ENHANCING STUDENT PRACTICAL SKILLS IN CARPENTRY AND JOINERY AT NATIONAL INSTRUCTORS COLLEGE ABILONINO IN KOLE DISTRICT, UGANDA

BY

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18/U/19610/GMVP/PD

RESEARCH REPORT SUBMITTED TO DIRECTORATE OF RESEARCH AND GRADUATE TRAINING IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MASTERS DEGREE IN VOCATIONAL PEDAGOGY OF KYAMBOGO UNIVERSITY

FEBRUARY 2023

DECLARATION

I, LOLU MOSES IGARU, do here by declare that this action research is my original piece of work and has never been submitted to any institution of higher learning or for the award of any degree.

Signature

……Date:……...

LOLU MOSES IGARU

CERTIFICATION

This is to certify that this action research report work titled “enhancing competences in carpentry and joinery industrial skills for civil engineering students at National Instructors’ College Abilonino-Kole District” has been under our supervision and is now ready for submission to Directorate of Research and Graduate Training for approval.

Signed ……. Date ……

DR. MUHWEZI LAWRENCE (Supervisor)

Signed …… Date: …….

MR. SERWANIKO CHRISTOPHER. (Supervisor)

DEDICATION

I dedicate this work to my Beloved Spouse Norah Poni and children namely; Lolu Oscar, Ngilia Priscilla, Opini Harmony, Kandaruku Jonathan and Letaru Trecy. Thank you for your patience and tolerance amidst difficult times you were always there for me encouraging me to move forward. God bless you abundantly.

ACKNOWLEDGEMENT

I hereby extend my sincere appreciation to the Department of Industrial Art and Design for offering me the study opportunity amidst COVID 19 pandemic that almost pulled hopes down.

I wish to give my special appreciation to my Supervisors namely; Dr. Muhwezi Lawrence and Mr. Serwaniko Christopher both of Kyambogo University who repeatedly gave consistent academic guidance in my work. God bless you.

I wish to extend my gratitude to National Instructors' College Abilonino who supported my studies especially the first year. Thanks a lot.

In the same manner, I also wish to thank dear friends who supported my tireless movements for the course amidst tight schedules especially; Mr. Olwa Hudson, Mr. Sam Eron and Mr. Ogwok Milton. God alone can reward you back.

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ACRONYMS

ACPIC	Abilonino Community Polytechnic Instructors College
ATL	Active Teaching and Learning.
ATPs	Assessment Training Package.
BTVET	Business Technical Vocational Education and Training
CBET	Competency Based Education and Training.
CPIC	Community Polytechnic Instructors College.
DITTE	Diploma in Instructor Technical Teacher Education.
FGD	Focus Group Discussions.
HODs	Heads of Departments
ICT	Information and Communication Technology
MOHEST	Ministry of Higher Education, Science andTechnology
NGO	Non-Governmental organization
NICA	National Instructors College Abilonino.
PPP	Public Private Partnership.
UPE	Universal Primary Education.
USE	Universal Secondary Education.
VET	Vocational Education and Training.

ABSTRACT

The study was an action research on enhancing students' practical skills in Carpentry and joinery industrial skills. The curriculum of DITTE consists of both Vocational theory and practical. On the other hand, Uganda government has prioritized Vocational training in order to impart skills among learners for technological advancement (MoESTS, 2011). It is against this background that the researcher was motivated to enhance practical skills training of learners.

The purpose of the study was to enhance practical skills in carpentry and joinery for student instructors at National Instructors College Abilonino (NICA) to meet expectations of the industry and the BTVET Institutions. Guided by these objectives 1. To develop appropriate practical skills training strategies, implement the suggested strategies and 3. Evaluate implemented strategies of practical skills in Carpentry and Joinery at NICA. Qualitative research with participatory action research methodology was employed. The sample was purposively selected comprising of two administrators, two heads of department, five lecturers and fifteen students. Data was collected and analyzed qualitatively. Data collection tools used included; observation checklists, focus group discussion, future workshop and work process analysis.

Three strategies developed, implemented and evaluated include; 1. Use of U tube channels, 2. Real life project, 3. Use of assessment rubrics and ATPs. The findings revealed that; the student Instructors had attained better practical assessment results upon using strategies of internet, assessment rubrics, ATPs and real life project.

CHAPTER ONE

INTRODUCTION

1.1 Overview of vocational training and vocational pedagogy as a field of study

Vocational Pedagogy is a field of knowledge oriented towards trade, occupations and professions. It is the education oriented towards the art of teaching, training and learning as specified in trades or occupations. These skills have brought economic development across the globe. The continuous innovations through technology require adequate practical skills in the areas of specialization. Vocational pedagogy serves here as an interplay between the practical skills training in the Vocational institutions and the world of work.

The Government of Zimbabwe, has been renewing efforts to promote Technical and Vocational Education and Training (TVET) with a particular emphasis on Competence Based Education and Training (CBET) and Modular Based Training (MBT) (Woyo, 2013). This is because many companies are inquisitive of the qualifications awarded by training institutions since many graduates come out half-baked and cannot handle the demands of the workplace set-up.

Practical skill -based education allows students to study and learn at their own pace. They can move quickly through materials they already know and focus on what they still need to learn hence saving both time and money. Competency-based education can improve quality and consistency, reduce costs, shorten the time required to graduate, and provide us with true measures of student learning. This is especially important because the learning outcome is the same for all abilities of learners and only time varies (Obwoge, 2017) .

The Uganda government has prioritized Vocational Training in order to impart skills among learners for technological advancement. The government has embarked on the creation of more

TVET institutions in order to fulfill this goal. This explains the existence of the National Instructors' College Abilonino and many similar TVET institutions in the country where training of practical skills for industry takes place (MoESTS, 2011).

1.2 Back ground of the study

This chapter presented background of the College where the action research took place, personal introduction, situational analysis, motivation statement, statement of the problem, purpose, objectives, research questions, scope of the study justification of the study, significance of the study and the operational definition.

1.2.1 Background of National Instructors' College Abilonino

The historical background shows that National Instructors' College Abilonino (NICA) started as Abilonino community polytechnic instructors' college (ACPIC) in 2002 among 11 other colleges to address the scarcity of instructors in the BTVET subsector by the Government of Uganda with the main aim of solving unemployment problems through provision of employable practical skills and job creation to Ugandans. However, in 2004 ten (10) CPIC's in Uganda were closed and only Abilonino CPIC remained with the sole purpose of training instructors for Community Polytechnics and TVETs institutions. Graduates from the then ACPIC were found to be on high demand in TVET training institutions at different levels both in private and Government aided institutions because of increased skill provision at the time. The students were deployed in farm institutes, technical institutions, technical schools and community polytechnics. ACPIC upgraded to NICA in 2014 as the only Instructors' training College in Uganda to date with the sole aims of improving the instructor training and pedagogical skills for BTVET institutions and improving the quality of teaching and learning.

1.2.2 Personal background

The researcher possesses Bachelors' degree of Education in Technological Studies, Diploma Education Secondary, and National Diploma in Civil and Building Engineering and craft certificates in carpentry and joinery and currently pursuing a Master's Degree in Vocational Pedagogy at Kyambogo University. The researcher is also the Head of Department of Civil and Building Engineering, a mentor in Active Teaching and Learning (ATL) methodologies and a lecturer in the Department majoring in carpentry and joinery industrial skills. He has taught in Technical Institutes and a Technical School before advancing to National Instructors' College Abilonino (NICA). The researcher has experience of working with the world of work especially NGOs and personal carpentry and joinery workshop. Using this background and work experience, the researcher could ably contribute to the improvement of practical skills training in carpentry and joinery in the work place.

1.3 Motivation for the Study

Uganda has one of the fastest growing population in the world and youth unemployment is very high (Pletscher, 2015). The Uganda government has prioritized vocational training in order to impart skills among learners for technological advancement as a solution to solve youth unemployment in the country. The TVET Policy clearly emphasizes a flexible workplace-oriented (practical) delivery when juxtaposed with the theoretical knowledge acquisition under the current general education system and it shifts TVET management from the government led to Public- Private Partnerships (PPP) delivery. (MoES, 2019). Some of the skills taught in TVET institutions include carpentry, electrical engineering, civil and building engineering and many others. The National Instructors' College Abilonino and many similar TVET institutions in the country offer some of these courses but little is known as to whether these courses really fulfill the government targets. The students had complained of inadequacy of the practical skill trainings in the College and how it affected their delivery during the school

practice and industrial training sessions. This among other factors motivated the researcher to carry out the study utilizing action research methods to enhance practical skills of the student instructors in Carpentry and Joinery.

1.4 Situational Analysis

The researcher used a situational analysis as a bench mark in its wider context and gathered the information together indicating the main problems and needs at National Instructors' Abilonino. The work production process analysis was used to establish the critical areas. The resources explored were; 2 practitioners, 15 students, 2 lecturers and 1 administrator. These were used as focus groups discussants that gave responses. The purpose of the situational analysis was to examine the broader picture of the critical issues at National instructors' college Abilonino.

1.5 Problem identification

The researcher used the work process analysis to derive the most pressing problem hindering carpentry production graduates' responsiveness to the demands of world of work. The office of the Academic registrar was used to obtain the full details of the work process.

1.5.1 Work/production process

Work process include; admission process of the students, planning of learning activities, conducting training, assessments, evaluation of industrial training, school practice and graduation. From the above processes, the training was key process at the college as it takes 25% of the total budget per annum. The academic registrar of the college was purposively used in gathering the data of the work process analysis by use of the question guide made by the researcher. The data collected was tabulated in Table 1.

Table 1: Work process analysis of a DITTE Student of Civil and Building Engineering Department

S/N	ACTIVITY	LECTURER COMPETENCE	STUDENT COMPETENCE
1	Admission	- Not applicable.	- Apply for DITTE program.
2	Training theory and practical in civil engineering course units	Teach theory concepts of civil engineering course units Teach practical lessons of civil engineering course units	Learn theory concepts of civil engineering. Apply the theoretical concepts of civil engineering. Demonstrate practical skills of civil engineering. Perform practical skills of Civil engineering works.
3	Teaching skills training skills' training	Train learners the teaching skills	Perform micro-teaching sessions Teach other learners of a lower level. Apply the teaching skills.
4	Assessments	ssess theoretical and practical concepts of civil engineering.	Do the assessment for both theory and practical work
5	School practice	Supervise students in school practice.	Teach both theoretical and practical lesson to learners during school Practice.
6	Industrial training	Supervise students in ustrial Training.	Perform real life projects in the world of work.
7	Examinations	- Set, invigilate and mark examinations	- Sit for examinations
8	Graduation	- Attend graduation	- Graduate

The above data were analyzed by the focus group discussants and came up with the main challenge of teaching and learning as in Tables 2 and 3.

The researcher allowed the stake holders to brainstorm and came up with many critical issues from the work production process. These challenges were then ranked to become a Centre of

interest for the future workshop. The Table1 reflects the group concerns of the challenges facing the training programme at the institution.

Table 2: Focus Group Presentations

Group one results	Group two results	Group three results
Improper teaching ofpractical work. Inadequate practical skills in carpentry And joinery industrialskills. Poor time management by Lecturers. Delay of results byKyambogo University. Improper management of Project work.	Improper teaching of practical work. Inadequate competence in carpentry and joinery industrial Skills. Poor time management by Students. Failure to conduct Study trips. Unclear curriculum.	Improper teaching of Practical work. Inadequate competence in carpentry and joinery industrial skills. Inadequate teaching and learning resources. Low syllabus coverage in some course units.

Table 3: Ranking of the scores

	Teaching of practical	Adequate competence in carpentry and joinery industrial skill	Poor time management	Unclear curriculum	Low syllabus overage in some course units	Delay of results by KyambogoUniversity.	Failure to conduct study trips.	Improper management of project work.	Poor time management by students.	Inadequate teaching and learning	Total	Rank
	1	2	3	4	5	6	7	8	9	10		
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

Figure 1: Students brainstorming during situational analysis

1.5.2 Conceptual framework

The conceptual framework consisted of both the independent and dependent variables. The independent variable was competence in skilled carpentry and joinery works that might have resulted due to; Inadequate practical skills, inadequate tools, machinesand equipment, low attitude towards carpentry practical training, incompetent skill trainers, inadequate training materials, theoretical training content among others. On the other hand, the dependent variable would result into both negative and positive impacts. The researcher in this study looked at the positive results such as; adequate employable knowledge, skills, attitude and attributes attained from the training institution, improved economic livelihood, high motivation for skilled work of Carpentry and Joinery and high level of connectivity to industries and training institutions through Public Private Partnership (PPP). This result shall give a better feed back to the training institutions especially on the active teaching and learning (ATL) methodologies in a work-based environment using the Competence Based Education and Training (CBET) strategy.

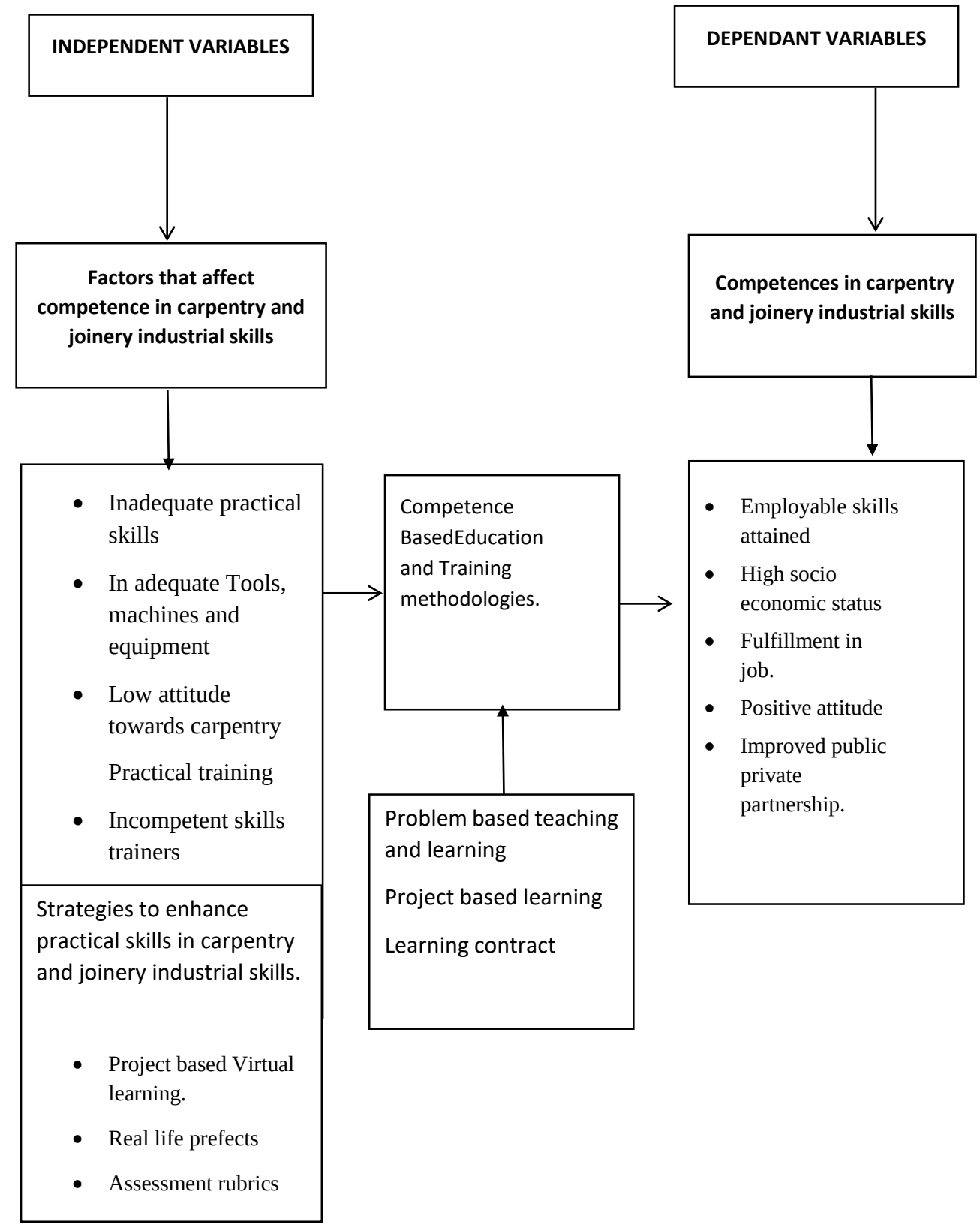


Figure 2: Conceptual Framework

1.6 Statement of the problem

The curriculum of DITTE requires the teaching of both vocational theory and practical training as reflected in the work production process of the college. The curriculum has not been revised since its inception in 2014. The Department of Civil Engineering at National Instructors' College Abilonino (NICA) endeavors to give vocational theory in carpentry and industrial skills as well as practical skills. However, the practical trainings are inadequate due to several factors such as shortage of equipment, materials and workshop experts. This result into low practical skills required for industry and the world of work. This has a multiplier effect because the students are trained as instructors to further train others in the BTVET sector and also to work with minimum supervision in the world of work. Students for several times have complained of the inadequacy of the training compared to the expectations at the work places during school practice and industrial training sessions. On the other hand, the students' active participation has gone down due to the negation of inadequate training tools compared to the yearly increasing numbers. Hence there was need to enhance the competence training in carpentry and joinery industrial skills in National Instructors College Abilonino (NICA). This action research therefore attempts to bridge the gap between the work based practical skills for Carpentry and Joinery at NICA and the world of work in industries and BTVET training institutions.

1.7 Purpose of the study

Shvetsova, (2021) emphasized that a researcher has to consider two important areas in the purpose of a study; determine the reason why and what you intend to accomplish from the study. Therefore, the main goal of the study was to enhance the practical skills in carpentry and joinery industrial skills for Civil and Building Engineering students at National Instructors' College Abilonino.

1.8 Specific objectives of the study

The specific objectives of the study were;

i. To identify and develop strategies to enhance practical skills for Civil Building Engineering students at National Instructors' College Abilonino.

ii. To implement suggested strategies to enhance practical skills for Civil Building Engineering students at National Instructors' College Abilonino.

iii. To evaluate the impact of implemented strategies for enhancing practical skills for Civil Building Engineering students at National Instructors' College Abilonino.

1.8.1 Research questions

i. What are the strategies used for enhancing practical skills in Carpentry and Joinery industrial skills?

ii. How can the strategies be used to enhance practical skills in Carpentry and Joinery industrialskills?

iii. How can the implemented strategies be used to enhance practical skills in Carpentry and Joinery industrial skills be evaluated?

1.9 Justification of the study

The BTVET strategic plan of skilling Uganda demands youths interested in competence-based education be given prospect to train in any field of skill (MOESTS, 2011). This is to allow self-employment and job creation for the masses. Carpentry and Joinery industrial skills are one of the key areas of innovation using appropriate technology for in sub Saharan Africa. The demand forfurniture such as beds, tables, chairs, cupboards, upholstery, office desks few to mention but a few remains wanting. On the other hand, construction of roof works, ceiling, and doors still takes the majority demand. The construction of the above-mentioned items

requires competently trained personnel to satisfy the demand of the industry. Feedbacks of the graduates from National Instructors'College Abilonino indicate that many graduates are not much involved in the practice of the skill work of carpentry and Joinery and majority who trained from National Instructors' College Abilonino (NICA) shy away from teaching the subject leaving it in the hands of 20th century instructors yet we are in the 21st centurywhere modern skills and innovation through technology are on the rise. Therefore, for the instructors at National Instructors' College to remain relevant, they should be thoroughly trained with the required practical skills in carpentry and joinery. This can be done through identifying and developing better strategies for competence-based education and training, implement and evaluate them to determine their effectiveness for the students of National Instructors' College Abilonino.

1.10 Significance of the study

The study of the Action Research on the competences in carpentry and Joinery will assist National Instructors' College, BTVET training institutions and the world of work to become aware of the employability and retention of employees of the required competences.

The study will enable National Instructors' College Abilonino (NICA) to enhance the training of the required competences for the purpose of integrating the theory of carpentry into practice. Public Private Partnership (PPP) collaboration between the industries and the NICA shall be enhanced. The institution shall on request to use industries workshop premises for further enhancement of skills and obtain a relevant curriculum using Developing a curriculum (DACUM) philosophy. The study will enable the students to realize their level of competence and will appreciate addition of newpedagogical knowledge that shall be used during school practice time and industrial training sessions.

1.11 Scope of the study

The study of the action research focused on; geographical, content and time/ period taken.

1.11.1 Geographical scope

The study was conducted in the Department of Civil and Building Engineering at National Instructors' College Abilonino, Ayer Sub County, Lwala parish and Abilonino ward about 10km from Kole District and 30km from Lira city.

1.11.2 Content scope

The research study focused on the challenges in Carpentry and Joinery industrial skills for the Civil and Building Engineering students at NICA. The study identified and developed strategies to enhance competences in Carpentry and Joinery industrial skills, implemented the possible strategies to enhance competences in Carpentry and Joinery Industrial skills and also evaluated the impact of implemented strategies for enhancing competences in Carpentry and Joinery Industrial skills. The first objective explored the strategies in the work/production process of a competent carpenter and a joiner while the second objective was to implement those strategies for competences in practice of Carpentry and Joinery industrial skills and then evaluate the impact of the strategies for a competent carpenter and joiner.

1.11.3 Time scope

The researcher conducted a situational analysis through a work/production process and a future workshop to derive the research proposal in September and October 2021 respectively. The research report was written from November 2021 and ended in June 2022.

1.12 Definition of terms

Active Teaching Learning (ATL): This refers to practical education where learners are exposed to real life training, equipment and skills. It is mostly offered in TVET institutions.

Competency: This refers to one's capacity to put in practice practical skills at place of work

learned from college, university or any other institution of learning.

Competency Based Education and Training: This simply refers to a training model where learners are exposed to skills-based training. This is mostly offered in TVET institutions.

TVET: Is the type of education that studies technologies and related sciences, it enables graduates to acquire; practical knowledge, skills, attitudes, and attributes relating to occupation in various sectors of economic and social life in addition to general education. It involves trainings that provide participants with skills, knowledge and attitudes that enable them to engage in meaningful work to make a difference in the labor market.

Practical Skill Training: it is the hands on teaching where learners are brought closer to the learning aid for the purpose of producing a product. Learners are able to transfer knowledge into reality.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presented scholarly formation in form of theoretical and empirical data from past publications. This chapter reviews literature in the fields of the strategies of enhancing practical skills in carpentry and joinery industrial skills, implementing possible strategies on how to enhance practical skills training in carpentry and joinery and evaluating the impact of implemented strategies to enhance practical skills in carpentry and joinery industrial skills.

A study from in New Zealand on vocational study literacy showed that "there are few literacies on how trades are being practiced especially Carpentry and Joinery compared to the scholarly on other academic studies" (Parkinson & Mackay, 2016). This is because the trade is expensive and there is less literature demand on it. This is true to date in Uganda, there is little study in this area it is at the verge of being extinct in the vocational institutions since the numbers of students doing this course are minimal in all the institutions.

2.1 Strategies to enhance practical skills training

A number of strategies have been developed to enhance practical skills training. Some of the published scholarly information is presented below;

Practical skills are seen through the competences required both in the classroom and workshop by the teachers(Lai et al., 2019). Graduates of woodwork can only fit in the world of work when there are proper strategies in place to improve the quality of practical projects. This implies that the required industry competences should be emphasized in the process of practical training. This will lead to the skill development and subsequently improved production.

Zakariya (2009) explains reflective teaching model as a strategy for teachers to implement competences in learning. Teachers should always reflect on what to do and think all the

possible solutions that shall aid the process of learning. These can be by planning, putting planned activities into practice, observation, recording observations, discussing observations, reflecting on observations, revising plan for a new one, re organizing plan for a new teaching and recording it again (Olitoquit, 2014).

In Vocational Pedagogy, the training curriculum is considered as general and specific sometimes known as TVET curriculum. This also implies that the training methodologies involved are general and specific. The specific methodologies are to be learner centered for the purpose of enhancing required competences in the specific area of specialization that can enable the learner to fit well in the world of work. Kosar and Hoeksma (2021) explained that the teacher should use active teaching and learning (ATL) as a strategy to enhance required competences and achieve adequate amount of learning both in the classroom and workshop settings. There is a clear difference between teaching academic and that of vocational subjects. It is of interest for the researcher to take keen view of the enhancement of the vocational competences that would be geared towards occupations (Kyobe & Rugumayo, 2005). Modularized curriculum developed basing on competency standards that would correspond to the learning outcomes, assessments criteria, contents, learning conditions and instructional methodologies (Mohd & Wahid, 2014). The competences should be realized from the industry needs basing on the industry standards and should clearly analyze the ability of performance through the duties and tasks a learner should perform such that there is transfer of knowledge, skills and attitudes to range of situations within a given occupation.

Instructional strategy should aim at the implementation of key principles of vocational pedagogy the outcome of which should be the learning experiences a learner would achieve. This should be geared towards the students' pedagogical and professional competences.

The students of carpentry and joinery are well placed in the pedagogic course as they have

specific Vocational Training course. The TVET curriculum gives them the opportunity to have a specific instructional methodology (methods and techniques) to enhance the required competences for industry. This can be under the formal, non-formal and informal curricula activities. Mjelde (2006) emphasized that; TVET formal and non-formal curricula activities, learners should be geared towards a competency-based education and training (BCET) where the emphasis is put on achievement rather than process. It should show what can be performed in the workplace, should not limit entry restrictions for a programme in case there is interest much as prior achievement would be necessary and where there is a gap, a bridge module should be involved. CBET should be flexible, not time-based learners should progress through units/modules at their own pace and complete whichever modules are appropriate for employment, it is individualized and learner centered the teacher should always be a facilitator. Trainees can access learning through ATL, CBET should enable trainees to learn at their own pace and select which modules appropriate for their learning. Trainees can focus on the skills they are confident of mastering and most importantly, it should be employment-led. For the training to be effective, it should be modularized into achievable units/elements of competence using the set occupational standards by industry and business enterprises. It is important that assessment and evaluation is continuous taking into account previous achievement and prior learning. Makarfi (2014) quotes from Usoro and Ogbuanya (2009) that one of the major thing teachers should do is to equip students with competences that are relevant for employment. A teacher who does not traverse with 21st century trends may very soon be obsolete. This implies that teachers should be highly updated with the needed Information Communication Technology (ICT) skills for fast and effective delivery. Many learning institutions were closed and 21st century technologies were used for teaching online (Mahmood, 2021). Ndirangu (2011) explained that technical teachers should be retrained two to six times in a year. Continued professional development helps a teacher to develop new skills of practice that are

relevant (Tyagi, 2021). This will keep them relevant in their field of practice. Usman, (2020) showed that the government of Nigeria and in particular in Niger state found out that the economy of the state cannot grow if the teachers are not well trained to impart the needed competences for industry. The government of Uganda through Technical Teachers Training Programme (TTTP) started such continuous professional development. However, it all of a sudden collapsed. To make it worse, those that were trained went for greener pastures. This of course will affect the needed competence development in the modern trends. This will definitely affect the quality of teachers and the products/graduate they produce. It implies that there should be a strategy to equip technical teachers with the needed skills to produce quality graduates.

2.2 Implementation of strategies to enhance competences in practical works

Competences are the driving factors in any vocational training for the young generation. It should be clearly stipulated and analyzed by industrialists and business expert's prior undertaking of such training projects. The trainers themselves should have adequate experiences of the needed competences prior training and follow the strategically planned competency standards (Wulansari, 2021). The institutions have to work hand in hand with the industries since they have more expertise in the competences required (Cheetham & Chivers, 1996). Despite this finding, the cited study did not examine whether the teachers' professional qualifications influenced the implementation of Technical and Vocational curriculum in Technical Colleges in Nigeria. Thus, the influence of teacher's professional qualification on the implementation of Artisan and Craft curriculum in community colleges in Uganda and urban areas of other regions was also investigated in the study. It was found out that organized hand book of Carpentry and Joinery activities should be used to instill the required competences in the industries (Tooke, 2014). Skills knowledge and attitudes are highly supported by a good working environment for one to perform better or attain a better

experience. The competences required are seen from the outcomes of the learning (Hicks et al., 2013). In Nigeria, in Edo and Delta States, research had shown that it is the responsibility of the Carpentry technical teachers in the technical colleges to assess the competences in Carpentry and Joinery works to achieve the recommended levels of attainment by use of assessment rubrics (Oviawe et al., 2021). Augmented reality helps Carpentry and Joinery students to quickly grasp the basic concepts that are technical to new learners; for instance, marking tenons, mortices, planing to required sizes, sawing to correct widths etc. Learners can view animations in three dimensional (3D) projection This enhances the needed competences (Lee et al., 2019).

Competency Based Education and Training (CBET) is a mode of training where the emphasis is placed on the acquisition of competence. It is designed to meet the demands of industry and business. It involves training individuals to be able to perform to the standards required in employment (Cornelius-ukpepi, 2018). The Strategic Plan is titled ―Skilling Uganda, which denotes a paradigm shift for skills development in Uganda. The BTVET system is expected to emerge from an educational sub-sector into a comprehensive system of skills development for employment, enhanced productivity and growth. The main purpose will be to create employable skills and competencies relevant in the labor market instead of educational certificates. It will embrace all Ugandans in need of skills, including but not only primary and secondary school leavers (MoESTS, 2011). Studies on teaching and learning strategies and learning of technical skills have shown high teacher preference to teaching theoretical over practical aspects of the TVET subjects. An example is the study by Ferej, Kitainge and Ooko (2012) that established that majority of teachers had inadequate work experience. Out of the TVET teachers interviewed, 38% had acquired industrial work experience of only six months or less, 26% had work experience of between 12 - 36 months and 16% had work experience of over 36 months. The importance of industrial experience for Artisan and Craft teachers

cannot be gainsaid. Adequate initial work experience and regular updating enables the teacher reflecton and demonstrate the appropriate work context to his or her students A growth mindset is the belief that intelligence can be developed through effort, and that a person with a growth mindset believes that they are able to develop his capabilities over time, effort, and diligence. AL-Husaini & Amayreh, (2021) deposited that people with a growth mindset become lifelong learners, and when they face challenges, they appear to be more resilient than those with a fixed growth mindset are On the other hand, and people with a stable growth mindset believe that they are unable to develop their own intelligence. This belief has negative effects on their development, effectiveness, and educational attitude, as they focus on the level of intelligence more than their participation in effective cognitive practices and problem-solving skills. They believe that they are unable to control their success or failure because they are determined by a fixed level of intelligence, moreover; They believe that talent alone can help a person succeed, and without effort, when teachers help students develop a growth mindset, they at the same time encourage students to develop the determination and passion needed to achieve long-term goals.

Chambers (2012) alludes to investment as a group of methodologies and techniques to empower country individuals to share, upgrade, and investigate their insight into life and conditions, to plan and act. Knife, (2009) highlights participatory methodologies as methods for building cooperative energy, proprietorship and improvement of manageability. Participatory approach has been scrutinized on the premise that no single examination (to set up) a causal connection between any result of a venture and its participatory components. They have likewise blamed the individualizationof the idea of activity and the depolarization of strengthening.

Mosse (2011) did an examination on a few participatory ventures and discovered that evenin

ventures which had an abnormal state of cooperation, with group contribution being regularly a develop of the arranging setting and hid the basic governmental issues of learning generation and utilize.

Dunggan (2009) found out that for one to be successful in determining the rate of return through productivity, supervisors should ensure that there is adequate knowledge of book keeping and good investment planning. It is imperative to create conventions for the dispensing of assets, acquisition, budgetary administration and straightforwardness of the advancement of youth preparing focuses (Haier, 2009).Haier additionally demonstrates that budgetary administration preparing is required in spite of the fact that endeavors ought to be made to rearrange accounting. The abuse of assets is a hazard when budgetary administration duties are exchanged to nearby communities that endure feeble limit and preparing ought to be done close by strategies to guarantee straightforwardness which incorporate theutilization of various neighborhood signatories for receipt of assets and acquirement, the upkeep of money related records and in addition community to and standard examinations of these records (Haier, 2009).

Addition to the above is the emergence of methods in VET institutions employing various tactics to operate with flexible procedures. For example, Brazilian enterprises have exemption agreements with the National Training (SENAI) so that instead of paying in to that institution, they can use directly part of their contribution, where this must be authorized by SENAI, and that part can only be used to contract courses with it. In Colombia, for example, enterprises can co-finance in-house training planswith SENAI, and get reimbursements equivalent to 50 per cent of their Para-fiscal contributions. Thesestudies articulate various ways in which some promising financing strategies are becoming apparent in the region, as they seem to fit in with new socio-economic and institutional developments. These are put into three categories as

follows: First, is the setting up of alliances or associations of the state with private executing or intermediary agents, to support training. In this way enterprises taking advantage of tax exemptions such as in the Chilean case VETinstitutions, managing authorities of TSE or official agencies in charge of training programmers targeting special populations, as well as Labor Ministries, Social Solidarity networks, and others, are free to contract training services with a wide range of suppliers. This breaks away from the prevailingmerging of financing and execution of training services, and promotes the autonomy of regulating, financing and executing bodies.

In supporting Ocala's findings "Kamba (2009:41) observed that vocational and technical education undoubtedly is quite expensive hence the need for private stakeholders and non-government organizations (NGOs) to work in conjunction with the state and federal governments. They could jointly fund the programme adequately so that functional laboratories, implements and tools are provided to students. These provides for the necessary practical experience required in the training ofvocational and technical education for national development. Studies carried out in the Caribbean countries by (ILO, 2001:6-8) on "Modernization in vocational education and training in the Latin American and the Caribbean Region" observe that characteristics of economic activities and new social needs bring training to the fore owing to its capacity to include people, mobilize knowledge, create better conditions for employability and facilitate options for social dialogue.

Despite the greater complexity of current situations in venture that have also exerted more strenuous efforts from the training institutions to keep updated and offer services in accordance with demands. The study concurs that this has to do with frequent modernization attempts undertaken by training institutes, or imposed uponthem by circumstances. The study points out that gradual incorporation of new actors to the training supply, the availability of a mix of

financing sources and the necessary relevance expected of trainingprograms are some of the factors that have led to the modernization and transformation of VET institutions. Thus, methods of transformation and adaptation to change are nowadays priority items on the agenda of VET institutions. Besides, these studies observed that the users of the graduates from the training institutions want to know about the best offers, especially those ensuring the greatest efficiency since both employers and workers are looking for signs of efficiency. On the same note, the funders of the training institutions would wish to know the best possible ways of the use of the funds because well-managed institutes give them a social assurance of efficient public spending. These studies agree that funds fromthe private sector must go to bodies accountable for relevant, effective and efficient training procedures. This left a literature gap that needed to be filled on existence of private financiers of VET institutions especially in the MIEMCK, and how well these institutions put funds in appropriate training to satisfy vocational needs of employers.

2.3 Evaluating the impact of Competences from Vocational Qualifications.

Evaluation enables a trainer to determine the fitness of a trainer to undertake forth-coming tasks ahead of him/her. This would be after compiling series of related competences. These competences should have a behavioral positive change towards a skill being trained and the knowledge gained.

Cheetham & Chivers, (1996) define competence as the outcomes of job specific duties and tasks that can be recognized from the performance of a job. Carpentry and joinery being a practical subject would require either a process or product evaluation or combinations of both methods are used. In science and technical colleges, during the period of training, students are involved in practical projects and subjected to the process and product evaluation by their teachers to determine their level of proficiency in practical skill acquisition. However, the total percentage

of the scores in the process and the product determines how well the individual performs in their place of employment after graduation. This therefore means that the process and product assessment based on criterion-based reference assessment for carpentry and joinery should start from the college level.

Most TVET teachers in Kenya underscore in their teaching experiences. The study on quality and relevance on technical teacher education showed that most of the technical teachers had inadequate work experience to meet the expected targets. Out of the TVET teachers interviewed, 38% had acquired industrial work experience of only six months or less, 26% had work experience of between 12 - 36 months and 16% had work experience of over 36 months. Part of this study was presented as part of the working document prepared the Association Teaching for the Development of Education in Africa (ADEA) triennial meeting held in Ouagadougou, Burkina Faso in 2012. (Ferej kitainge, 2012) this study further explains the industrial experience for Artisan and Craft teachers are crucial and acts as a foundation of industrial skill experience on which more advanced skilled are built. In 2007, UNESCO indicates that in 2007 very few African countries had had unemployed trained graduates much as opportunities for skilled workers do exist in their economy.

In Uganda, there has been low absorption of the graduates that qualify from the tertiary institutions. This is due to the perception that they have low levels of competences in the areas of their training (UBOS, 2015). This therefore shows the need to enhance some of the technical competences in the public institutions especially that of carpentry and joinery (Kintu et al., 2019).

An evaluation of vocational technical education in Africa indicate that there are improved labor market skills especially in Kenya where the government has expended the sector by establishing different vocational programs together with the Non-Governmental Organizations

(NGOs). Majority of the less developed countries in Africa are expanding these sectors. This may help to boost decision making at policy levels (Bozzo, 2010). In Uganda government came up with the Uganda white paper in 1992, where much emphasis was put on vocational education, in 2008 policy makers came with the BTVET policy that gave birth to the skilling Uganda strategic program. Through the Directorate of Industrial Training (DIT) skilling program is still in force. This therefore means that enhancing carpentry and joinery industrial skills will be in line with the government's development plan and shall boost livelihood of technicians and economic development.

CHAPTER THREE

METHODOLOGY

3.1 Overview

This chapter consists of research design, population sample and size, instruments to be used in the research, ethical considerations, data collection procedure and analysis.

3.2 Research design.

This research employed qualitative research methodologies of participatory action research. According to Lee (2009) research design should indicate the way of how you are going do a study by clearly showing the framework for data collection. Royal (2018) says that research design could be confusing, however gave five authentic educational research designs. For the purpose of this research, the researcher chose a qualitative design. Participatory Action Research (PAR) was used as an approach by the aid of future workshop tools. The approach involved the ideas of all the stakeholders through a collective inquiry and experimentation based on the different competences and experiences at work places. Action research has four elements namely planning, action, observation and reflection. This process helps individuals undertaking action research to always reflect and improve on their way of performances (Hine, 2017). The action research was conducted because the researcher was interested in change through shared decision making with participants at NICA. The study adopted action Research model while undertaking the study. The purpose of this approach was to enhance the competences in carpentry and joinery industrial skills for civil engineering students at National Instructors' college Abilonino. The action research can be illustrated as a participatory involving the relevant stakeholders in Figure 3.

3.3 Study population size and sample

The study population comprised of 2 Administrators, 2 Heads of Departments, 2 lecturers and 15 students purposively selected to represent the different interest groups crucial for the

enhancement of the competences in Carpentry and Joinery industrial skills. The administrators provided the record of data and policies running the college while the lecturers and the students provided data relating to the teaching and learning for the purposes of enhancing competences in carpentry and joinery industrial skills.

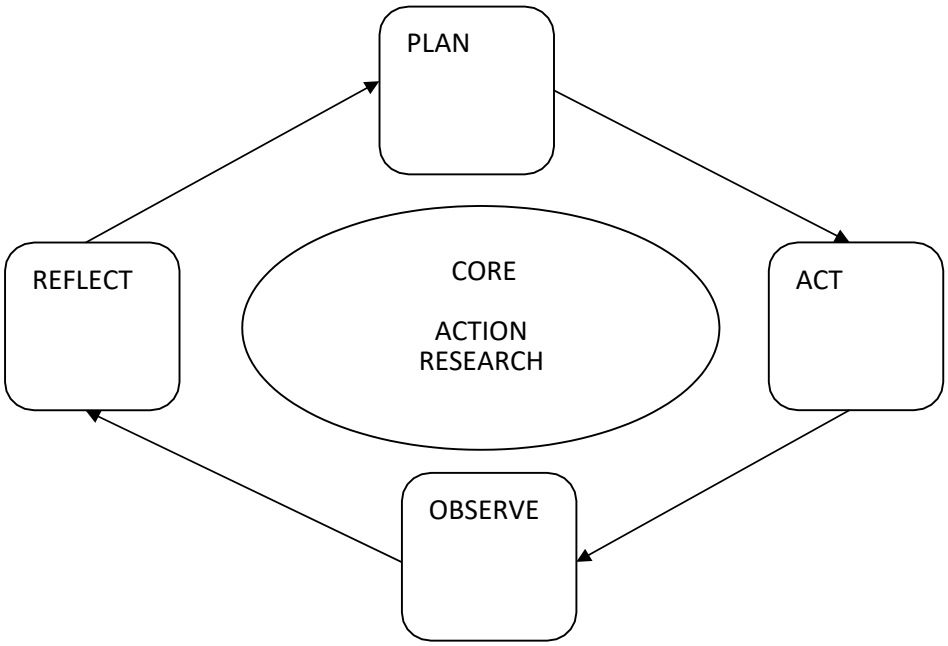


Figure 3: Action Research Cycle

Source: Adapted from (Zuber-Skerritt & Perry, 2002)

3.4 Methods of data collection

The researcher used observation, focus group discussion, brainstorming and future workshop as the key methods.

3.4.1 Observation

The researcher undertook keen interest to listen to the contribution of the focus group members, took notes and observed activities of interest. Observations were used for the purpose of making self-judgments of activities of focus groups to analyze the strategies and its impact on the enhancement of competences in Carpentry and Joinery Industrial skills.

3.4.2 Focus group discussions

The researcher organized discussions according to the purposively selected stakeholders mainly the administrators, HODs, Lecturers and students. This eliminated timidity among the subordinates of the different groups and gave full and precise contributions of participants for better strategies to enhance required competences in Carpentry and Joinery industrial skills. Question guides were used relating to the enhancement of competences in Carpentry and Joinery industrial skills.

3.4.3 Brainstorming

The researcher used brainstorming techniques of paper carousel, think pair and share and falling leave. This allowed active participation of the different focus groups and generated adequate data for discussion.

3.4.4 Future workshop

Future workshop was used for assessing features and finding alternatives for current activities, seekingpossible new directions against the outlined future possibilities (scenarios) for this information in mind. The researcher considered the future workshop to be the main approach of driving the stakeholders to achieve democratic resolutions of issues to address and come up with a template for overcoming suchchallenges and together agreed to implement interventions collectively. The future workshop resultedinto positive dependent variables and outputs that enhanced the competences required in Carpentry and Joinery industrial skills.

The same stakeholders in chapter one were used for the purpose of exploring the critical concerns that were earlier on built up by the focus group discussions (FGD). Castles and utopian imaginations werethen built in the sky by creating fantasy pictures of the college. Lastly the stakeholders were taken to the reality phase of the inadequate skills in Carpentry and Joinery industrial skills. This enabled the researcher to come up with the most pressing concern of the stakeholders after pair wise ranking of the reality concerns. Unanimously, the

stakeholders noticed the gap that was most needed to be addressed. The researcher narrowed to the competences on the practical skill training gap in carpentry and industrial skills for civil engineering students at National Instructors' College Abilonino.

3.4.4.1 Critique phase

During the critique phase, the stakeholders brainstormed on the causes of inadequate Practical skills in Carpentry and Joinery industrial skills for the students of National Instructors College Abilonino. The causes were grouped according to the short term, medium term and long term causes as shown Table 4.

Table 4: The critique phase

Short term	Medium term	Long term
In adequate time for practicalwork Poor time management by students and lecturers. In adequate preparation of Lecturers In adequate training materials Lack of protective gears. Poor attitude of learners towards Practical work. Poor attitude of lecturers towards Practical work. In sufficient tools andequipment Skill gaps of some lecturers Lack of assessment rubrics. Low market of products High cost of trainingequipment High cost of training materials Lack of learner's portfolio on assessment In adequate practical tests incarpentry and joinery Lack of skill in designing and Marketing carpentry products.	Lack of sick Bay/firstaid. Lack of field trips for Exposure. Indiscipline of learners on Practicalwork. Lack of refresher courses For lecturers. Poor Lecturer and student relationship Gender imbalance Imbalance in the curriculum. Low motivation of lecturers.	Low Enrolment. Low/poor Fees structure. In adequate accommodation High cost of repairing machines Unfavorable weather Conditions. Low enrollment.

Source: Primary data

The stakeholders further clustered the short-term causes of the in adequate training skills as shown in the Table 5.

Table 5: Clustered challenges

Un-clustered challenges	Clustered challenges
In adequate training materials Lack of protective gears. In sufficient tools and equipment Low market of products High cost of training equipment High cost of training materials.	In adequate training resources
Poor attitude of learners towards practical work. Poor attitude of lecturers towards practical work.	Poor attitude towards practical work
Skill gaps of some lecturers in demonstration ofpractical work in carpentry and joinery. In adequate preparation of Lecturers	In adequate skills in handling practical works in carpentry and joinery.
Low market of products Poor location of products. Lack of skill in designing and marketingcarpentry products.	Lack of entrepreneurial skills to handle carpentry and joinery products.
Lack of assessment rubrics. Lack of learner's portfolio on assessment In adequate practical tests in carpentry andjoinery	Poor method of assessment.
In adequate time for practical work Poor time management by students and lecturers.	Limited time for practical work in carpentry and joinery.

Source: Primary data

The major causes of inadequate practical skills in Carpentry and Joinery industrial skill has been clustered as;

i. In adequate training resources

ii. Poor attitude towards practical work

iii. In adequate skills in handling practical works in Carpentry and Joinery.

iv. Lack of entrepreneurial skills to handle Carpentry and Joinery products.

v. Poor method of assessment.

vi. Limited time for practical work in Carpentry and Joinery.

3.4.4.2 Fantasy phase

The stakeholders drew ideal possibilities of the causes from the critique phase of the future workshop as;

- Increased training materials for practical training.
- Increased sensitization on competences of industrial skills in carpentry and joinery.
- Institute career guidance in the institute.
- Enhanced practical skills training in carpentry and joinery industrial skills.
- Enhanced entrepreneurial skills in handling carpentry and joinery products.
- Increase the contact and practical hours for carpentry and joinery industrial skills.
- Retool the Lecturers to acquire the skill gaps and adapt to the learner centered methods of teaching.

3.4.4.3 Reality phase

Under the reality phase, the stakeholders agreed to revisit the challenges with their possible solutions to reach to a consensus on what is possible to implement using the available college resources. The causes were ranked according to the pressing areas regarding the inadequacy of the competences required for enhancing practical skills in carpentry and joinery industrial

skills.

Table 6 Ranking of the reality phase

	In adequate training resources	Poor attitude towards practical work	In adequate skills in handling practical skills in Carpentry and Joinery.	Lack of entrepreneurial skills to handle Carpentry and Joinery products	Poor Method of assessment.	Limited time for practical work in Carpentry and Joinery.	Total	Rank
1		1	1	1	1	6	4	02
2			2	3	3	2	02	04
3				3	3	3	05	01
4					5	5	0	06
5						5	03	03
6							01	05

Source: Primary data

The stakeholders agreed the way forward of implementing the possible solutions to the reality phase by;

- The need for industrial tour to explore different learning experiences.
- Retooling of lecturers in the course unit of Carpentry and Joinery practical skills.
- Exhibition of carpentry and joinery industrial products to attract more interest in the practical learning.
- Sensitization on personal protective equipment and observation of health guidelines of workshop practice to reduce occurrences of accidents.
- Use of assessment rubrics, assessment training packages and Assessment Training Packages (ATPs) in the workshop practices.
- Use of downloads from you tubes on the application of practical skills in Carpentry and Joinery.

- Training of the entrepreneurial skills in handling the carpentry and joinery industrial skill products.

The stakeholders agreed the way forward of implementing the possible solutions to the reality phase by;

- Use of downloads from you tubes on the application of practical skills in Carpentry and Joinery.
- Developing an assessment rubric.
- Training of the Lecturers and the student on the use of the assessment rubrics
- Assessment training packages and assessment Training Packages (ATPs) in the workshop practices.

Figure 4: Researcher with a private partner during the future workshop

Figure 5: Students group discussion during the future workshop.

Figure 6: Brainstorming of administrators and heads of departments during the future workshop

3.5 Instruments for data collection

The researcher used interview guide, future workshop, flash cards, log books, camera/video as the appropriate data collection instruments.

3.5.1 Interview guide

Wiles & Crow, (2013) emphasized that in qualitative interviews, words are the main currency of the interviewing and subject to analytic interpretation. The researcher designed a question guide for the purposes of obtaining data during the situational analysis using the approach of work/production process at NICA.

3.5.2 Flash cards

The researcher used the flash cards to extract the contributions of the focus groups during the work/production process and the future workshop. The flashcards were used purposively to engage focus groups in active participation during brainstorming sessions and also generate enough data to enhance competences in Carpentry and Joinery.

3.5.3 Log books

The researcher used the log books for collecting the views and observations of the participants, data from the flash cards, videos and camera pictures for the purposes of generating comprehensive information for enhancement of the competences in Carpentry and Joinery industrial skills.

3.5.4 Camera

The researcher used camera for taking photos, recording videos of the participants during different sessions of collecting data. All forms of camera may be used to collect data. These may include smart phones and actual digital cameras. Cameras give concrete evidence of reality especially the contribution of the participants that helps in better reflection of decisions of the stakeholders.

3.6 Validity and reliability of instruments

The reliability and validity should test the consistency and accuracy of results. It should achieve the intended purpose, analyze and judge the quality of results (Golafshani, 2015). The

researcher used the different tools for collecting the above data such as the focus group discussions, observations, brainstorming, flash cards, camera and logbook to derive myriad of the objectives for the research and compared data obtained. The findings indicated that; student Instructors had attained more content that were directly solving their problem within little time, there was more attention and revisit for clarity of procedures of work process, more new innovative talents were created during the work process, higher standards of work were identified, there was self-assessment and improvement, improved performance realized, reduced complaints on performance. There was deeper engagement and interaction with the learning content during the real life project, high order thinking and problem solving skills acquired and competences in real project work enhanced.

3.7 Data collection procedures

The researcher collected the data basing on the research objectives using the future workshop. The phases of the future workshop were; the preparatory, critique, utopian/fantasy, reality and implementation stage.

The preparatory stage involved taking introduction letters from the University to the principal of the college and verbally explaining the importance of the action research to the researcher and the college as a whole, wrote a permission letter to start the process of future workshop, met with the participants/stake holders to establish the situational analysis and the actual future workshop to establish the issues affecting the college, establish the dream of the college, the reality and make action points to implement the realities observed.

3.8 Ethical considerations

Lee (2009) asserted that it is a requirement for the researcher to be technically competent in chattered intimacies, opening oneself to the subjects, feeling worlds whether congenial to them or repulsive. This implies that the researcher must protect the feelings, welfare, and rights of

the participants through confidentiality.

The researcher sought permission to conduct an action research from the college administration National Instructors College Abilonino and also sought for the consent of the participants. The researcher considered real names and identities of participants confidential to avoid victimization and timidity. This was to allow for free and fair contributions of valid data.

The broad social context of qualitative interviews requires good practice in research and an appropriateapproach to risk and ethical considerations, particularly in relation to institutional liability (Wiles & Crow, 2013).

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF RESULTS

This chapter presents the findings recorded from observation, focus group discussion and brainstorming. The findings were presented by the students and the lecturers. The results were discussed for enhancement of practical skills in Carpentry and Joinery industrial skills.

4.1 Strategies identified for enhancement of practical skills in carpentry and joinery.

The strategies for enhancing practical skills were generated during the fantasy stage of future workshop using the focus group discussions of the stakeholders namely; the administrators, Lecturers, public private partners and the students. Identified strategies include; the need for industrial tour, retooling of lecturers in the course unit of Carpentry and Joinery industrial skills, exhibition of Carpentry and Joinery industrial products, sensitization on personal protective equipment and observation of health guidelines of workshop practice. Use of assessment rubrics, Assessment Training Packages. (ATPs) in the workshop practices and use of downloads from u tubes on the application of practical skills in Carpentry and Joinery.

Due to limitation of time and the available resources, only four strategies were prioritized namely; use of u-tube downloads on application of Carpentry and Joinery, the use of the assessment rubrics, ATPs and training with a real-life project. These strategies were developed using an action plan where competent members from the stakeholders were tasked responsibility to implement the action plan as in Appendix I

4.2 Implementation of the strategies to enhance practical skills in carpentry and joinery

The prioritized strategies identified and developed in 4.1 above were employed during the implementation stage.

4.2.1 Use of you-tube downloads to enhance practical skills in carpentry and joinery.

Carpentry and Joinery is a multi-skilled job, therefore, there was need to be updated on the current designs and demands of industry and the end users of the product. According to Oviawe (2021) "These Virtual Reality applications reduce the complexity of teaching, improve students' familiarity with the use of machines, and can effectively integrate the operational perception required by vocational education into teaching so that learners can approach the operational state of real vocational training" (Gavish et al., 2015). In this strategy, the implementation plan was used to outline the activities, the actors, the indicators of the results and the time frame needed to implement each activity as attached in the appendix. This study used virtual reality technology to ameliorate the following three problems; the space limitation and equipment shortage in schools, the fragmented teaching and sectional furniture processing procedures and the students' improved understanding of the production processes and operation skills of furniture production line (Kristanto & Mariono, 2017). The college information and communication technology (ICT) technician was used to train the learners on best ways of searching and downloading from the u tube. He highlighted the web browsers and the best applications used and the methods of using both the computers and mobile phones. Learners were able to search, grasp competences and download to their desktops different wood working skills in the workshop. These tutorials were shared among the learners that motivated the learning of the practical works. Learners were inspired to come up with new designs in wood work.

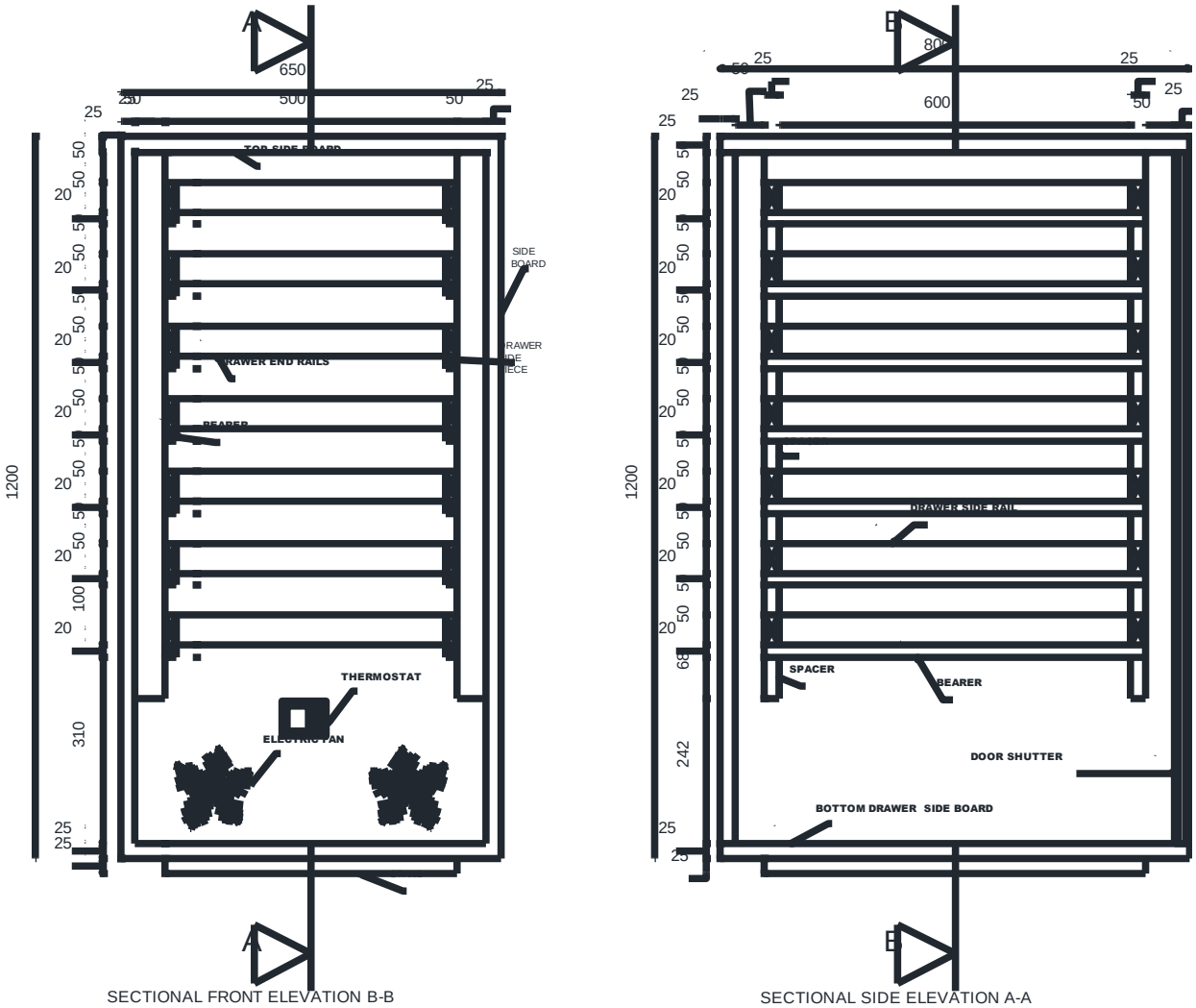
4.2.2 Training with a real-life project

The researcher designed a real-life project of constructing a wooden egg incubator after stakeholders were impressed of the same from a u tube and collaboratively agreed to do the same to enable trainees to get new skills that is highly responsive to market demand. The participants expressed the gap it will address within the community as; a way of collaborating

with the agriculture department to enhance poultry farming to supply the local population, encouraging the local poultry farmers to increase production, enhance innovation and an income generating activity in the department. The work /production process involved drafting of the plan, making the cutting list, obtaining the tools and equipment for the production of the real life project and observance of health and safety regulations during the execution of the work. The drawings were made and distributed to all the students and it was interpreted through a guided brainstorming by the researcher. Due to shortage of equipment and other resources, students were made to work in groups making the different components of the project. The work drawing is shown in Figure 7.

Figure 7: Drawing sections of an egg incubator.

NATIONAL INSTRUCTORS' COLLEGE ABILONINO.
YEAR II SEMESTER TWO. CLASS: CIVIL ENGINEERING STUDENTS
WORKING DRAWING FOR A WOODEN INCUBATOR



SECTIONAL FRONT ELEVATION B-B

SECTIONAL SIDE ELEVATION A-A

Table 7: Cutting list for an incubator

S/NO	ITEMS REQUIRED	UNITS	SIZES (LXWXT)	QUANTITY
	Timber (225 x 25mm)			
1	Sides	pcs	1200 x 225 x25	06
2	Top	pcs	650 x 225 x 25	06
3	Bottom	pcs	650 x 225 x 25	06
4	Drawer sides	pcs	850 x 60 x 25	02
5	Drawer ends	pcs	650 x 60 x 25	02
6	Drawer runners	pcs	850 x 40 x 25	02
7	Emulsion paint	litres	-	05
8	Brush	pcs	-	02
	IRON MONGERIES		-	
9	Chain hinge	M	-	01
10	Hasp and staple pad locks	pcs	-	02
11	Metallic rollers	pcs	-	04
12	Screw nails	gross	1½''	01

4.2.3 Tools and materials required for the job

The major hand tools used during the execution of the real-life project included; cross cut saw, rip saw, jack plane, try square, measuring tape, marking gauge, chisel, screw driver cramp, wood vice and sash cramp. The materials used are; timber boards, screws, hinges, emulsion paint, and metallic rollers.

4.2.4 Occupation health and safety

The safety requirements include the use of; Personal protective equipment such as boots, overalls, headsets and hand gloves and observance of the workshop regulations and rules during operational hours. The work sheet was given to every student to enable adequate preparation prior start of work.

4.3 Assessment Rubrics and Assessment Training Package

A sheet of assessment rubrics showed the ideal work production processes and the competences required to produce the real-life project. This was distributed to the trainees to follow during the work process. Students worked in groups and discussed where necessary to improve on the accuracy of every work/production process. The levels of the descriptors helped trainees to judge their own competences. Table 8 shows the format of the assessment rubrics used during the work/ production process. ATPs were used to assess the impact of the assessment rubric. Where the assessment rubric was used, there were higher scores realized and where there was no assessment rubric, the scores were lower as tabulated in table 8. Therefore, from the above results, it implies that the strategy of using assessment rubric is quite effective to enhance the required competences in carpentry and joinery industrial skills.

Table 8: Assessment rubrics for a real-life project

CRITERIA	**DESCRIPTOR**					
	Maintaining clean workshop environment	**Observing health And safety rules**	**Interpretation of the drawing**	**Preparation of the materials**	**Assembling of the job**	**Finishing of the job**
4	Begins and ends by cleaning the workshop	Dressed in PPE and observes safety rules	Always refer to the drawing before proceeding to the next step	Prepares the job members to the required sizes	Assembles the job according to the drawn plan	Cleans, sand paper and apply at least two coats of varnish/paint

3	Only cleans workshop at the end of work	Half dressed in PPE and observes safety rules	Partly refer to the drawing before proceeding to the next step	Prepares the job members to the required sizes but does not show face, side and edge.	Does not follow the principles of assembling the job according to the drawn plan	Does not clean before and papering and apply at least two coats of varnish/paint .
2	Only cleans workshop at the start of work	Half dressed in PPE and does not observes safety rules	Only estimates drawing units before proceeding to the next step	Prepares the members to the required sizes without using the right principles and tools.	Assembled work is not square but correct members used	Doesn't clean and sand paper but apply at least two coats of varnish/paint .
1	Does not clean the workshop well	Not dressed in PPE , and observes few safety rules	Does not refer to the drawing before proceeding to the next step.	Does not prepare the job to the required sizes	Assembled work doesn't conform to the design intended.	Doesn't clean, sand paper and apply at least two coats of varnish/paint .

Figure 8: Trainees brainstorming the assessment rubrics

Figure 9: Trainees preparing the pieces on a surface planer.

Figure 10: Trainees making drawers of the incubator

Figure 11: Trainee planing the pieces

Figure 12: Trainees assembling egg tray

Figure 13: Trainee fixing the chain hinges

Table 9: ATP used with the assessment rubric sheet

criteria	Begins and ends by cleaning the workshop		Dressed in PPE and observes safety rules		Always refer to the drawing before proceeding to next step		Prepares the job members to the required sizes		Assembles the job according to the drawn plan.		Cleans, sand paper and apply at least two coats of varnish/paint.		
scores	Process /5	Product /5	Process /5	Product /5	Process /5	Product 10	Process /10	Product /15	Process /10	Product /10	Process 10	Product /10	Total /100
Group													
01	5	5	5	5	5	5	7	12	10	10	5	7	81
02	5	5	5	5	5	5	8	10	10	10	10	5	83
03	5	5	5	5	5	5	9	14	10	10	10	5	88
04	5	5	5	5	5	5	6	13	10	10	08	5	82
05	5	5	5	5	5	5	7	12	10	10	10	5	84

Table 10: Assessment training package (ATP) used without assessment rubric

criteria	Begins and ends by cleaning the workshop		Dressed in PPE and observe safety rules		Always refer to the drawing before proceeding to next step		Prepares the job members to the required sizes		Assembles the job according to the drawn plan.		Cleans, sand paper and apply at least two coats of varnish/paint.		
scores	Process /5	Product /5	Process /5	Product /5	Process /5	Product 10	Process /10	Product /15	Process /10	Product /10	Process 10	Product /10	Total /100
Group													
01	5	5	5	5	5	5	7	12	08	05	5	7	75
02	5	5	5	5	5	5	8	10	07	05	10	5	77
03	5	5	5	5	5	5	9	14	08	05	10	5	84
4	5	5	5	5	5	5	6	13	07	05	08	5	78
05	5	5	5	5	5	5	7	12	06	05	10	5	80

Figure 14: Trainees assembling the drawers

Figure 15: Trainees fixing the metallic rollers

Figure 16: Trainees finishing the job

Figure 17: Trainees fixing iron mongeries to the incubator.

4.4 Use of the assessment Rubrics and ATPS

The assessment rubrics were given to the trainees' right at the start of the job. It entails the criteria of the assessment and the levels of performance. This encouraged the individual members to observe accuracy and keen attention during the work production process. The details of the assessment rubric were explained by the researcher prior start of the job. The researcher and the instructors helped to observe and guide where necessary to work close to the descriptors highest levels.

The ATPs were used by the instructors and the researcher assessed the critical skills attained that were relevant to the world of work after completion of the real life project. Each level of the competence was rated in percentage to gauge the skills attained.

4.5 Evaluation of the impact of implemented strategies for enhancing practical skills in Carpentry and Joinery.

Evaluation of the implemented strategies was done through interviews using the questionnaire guides, observation, and reflections that were recorded during the training and the work production process of the real-life project for the agreed implementable interventions during

the future workshop. Feed backs were collected from 15 students of year two. This was preferred because they are almost aging out of the college after acquiring many other skills relevant to the world of work. On the other hand, they are going to impart the same skills in the technical Vocational Education and Training (TVET) institutions.

4.5.1 Evaluation on the use of you tube for enhancement of carpentry and joinery practical skills

The researcher used a questionnaire guide to elicit responses from the trainees. This generated very many positive responses such as; ability to get any design on woodwork, clarity of procedures in constructing carpentry and joinery works from videos, discovery of new ideas of innovation using locally available materials to mention but a few. On the other hand, there was great emphasis on establishment of internet in the college which was lacking, high cost of internet bundles to students which they had tried to use to apply the knowledge attained and in adequacy of ICT equipment to explore the skills required in the world of work. Through this strategy, learners were able to; innovate different designs of Carpentry and Joinery items. Learners also applied new skills of construction in Carpentry and Joinery industrial skill.

4.5.2 Evaluation of the Real Life Project by the Student

Evaluation of the real-life project was done by comparing the traditional methodology of construction and the use of a well-designed work sheet.

4.5.2.1 Construction of Real-Life Project using an assessment Rubric

The researcher designed a work sheet with a full content of instructions, drawings, cutting list, tools, equipment, occupational health and safety precautions and the assessment rubric for the construction project. Learners were able to construct a wooden incubator to a standard of a world of work. There was a high level of competence realized as required features of the project were completed.

4.5.2.2 Construction of Real-Life Project without an assessment Rubric

The researcher here presented the work sheet to the learners however omitted the assessment rubric.

This resulted into a lower level of competence. More time was consumed; there were some omissions from the drawings.

4.5.3 Evaluation of the assessment Rubrics/ ATPs

The researcher developed an evaluation sheet to assess the responses of the stake holders mainly the trainees. The responses showed that the rubrics simplified instruction and made it possible for the trainees to measure their own practical work in the workshop. On the other hand, learners were able to measure their practical skills of their colleagues as they shared ideas and experiences.

4.6 Discussion of the Findings

The research objectives sought for identification of strategies to enhance practical skills in Carpentry andJoinery industrial skills. These strategies include; the use of you tube channels, real life projects and assessment rubrics.

4.6.1 Relevance of the you tube Channels in Carpentry and Joinery

Wawuda, (2019) says that you tube is the most popular website where a variety of videos are hosted. They include educational videos, documentaries, video clips and live streams from media corporations. This often integrated into teaching for the purposes of learning

The researcher found out that the use of you tube in the study enhanced research and innovation with ease as new ideas were generated from such videos. This agrees with the study at Nakuru schools in Kenya where the use of you tube gave a significant and analytical results and teachers adapted it as a vital resource that makes teaching and learning meaningful (Wawuda, 2019). This is the way to go in this era. The use of you tube channel is quite relevant

to the 21st century instructor. It makes the technologies around the globe visible at the local levels which bring utopian imaginations to reality. On the other hand, technologies are increasing and changing every day. Therefore, those who do not move with the technology will become obsolete while those moving with the technologies will be able to satisfy the increasing market demands.

Studies at Mälardalen University, Sweden indicated that searches on YouTube gives a scheme of Physics lecture used as an educational tool in physics teaching. It gives a rather interactive environment picture dominated by videos of lectures and demonstrations (Gustafsson, 2014). This confirms the importance of this strategy in the study

Studies at National University of Lesotho, Maseru, Lesotho indicated that YouTube videos incorporated in the teaching and learning of Chemistry provided a better option than the traditional method of science teaching (Bohloko et al., 2019). The researcher found out that it is first and effective for group learning.

Students' of Vietnam increased in knowledge of the furniture-manufacturing process upon exposure to virtual learning of furniture production. This study enabled students to experience and observes the manufacturing process of furniture production through Virtual Reality to overcome the limitations in the present teaching environment (Lee, 2020).

4.6.2 Relevance of Real-Life Projects

Real life projects are adopted by Uganda Business Technical Examinations Board (UBTEB) and the Directorate of Industrial Training (DIT) because it's a hand on practice of learners on real construction items. Interestingly, it assesses using a criterion-based type of assessment. This ensures that all relevant competences are achieved on completion of a chosen item and can certify one to qualify for industrial works. The completion of the project gave confidence to the trainees and motivation for self-trials at other times. Almost all the basic practical skills

in timber work production processes were achieved. This agrees with research at the University of Zaragoza, Department of Design and Manufacturing Engineering that emphasized Real life in groups as effective and produces expected results. There is group confidence and optimism in the quality of work being done due to proper coordination (Cano et al., 2006)

Studies at the University of York indicated that Learning science is a constructivist view, it is the central part of developing students' knowledge on practical work, there is always action and reflection on the Practical work process involved and it also links between two domains of real objects and observable things to that of knowledge (Millar, 2004). This was found to be true in this study and therefore this makes the study valid to its intended objectives.

Studies at Education Faculty, Erzincan University, Turkey indicated that teachers who employed the real life project methodology performed better results than those who did not. (Yalçin et al., 2017). The researcher found out that learners were able to explore beyond the expected limits since there was opportunity to consult group members. This therefore should encourage all teachers to adopt the same instructional methodologies to make teaching active and learner centered.

4.6.3 Relevance of assessment Rubrics

Rubrics are evaluation instruments that make it possible for teachers to measure and report on the learning academic achievement process (Oviawe et al., 2021). Assessment rubric is a tool of gauging the level of a learners' performance during the work/ production process.

The feedback that students received through an assessment rubric helped them to improve their performance; Rubrics also allowed for consistency in grading for those who assessed the students' work; Rubrics improved student performance, as well as monitored it, by making expectations clear and by showing students how to meet the expectations; The results showed marked improvement in quality of students' work when the rubric was used in carrying out the

practical. It was also used for assessment of students' work.

The university Walden in USA, used Rubrics to design, align outcomes and assess the levels of achievement for each major component of an assignment (Olson, 2022). This is because it focuses on performance and higher order thinking processes for better results (Gallardo, 2020)

Horst, S. J., & Prendergast, C. O. (2020) explains that in the performance assessment, there is learning and assessment of oneself, this allows students to demonstrate their practical skills and knowledge in real-world applications as they can view the key objectives on the rubric and communicate the assignment's expectations

Rubrics uses same criteria in a group work therefore it can provide more accurate, unbiased, and consistent scoring and serves as a reflector tool for self-judgment on the other hand helps the groups to monitor the levels of progress.

Studies in South East University, Dhaka, Bangladesh showed that rubrics as an instructional tool make in the teaching-learning more valid and reliable since it gives the rules and the guide for score levels. Therefore the students can identify their strengths and weaknesses (Chowdhury, 2019).

Studies at the University of Colorado at Denver and Health Sciences Center showed that rubrics enhances teaching, contribute to sound judgment of students' performance, and is an important source of information for program improvement. The studies developed three key steps in developing an assessment rubric namely; identifying performance criteria, setting performance levels and creating performance descriptions (Wolf & Stevens, 2007). The studies gave the limitations of rubrics as; evaluators and teachers to draw on their professional knowledge and to use that professional knowledge in ways that the rating process doesn't fall victim to personality variations or limitations of human information processing. Rubrics are

laborious to create by the teacher. It involves a lot of well-organized written levels of competences and if it is vaguely designed, it diminishes the learning process. This is because what is not captured is not considered as important yet it may be a crucial part ignored. This means that it should be designed and tested first to be quite sure that it will work.

4.7 Limitations

Okolie, Igwe, & Elom, (2019) argued that facilities in schools are the physical and spatial enablers of teaching and learning that improve results. We were interfered by shortage of both equipment and the practical materials. This forced us to work in groups of 4 learners to achieve the target. There was a sudden dispersal of the key stakeholders because of COVID 19 in June 2021 when implementation process had just kick started. The next opening was in November 2021 where there were pressures on the learners from different learning areas. This partly dis organized the action plan of the research. There was financial constraint to buy the prior estimated requirement for the real-life project. The researcher had to scale down to using group work rather than individual participation.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter presents the summary of the findings, conclusions and recommendations of the action research on enhancing practical skills in carpentry and joinery industrial skills. The basic competences attained were; ability of planing timber, marking dressed wood, sawing of wood, Sand papering of timber members, assembling of job, cleaning of job., varnishing and observing health and safety rules of the job. These competences were achieved by identifying and developing strategies of using you tube channels, construction of real life project and use of assessment rubrics. These strategies were implemented and evaluation results satisfy the purpose of the research work.

5.2 Conclusions

The action research drew conclusions from the situational analysis, the process analysis, the future workshop and findings of the study. The study showed that at the beginning, the student instructors were faced with numerous practical challenges such as; inadequate training resources, Poor attitude towards practical work, in adequate skills in handling practicalworks in carpentry and joinery, lack of entrepreneurial skills to handle carpentry and joinery products, poor method of assessment and limited time for practical works. Stakeholders prioritized the need for the study to address the inadequate skills for practical works by enhancing competences in carpentry and joinery as a course unit. The study found out three major strategies that enhanced competences in the workshop practice of carpentry and joinery. These include; you tube channel demonstrations, real life projects and use of assessment rubrics and assessment training packages. The findings from the study showed that; Instructors had attained more content that were directly solving their problem within little time, there was more attention and revisit for clarity of procedures of work process, more new innovative talents

were created during the work process, higher standards of work were identified, there was self-assessment and improvement, improved performance realized, reduced complaints on performance. There was deeper engagement and interaction with the learning content during the real life project, high order thinking and problem solving skills acquired and competences in real project work enhanced. Student learning and Self-Assessment was fostered. This action research has therefore enhanced practical skills in Carpentry and Joinery through implemented strategies of real life project, you tube and assessment projects.

5.8 Recommendations

Action research is an undertaking for the purpose of causing a change. The researcher therefore recommends the following views;

That management in the training institutions should establish internet system in their institutions to aid fast transfer of knowledge from u tube channels, mobile apps and all internet browsers. This will enable trainers to instill skills relevant to the world of work. On the other hand, learners would discover new innovative ideas by themselves to improve on their own competences.

Policy makers should keep on reviewing the training curriculum to make it more work based for the purposes of fitting trainers well in the world of work. On the same note provide adequate training tools and equipment to allow individual evaluation of the required competences in the world of work.

There is need to support research and innovation of all areas in the training institutions.

Policy makers in the institutions should increase support for interventions.

There was little time due to COVID 19 pandemic. There is need to scale down real life projects to individual levels to determine empirical values of enhancement to practical skill training.

More different projects could be exploited by implementing strategies of real life projects, you tube videos and assessment rubrics as outlined in this report.

REFERENCE

AL-Husaini, A. S. A., & Amayreh, E. A. (2021). The Effectiveness of a Strategy Based on the Concepts of a Growth Mindset for Teaching Carpentry and Decoration in Developing Practical Vocational Skills and Imaginative Thinking. *Asian Social Science*, *17*(4). https://doi.org/10.5539/ass.v17n4p1

Bohloko, M., Makatjane, T. J., George, M. J., Mokuku, T., Bohloko, M., Makatjane, T. J., George, M. J., & Mokuku, T. (2019). *Assessing the Effectiveness of using YouTube Videos in Teaching the Chemistry of Group I and VII Elements in a High School in Lesotho Assessing the Effectiveness of using YouTube Videos in Teaching the Chemistry of Group I and VII Elements in a High Schoo*. *7295*. https://doi.org/10.1080/18117295.2019.1593610

Cano, J. L., Lidon, I., Rebollar, R., Roman, P., & Saenz, M. J. (2006). Student groups solving real-life projects. A case study of experiential learning *Juan L. CanoIvan Lidon[...]M. Jesus Saenz International Journal of Engineering Education (2006). January*.

Cheetham, G., & Chivers, G. (1996). Towards a holistic model of professional competence. *Journal of European Industrial Training*. https://doi.org/10.1108/03090599610119692

Chowdhury, F. (2019). Application of Rubrics in the Classroom : A Vital Tool for Improvement in Assessment , Feedback and Learning. 12(1), 61–68. https://doi.org/10.5539/ies.v12n1p61

Clough, P., & Nutbrown, C. (2019). Exploring the place of arts-based approaches in early childhood education research. *Journal of Early Childhood Research*, *17*(1), 3–13. https://doi.org/10.1177/1476718X19834220

Cornelius-ukpepi, B. U. (2018). Philosophical implications in curriculum development. September 2007.

Ferej, A., Kitainge, K., & Ooko, Z. (2012). Reform of TVET teacher education in Kenya:

Overcoming the challenges of quality and relevance. *Triennale on Education and Training in Africa, 12-17.*

Gallardo, K. (2020). Competency-Based Assessment and the Use of Performance-Based Evaluation Rubrics in Higher Education: Challenges Towards the Next Decade. *Problems of Education in the 21st Century*, *78*(1), 61–79. https://doi.org/10.33225/pec/20.78.61

Gavish, N., Gutiérrez, T., Webel, S., Rodríguez, J., Peveri, M., Bockholt, U., & Tecchia, F. (2015). "(Gavish et al., 2015; Lin & Lee, 2020). *Interactive Learning Environments*, *23*(6), 778–798. https://doi.org/10.1080/10494820.2013.815221

Golafshani, N. (2015). Understanding Reliability and Validity in Qualitative Research. *The Qualitative Report*, *8*(4), 597–606. https://doi.org/10.46743/2160-3715/2003.1870

Gustafsson, P. (2014). *Youtube as an educational tool in physics teaching*. *October 2012*.

Hicks, J. H., Kremer, M., Mbiti, I., & Miguel, E. (2013). Vocational Education in Kenya : Evidence from A Randomized Evaluation Among Youth.

https://www.theigc.org/sites/default/files/2014/10/Hicks-et-al-2013-Working-Paper.pdf

Hine, G. (2017). The Importance of Action Research in Teacher Education Programs Professional Practice paper The importance of action research in teacher education programs. March 2013.

https://www.researchgate.net/publication/269406979_

Horst, S. J., & Prendergast, C. O. (2020). The Assessment Skills Framework: A Taxonomy of Assessment Knowledge, Skills and Attitudes. *Research & Practice in Assessment*, *15*(1), 1–25.

Kintu, D., Kitainge, K. M., & Ferej, A. (2019). Employers' Perceptions about the Employability of Technical, Vocational Education and Training Graduates in Uganda. *Advances in*

Research. https://doi.org/10.9734/air/2019/v18i230087

Kosar Altinyelken, H., & Hoeksma, M. (n.d.). Improving educational quality through active learning: *Perspectives from secondary school teachers in Malawi*. *16*(2), 117–139. https://doi.org/10.1177/1745499921992904

Kristanto, A., & Mariono, A. (2017). The Development of Instructional Materials E-Learning Based On Blended Learning. 10(7), 10–17. https://doi.org/10.5539/ies.v10n7p10

Kyobe, E., & Rugumayo, A. (2005). *Competency based education and training (CBET): A Case Study in Uganda Introduction :* 189–191.

Lai, C. S., Hamisu, M. A., & Salleh, K. M. (2019). Development of competency framework for Nigerian TVET teachers in tertiary TVET institutions. *Journal of Technical Education and Training*, *11*(1), 11–18. https://doi.org/10.30880/jtet.2019.11.01.002

Lee, I. J., Hsu, T. C., Chen, T. L., & Zheng, M. C. (2019). The application of ar technology to spatial skills learning in carpentry training. *International Journal of Information and Education Technology*. https://doi.org/10.18178/ijiet.2019.9.1.1173

Lee, I., & Lee, I. (2020). Applying virtual reality for learning woodworking in the vocational training of batch wood furniture production vocational training of batch wood furniture production. *Interactive Learning Environments*, *0*(0), 1–19. https://doi.org/10.1080/10494820.2020.1841799

Lee, J. H. (2009). feeling worlds, whether these worlds are congenial to them or repulsive. *Computer Systems Science and Engineering*, *24*(4), 261–271.

Mahmood, S. (2021). Instructional Strategies for Online Teaching in COVID-19 Pandemic. August 2020, 199–203. https://doi.org/10.1002/hbe2.218.

Makarfi, A. (2014). *Strategies for improving practical projects in woodwork in colleges of education (technical) in north-western states of Nigeria.*

http://www.unn.edu.ng/publications/files/ALIYU%20MAKARFI%20PROJECT.pdf

Millar, R. (2004). The role of practical work in the teaching and learning of science.

Ministry of Education and Sports. (2019). The Technical Vocational Education and Training (TVET) Policy. July, 1–67. http://www.eskom.co.za/CustomerCare/TariffsAndCharges/Documents/RSA Distribution Tariff Code Vers 6.pdf%0Ahttp://www.nersa.org.za/

Mjelde, L., & Daly, R. (2012). Aspects of vocational pedagogy as practice: Decolonizing minds and negotiating local knowledge. *International Journal of Training Research*, *10*(1). https://doi.org/10.5172/ijtr.2012.10.1.43

MoESTS. (2011). Skilling Uganda - BTVET Strategic Plan 2011-2020. *July*, 112. *Uganda Kampala.*

https://planipolis.iiep.unesco.org/en/2011/skilling-uganda-btvet-strategic-plan-2011-2020-5481

Millar, R. (2004). *The role of practical work in the teaching and learning of science*. *October 2004*.

Mohd Yusoff Abu Bakar, . (2014). *Guidelines for Tvet Curriculum Development*. http://www.molhr.gov.bt/molhr/wp-content/uploads/2018/08/GUIDELINES-FOR-DEVELOPMENT-OF-TVET-CURRICULUM-2018.pdf

Obwoge, E. (2017). Competency Based Education and Training : *A fresh green leaf from the Australian context for TVET in Africa*. *July 2016*. https://doi.org/10.21013/jems.v3.n3.p23

Olitoquit, J.C. (2014) Reflective teaching. http://www.slideshare.net.BSEPhySci14/reflective-teaching-40380612[17]

Okolie, U. C., Igwe, P. A., & Elom, E. N. (2019). Improving graduate outcomes for technical colOkolie, U. C., Igwe, P. A., & Elom, E. N. (2019). Improving graduate outcomes for technical colleges in Nigeria. Australian Journal of Career Development, 28(1), 21–30. https://doi.org/10.1177/1038416218772189l. *Australian Journal of Career Development*, *28*(1), 21–30. https://doi.org/10.1177/1038416218772189

Olson, J. M. (2022). Rubrics as Tools for Effective Assessment of Student Learning and Program Quality. January. https://doi.org/10.4018/978-1-7998-7653-3.ch010

Oviawe, J. I., Azman, M. N. A., Kiong, T. T., & Retnowati, E. (2021). Effect of assessment for learning method on students' academic achievement in carpentry and joinery in technical colleges. *Perspektivy Nauki i Obrazovania*, *52*(4), 121–131. https://doi.org/10.32744/pse.2021.4.8

Parkinson, J., & Mackay, J. (2016). The literacy practices of vocational training in Carpentry and Automotive Technology. *Journal of Vocational Education and Training*. https://doi.org/10.1080/13636820.2015.1104714

Pletscher, M. (2015). Youth unemployment in Uganda : Roots of the problem and possible ways to mitigate them. *Master in International Affairs and Governance (MIA)*.

Royal, K. (2018). Robust (and ethical) educational research designs. *Journal of Veterinary Medical Education*, *45*(1), 11–15. https://doi.org/10.3138/jvme.1015-162r1

Shvetsova, M. B. (2021). John Locke's Philosophy as a Teaching about Human and their Behavior. *Anthropological Measurements of Philosophical Research*, *7242*(20), 134–141. https://doi.org/10.15802/ampr.v0i20.249594

Tooke. (2014). Carpentry and Joinery: Work Activities. In Carpentry and Joinery: Work Activities. https://doi.org/10.4324/9781315001395

Tyagi, C. (2021). Continuing Professional Development of Teacher Educators : Challenges and Initiatives.

Ugandan, A. T., From, S., & Prosperity, T. F. O. R. (2014). Prosperous country within 30 years vision : theme : april 2010.

UBOS (2015) Nationsl service delivery survey report. *Kampala- Uganda.*

Usman, A. N. (2020). A professional competence for technical and vocational education training teachers at technical colleges in Niger state , *Nigeria*.

Wawuda, G. M. (2019). Integration of youtube videos in teaching and learning.

Wiles, R., & Crow, G. (2013). What is Qualitative Interviewing ? ‘ What is ?’ Research Methods series Edited by Graham Crow , University of Edinburgh. *Rosalind Edwards and Janet Holland, 2013*

Wolf, K., & Stevens, E. (2007). *The Role of Rubrics in Advancing and Assessing Student Learning*. *7*(1).

Woyo, E. (2013). Challenges Facing Technical and Vocational Education and Training Institutions in Producing Competent Graduates in Zimbabwe. *Open Journal of Education*, *1*(7), 182. https://doi.org/10.12966/oje.11.03.2013

Wulansari, S. (2021). Management of industrial work practices in improving student competence and satisfaction of the industrial as a partner vocational school. *JPGI (Jurnal Penelitian Guru Indonesia)*, *6*(2), 552. https://doi.org/10.29210/021088jpgi0005

Yalçin, S. A., Yalçin, P., Akar, M. S., & Sağirli, M. Ö. (2017). The Effect of Teaching Practices with Real Life Content in Light and Sound Learning Areas i. 5(9), 1621–1631. https://doi.org/10.13189/ujer.2017.050920

Zakariya, T. (2009) Reflective thinking. Paper presented at the UNICEF A – field SBTS workshop;, *Owerri*.

Zuber-Skerritt, O., & Perry, C. (2002). Action research within organisations and university thesis writing. *The Learning Organization*. https://doi.org/10.1108/09696470210428895

APPENDICES:

APPENDIX I: WORK PLAN

ACTIVITY	TOOL	RESPONSIBLE PERSON	PERIOD	INDICATORS
Examining the cause of inadequate training practical skills in carpentry and joinery.	Situational analysis Work process analysis Future analysis	Students Administration Lecturers Researchers Mentors	01/01/2020 To 31/04/2020	Minutes of meetings Discussions held Presentations of group work
Identify and develop strategies to enhance practical skills in carpentry and joinery.	Future workshop with the stakeholders	Students Administration Lecturers Researchers Mentors	01/4/2021 To 01/05/2021	Minutes of meetings Discussions held Presentations of group work Ranked/ prioritized strategies
Implement the possible strategies to enhance practical skills in carpentry and joinery.	Develop tasks Develop templates Give tasks to learners Make assessment rubrics	Students Administration Lecturers Researchers Mentors	01/05/2021 To 30/06/2021	Drawn plans Real life project work done
Evaluate the impact	Hold meetings	Students	01/07/2021	

of implemented strategies for enhancing practical skills in carpentry and joinery.	with stakeholders	Administration Lecturers Researchers Mentors	To 30/07/2021	
Mock and viva presentations	Power point presentations	Students Administration Lecturers Researchers Mentors	01/08/2021 To 30/08/2021	
Submission of thesis	Research thesis booklet	Students Administration Lecturers Researchers Mentors	01/09/2021 To 01/10/2021	

APPENDIX II

ESTIMATE FOR THE RESEARCH WORK

SNO	PARTICULARS	UNITS	QUANTITY	RATE	AMOUNT
	Basic hand tools				
	Jackplanes	PCS	6	400,000	2400000
	Measuring tape	PCS	15	5000	75000
	Square	PCS	15	3000	45000
	Rip saw	PCS	15	20000	300000
	Tenon saw	PCS	15	15000	225000
	Cross cut saw	PCS	5	10000	50000
	Mortise gauge	PCS	10	15000	150000
	Marking gauge	PCS	5	15000	75000
	Plumb bob	PCS	5	5000	25000
	Claw hammer	PCS	10	15000	150000
	Craw bar	PCS	5	10000	50000
	SUB TOTAL 1				3545000
	Portable power hand	PCS			
	Circular saw	PCS	2	500000	1000000
	Surface planer	PCS	2	400000	800000
	Jig saw	PCS	2	450000	900000
	Router	PCS	2	500000	1000000
	Belt sander	PCS	2	400000	800000
	Disc sander	PCS	2	350000	700000
	Wood sprayer	PCS	2	500000	1000000
	Materials	PCS			6200000
	Timber	PCS			
	2 x 8	PCS	20	28,000	560000
	6 x 2	PCS	20	14,000	280000
	4 x 2	PCS	50	10,000	500000
	4 x 3	PCS	20	13,000	260000
	12 x 1	PCS	10	28,000	280000

	10 x 1	PCS	10	24,000	240000
	9 x 1	PCS	10	20,000	200000
	Wood glue	LITRES	6	10,000	60000
	Wood sealer		5	10,000	50000
	Assorted sanding Paper	ROLLS	4	20,000	80000
	Wood brush	PCS	20	5,000	100000
	Assorted wire nails	KGS	10	6,000	60000
	Hoop iron	ROLLS	2	60,000	120000
	Screws	PKT	10	10,000	100000
	Assorted bolts	PCS	10	2,000	20000
	Transport		10	100,000	1000000
					3910000
					13655000
	Miscellaneous		10%		13655000
	GRAND TOTAL				27310000

APPENDIX III

MINUTES OF WORK PROCESS ANALYSIS

NATIONAL INSTRUCTORS'COLLEGE ABILONINO

P.O.BOX 437. LIRA

29/1/2021.

MINUTES ON WORK/PRODUCTION PROCESS HELD ON 29TH NOVEMBER 2019 AT NATIONAL INSTRUCTORS COLLEGE, ABILONINO WITH CIVIL DEPARTMENT STUDENTS YEAR II.

AGENDA

1. Prayers
2. Welcome remarks and introduction
3. Work/production processes at NIC-Abilonino.
4. Brainstorming the work production at the college.
5. Closure.

MEMBERS PRESENT WERE;

S/NO	NAME	TITLE	SIGNATURE
01	ERIMU Erigu James	Academic register	
02	MWANAMOIZA. Richard	Lecturer	
03	AKONGO. Dorcas Janet.	Lecturer	
04	LOLU. Moses Igaru	Senior lecturer	
05	KABUNGA. Ssendi Peter	Lecturer	
06	KIKOSTOLEKO Edward	ICT technician	
07	MAGUMADE. Alex	Student Coordinator	

08	Oriokot Robert	Assistant student coordinator	
09			
10			
11			
12			
13			
14			
15			

MINUTE NUMBER	DETAILS	RESPONSIBLE PERSON	REMARKS
M1/29/2019	Opening prayer was led Mr. Kabana Peter	Mr. Kabunga Ssendi Peter	
M2/29/2019 Welcome Remarks and introduction.	Welcoming remarks and introduction made by the researcher. He explained the purpose of the meeting mainly to establish critical issues in the department.	Researcher.	Done as planned
M3/ 29 /2019 work/productionprocess at NIC Abilonino	The researcher guided the process of the Work production processes and invited the academic registrar to take the members through it. The academic registrar explained the process to include; Admission Teaching and learning	The academic registrar to explain. All members to note.	

	Assessment School practice Industrial training Examination and Graduation.		
M3/29/2019 Brain storming on the work/ production process at NIC-Abilonino by focused groups.	The administrators identified the following issues; Different backgrounds of studentsadmitted. Inadequate teaching of practical skills. Inadequate number of lecturers. Ineffective assessment of practical work. Dominance of theory on time table than practical course units.	The academic registrar.	Done as planned
	Poor time management by both lecturers and students. Curriculum being full of theory than practical. Inadequate training materials. Inadequate tools for practical work. Inadequate fund for IT and SPsupervision.		
M4/29/2019 Closure.	As matters to be discussed were exhausted, the meeting was officially closed.	All to note.	

CHAIRPERSON MINUTE SECRETARY

Lolu Moses Igaru. Kabuga Ssendi Peter

APPENDIX IV

FOCUS GROUP DISCUSSION QUESTION GUIDE

NATIONAL INSTRUCTORS'COLLEGE ABILONINO

P.O.BOX 437. LIRA

QUESTION GUIDE FOR FOCUS GROUP DISCUSSIONS:

Using think, pair and share brainstorming technique, discuss the following questions.

1. Is the practical training in the workshop adequate?
2. What are the challenges of practical training in the college?
3. What comment you make on the training and the learning process?
4. Are the competences achieved in the training relevant to the world of work?
5. How can the instructor improve on the competences expected?
6. What do you think can be done to produce a competent student in carpentry and joinery industrialskills?

Thank you.

APPENDIX V

DISCUSSION OF U-TUBE VIDEO PROJECTS

APPENDIX VI

EVALUATION SHEET

NATIONAL INSTRUCTORS'COLLEGE ABILONINO

P.O.BOX 437. LIRA

Date;

RE: EVALUATION SHEET.

I am Lolu Moses Igaru, a student of Master's Degree in Vocational Pedagogy (MVP) of Kyambogo University. As a research student, am interested in evaluating the action research work implemented at NIC Abilonino to enhance competences in practical training for the purposes of producing marketable industrial goods. I appreciate your time for your response in this matter. Your responses shall be regardedhighly confidential. Make a tick where necessary.

ACTIVITY	Strongly agree	agree	disagree	undecided
The training on the 3D virtual learning from internet Improved my skills of designing and construction?				
I have obtained new skills of constructing an egg incubator				
I can comfortably guide my self-using an assessment rubric				
What did you like most in the training				
Which areas required improvement				
What other alternative will enhance better skills in carpentry and joinery?				

Thank you.

Signature: …….…….

Lolu Moses Igaru

APPENDIX VII

FUTURE WORKSHOP GUIDE

NATIONAL INSTRUCTORS' COLLEGE ABILONINO.

FUTURE WORKSHOP GUIDE:

INTRODUCTION:

A future workshop is a tool used to identify a problem in a given setting and collaboratively generateworkable solutions within the work place.

A future workshop has four (4) stages/phases that has to be arrived one after another. These include; the preparatory phase, critique phase, fantasy phase and the reality phase.

1. The preparatory phase helps the organizer in the following;

- Setting the date, venue and informing the participants.
- Organizing refreshments, scholastic materials and set the agenda to guide the process. The agenda are;

- Opening prayers.
- Self-introduction by the participants.
- Communication by the researcher; briefing on Action research (A, R), Future workshop (FW), setground rules, and the set the principles of the discussion.
- Carrying out the future workshop activities.
- Way forward
- Closure.

2. CRITIQUE PHASE.

   Set a critical question before the stake holders.

3. FANTASY PHASE:

   Turn all the negatives ideas/issues into positives/ possibilities.

4. REALITY PHASE:

- The ideal situation to take a short term challenges which has to be subjected to pairwise rankingmatrix or voting to get the most pressing challenge.
- The challenges identified with the highest tally becomes the next research problem.
- The stakeholders agree upon the most pressing problem to be the research problem.
- Participants agree on action implementation strategies

APPENDIX VIII

MINUTES OF FUTURE WORKSHOP MEETING

NATIONAL INSTRUCTORS'COLLEGE ABILONINO

P.O.BOX 437. LIRA

29/1/2021.

FUTURE WORKSHOP MEETING HELD ON 04TH, JANUARY 2021 AT NATIONAL INSTRUCTORS COLLEGE, ABILONINO WITH STAKEHOLDERS FROM 12:30PM.

AGENDA

1. Prayers
2. Welcome remarks and introduction
3. Communication from the chair person.
4. Brain storming on the inadequate practical skills in Carpentry and Joinery using Future workshop methodology
5. Closure.

MEMBERS PRESENT WERE;

S/NO	NAME	TITLE	SIGNATURE
01	ERIMU Erigu James	Academic registrar	
02	MWANAMOIZA. Richard	Lecturer	
03	AKONGO. Dorcas Janet.	Lecturer	
04	LOLU. Moses Igaru	Senior Lecturer	
05	KABUNGA. Ssendi Peter	Lecturer	
06	KIKOSTOLEKO Edward	ICT technician	
07	MAGUMADE. Alex	Student Coordinator	
08	Oriokot Robert	Assistant student coordinator	

CHAIRPERSON MINUTE SECRETARY

MINUTE NUMBER	DETAILS	RESPONSIBLE PERSON	REMARKS
M1/2/2021	Opening prayer was led Mr. Kabana Peter	Mr. Kabunga Ssendi Peter	
M2/2/2021 Welcome remarks and introduction.	Welcoming remarks and introduction made by the researcher. He explained the purpose of the meeting mainly to establish a research topic from the most pressing issue from the situational analysis.	Researcher.	Done as planned
M3/2/2021 Communication from the chair person.	The researcher used the process of the situational analysis generated from the work process analysis. That the critical issue ranked to be the highest was inadequate practical skills delivery of Carpentry and Joinery and urged the members to further discuss this into details.	Researcher All members to note.	Members got the perception of future workshop.
M4/2/2021 Brain storming on the inadequate practical skills in Carpentry and Joinery using Future workshop methodology	FGM brainstormed and presented on the critical phase, fantasy phase and reality phase of the future workshop. Short term causes of inadequate practical skills Issues were clustered and then ranked To realize the topic of the study.	FGM leaders and the researcher.	Done as planned
M5/2/2021 Closure.	As matters to be discussed were exhausted, the meeting was officially closed.	All to note.	Meeting officially closed at 4:30PM

Lolu Moses Igaru. Kabuga Ssendi Peter