

The strategies for skills acquisition in motor rewinding and were generated in the fantasy phase (explained in 1.4.1.3 chapter one) through brainstorming and these are as follows:frequent field tour to the power plant, industries and factories, real life projects, motor rewinding, regular in house training in all course of electrical engineering DITTE, counselling and guidance to enable learners achieve their goals, hiring tool and equipment which we cannot afford to purchase from external environment, call for curriculum review through lobby donors, costing sharing, convert electrical workshop into production unit and staff development in their trades to increase on level of competences. The finding reveals that together with stake holders stakeholders had to select few action strategies due to limited time and resources for implementation. Strategies are: real life project of motor rewinding, time tabling more contact hours for practical, in house training and cost sharing.

4.4 Action implementation of strategies for in house training

The participants collaboratively agreed to have an in-house training. To that effect, 3 experts from world of work were hired to conduct the training of motor rewinding through using my research project facilitation. They took stakeholders and researcher through the theory of motor rewinding, practical of motor rewinding.

Steps or procedures in motor rewinding:

The researcher, stakeholders and experts together identified faulted motors from electrical department to be worked on. The appropriate tools and equipment used in motor rewinding wooden mallet, a set of spanner or wrench, flat chisel, mallet hammer, puller, screwdriver, Allen key and oil can, bamboo stick, multi meter, pair of scissor, lamp meter, wire gauge and soldering gun were adequately selected. Then materials used in motor rewinding were copper wire, sleeves, press pan paper, lead wire (asbestos), cotton tap/thread, soldering wire, insulating vanish and capacitor. Stakeholders and researcher purchased materials together with the expert to enable trainees gain competences like generating bill of material, appropriate selection of the materials used in motor rewinding.

Dismantling a motor: stakeholders removed the key pin or set screw holding the pulley in place by using a screwdriver or Allen key, removed the pulley straight up by using a puller and spanner or wrench, applied penetrating oil to the motor shaft if the pulley was rusted, made an alignment mark where the housing or stator and end brackets meet by using a flat chisel and hammer lightly and loosen the bolts gradually, switched from side to side until could be removed, set the chisel between the housing or stator and the end bracket, taped the chisel lightly with the hammer, and separated the stator and the end bracket, pulled off the end bracket and the rotor together, paralleled to the stator, removed the end bracket from the rotor by tapping the end bracket lightly with the wooden mallet.

***Figure 3*: Trainees dismantling the motor**

Source: Primary data

Reading of operation data (Name Plate), construction and winding data; the experts took us through reading the operation data from name plate of the motor, which involved getting to know size of the motor (Hp), revolution per minute (RPM) commonly known as speed, rated voltage (Volt), rated current (A), number of poles, working hours, cycle frequency, type model and serial (Table7).

Table 7: ***Motor operation data***

Horse Power (HP)	Revolution per Minute (R.P.M)	Rated Voltage (Volts)	Rated Currents (AMPS)
Phase (PH)	Cycle Frequency	Type Model	Serial Age
No. of Poles	Working hour		

Source: Primary data

The experts took stakeholders through reading the construction table which includes; number of stator slots, number of rotor slots, air gap, ventilation protection, internal diameter of stator, height of stator, and type of insulation used in the slots (Table 8).

Table 8: ***Construction data***

No. of Stator Slots	No. of rotor Slots	Air Gap	Ventilation Protection
Internal diameter of stator	Height of stator	Type of insulation used in the slots	

Source: Primary data

The experts took stakeholders through reading of winding data which includes: types of windings, number of coils per slots, number of coils per phase, number of coils set, number of coils per set, number of turns per coil, size of wire, number of coils set and coil pitch (Table 9).

Table 9: ***Winding data***

Types of Windings (half or full basket)	No. Of coils per slots	No. Of coils per Phase	No. Of coils set
No. Of coils per set	No. Of turns per coil	Size of wire SWG	Coil pitch
How coils are placed in the slots	Type of Connection	End winding length dimension	No. Of coils group

Source: Primary data

Stripping and preparing slots: stakeholders confirmed the winding data before you begin to strip the windings, cut the windings or coils from one side by using a side cuter, removed the coils or windings bit by bit at a time in sequence by using a pair of pliers, checked the coil pitch, they checked the type and diameter of the wire or winding used, checked the coils winding method and number of windings and check the total coil weight.

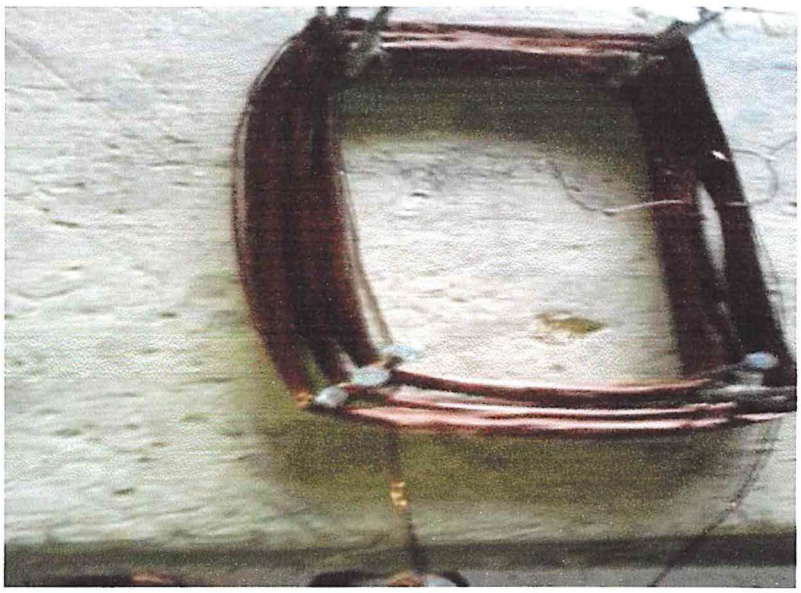

Figure 4: **Prepared slot for motor rewinding**

Source: Primary data

Preparing of the bent slots: stakeholders re-aligned bent slot teeth by using wooden mallet, light hammer and screwdriver, removed all remaining foreign matter from the coil slots by blowing clean with compressed air, blow thin insulation vanishes all over the stator core area.

Figure 5**: Prepared bent slots by stakeholder**

Source: Primary data

Insulating the stator/slots: stakeholders selected old insulating material removed from the stator, they took the width and length of that insulator, selected **the correct type of the new insulator to be replaced, set the share machine to the** required dimension, cut the insulator to size, fold both ends of the insulator to size **and place the insulators in the slots.**

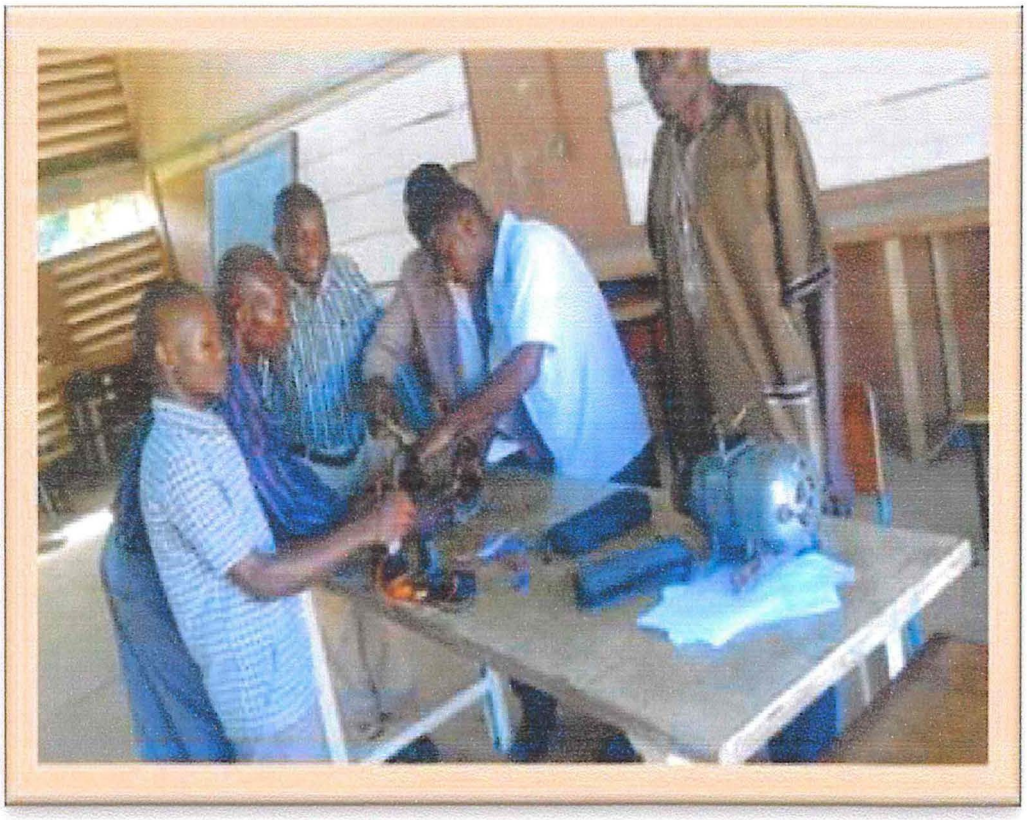

***Figure 6*: Trainees demonstrating how to insert slots in the motor**

Source: Primary data

Making winding formers or frame: stakeholders selected wood or ebonite **material to be used, marked the width of the former by taking the straight distance** equal to the coil pitch plus on an additional slot, marked the length of the former, **by taking the length of the stator (core) plus 5mm to 10mm additional length on**

each side or the take the actual length of the used coil. Determined the thickness of the former by considering the depth and width of the slots and windings (thickness of the coil) shape the formers to size, produced side boards (Covers) by making two side boards to fit the winding frame, made side boards about 15mm to 20mm larger than the winding frame, made the side boards about 10mm thick, shaped the covers or side boards, they cut or slot 6 slits into the side boards for binding or looping the coils, drilled a hole in center of the frame and side boards for the shaft fitting, attach the side boards to fit the winding frames by using wood screws and nails as shown in figure 5.

Figure 7: Finished frames

Source: Primary data

Coil winding or forming: stakeholders attached the winding frames securely on to the coil winder shaft, insert about 10cm or otherwise long into the winding frame slits; read for binding the coils after winding, set the winder speed (if electric) and the counter, set the copper wire on spool, leave a reasonable

length of wire for the start and the end for connection, applied reasonable tension on the wire taking care not to damage the insulation, wind according to turns recorded making sure that the coil twisted an pack properly without crossing, after winding, tied the coils by using the fiber, removed the winding frame from the winder, made sure that the coil is not damaged when removing it and repeat the process until you get the required number of coils or coil sets.

Connecting of coils: stakeholder identified the coil sets or groups, identified the beginnings and ends of the coils and label them, checked for continuity and insulation resistance of the coils and frame, connected the coils as per the data taken, connected phase by phase starting with phase A, B, and C respectively, checked the resistance between the coils if they are balanced or not, measured the insulation resistance between the frame or stator and the coils (not less than 1 mega ohm) , soldered the joints and binded the coils (or connections).

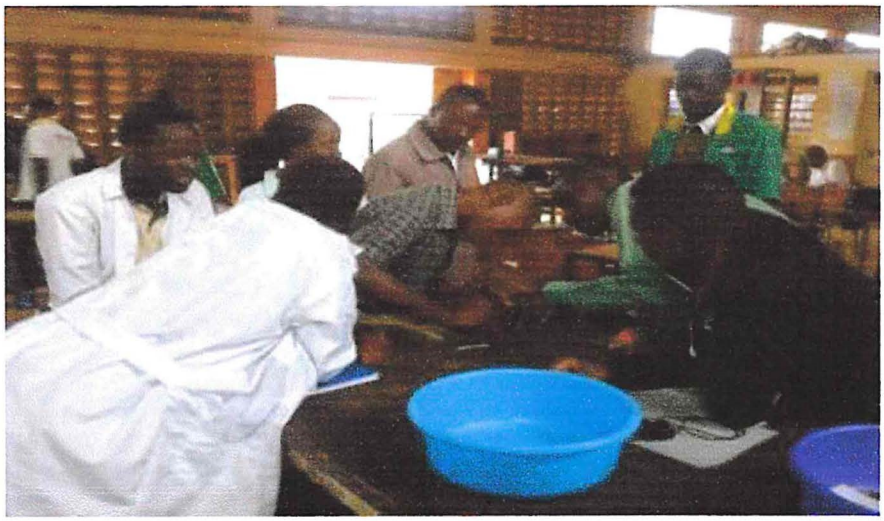

Figure 8: **Trainees demonstrating connection of coils into the motor**

Source: Primary data

Inspecting: stakeholder verified that the connections are made to data by using tester, measured the winding resistance, measured the insulation resistance (not less than 1 mega ohm), checked for continuity, tested for polarity and short circuit of the windings, bake, vanish and dry, test, assemble and test

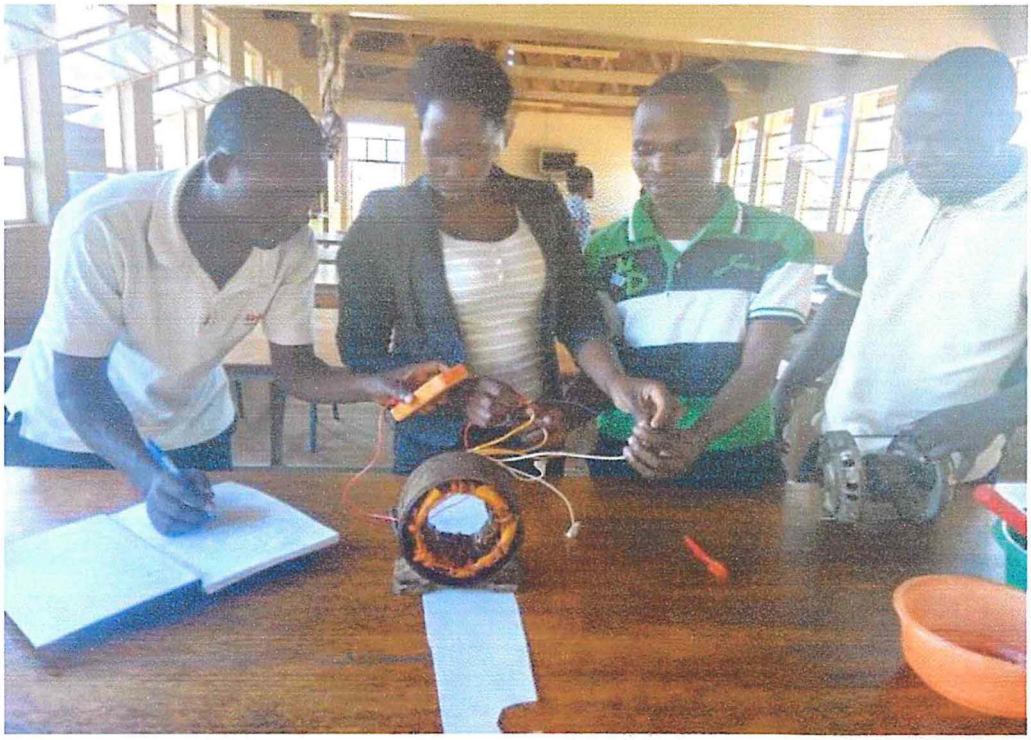

Figure 9: **Trainees carrying out tests on the Motor by use of Multimeter**

Source:Primary data

Vanishing: stakeholder applied vanish and baked the stator in the oven for 10 to 20 hours at 90-95 degree centigrade, used thinner to mix the vanish to required mixture, dipped the stator into the vanish tank while still hot or use brush, stakeholders lifted the stator out to allow the excess vanish to drain off, dry it for about 15 to 20 hours at 100 to 120 degree centigrade, immersed it for second vanish coating, coat it with the finishing vanish by painting by using brush the finishing vanish onto the coil ends, dry for 4 hours at 100 to 200 degree

centigrade, remove the excess vanish with the scraper, confirm and assemble the stator.

***Figure 10*: Trainees performing vanishing of the coil**

Source: Primary data

Assembling: stakeholder identified the motor parts, they assembled in the reverse order of disassembling, carry the necessary test on the windings, they supplied the motor with the rated voltage, confirm and satisfy the motor operation.

***Figure 11*: Trainees assembling motor**

Source: Primary data

4.5 Evaluation of in house training, motor rewinding and

Skills attained after training in motor rewinding was assessed by use of assessment training package (ATP). Assessment training package (APT) is a tool designed to assess competences of motor rewinding.

Table 10: ***Skills attained by stakeholders after attending motor rewinding***

Skill attained by stake holders
Effective use of personal protective equipment's
Bill of materials generated and correct materials selected
Accurate selection of tools and equipment's
Interpretations and drawing accurate diagram
Correct and accurate connections
Terminating conductors and cables
Firm fixing skills
Use of measuring instruments
Competences on power testing

Source: Primary data

4.6 Evaluation of in house training, motor rewinding at JVTI

During the evaluation of implemented strategies, interviews, observations and reflection were recorded as per the progress of the implementable interventions that were agreed together with the key stakeholders.

Figure 12: **Evaluation and dissemination of the finding meeting 22th April, 2017**

Source: Primary data

4.6.1 Feedback from evaluation was collected from 23 DITTE electrical trainees

The responses on implementation of in house training at JVTI are presented in Table 11

Table 11: ***Responses on the in-house training of motor rewinding and motor starter***

NO	RESPONSE	STONGLY AGREE	AGREEE	DISAGREE	UN- DECIDED
1.	To allocate more time for practical training	20	3	0	0
2.	Team work spirit bridges the gaps in motor rewinding project	21	2	0	0
3.	Motivation of trainees towards the project	19	4	0	0
4.	Real life project as method of delivery	20	3	1	0
5.	Assessment by use of Assessment training package (ATP)	13	4	1	5
6.	Cost sharing in material to be used in skill training	10	5	2	6

Source: Primary data

More time allocation for practical lesson: from above Table 11, it is shown that 20 trainees strongly and 3 agreed that more time allocation for practical lesson implemented through time table making. Team work spirit: 21 trainees strongly agreed and 2 trainees agreed with team work since it engages individual with different skills.

Motivation of trainees towards the project: motor rewinding and starters being practical based, trainees were highly motivated with 19 trainees strongly agreed and 4 trainees agreed with this initiative. Made it possible for them to even apply skills, knowledge, norms, attitude and experience to the world of work.

Real life project as method of delivery: 20 trainees strongly agreed and 3 trainees agreed with the project since they shared experiences from trainers from world of work. One disagreed with real life project.

Assessment by use of ATP (Assessment training package): 13 trainees strongly agreed and 4 agreed and one disagrees since it was a new competence based education and training tool for assessment of competences. The researcher encouraged them to use ATP while assessing practical in the world of work. It captures skills attained at each stage of practical work.

Cost sharing in training material: 10 trainees strongly agreed and 5 trainees agreed with the idea of costing sharing. The financial constraints are shared amongst the stakeholder, 2 disagreed and 6 were undecided.

4.6.2 Feedback from Instructors and administrators on implementation

Feedback from four (04) instructor and six (05) administrators are presented in table below;

Table 12: ***Responses from intervention strategies used to enhance motor rewinding and by instructors and administrators***

NO	RESPONSES	STONGLY AGREE	AGREE	DISAGREE	UN-DECIDED
1.	Procure materials in time hence material availability through submission of requests in time	7	2	0	0
2.	Promoted collaboration between the teachers administrators and trainees	6	2	1	0
3.	Implemented cost share by issuing circular and admission	5	2	1	1
4.	In housing training in real life projects	8	1	0	0
5.	Motivated instructors toward project of motor rewinding	7	2	0	0
6.	Assessment by use of ATP(Assessment training package)	5	3	1	0
7.	More time allocation for practical lesson	6	1	1	1

Procure materials and instructors to submit their requests in time: from Table 12, it is shown that 7 instructors and administrator strongly agreed and 2 agreed to procure materials in time hence material availability through submission of

requests. This affects teaching and learning processes especially in motor rewinding if delayed.

Promoted collaboration between the instructor, administrator and trainees: 6 instructors and administrator strongly agreed, 2 agreed and one disagreed with collaboration.

Implemented cost share by issuing circular on admission: 5 instructors and administrator strongly agreed and 2 agreed and one disagreed while one was undecided with cost sharing.

In housing training in real life projects: 8 instructors and administrator strongly agreed and 1 agreed within house training because it is cost effective in terms of time and labor.

Motivated instructors towards the project of motor rewinding: 7 instructors and administrator strongly agreed and 2 agreed with motivating staff by timely payments.

Assessment by use of ATP (Assessment training package): 5 instructors and administrator strongly agreed and 3 agreed and one disagreed to use assessment training package. ATP is assessing competences at each stage.

More time allocation for practical lesson: 6 instructors and administrator strongly agreed and agreed and the researcher to allocate more hours for practical lesson.

CHAPTER 5.0: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter presents discussion and conclusion and recommendations of the results from action implementation and evaluation presented in chapter four of this report. It discusses the results which basically depended on my interpretation and description of the processes. All these are based on my experience, observation and reflection, upon the situation as it unfolded in the process of research project. Also the perceptions and views from the participants of this research were considered. In this discussion, the researcher integrated related views, theories and concepts from various scholars where it was deemed necessary to back up the analysis of the results. After discussing and analyzing the results, the researcher also put down conclusions based on his learning and understanding acquired through the research process and the recommendations which would reveal the way forward for this research project. The findings from the research project are going to be presented in a comparative way of the stated objectives.

5.2 Discussion of the findings

The research sought to examine the challenges of skills acquisition, to identify strategies for enhancing skills acquisition, to implement the strategies for enhancing skill acquisition and to evaluate the intervention strategies in enhancing skills acquisition in motor rewinding. Therefore, the findings are discussed in line with these objectives as comparative as below.

The research project revealed inadequate contact hours for practical: the time tabling of learning activities; under instructor trainee electrical motor rewinding project is based on credit units (cu) per course unit. Implies that this course unit will be timetabled for two 2 hours per week. Course unit system is ideal for Kyambogo University setting whereby the laboratory technician assists the lecturer in accomplishing the practical tasks as he/she handles the lectures. In the case of JVTI instructors handle both practical and theory components, this is a true indication that the time scheduled is limited to cover practical. The situation shows a gap in competences as far as practical training is concerned. This implying that trainees have limited time to practice motor rewinding, reflect on the practice, and apply skills to the world of work. In agreement with stakeholders, stakeholder proposed that time tabling coordinator should allocate more extra 2 hours for this particular course unit of motor rewinding to enable trainees to practice collaboratively at their convenience. The researcher support time allocation for motor rewinding to be increased to give learners enough time to practice motor rewinding. Increased or more time allocation could help to build confidence in trainees, make them more competent through several trials, increase critical thinking of the trainees, and gives opportunities for learning and increased norms, attributes, experiences, skills, knowledge and attitude. The approach or arrangement is line with Freire (1996, p.14) who considers this type of learning as a way of discovering oneself and the potential to learn motor rewinding. In this respect, trainees if empowered are capable of making their own internalization

and analysis of the motor rewinding and make use of it as they interact with others in workshop or world of work?

Inappropriate teaching of practical: the findings revealed that TVET instructors employ inappropriate methods of teaching which limits trainees to construct knowledge and skill discoveries. One of the instructor trainee points out that, denying a chance to the learner to learn is one way of distorting generation of new knowledge. Sharing my experience at work place, the researcher got to learn how to operate electricity in distribution substations which involves switching, linking safety testing and earthing in secondary power substation through experience. In addition project based learning, when applied effectively, enables learners to discover their own learning hence constructing knowledge, attitude, norms, skills, attributes and experiences. If an instructor denies trainees to analyze learning and construct meaningful reflection, then trainees become passive in the teaching and learning process. This encourages cram work and the teacher being recognized as a custodian of knowledge (teacher centeredness). These inappropriate methods of teaching are indicated as capacity gaps in education, constraining the performance of education and sports sector in Uganda. This is also shared by national development plan (Uganda, 2010, p. 218) that, the teaching methods are old fashioned and books are not only inadequate but even those that are available are not always used effectively. This has led to poor delivery by teachers, poor performance, and besides learners cannot construct knowledge.

Based on my experience and being active teaching and learning practioner, the researcher strongly support the trainee centered approach of teaching, which means I disagree with inappropriate teaching methods of practical lesson that has been common practice at JVTI. This challenge can be solved by encouraging all instructors to embrace real life project of motor rewinding. This real life project enables learners to demonstrate tangible ways that they have learnt key concepts and skills. Such projects provide opportunities for learners to produce observable evidences that they have mastered rigorously as they apply their learning and solve the problems at hand. As well, the project provides extensive evidence of processed work and self-directed learning. The research project findings revealed that competences attained by trainees are; costing for material, generating bill of materials, workshop safety, taking data from faulty motor, dismantling and assembling motor, insulating motor, placing slots, selection of the tools and equipment for use during motor rewinding, carry out test on motors and motor rewinding techniques. This in line with Lave and Wenger (1991, p.14) who describe learning as a form of social co-participation, where the social situation in which it occurs is a focal point. The individual learner acquires the skill by actually engaging in the process, under the attenuated condition of legitimate peripheral participation. This process of skills attainment is highly interactive and productive. Learning is by participation in a particular task. One must get fully involved in the real act of the task in order to learn it, which is an emphasis of vocational learning. The research project also revealed that in house training is very much cheaper compared to sending a staff for further study. It

also helps the staff to be updated all times. In addition the instructors gained entrepreneur skills in motor rewinding. The administrator in charge of training encouraged me to continuously organise such trainings to enhance the competences of instructors in pedagogical and technical skills. This helps administrators to maximise labour at JVTI. However, '*five trainees stated that the skills they have acquired in motor rewinding to be applied in small and medium scale industries'*. This is in line with Freire (1996, p.14) who described learning as a way of discovering oneself and a potential to name things around us. In this respect, people if empowered are capable of making their own internalization and analysis of the world around them and make use of it as they interact with others.

The findings revealed that inadequate training materials was a challenge, as similar to what (Okinyal 2006) observed that, BTVET institutions lack instructional material and infrastructure like lecture rooms, teacher's houses, workshops, tools, equipments, books and libraries. Yet BTVET is practically oriented and its success is dependent on the availability of teaching materials, tools, machines and equipment. If these are grossly lacking in the institutions, the products from them will not have the competencies directly required in the labor market. This makes instructors rely on improvisation hence less skill acquisition is imparted in the trainees. JVTI being among the BTVET institutions suffers from inadequate training material due to under funding by government. This situation also existed in Kyambogo University when the researcher was still a student. The researcher could not engage practical lesson due to lack of materials, equipment and tools. This greatly affected my learning as the researcher did not

acquire competences in some areas. To make them competent, they have to expose them to apprenticeship training at world of work. The researcher strongly disagrees with inadequate training material in BTVET institutions, if our aim is to produce competent technicians with both pedagogical and technical knowledge. The researcher advocate for adequate training materials in BTVET institutions. In the bid to solve this, stakeholder agreed with stakeholders to have cost sharing with trainees towards purchasing materials for training. Asian Devolpment Bank (ADB, 2009) report points out that with cost sharing, institutions will become more responsive to clients and that students will be more concerned about receiving value for money. Under a regime of institutional grants from governments, incentives are available for higher education institutions to focus on bureaucratic and political interests. In light of this, stakeholders agreed to implement cost sharing whether for government or private trainees at JVTI. Trainees at JVTI contributed one hundred thousand shilling for training material to supplement the grant from government.

The research project findings reveal inadequate study tour as another challenge; field practicum is intended to expose instructor trainees in electrical engineering to observable work processes through field practical experience. However, the funding of this activity by institute remains cost burden to facilitate their effective implementation. For example, field work practicum is perceived as being expensive and not provided for in the grant budget. For that matter, this activity is in most cases not promptly funded. In addition when the researcher was pursuing my degree at Kyambogo University, the researcher was not exposed to

industrial tours. In the course of four years, the researcher went to only Mubuuku hydro power plant in Kasese. The researcher strongly disagrees with limited field tour as it does not expose trainees to what happens at world of work. In the bid to solve this together with stake holders we agreed to implement cost sharing to boost funding of that activity.

Thus inadequate field tour has been a major hindrance to the acquisition of skills (Dasmani, 2005). The stakeholders therefore agreed to organize routine field tours using the funds they pay. This is deemed a successful strategy as it helps trainees to bridge the gap between mostly theoretical class work and the practical aspect of the course they undertake.

5.3 Conclusion

Training in motor rewinding at JVTI is hindered by inadequate training materials, inappropriate teaching of practical lessons, inadequate field tour and limited time for practical lessons. The situation is worsened by delay in provision of training material which makes the training to become more theoretical than practical thus leading the trainees to lack skills in motor rewinding.

To counteract the challenges, strategies of in-house training in motor rewinding, cost sharing, more hours to allocate for practical lesson of motor rewinding were successfully implemented. The situation was observed to improve greatly as reflected in the number of DITTE electrical engineering students and instructors who were trained. The instructors who were trained in motor rewinding during the project will be capable of passing on the competences attained and thus the

sustainability of the project's efforts. Constant practice of the same skills is paramount since skills cannot be acquired at once in a life time.

5.4 Recommendations

In view of the findings and conclusions, the researcher together with participants made the following, six recommendations to sustain the motor rewinding.

The Jinja Vocational Training Institute (JVTI) should provide the required training materials to be used in motor rewinding to enables trainees to acquire relevant skills.

The Jinja Vocational Institute (JVTI) should maintain a policy of cost sharing as regards practical training materials.

The institution should embark on training trainers so as to keep momentum of motor rewinding through in house training.

The Jinja Vocational Training Institute (JVTI) should convert the electrical workshop into a production unit such that factories and industries around can access the services to have their burnt motors rewound.

The Jinja Vocational Training Institute (JVTI) should collaborate with neighboring industries such that the trainees can acquire more skills related to motor. For the realization of quality in practical skill training, the vocational institutes should vigorously promote industrial attachment programmes for both staff and students.

Other researchers should research on calculating the efficiency and how to maintain of the motor after rewininding.

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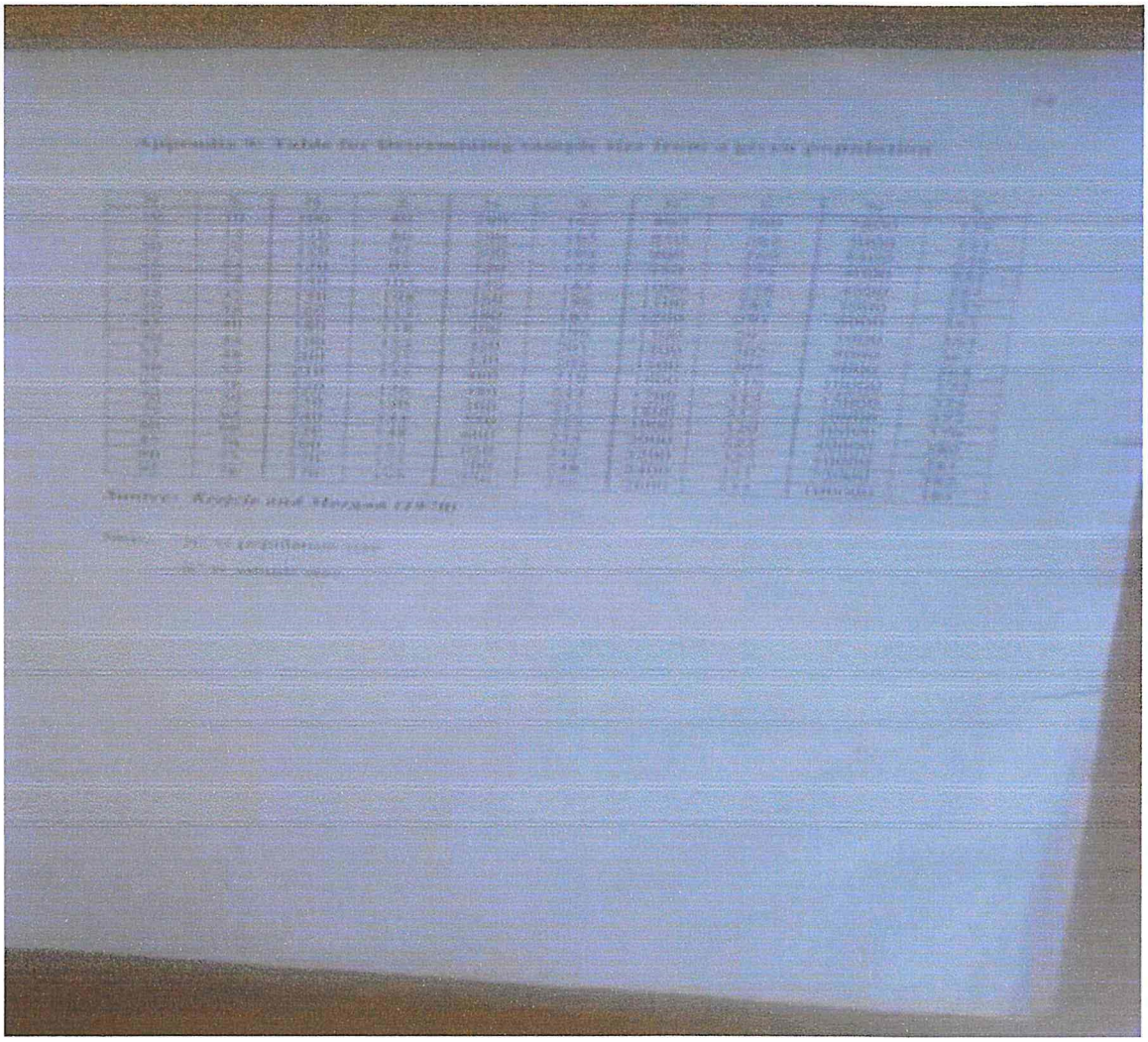
APPENDIX A: Work plan

Work plan

Activity	Responsible personnel	Duration Schedule
Examine challenges of skill acquisition in motor rewinding and	Student, administration and instructors	01/10/2016 To 31/12/2016
Give strategies for skill acquisition in motor rewinding and	Student, administration and instructors	03/01/2017 To 31/03/2017
Implement the possible strategies for enhancing skill acquisition in motor rewinding and	Student, administration, instructors and researcher	02/04/2017 T0 28/05/2017
Evaluate the possible strategies for enhancing skill acquisition in motor rewinding and	Student, administration, instructors and researcher	02/06/2017 T0 28/06/2017
Mocks, viva presentations.	Administration, researcher, researcher supervisors	01/07/2017 T0 30/08/2017
Submission of Thesis	Administration, researcher, supervisors	01/09/2017 To 05/10/2017
Graduation	Administration, researcher, Supervisors	03/11/2017 To 15/12/2017

APPENDIX B: Table of determining sample size from a given population



APPENDIX C: Motor rewinding evaluation project form

MOTOR REWINDING EVALUATION PROJECT FORM

PART 1 & II:	**PRESENTING AND TESTING THE FINISHED PRODUCT (80MARKS)**		**SCORE**
Assessment criteria	**Scoring guide**	**Max. score**	**Scores**
Background information	Stated the title of the project	**1**	
	State the purpose and objectives of the project	**3**	
	Identified the type of motor	**2**	
	Explained the construction of the motor	**3**	
	Explained the principle of operation	**3**	
	Identified the tools used and their functions	**4**	
	Stated the material used and their function	**4**	
Testing the motor	Explained the test carried out before the rewinding starts ie • Ground tests • Resistance tests on motor etc	**4**	
Read & record motor data	Explained how to read and record data from the motor	**1**	
	Identify the type of data that is read off from the motor • Operation data • Construction data • Winding data	**3**	
Remove and wind motor coils	Explained how to remove motor windings; • Selection of tools • Cutting windings • Pulling windings • Cleaning the stator • Preparing slots	**2** **2** **2** **2**	
	Explain how the selection and inserting of insulators is done • Taking size of the insulators • Selection of type of insulator • Cutting insulator to size • Folding insulator to size • Placing insulator to slots	**2** **2** **2** **2**	

	Stated the procedural steps for making winding frames • selection of correct size of wood / ebonite • marking of dimensions • cutting & shaping frames • drilling & slitting the frames	**2** **2** **2** **2**	
	Stated the procedural steps for winding motor coils • Prepare motor coils • Place the coil in slots • Connect motor coils	**2** **2** **2** **2**	
Inspect & test motor	Testing for continuity	**3**	
	Testing for short circuit	**3**	
	Test for insulation Resistance	**3**	
	Testing windings	**3**	
	Supplying the motor with rated voltage	**3**	
Presentation skills	Fluent in speech Exhibited knowledge and skills of the project Showed ownership of the project work	**4**	
Safety	Stated the safety rules and regulations observed	**3**	
	SUB-TOTAL	**x/80*100**	

APPENDIX D: Sample for minutes of stakeholders at JVTI

ENHANCING SKILLS ACQUISITION IN MOTOR REWINDING FOR ELECTRICAL INSTRUCTOR TRAINEES AT JINJA VOCATIONAL TRAINING INSTITUTE, UGANDA

SAMPLE FOR MINUTES OF THE STAKEHOLDER HELD ON 3rd/ 03/ 2017 AT JINJA VTI

Members Present

No.	Name	Status	Telephone number
1	Mr.Owori peter	Instructor	0776421341
2	Mr. Sempala sabastian	Researcher/Adopted Chairman	0757302788/0774256707
3	Mr. Bamusibule Charles	Head of department Electrical	0772515929
4	Mr.Muzito Tenywa Moses	Instructor	0772420444
5	Mr.Turiyo Gabriel	Instructor	0772920378
6	Oliwa Emmanuel	Instructor Trainee	0771898560
7	Christmas Christopher	Instructor Trainee	0771417379
8	Wabwire L. Charles	Instructor Trainee	0704415156
9	Bagoole Samuel	Instructor Trainee	0757862181

	Maleka		
10	Otai Joseph	Instructor Trainee	0772999437
11	Katushabe Mercy	Instructor Trainee	0757731301
12	Kaluya Alex	Instructor Trainee	0750902614
13	Okuk James	Instructor Trainee	0787321337
14	Nakalema Carolyn	Instructor Trainee/Adopted secretary	
15	Leku Bernard	Instructor Trainee	0793889249
16	Muzeeyi Gerald	Instructor Trainee	0790155141
17	Nakalyango Rose	Instructor Trainee	0773383078
18	Isabirye Tom	Instructor Trainee	0784417498
19	Mulamba Peter	Instructor Trainee	0784890054
20	Nayebare Jeninah	Instructor Trainee	
21	Kisira Ivan	Instructor Trainee	0771367133
22	Kiwewa Yasin	Instructor Trainee	0706421676
23	Abiko Abeate	Instructor Trainee	0705888540

Members absent with an apology

1	Mr.Nganga-Zangu Lazarus	**Deputy Training**	0776248371
2	**Asinai Jesca**	**Instructor Trainee**	
3	**Rukundo Joshua**	**Instructor Trainee**	

4	Onencan Thomas	**Instructor Trainee**	0784525788
5	EGAU betty	**Ag academic Registrar**	

Agenda

No.	Item
1.	Prayer
2	Introduction of members present
3.	Communication from the Chairman
4	Examine factors hindering practical training and identify strategies to improve practical training.
5.	Way forward
6	Closure

Minute No.	Discussions and Recommendations	Action by
Min.13 /MVP/2017 Prayer and adoption of the agenda	The meeting was opened at 8:40am with a prayer led by Abiko abeate One member proposed the agenda to be adopted and was seconded by Christian Christmas.	All Stake holders
Min.14/MVP/17 Introduction	Members present introduced themselves so as to know each other by names and Trade.	All Stake holders
Min.15/MVP/17 Communication fromthe chair	The chairman welcomed members and thanked them for turning up for the meeting. He commended members upon their contribution towards Improving practical training in skill acquisition for electrical instructor trainee at Jinja VTI. He argued members to be committed towards the success of the project.	Chairperson adopted All Stake holders

	He declared the meeting open and wished them good submission in the meeting.	
Min.16/MVP/17 Examine challenges hindering skill acquisition training and Identify strategies for enhancing skill acquisition	Stake holders presented challenges hindering practical training through brain storming by use of paper crousal To lay strategies for improving practical training and intervention to overcome the challenges were suggested by stakeholders	All Stake holders
Min.17/MVP/17 Wayforward	Stakeholders agreed to :- • Factors hindering practical training like inadequate material, lack of competent instructor, lack of study tour, practical time is not always indicated in Time table, un clear curriculum etc. **Possible strategies included** • Real life project i.e. Motor rewinding • In house training in practical's for electrical engineering DITTE, computer as Tool in Teaching • Field tours to industries and factories • Time tabling practical • Rotation of Instructors in all course units Team leaders were nominated to lead Motor rewinding and in house training Mr. Christian Christopher and Kaluya Alex were elected.	All Stake holders
Min. 18/MVP/17	There being no other matters to discuss, The meeting was adjourned at 11:40am	All Stake holders

Sign by secretary.....
Chairman.....

APPENDIX E: Motor rewinding material

MOTOR REWINDING MATERIAL REQUIRED

NO	MOTOR RATE	MATERIAL	QTY	UNIT COST	AMOUNT
1	3phase 2HP 415 AC Motor	Copper wire	2kg	45,000/=	90,000/=
		Sleeves	7pcs	2000/=	14,000/=
		Press pan paper	1	35000/=	35,000/=
		Insulating vanish	0.5L	17,000/=	17,000/=
		Lead wire (asbestos)	2m	5,000/=	10,000/=
		Cotton tap/ thread	1 roll	15,000/=	15,000/=
		Soldering wire	2m	3,000/=	6,000/=
					187,000/=
2	1phase 2HP 415 AC Motor	Copper wire	2.5kg	45,000/=	115,000/=
		Sleeves	7pcs	2000/=	14,000/=
		Insulating vanish	0.5L	17,000/=	17,000/=
		Press Pan Paper	1m	35,000/=	35,000/=
		Lead wire (asbestos)	3m	5,000/=	15,000/=
		Cotton tap/ thread	1Roll	15,000/=	15,000/
		Soldering wire	2m	3,000/=	6,000/=
		Start Capacitor	1	60,000/=	60,000/=
			Subtotal		**280,000/=**
			Grand Total		**467,000/=**

APPENDIX F: Respondent's interview guide for students, instructors and administrators

Dear respondent,

I am **Sempala Sabastian**, a student of Kyambogo University, Department of Art and industrial design, conducting research project on the Topic: enhancing skills acquisition in motor rewinding and . You have been identified as a respondent: Please give your opinion on reservation on the topic under study. The information provided is for academic purpose and will remain confidential. I kindly request you to support me by responding to the interview guide.

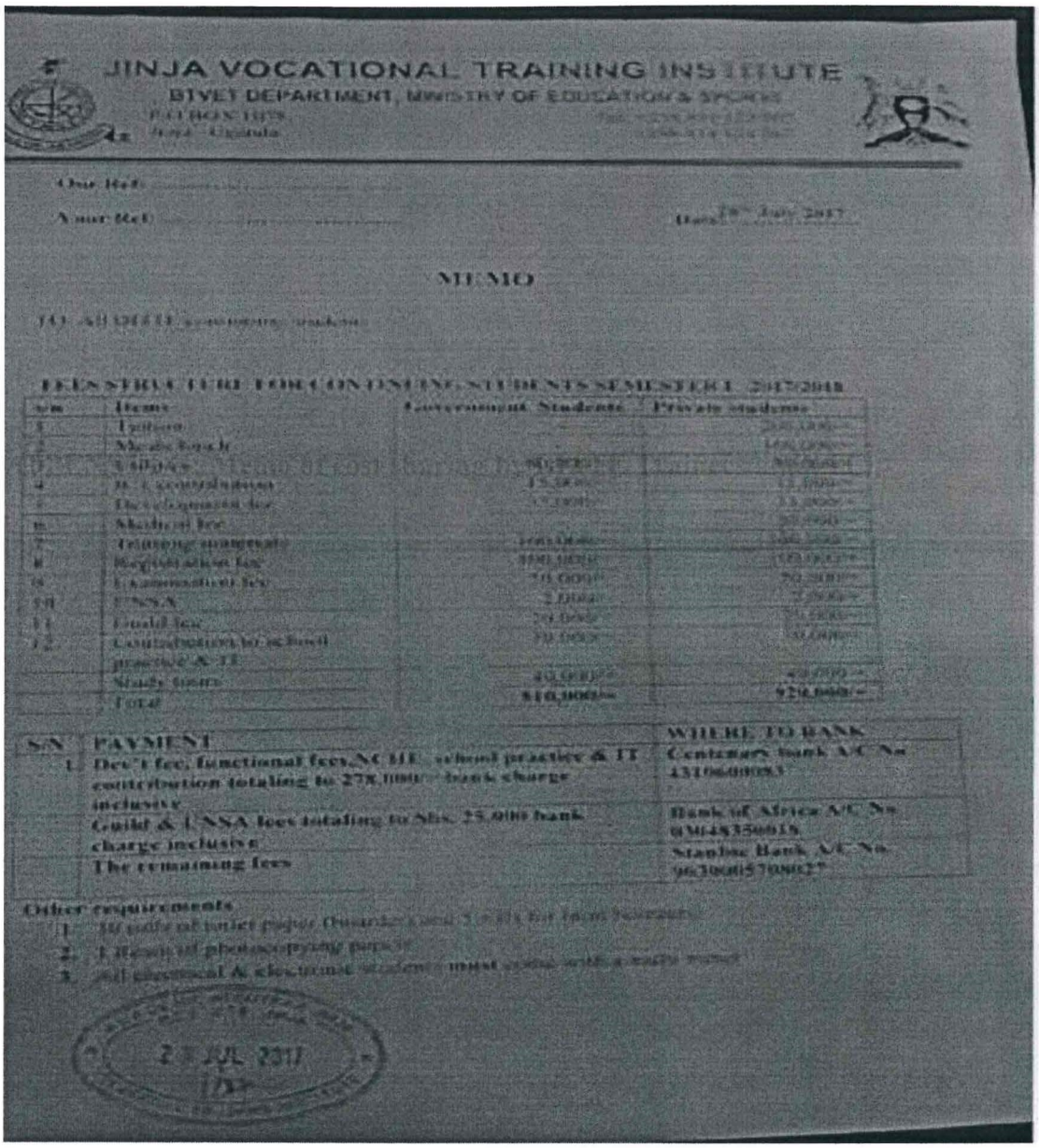
Thank you.

Title:	Respond by tick
Student, Instructor and administrators	√

Responses on the in-house of motor rewinding and motor starter

NO	RESPONSE	STONGLY AGREE	AGREEE	DISAGREE	UN- DECIDED
1.	To allocate more time for practical training				
2.	Team work spirit brings about gaps in motor rewinding project				
3.	Motivation of trainees towards the project				
4.	Real life project as method of delivery				
5.	Assessment by use of Assessment training package (ATP)				
6.	Cost sharing in material to be used in skill training				

APPENDIX G: Memo of cost sharing by DITTE Trainees at JVTI



JINJA VOCATIONAL TRAINING INSTITUTE

BTVET DEPARTMENT, MINISTRY OF EDUCATION & SPORTS

P.O BOX 1819

Jinja - Uganda

Our Ref:

Your Ref:

Date: 28th July 2017

MEMO

TO: ALL DITTE [illegible] students

REGISTRATION FOR FOREIGN DITTE STUDENTS SEMESTER I 2017/2018

s/n	Items	Government Students	Private students
1	Tuition		
2	Meals/Lunch		
3	Library		
4	ICT contribution		
5	Development fee		
6	Medical fee		
7	Training manual		
8	Registration fee		
9	Examination fee		
10	UNSA		
11	Guild fee		
12	Contribution to school practice & IT		
	Study tours		
	Total		

S/N	PAYMENT	WHERE TO BANK
1.	Dev't fee, functional fees, NCHE, school practice & IT contribution totaling to 278,000/= bank charge inclusive	Centenary bank A/C No 3310680083
	Guild & UNSA fees totaling to Shs. 25,000 bank charge inclusive	Bank of Africa A/C No 0041833601S
	The remaining fees	Stanbic Bank A/C No 9030015700027

Other requirements

1. [illegible]
2. 1 Ream of photocopying paper
3. All electrical & electronic students must come with a multi meter

28 JUL 2017

JVTI

APPENDIX H: Observation Checklist

1. Management of time by stakeholders on tasks assigned of motor rewinding

2. What are the challenges hindering skill acquisition in motor rewinding at JVTI?

_____

_____

3. How can we enhance skills acquisition in motor rewinding?

_____

_____

4. Which strategies can we use to implement the solution for enhancing skill acquisition in motor rewinding?

_____

_____

5. What are the intervention strategies in enhancing skill acquisition in motor rewinding?

_____

_____

APPENDIX I: Future Workshop Guide

1. Preparation phase: - Set date/ venue, informed participants, stationary, refreshments
2. Critique phase: - Stake holders generate ideas while observing the rule of thumb - first idea generation, respect for every ones idea, short responses, no critism
3. Utopia/ fantasy phase:- Turning all the negative ideas in the Critique phase into positive, assuming every situation to be possible, resources available to fix every problem
4. Reality phase – This is the ideal situation, stakeholders point workable solutions within the available resources, subjected the pressing issues to pair wise matrix ranking to get the most pressing challenge.
5. Action implementation of the agreed strategies
6. Follow up the impact of the implemented activities

APPENDIX J: Introduction letter from Kyambogo University to JVTI