Evaluating the practical competency of arc welders trained under formal and informal apprenticeship model in Minna, Niger state.

BY

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2016 /6/62004TI

DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION
FEDERAL UNIVERSITY OF TECHNOOGY, MINNA

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A RESEARCH PROJECT SUBMITTED TO THE
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DECLARATION

I DAPAK MARK MAK'AN. Matric No: 2016 /1/62004TI an undergraduate student of the Department of Industrial and Technology Education certify that the work embodied in this project is original and has not been submitted in part or full for any other diploma or degree of this or any other university

DAPAK MARK MAK'AN _____

2016/1/62004TI Signature & Date

CERTIFICATION

This project has been read and approved as meeting the requirements for the award of B. Tech degree in Industrial and Technology Education, School of Science and Technology Education, Federal University of Technology, Minna.

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Project supervisor _____
Signature & Date

Dr. T.M. Saba
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External Examiner _____
Signature & Date

DEDICATION

This research work is dedicated to almighty God for his grace, protection and good health throughout my undergraduate program in federal university of technology minna, and also dedicated to my parents Mr. Joseph Dapak, Naanlang John Nasuk. I say a big thank for you you prayers and support throughout my stay as an undergraduate in Federal University of Technology Minna,

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I would like to express my profound gratitude to God the almighty for sustaining me through the course of this project and the completion of the whole course itself. My profound gratitude also goes to my able supervisor Mr Benjamin E. for his support, guidance, advice contributions and necessary suggestion through the course of this project. May God almighty reward you abundantly. Special thanks to Dr. T. M. Saba, the head of the department. The project coordinator Dr. Hassan A. Abdullahi and staffs of I T E Department Prof. B. N. Atsumbe, Prof. I. Y. Umar and Prof. R. O. Okwori, Dr. C. O. Igwe, Dr. B. M. Usman, and Dr. A. B. Kagara, for their support and contributions towards ensuring that this project and the academic pursuit is well successful. My joy and happiness will be incomplete without specially thanking my brothers in respect of Mr. Joseph Dapak, Naanlang Dapak and Nasuk Dapak I will like to thank my sisters for their Mrs. Nakenaan Dapak and Josephine Dapak. I also wants to extend my appreciation to my helpful Friends at home and in school for their wonderful support.

ABSTRACT

The main aim of the study is to evaluate the practical competency of arc welders trained under formal and informal apprenticeship model in Minna Niger states. Three researcher questions and three hypothesis were formulated and guided the study. Survey research design was used for the study. The study was carried out in Minna, Niger state The target population of the study comprises of 60 welders apprentices. The entire population size was adopted for the study and therefore there was no need of sampling techniques to use. The instrument used in data collection is a structure questionnaire. The data collection for this study was through the use of questionnaire. Finding revealed that the setting up the arc welding equipment, ability to use appropriate power supply, ability to hold torch properly and ability to direct the arc into the weld joint. The findings also reveal that choosing the appropriate power supply, operating at the correct wire feeder speed, and proper cooling of the nozzle. Therefore, the study concluded that apprentices in Minna Institution of Technology Innovation MITI and the road side welders possess practical competency in arc welding which is also one of the objectives of TVET. Technical and vocational training plays an essential role in the development of country since it provides practical human

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CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Metal work is the practical skills that deals with the act of producing things from metal. These skills are usually acquire by a combination learning the theoretical and practical experience. Metal work involves the following practical experiences; soldering, casting, brazing, heat treatment, sheet metal working and welding and fabrication etc.

Welding is the process of joining pieces of metals together by the use of heat produced at the tip of electrode if electric welding is used or by heat produced by gas flame if gas welding or oxy-acetylene is used to melt the edges or parts of metals together (Akpan, 2010). There are over forty different welding processes but only a few are widely practiced in Minna, Niger State. These welding processes include: gas (oxy-acetylene) welding and arc welding. arc welding process, according to Parmer (2010), coated electrodes are used for producing an arc to act as a heat source, the covering on burning provides the necessary shield to protect the molten metal from the ill effects of oxygen and nitrogen from the surrounding atmosphere. Arc welding is the process of joining metals by using heat of an electric arc but without pressure. It is the process in which metal pieces are joined by heating the metals to a suitable temperature of about 5000^0C to cause the pieces to meet and fuse together into a single piece.

In Arc welding, the intense heat needed to melt metal which is produced by an electric arc. The arc is formed between the actual work and an electrode that is manually or mechanically guided along the joint. The electrode can either be a rod or wire that not only conduct the current but also melts and supplies filler metal to the joint. Most welding in the manufacture or steel products uses

the second type of electrode. An arc is created across the gap when the energized circuit and the electrode tip touch the work piece and is withdrawn, yet within close contacts (Kopeliotch, 2014; Hart, 2014). Learners going through arc welding processes can also be refers to apprentice.

Apprenticeship is an occupational skills training that combine on the job experience with classroom instructions. Apprenticeship is a proven way to trained people for career that wants a wide range of skills, knowledge learn and practical on-the-job with classroom training. Apprenticeship is a method in which trainees learn a craft or trade by hands-on experience while working with a skilled worker, usually under a written or agreement (Business Dictionary, 2015).

Apprenticeship in arc welding is a program in which an individual or group of individuals who learn a theoretical and practical skill in an arc welding enterprise with a professional welder to become one in future. The professional trained and supervise the apprentice who learn how to follow the safety practice, handle welding tools and practice welding techniques. This is either done within a formal training environment or practical arc welding experience.

An Apprenticeship differ from academic study or schooling in that case, each students learn directly by watching and working together with a master craftsman. Apprenticeship is a combination of on-the-job training and related classroom learning that lead to a trade credential or ticket. Once you complete your apprenticeship and have your ticket, you qualified to work in a skilled trade. This is done under the supervision of a craft man person or trade professional in which an apprentice learn the practical and theoretical aspects of a highly skilled occupation (Bilginsory, 2000). Apprenticeship has been an age-long method used in training young people in trades and crafts, the apprentice lives with their master and receive no pay except maintenance and training. After the period of training and after satisfying the require standard of techniques in that particular trade, the apprentices then graduate and passed from a stage of apprenticeship but is not

yet qualify to a master craftsmen, they still work under a master to receive a six wages for their labor.

According to International Labor Organization (ILO, 2018). Apprenticeship is not a complicated concept for us. It is familiar approach in Minna, Niger State, culture and countries. Apprenticeship originated many century ago. However, it is successful requires a great care planning and attention. International Labor Organization ILO, also emphasis that apprenticeship is for young people. In some cases, such as for the recognition of future learning, the analysis and recommendation propose are even significantly more relevant for adult because they have more idea and experience compare to the young people. Before the entrance of formal vocational training in Minna Niger state, there was traditional training where learners acquired skills from master craftsmen through observation and imitation.

Formal apprenticeship is a systematic way of training whereby, organize documented, syllabus and time table are used. The syllabus and the time table can be change at any given time, this depend on the condition that is on ground. There is a specific period of time for the completion of this apprenticeship, which lead to the awarding of certificates. In this system, the apprentice acquires the skills for a trade in an enterprise learning and work side by side with experience craftsperson, usually completed by classroom-base instruction to International Labor Organization (ILO, 2012)

Informal apprenticeship training in the other hand does not make use of syllabus or time table to run a program. Here in this system, the apprentice or the trainees acquire a skills for trade in a small enterprise learning and working side by side with an experience person. The period of the apprenticeship depends on the ability of the learner(s). This system of apprenticeship is done by

which a young or adult apprenticeship acquired the skills for trade in a small or micro enterprise, learning and working side by side with an experience practitioner (Vaughan, 2017).

According to Peter-Cookey and Janyam (2017) notice that informal apprenticeship training extends well beyond the acquirement of technical skills. The informal apprenticeship system training has merits that cannot be achieved through formal system. These form of training are trade where learned directly from a professional or master craft man at a given period of time which are classified as formal and informal apprenticeship. In other way, apprenticeship is a practical job or skills in which an individual is paid to learn a set of skills through on-the-job learning program. Informal apprenticeship is seen as a system by which a young apprentice acquire a skills for a trade or craft in a micro enterprise learning and working side by side with an experience craftsperson. Both formal and informal apprenticeship require competency training in arc welding.

Competency is a set of demonstrable characteristics and skills that enable and improve the performance of a job. some scholars see 'competency' as a combination of practical and theoretical knowledge, cognitive skills, behavior and value used to improve performance as a state of being well qualified to perform a specific role. Hayes (1979); competency is generally includes knowledge, motivation social characteristics and roles of one person in accordance with the demand of organization of their clerk. Rankin (2002). Competency is describe as the combination of training skills experience and knowledge that a person has and their ability to apply them to perform a task safely. Karbasioun et al. (2007) posit that, to be competent means that the individual has adequately acquired the knowledge, skills, attitude, and judgments which are required in other to perform successfully at a specified proficiency level in a given work.

Training is a teaching or developing in oneself or others, any practical skills and knowledge that relate to specific useful competencies. In other way training is a learning and teaching activities

carried out for the purpose of helping learners in an organization to acquire knowledge and skills need by a particular enterprise. Dale S. Beach, 2009. Describe training as the organize procedure by which people learn knowledge and skills for a certain purpose. International Labor Organization Working papers ILO (2002) observe that training in developing countries has failed to make a positive impact as a result of designing programs and conducting pupil-teacher style of instruction in classroom and ignoring and exposing the trainees to a real world of work.

1.2 Statement of the Problem

In Minna, Niger state the training system in any vocational program which is marked by a combination of formal and informal training program that helps an apprentice in different sectors. This vocational training helps to equip every individual with adequate and relevant skills in a specific area of occupation. Many of this program lack policy to guide and regulate the problems in the course of training that apprentices undertake during their skills training in both formal and informal sector. Some other problems, such as inadequate training equipment, lack of meaningful work experience and poor supervision during attachment, no good machines that help the apprentice learn fast, some of the equipment used are not enough for the apprentices and find it badly to continue with the training (Gambin & Hogarth, 2016). Neenan (2017) noted that the attitudes of some of their apprentice, some of them find it difficult to teach other people forgetting that they were once like them. They show no concern to them especially those that knows that job very well. Some of the apprentice colleagues show bad attitudes to their fellow colleagues. The study focus on this problems in the training of apprenticeship under formal and informal training in Minna, Niger state.

1.3 purpose of the Study

The purpose of the study is to evaluate the practical competency of arc welders trained under formal and informal apprenticeship model in Minna, Niger state. The specific the study seek to determine the following:

1. Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state.
2. Practical competency task carried out by formal and informal apprenticeship in arc welders trained in Minna, Niger state
3. Strategies for enhancing adequate Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state

1.4 Significance of the Study

The finding of this study is a great benefit to apprentices

1. Serve as a guide for policy makers, contractors, government and the general public to employ competence workers in arc welding which will go a long way to improve a quality of construction.
2. It helps to provide the apprentices an extremely skillful workforce.
3. It helps to a graduate who participate in formal apprenticeship program to secure a permanent job and high status.

1.5 Scope of the study

This research study is focused on practical competency of arc welders trained under formal and informal apprenticeship models in Minna, Niger state. The scope of the study will cover the practical competency. Challenges as well as Strategies for enhancing adequate Practical Competency need by formal and informal apprenticeship in arc welders trained in Minna, Niger state. Due to constraint availability of facilities will not be covered.

1.6 Research Questions

The study employed some of the following research questions for investigating the problem.

1. What are the Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state?
2. What are the practical competency task carried out by formal and informal apprenticeship in arc welders trained in Minna, Niger state?
3. What are the Strategies for enhancing adequate Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state?

1.7 Hypothesis

The following hypothesis will be tested at 0.05 level of significance.

H_{01}. There is no significance different between the mean response of arc welders apprentice and instructors on the Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state.

H_{02}. There is no significance different between the mean response of arc welders apprentice and instructors the practical competency task carried out by formal and informal apprenticeship in arc welders trained in Minna, Niger state.

H_{03}. There is no significance different between the mean response of arc welders and instructors the Strategies for enhancing adequate Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state.

CHAPTER TWO

2.0 REVIEW OF RELATED LITERATURE

2.1 Theoretical framework

2.1.1 Theory of Skill Development

Theory of skill development was implied by Cratty in 1973. The theory states that individuals have tendency of developing skills in an occupation as a result of continuous or repetitive practice. It is stated that practical skills are essential skills that could be acquired through repetitive means in all technical occupations or professions. It is on this premise that the major objective of all Technical Colleges' programmed should make provision for practical skills to its graduates for self-reliant. Therefore the teaching of vocational education at technical college level should mostly focus on practical skills so as to enable the students acquire marketable skills. Technical Colleges programmed therefore cannot be said to have accomplished without practical skills manifestation.

It is also stressed that skills acquisition cannot be expressed in word but only through demonstration. Theory of skill development is related to the present study in that graduates of and maintenance work technology need to develop skills for effective performance in their various industries or workplaces. Development of relevant skills makes them fit into various sit or positions in relevant industries. Without skills being develop there will be unemployment among graduates of general installation and maintenance work engineering craft students.

Skill development is a key factor in the employability of workers and the sustainability of enterprises, it is one of the objectives of skills development system to ensure that the skills acquired match the skills valued in the work place. Skills development systems must also help workers and

enterprises adjust to changes and handle new conditions by constantly improving their skills to meet up with the climatic change, globalization, demographic trends, technological innovation and/or financial crisis. This is in line with the theory of technical and vocational skill development (TTVSD) by (Nyapson, 2017). TTSD states that improvement needs in skill development under lie vocational choice development, employability, mobility and sustainability of socio-economy of energy progressive society. Hence this theory is relevant to this study because technological innovations and advancement in general practical training needs.

2.2 Conceptual Framework

2.2.1 History of the apprenticeship training program

Apprenticeship was well known in ancient culture such as Ancient Egypt, Greece, and Rome, as well as Asia. Apprenticeship was supervised by craft union and town government. The training in craft skills was organized to maintain an adequate number of craftsmen. The system were used in 18th century BC, which are require to teach their craft to the next generation.

Makoju (1999) state that apprenticeship system existed in all the crafts in Nigeria. The period of apprenticeship varied from districts to districts and from craft to craft. He added that in the major towns of Nigeria, there are the vocational improvement centers (VIC) highly supported by the Industrial Training Fund (ITF) and government Agency in the states. However, this support has declined in recent times and the ITF has since established its own centers. Governments, particularly in the northern states of Nigeria, have established what is known as Basic Apprenticeship Training Centre (BATC) in all the Local Government headquarters. These training centres are under the protection of the state Governments Ministries of Trade and Industries. They trained apprentices in most of the trades, automobile, electrical, mechanical engineering,

carpentry, metal work, welding and also trainees are given fundamental training in communication skills. Apprenticeship exists in business, agriculture, technology, medicine and other professional areas.

Apprenticeship which is learning through observation and doing is practiced almost in every area of life. Life is full of experiences acquired through a master or mentor who could be a teacher, parent, relatives, or peers. These learning experiences could be conscious or unconscious.

National master plan for technical and vocational education development (2000), described apprenticeship as a system where a self-directed individual acquired attitudes, values, skills and knowledge for learning and doing work as part of living experience .

Osinem & Nwoji (2010) describes apprenticeship as a kind of vocational training given to a person who learns under an expert by taking time with the trainer to learn a craft from his expertise for a period of time. Osinem & Nwoji further noted that, a well-planned and supervised apprenticeship program will provide the following benefits.

- Provide the most efficient way to trained all-round craftsmen to meet present and future needs.
- Assure an adequate supply of skilled workers to fill employment opportunities.
- Assure the community of competent craftsmen, skilled in relevant aspect of their trades.
- Give the individual worker a greater sense of social and economic security and fulfillment.
- Generally raise skill levels in an organization.

2.2.2 Modern apprenticeship and vocational training

The modern apprenticeship program provides both on the job training and classroom instruction, it helps some apprenticeship to earn wages while learning a trade. Apprenticeship usually start by taking on a simple task and progress to more complex tasks as time goes on. At the end of the program, the apprenticeship archive a certificate of completing and achieving the journey work status. Modern apprenticeship program can last for about four years but some expand it from 1-6 years. In contrast to historical apprenticeship. Modern apprenticeship program in nowadays are operate to both men and women.

Vocational training specialized in a training program for a particular trade. The training in most cases does not consider professional skills but lay emphasis on the practical of skills that was learned, hence it linked you to the working field. The vocational training skills help the apprentices to improve their working style, speed and performance.

2.2.3 Management and Maintenance of Training Facilities in Electrical Arc Welding Garages

Equipment, tools and machine supplied and assist in workshops should be well managed and organized. According to the management guru Peter Drucker (2008), management is the organization and coordination of the activities of a business in order to achieve defined objectives. Management is often included as a factor of production along with, machines, materials, and money. The basic task of management includes both marketing and innovation. Practice of modern management originates from the 16th century study of low-efficiency and failures of certain enterprises, conducted by the English statesman Sir Thomas More (1478-1535). management consist of interlocking function of creating corporate policy and organizing, planning, controlling and directing an organization’s resources in order to achieve the objective of that policy.

Management from the point of view of sackey et Al. (1994) is the act of directing human activities and by the implementation of all staff and managers. He related the material affairs to humanity, since the staff who are also managers by implication deal directly with the trainees, workshop assistance and contractors. Therefore the most effective workshop management depends on the instructor's ability to organize, control, co-ordinate, communicate and lead shop management in respect to human and materials resources. A small mistake or mismanagement can bring irreparable ruin to the whole workshop hence prevention is better than cure. To ensure that your tools, equipment and machines work efficiently and have the longest possible life, a good programmed of regular maintenance is essential. The training scheme in line with the principle of dual training, apprentices spend two-thirds of their time receiving hands-on training in a workshop under the supervision to an accredited master trainer, and the remaining one-third following theoretical courses in a public vocational training center. Practical work experience in businesses is an integral part of the scheme and is covered by agreements signed between the State and business organizations.

The different stages in the four-year apprenticeships are organized as follows:

- Three months to familiarize apprentices with the work environment;
- Three months instruction on health and safety issues;
- Six months in a workshop, with training on the use of tools and equipment;
- Three years hands-on training through involvement in production activities;

This training is assessed at regular intervals to detect and correct apprentices' knowledge and skills gaps. After a final assessment, apprentices receive a certificate recognized by all the actors involved. Apprentices who have completed their training and satisfy the academic requirements can sit for National Recognized Diploma such as the Vocational Skills.

2.2.4 Effective Training Programs to apprenticeship

Competency and confidence is an excellent mixture in the workplace. An employee with this traits can motivate others to work together and create a safe and productive movement. The establishing of an effective program is the best way to start. He gave out six 6 tips that will help one to achieve effective training.

Apply knowledge in a right away: it can be easily to forget something if you don't use or practice it. You should not wait longer than two weeks to make use of new acquired skills. Even if people don't forget, they are more much motivated when they know it can put their learning to use it in the right away.

Use the training experts: Several companies produce interesting training videos and other aids that use the principles of variety, repetition and doses. Who are the experts?. Surely, a company that makes motors and know about motors.

Use a matrix: Many engineers and financial types are often use spreadsheet. If you do not have spreadsheet knowledge, ask for help. If you do not have a matrix, you are administering your training in a hazards manner. This says something to apprentices.

Gives everyone a chance: Every trainees must have the chance to contribute and have confidence in the job training. Master apprentice must show the apprentices that they are all important, and he will have a positive impact on them. When everyone is an expert in something, then he has accomplished one of the main goal of training.

Involvement: An effective feature of all good training programs is active involvement for all participants. Adults need to be part of their training, and a good training program has frequent

exercises to it. Practice sessions at the end of each training are a good way to improve your training experience.

Feedback: Feedback reinforce learning by making the students recall information. The method of feedback is important. The master of the apprentice try to test the learning experience of the trainee. In fact, success on frequent tests will boost the student's confidence. The quiz or test can be formal, informal, oral or written.

2.2.5 Quality Training

According to Dan Bobinski, (2000) what makes a quality training program? He says it is not the talent or experience of the trainer; it is not the comprehensiveness of the training or even heritage talent of the people participating in the training. The key to having a quality training program of any kind is the desire within everyone concern that the training will be a successful one.Dan Bobinski (2000) suggested four factors that can contribute to good training program.

A quality curriculum: Training should be designed and developed after asking several key questions: what are the expected results of the training? What behavior are needed to achieve those results? What knowledge, skills, and attitude that are needed to affect desire behavior. This question should ask and learning objectives should be considered.

Training location: Some training requires one-on-one to the job efforts. Other training requires lectures in large environments. But most training falls somewhere in between those two. The best location for your training will be the most cost effective in which apprentice can learn what is needed without interruption.

Appropriate training: Too many training is the frequent solution to a problems when the roots cause of the problem will not be solved with training. So first, if you are conducting training to resolve problems, make sure it is an appropriate solution for the problem.

2.2.6 Types of Apprenticeship

There are basically two types of apprenticeship: Formal and Informal apprenticeship.

Formal apprenticeship: Makoju (1999) describes formal apprenticeship as scheme offered by organizations such as manufacturing and service industries and public corporation which have adequate resources in manpower, machines and materials to trained people to perform certain skills in their organizations. Osinem & Nwoji (2010), view formal apprenticeship as a learning process which transits from the classroom to real practical situation in the workplace in the industry. Learning experiences acquired in the classroom are transferred to the real work situation. Programs where formal apprenticeship is practiced are: Internship, Students industrial work experience scheme (SIWES) and on-the-job training scheme.

Internship training: It is a technique for training professionals and sub-professional in the field of work, such as teachers, physicians, pharmacists, lawyers, counselors and social workers (Osinem & Nwoji, 2010). The training is undertaken typically as a culminating experience prior to the student's graduation, after preliminary class work and usually a full time resident experience to provide a complete experience. The student is placed in a firm or agency selected by the college for its progressive method of operation and supervised by a professional person selected on professional abilities and competency. The intern student receives a salary for the productive services rendered at a reduced rate. The internship is an occupational (professional) development competency through practice after theory education has been completed.

Student industrial work experience scheme (SIWES): It is a skill-training programme designed to expose and prepare students of higher institutions for work situations, as they exist in the world of work. This covers programs like Engineering, Technology, Applied Science and Applied Arts (Osinem & Nwoji, 2010). Osinem and Nwoji further stated that, the scheme helps to bridge the gap between theory learnt in school and practice as they exist in the industries. The scheme provides students with opportunities to familiarize with and expose them to tools, equipment and machines that are not available in their various institutions but will be used after graduation. The scheme also prepares the students to work methods and prepares them in safeguarding the work area and other workers in the industry. Olaitan et al (1999), described SIWES as the acquisition of relevant production skills needed in industry and work situations, through exposure to theory and practice on the job. SIWES is a skill training programme designed to expose and prepare students to work methods and give them the needed experience in handling equipment and machinery that may not be available in educational institutions (Okorie, 2000).

On-the-job Training: The instructor uses the observation and practice strategies for training. Olaitan et al (1999) opine that the training provides individuals with the necessary learning approaches in specific task in occupation and training which enables individuals to learn while working. Olaitan et al (1999) suggest characteristics of on-the-job-training to include.

- Performance of an activity by the master trainer.
- Watching of what the master trainer does by the apprentices.
- Doing of master trainer activity by trial and error.
- Repetition of activity in order to achieve mastery.

Ede (2001) views on- the- job training as a short-term training, aimed at improving the limited skills and knowledge of shop-floor supervisors and operatives to make them more productive and

versatile in their assigned jobs and will in-turn accelerate the pace of industrial efficiency and productivity. On-the-job training has become an effective means of training skilled and semi-skilled craftsmen in the industries.

2. Informal apprenticeship: Orjinta (1997) notes that, the scheme adopts the learner sitting by the master, whereby the apprentice learns the skills of the trade by observing his master performing the job. He added that, the more differences of the jobs his master gets and how well he observes the master perform, the better he is trained. No theory is taught, the facilities in which the training is done are ill-equipped and no training syllabus used. National master-plan for TVE development (2000) describes informal apprenticeship as situation where a learner sits near the master to learn his craft as practiced by the road side shops. A system whereby a self-directed individual acquires attitudes, values, skills and knowledge for learning and doing work as part of living experience. It is a form of vocational training in traditional society, where learning a craft often begins with personal services to the master, young boys would become house servants to a close relative and gradually be introduced to the crafts (Fafunwa, 1974). Informal apprenticeship is unsystematic, an individual identifies a crafts master of choice and contract to learn a trade or crafts for livelihood. The apprentice is trained in the trade or crafts for period of time and then continuous as journey man after mastery of the trade/crafts satisfactorily to the master. Okorie (2000) observes that, it is usually the practice in Nigeria for people who need to learn some trade to locate the fashion designer under whom to learn the tailoring. Informal apprenticeship is practiced in trades like; craftwork, carpentry, auto mechanic work, cabinet making, blacksmith, goldsmith, shoe-making, electronics repairs, electrical appliances repairs. This apprenticeship training is planned on the basis of what the apprentice must do and what to know in order to perform the operation on the

job in a safe and satisfactorily manner. This involves actual participation in learning activities on the job and the study of related information in the workshop.

Traditional Apprenticeship: Formal specialized schools request a base section capability, for example, two years of secondary school instruction or effective consummation of national auxiliary school exams. This does exclude most of the adolescent gathering in Africa who had no formal instruction or just a couple of years of it. Abilities important for business would need to be procured through a non-formal apprenticeship framework. In numerous African urban areas, one takes in an exchange by perception and through non-formal apprenticeship frameworks (Kishindo 1993).

Apprenticeship has for quite some time been sorted out as an imperative means through which the young enter the casual segment. It is, clearly, the most settled and the conventional technique for preparing. Few starting abilities and little experience are expected to select on apprenticeship. Through their work, the students help the expert in delivering items or administrations. In time, the disciple will get abilities by watching and doing fundamental undertakings. Over the long haul, he/she will be required to finish complex assignments. The preparation is seriously useful, focusing on quick issues of the work itself.

Apprenticeship is frequently the main method for taking in an exchange for most youngsters in Africa. It is likewise more basic in West Africa than in eastern and southern Africa (Fluitman & Sangare, 1989). Apprenticeship is administered by authorization in some African countries. Be it as it might, a few artisans have likewise battled for enactment to secure their privilege at work environment. These disciples may get free load up and holding up and in some cases pocket cash or a periodic reward. The considerable number of understudies in the casual division, in any case, works under unfavorable conditions. Some compensation for their preparation while others

renounce wage for the work they do. Artisans are for the most part youngsters. On the other hand, laborers over 20 years of age may similarly fill in as understudy. The term of apprenticeship may reach out from a few months to a few years (Fluitman & Sangare, 1989).

Understudies in exceptionally specialized specialties for the most part have minimal hypothetical learning of the frameworks or procedures with which they work, aside from when their preparation is supplemented with a repair manual or individual course books (McLaughlin 1990). Kasliwal (1995) contends that apprenticeship includes a component of "shoddy work" and it is here and there saw as "exploitative". Regardless, specialized aptitudes can best be redesigned by working inside the setting of the conventional apprenticeship framework, particularly in the art and workshop divisions (Herschbach 1989). Formal professional preparing focuses are routinely seen to be less compelling than casual division apprenticeship (Fluitman & Sangare, 1989).

2.2.6 Overview of the information sector through vocational training.

The respective researchers area help to identify five major factors and guidelines to ensure that the vocational training in the informal sector has the means to increase the skill and qualifications levels of employees and micro entrepreneurs, and make positive contributions to their working condition and the profitability of their activities.

Acknowledge the sectors as a resource for skilled development to its own rights.

In the informal methods of training and acquiring qualifications, ensure that there is a whole range of ways and means of developing skills that are either not known to those responsible for existing formal Training systems in terms of knowledge on the job training though observation and imitation and by means of traditional apprenticeship in the area where this will be developed. This

choice that is taken by sectors workers, record for the training of up to 80 percent of an area workforce.

It organized apprenticeship practices slowly but surely.

Traditional apprenticeship is the most common forms of youth training in most areas of learning. Traditional forms of youth training in workshops are in fact the point of going slow but far reaching transformation of craft apprenticeship into dual systems that combines on the job and theoretical training. The changes taking place varies from country to country or areas of training to the other.

Providing resources to support employment and activities creation after training.

The various areas of technical training and financial partners that are working in the informal sector agree that this training should not be an end in itself but most truly enables young people and adults to find an appropriate job or activities to be doing. They often developed educational, materials and financial resources to help and create effective ways from training to the world of work. This is done by supporting the implementation of skilled acquired.

Training adults at the same time as young people.

Current training efforts in the informal economy gives chance to young people in apprenticeship and many young people outside the education of the training system who are seeking to earn a living. However, this observation does not reduce from the legit request that is made by many groups of small entrepreneurs made during this study to be able to access training.

It raises the educational level of all workers in the sector.

Firstly the informal service is done by large employers of poorly educated and uneducated, young people and adults. Secondly, the greater the number of years spend at school by the self-employed

and entrepreneur, the more the result of their activities will be positive and allow them to earn a decent living. Universal education provides the foundation to any major efforts which help people into the labor market that can be built.

Introduced pre vocational skills training scheme to avoid social and educational waste

A lot of children leave school at the age of ten or twelve years and do not have a chance to start an apprenticeship before they are of fourteen, some of them lost the few educational knowledge that was gained at school either because they are on the street or because they started to work too young. Other may continue to work in the family or neighborhood activities and have no opportunities to progress to another field of work. World Bank report 2011 given them a chance to have pre-vocational training in order to strengthen or maintain educational achievements and activities which will help them to choose an occupation that will allow them to avoid the social ravaged of the street and progress towards possible vocational qualifications. Agencies Franciase Development 2010

2.3 Related Empirical Studies

Desmond (2016) carried out a study on evaluating the practical competency of arc welders trained under formal and informal apprenticeship Module in the Ketu south municipal area of Volta region. The study employed both qualitative and quantitative statistical procedure to analyze the data collected through questionnaires and interviewing of respondents. A total of one hundred (100) respondents were sampled for the study using purposive, stratified and quota sampling techniques. The study revealed that the practical competency level of arc welders is going down even though the quality of training is good, respondents affirmed that various strategies must be put in place to improve the quality of training. Also, majority of workers employed by contractors

do not have enough training time. The study recommended the need to invest more in technical education by government both in the formal and informal sectors to improve practical competency of apprentice since its emphasis can propel the country's technological development.

Francis (2017) The study determined the fabrication and welding trade skills need of technical college students in Akwa Ibom State. Two specific purposes, two research questions and two null hypotheses were formulated to guide the study. Survey research design was adopted for the study. The population of the study comprised 235 fabrication and welding trade students in senior technical two (ST 2) and 14 instructors in technical colleges in Akwa Ibom State. Purposive Sampling technique was used since the population was not too large. A total of 205 copies of the questionnaire were completely filled and used for data analysis. Fabrication and Welding Trade Skills Need Questionnaire (FWTSNQ) was used for data collection. The instrument was validated by two experts of Fabrication and Welding Trade and one Expert of Test and Measurement in the Faculty of Education, University of Uyo. The reliability of the instrument was .84 which was established using Cronbach Alpha method. Mean, standard deviation and independent t-test were used for data analysis. Findings of the study revealed that technical college students need arc welding and soldering skills to a great extent. And there is no significant difference in the mean responses of technical college students and instructors on the extent to which technical college students need arc welding and soldering skills. It is recommended among others that fabrication and welding workshops should be equipped with modern tools, machines, equipment and materials.

Olakotan (2019) conducted a study on appraised fabrication and welding students' employability skills in Ogun State technical colleges. Two research questions were raised in relation to the focus of the study. A structured Questionnaire containing 15 items was developed and used for data

collection. The questionnaire was validated by 3 experts and tested for reliability using Cronbach Alpha Coefficient at 0.96. The questionnaire was used for collecting data from 57 respondents made by fabrication and welding industrial-based supervisors in Ogun State. The data collected were analysed using descriptive statistics of mean and standard deviation to answer the research questions raised in the study. The study affirmed that fabrication and welding students in Ogun State technical colleges possessed sheet metalwork skills and gas welding skills. The study recommended among others that adequate supervision and monitoring of Technical and Vocational Education and Training (TVET) institution's students on industrial attachment should be ensured by TVET institution's administrators and that industrial-based supervisors should be objective in discharging their duties during students' industrial attachment period.

Ukpong (2023) study investigated the appropriate specific tasks in gas tungsten arc welding and gas metal arc welding for inclusion in the instructional package for technical colleges in Akwa Ibom State. The objective of the study is to determine appropriate specific tasks in Gas Tungsten Arc Welding (GTAW) and Gas Metal Arc Welding (GMAW) for inclusion in the instructional package for Technical Colleges in Akwa Ibom State. Two specific objectives, two research questions and two hypotheses guided the study. The research design was Research and Development design (R&D), population of the study consisted of 145 respondents from the nine Government Technical Colleges in Akwa Ibom State, National Business and Technical Education Board and Mechanical Engineering or relevant field. Using the Krejcie and Morgan sample size determination of 1970, the sample size of this study comprised of 128 respondents out of the 145 respondents from the nine Government Technical Colleges in Akwa Ibom State, National Business and Technical Education Board and Mechanical Engineering or relevant field. The researcher developed an instrument titled: called "Argon Welding Instructional Package Checklist"

(AWIPC). To analyze the data, mean and standard deviation were used to answer the research questions while the hypotheses were tested with analysis of variance (ANOVA) in conjunction with the content validity ratio at 0.05 probability level. The study concluded that that all the specific tasks in the identified areas of Gas Tungsten Arc Welding (GTAW) and Gas Metal Arc Welding (GMAW) are highly appropriate for inclusion in Instructional Package for Teaching Gas Tungsten Arc Welding (GTAW) and Gas Metal Arc Welding (GMAW) in Technical Colleges in Akwa Ibom State. The study therefore recommended that Technical Colleges in Akwa Ibom State should adopt the developed and validated instructional package for the teaching of c in Technical colleges in Akwa Ibom State.

2.4 Summary of Literature Reviewed

The literature reviewed is discussed under the following heading: History of the apprenticeship training program, Modern apprenticeship and vocational training, Management and Maintenance of Training Facilities in Electrical Arc Welding Garages, Effective Training Programs to apprenticeship, Quality Training, Types of Apprenticeship, Overview of the information sector through vocational training. Relevant and adequate literatures were reviewed in the study.

CHAPTER THREE

RESEACH METHODOLOGY

3.1 Introduction

This chapter focus on the methodologies use of the study. It deals with the design of the study, area of the study population of the study samples and sampling techniques**,** Instrument for data collection, Validation of the instrument, administration of the instrument, Method of the data collection, and Method of data analysis.

3.2. Design of the study

The research used in carrying out this study was survey research design. The survey research design was chosen because the information that was gathered, was a detailed combination of formal and informal apprenticeship training programs. This was to investigate the performance of individual training in electrical arc welding garage and institution of formal and informal apprenticeship in Minna, Niger state. The purpose was to examine and document the results of its training organization. Survey questionnaire were distributed to apprentices and students in the training school to get information from their responses.

3.3. Area of the Study

This study was conducted in Minna, and covered the following areas of ministry of works, Minna, Institution of Technology Innovation {MITI}, science and technology institution, Tunga Goro and Bosso, Where electrical arc welding garage shops are covered in the central city of Minna. Niger state.

3.4. Population of the study

The target population of this study comprised of 40 arc welders apprentices in the ministry of works in Minna, Niger state, Minna Institution of Technology Innovation {MITI}, science and technology institution, Tunga, Goro and Bosso. And 20 instructors the total of 60 respondents.

3.5. Sample and sampling techniques

Since the entire population size were adopt for the study and therefore, there was no need of sampling techniques to use.

3.6. Instrument for data collection.

The instrument used in the data collection is a structured questionnaire with a titled [Evaluating the practical competency of arc welders trained under formal and informal apprenticeship model in Minna, Niger state which was developed to provide information from the respondents. The instrument consists of four sections, which is section A**,** B, C and D. with 37 items in total. Section A contains personal data, section B contains the practical competency needed by formal and informal apprenticeship in arc welding, section C evaluate the practical competency task carried out by formal and informal apprenticeship in arc welding and section D contains the strategies for enhancing adequate practical competency needed by formal and informal apprenticeship in arc welding.

3.7. Validation of the instrument

The instrument used for data collection was designed by the researcher under the guidance and supervision. The instrument was also validated by experts in the Department of Industrial and Technology Education, Federal University of Technology, Minna. Their suggestions and corrections will be made before it's reflect in the final copy of the working instruments to the respondents by the researcher.

3.8. Administration of the instrument

This instrument for the data collection was administered by the researcher and one research assistant in the department of Industrial and Technology Education

3.9. Method of the data collection.

The data collection for this study was through the use of questionnaire. These questionnaire were produced and distributed to the target population and the respondents were given enough time to respond to the questionnaire. Their own opinions, facts and other needed information were getting from the target population to assist in getting the results.

3.10. Method of data analysis.

Data collected will be analyzed using mean and standard deviation for the research questions while t-test will be used to test the hypothesis at the 0.05 level of significant. A four (4) point rating scale will be to analyze the data as shown below.

Strongly Agree	(SA)	=	4points (3.5 – 4.0)
Agree	(A)	=	3points (2.5 - 3.49)
Disagree	(D)	=	2points (1.5 – 2.49)
Strongly Disagree	(SD)	=	1point (1.0 – 1.49)

Therefore, the mean value of the 4 point scale is:

$$\bar{X} = \frac{4+3+2+1}{4} = \frac{10}{4} = 2.5$$

The cutoff point of the mean score of 2.50 will be calculated as the agreed. Therefore, an item with mean response below 2.50 will be regard or consider as disagreed while an item with response at 2.5 and above was regard or considered as agreed.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

4.1 Research Question 1

What are the Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state?

Table 4.1: Mean responses of the arc welders apprentice and instructors on the challenges faced by women in carrying out the building construction skills in building industries.

		N_1= 40		N_2=20
S/N	ITEMS	$\bar{X}$	**SD**	Remark
1	Setting up the arc welding equipment	3.63	.517	Agreed
2	Ability to Use appropriate power supply	3.57	.529	Agreed
3	Ability to Hold the torch properly	3.60	.524	Agreed
4	Ability to Direct the arc into the weld joint	3.58	.635	Agreed
5	Feeding the filler metal into the leading edges of the puddle	3.62	.550	Agreed
6	Ability to Adjust the argon regulator	3.62	.550	Agreed
7	Ability to Adjust the length of electrode	3.63	.547	Agreed
8	Ability to Cool of the torches	3.66	.509	Agreed
9	Ability to Select appropriate filler metal angle	3.65	.513	Agreed
10	Ability to Select proper joint designs	3.69	.498	Agreed
11	Ability use Appropriate electrode	3.68	.503	Agreed
12	Ability to Move the torch in front of the pool	3.66	.509	Agreed
13	Ability to tilting the torch Appropriate when welding	3.66	.509	Agreed
14	Ability to Select appropriate diameter of electrode for the job	3.69	.498	Agreed

15	Ability to Maintain a constant separation between the electrode and the work piece.	3.68	.503	Agreed

N=60

$\bar{X}$= mean of the respondents

N_1 = No. of arc welder apprentice

N_2= No. instructors

SD = standard deviation of the respondents

Table 4.1 showed that both the arc welders apprentice and instructors agreed on all items from 1 to 15. This is because none of the mean response was below 2.50 which was the beach mark of agreed on the 4-points response options. The standard deviation score ranged between 0.498 and 0.635. This showed that the responses of the arc welders apprentice and instructors on the items were not divergent.

4.2 Research Question 2

What are the practical competency task carried out by formal and informal apprenticeship in arc welders trained in Minna, Niger state?

Table 4.2: mean response of the arc welders apprentice and instructors on the practical competency task carried out by formal and informal apprenticeship in arc welders trained in Minna, Niger state.

		N_1= 40		**N_2=20**
S/N	ITEMS	$\bar{X}$	**SD**	Remark
1	Choosing the appropriate power supply	3.63	.517	Agreed
2	Operating at the correct wire feeder speed	3.57	.529	Agreed
3	Proper cooling of the nozzle	3.60	.524	Agreed
4	Using argon in proportion of other gases	3.52	.664	Agreed
5	Selecting electrodes with the correct diameters	3.63	.547	Agreed
6	Choosing the correct angle of MIG gun	3.58	.556	Agreed
7	Using the right manipulation pattern	3.62	.550	Agreed
8	Determining the stick out of the electrode	3.57	.612	Agreed
9	Manipulating the weld pool when welding in an	3.62	.521	Agreed

	overhead position			
10	Controlling the shielding gas and the type and size of the electrode	3.69	.498	Agreed
11	Performing a zig-zag pattern while welding	3.63	.517	Agreed
12	Replacing a new consumable bare wire electrode to the torch while welding	3.62	.521	Agreed
13	Directing the electrode and shielding gas to the arc area from the torch	3.65	.513	Agreed
14	Controlling the gun tip-to-work distance (stickout)	3.65	.513	Agreed
15	Ability of including consumable tungsten electrode of bare wire on a spool	3.62	.521	Agreed

N=60

$\bar{X}$**=** mean of the respondents

N_1 = No. of arc welder apprentice

N_2= No. instructors

SD = standard deviation of the respondents

Table 4.2 showed that both the arc welders apprentice and instructors agreed on all items. This was because none of the mean response was below 2.50 which was the bench mark of agreed on the 4-point response options. The standard deviation score ranged between 0.498 and 0.612. This showed that the responses of the arc welders apprentice and instructors on the items were not divergent.

4.3 Research Question 3

What are the Strategies for enhancing adequate Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state?

Table 4.3: mean responses of the arc welders apprentice and instructors on the Strategies for enhancing adequate Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state.

N_1= 40 N_2=20

S/N	ITEMS	$\bar{X}$	SD	Remark
1	Skills Recognition through Competency Standards	3.63	.486	Agreed
2	Apprenticeship Learning Organization	3.57	.499	Agreed
3	National Skills Standards should be the basis for further curricula development	3.58	.497	Agreed
4	Provision of incentives for both employers and potential apprentices to participate in an apprenticeship system	3.60	.607	Agreed
5	System of simple logbooks based can be used to track the progress of learning during apprenticeships	3.62	.550	Agreed
6	Use and maintenance of informal social networks in shoring business activities and regulating the use of improved training methods such as apprenticeship	3.66	.509	Agreed
7	Make awareness of the benefit attached to apprenticeship so as to increase the apprentice in the programme	3.68	.503	Agreed

N=60

$\bar{X}$**=** mean of the respondents

N_1 = No. of arc welder apprentice

N_2= No. instructors

SD = standard deviation of the respondents

Table 4.3 showed that both the arc welders apprentice and instructors agreed on all items from 1 to 7. This was because none of the mean response was below 2.50 which was the bench mark of agreed on the 4-point response options. The standard deviation score ranged between 0.486 and 0.607. This showed that the responses of the arc welders apprentice and instructors on the items were not divergent.

4.4 Hypothesis 1

There is no significance different between the mean response of arc welders apprentice and instructors on the Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state

Table 4.4 T-test on Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state.

$N_1 = 40$ AND $N_2 = 20$

Respondents	N	X	SD	Df	Tcal	P-value	Remark
Arc welders apprentice	40	3.54	0.87	58	0.443	0.002	NS
Instructors	20	3.60	0.60				

N=60

$\bar{X}_1$**=** mean of arc welders apprentice

$\bar{X}_2$ = mean of instructors

N_1 = arc welders apprentice

N_2= instructors

SD_1 = standard deviation of arc welders apprentice

SD_2 **=** standard deviation of instructors

NS=Not Significant

Table 4.4 showed that there was no significant difference in the responses of arc welders apprentice and instructors on all the items as Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state; therefore the null hypothesis of no significant difference was upheld at 0.05 level of significance.

4.5 Hypothesis 2

There is no significance different between the mean response of arc welders apprentice and instructors the practical competency task carried out by formal and informal apprenticeship in arc welders trained in Minna, Niger state.

Table 4.5 T-test on the practical competency task carried out by formal and informal apprenticeship in arc welders trained in Minna, Niger state

$N_1 = 40$ AND $N_2 = 20$

Respondents	N	X	SD	Df	Tcal	P-value	Remark
Arc welders apprentice	40	3.62	.480	58	.363	0.001	NS
Instructors	20	3.50	.612				

N=60

$\bar{X}_1$= mean of arc welders apprentice

$\bar{X}_2$ = mean of instructors

N_1 = arc welders apprentice

N_2= instructors

SD_1 = standard deviation of arc welders apprentice

SD_2 = standard deviation of instructors

NS=Not Significant

Table 4.5 showed that there was no significant difference in the responses of arc welders apprentice and instructors on all the items as practical competency task carried out by formal and informal apprenticeship in arc welders trained in Minna, Niger state; therefore the null hypothesis of no significant difference was upheld at 0.05 level of significance.

4.6 Hypothesis 3

There is no significance different between the mean response of arc welders and instructors the Strategies for enhancing adequate Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state

Table 4.6 T-test on the Strategies for enhancing adequate Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state**.**

N_1 = 40 AND N_2 = 20

Respondents	**N**	**X**	**SD**	**Df**	**Tcal**	**P-value**	**Remark**
Arc welders apprentice	40	3.63	.595	58	.152	0.003	NS
Instructors	20	3.75	.358				

N=60

$\bar{X}_1$**=** mean of arc welders apprentice

$\bar{X}_2$ = mean of instructors

N_1 = arc welders apprentice

N_2= instructors

SD_1 = standard deviation of arc welders apprentice

SD_2 = standard deviation of instructors

NS=Not Significant

Table 4.6 showed that there was no significant difference in the responses of arc welders and instructors on all the items as Strategies for enhancing adequate Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state; therefore the null hypothesis of no significant difference was upheld at 0.05 level of significance.

4.7 Findings of the study

The following are the main findings of the study; they are prepared based on the research questions and hypothesis tested.

1. The finding on the Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state showed that all the respondents agree on all the items, among all is feeding the filler metal into the leading edges of the puddle.
2. The finding on the practical competency task carried out by formal and informal apprenticeship in arc welders trained in Minna, Niger state showed that all the respondents agree on all the items, among all is replacing a new consumable bare wire electrode to the torch while welding.
3. The findings on Strategies for enhancing adequate Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state shows that showed that all the respondents agree on all the items, among all is Provision of incentives for both employers and potential apprentices to participate in an apprenticeship system
4. There was no significant difference in the responses of arc welders apprentice and instructors on the Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state.
5. There was no significant difference in the responses of arc welders apprentice and instructors the practical competency task carried out by formal and informal apprenticeship in arc welders trained in Minna, Niger state
6. There was no significant difference in the responses of arc welders and instructors the Strategies for enhancing adequate Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state.

4.8 Discussion of findings

The result from table 4.1 shows the findings on the Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state. The findings of the study revealed the Setting up the arc welding equipment, Ability to Use appropriate power supply, Ability to Hold the torch properly, Ability to Direct the arc into the weld joint, Feeding the filler metal into the leading edges of the puddle, Ability to Adjust the argon regulator, Ability to Adjust the length of electrode, Ability to Cool of the torches, Ability to Select appropriate filler metal angle, Ability to Select proper joint designs, Ability use Appropriate electrode, ability to Move the torch in front of the pool, Ability to tilting the torch Appropriate when welding, Ability to Select appropriate diameter of electrode for the job, Ability to Maintain a constant separation between the electrode and the work piece. The findings of study is in line with Schouten (2015) who stresses on the frequency of training programs putting it that the instructor should spread topics across a week instead of doing it once at a time. In this view, with the average frequency for the implementation of training programs being a month, it becomes expedient on managers and trainers to implement training programs in a more appropriate ways that benefits apprentices

The result of the hypothesis on the Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state shows that there was no significant difference in the responses of arc welders apprentice and instructors on the Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state.

Table 4.2 shows the result of the findings on the practical competency task carried out by formal and informal apprenticeship in arc welders trained in Minna, Niger state. The findings of the study revealed Choosing the appropriate power supply, Operating at the correct wire feeder speed, Proper cooling of the nozzle, Using argon in proportion of other gases, Selecting electrodes with

the correct diameters, Choosing the correct angle of MIG gun, Using the right manipulation pattern, Determining the stick out of the electrode, Manipulating the weld pool when welding in an overhead position, Controlling the shielding gas and the type and size of the electrode, Performing a zig-zag pattern while welding, Replacing a new consumable bare wire electrode to the torch while welding, Directing the electrode and shielding gas to the arc area from the torch, Controlling the gun tip-to-work distance (stickout), Ability of including consumable tungsten electrode of bare wire on a spool. The findings of the study revealed the Sheahan *et al.* (2015) who stated that the quality of training is dependent on the comprehensiveness of the training

The result of the hypothesis on the practical competency task carried out by formal and informal apprenticeship in arc welders trained in Minna, Niger state shows that there was no significant difference in the responses of arc welders apprentice and instructors the practical competency task carried out by formal and informal apprenticeship in arc welders trained in Minna, Niger state.

The result from table 4.3 reveal the findings on Strategies for enhancing adequate Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state. The findings of the study revealed Skills Recognition through Competency Standards, Apprenticeship Learning Organization, National Skills Standards should be the basis for further curricula development, Provision of incentives for both employers and potential apprentices to participate in an apprenticeship system, System of simple logbooks based can be used to track the progress of learning during apprenticeships, Use and maintenance of informal social networks in shoring business activities and regulating the use of improved training methods such as apprenticeship, Make awareness of the benefit attached to apprenticeship so as to increase the apprentice in the programme. The findings of the study is in line with Chenoy *et al.* (2019) who

noted that Apprenticeships can play an integral role in enhancing the overall productivity and skill level of workforce through providing on the-job training

The result of the hypothesis on the Strategies for enhancing adequate Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state shows that there was no significant difference in the responses of arc welders and instructors the Strategies for enhancing adequate Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Study

The main focus of this research study was to find out the evaluating the practical competency of arc welders trained under formal and informal apprenticeship model in Minna Niger.

Chapter 1 of the study discussed the background of the study, the statement of problem, purpose, significance, scope and the research questions were all stated and discussed for the conduct of this research.

The review of related literature looked into History of the apprenticeship training program, Modern apprenticeship and vocational training, Management and Maintenance of Training Facilities in Electrical Arc Welding Garages, Effective Training Programs to apprenticeship, Quality Training, Types of Apprenticeship, Overview of the information sector through vocational training. Various views of different authors concerning the topic were harmonized in a comprehensive literature review and empirical studies.

A survey approach was used to developed instrument for the study; the respondents identified as the population of the study were the arc welders apprentice and instructors. The entire respondents were used. A number of 60 questionnaires were administered. The instrument used was analysed using frequency count, and mean scores. The research questions were discussed base on the findings from the responses and results of the instrument used.

Implication of the study and conclusions were also drawn from the findings discussed. Recommendations and suggestions for further study were formulated and stated according to the findings of the study.

5.2 Implication of the Study

The findings of the study had implications for government, Instructors and apprentices. From the outcome of the study, it implies that If the identified areas where put in place it will give apprentice more advantage to acquire relevant skills need in their desired trade.

5.3 Contribution to Knowledge

This study will enable policy makers, contractors, government, technical college student in the skills need in and the general public to employ the competence workers in arc welding which will go a long way to improve the various quality of constructions.

5.4 Conclusion

Based on the findings of the study, the following conclusions were drawn: From the findings of the study it is therefore concluded that apprentice in MIIT possess practical competency in arc welding which is also one of the objective of TVET. Technical and vocational training play an indispensable role in the development of a country since it provides practical human resources for the economy through the acquisition of skills

5.5 Recommendations

Based on the findings of the study, the following recommendations were made:

3 Focus should be on providing adequate and more financial opportunities for women willing to venture into construction entrepreneurship.

4 Young women should be made aware of construction industry opportunities is needed to encourage them to build their careers in construction from the school stage in order to increase the number of professional women participating in future.

5 There should be career advancement activities that are needed to sustain career path progression include training and mentoring in order to retain women professionals.

5.6 Suggestion for Further Study

The following are suggested for further studies:

1. Evaluate the practical competency of arc welders trained under formal and informal apprenticeship model in other location.
2. Evaluate the technical skills in forging technology trained under formal and informal apprenticeship model

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APPENDIX

QUESTIONNAIRE

FEDERAL UNIVERSITY OF TECHNOLOGY MINNA, NIGER STATE

SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION

DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION

A QUESTIONNAIRE ON EVALUATION OF PRACTICAL COMPETENCY OF ARC WELDERS TRAINED UNDER FORMAL AND INFORMAL APPRENTICESHIP MODEL IN MINNA, NIGER STATE

INTRODUCTION: Please kindly complete this questionnaire by ticking the column that best present your perception about the topic. The questionnaire is for research purpose and your view will be confidentially and strictly treated in response to the purpose of the research work.

SECTION A

PERSONAL DATA

Arc welders apprentice: ☐

Instructor: ☐

Note: A four (4) point scale is used to indicate your opinion, tick the options which best describe your agreement as shown below:

Strongly Agree	(SA)	=	4points
Agree	(A)	=	3points
Disagree	(D)	=	2points
Strongly Disagree	(SD)	=	1points

Section B: What are the Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state?

S/N	Items	Scales			
		SA	A	D	SD
1.	Setting up the arc welding equipment				
2.	Ability to Use appropriate power supply				
3.	Ability to Hold the torch properly				
4.	Ability to Direct the arc into the weld joint				
5.	Feeding the filler metal into the leading edges of the puddle				
6.	Ability to Adjust the argon regulator				
7.	Ability to Adjust the length of electrode				
8.	Ability to Cool of the torches				
9.	Ability to Select appropriate filler metal angle				
10.	Ability to Select proper joint designs				
11.	Ability use Appropriate electrode				
12.	Ability to Move the torch in front of the pool				
13.	Ability to tilting the torch Appropriate when welding				
14.	Ability to Select appropriate diameter of electrode for the job				
15.	Ability to Maintain a constant separation between the electrode and the work piece.				

Section C: What are the practical competency task carried out by formal and informal apprenticeship in arc welders trained in Minna, Niger state?

S/N	Items	Scales			
		SA	A	D	SD
1.	Choosing the appropriate power supply				
2.	Operating at the correct wire feeder speed				
3.	Proper cooling of the nozzle				
4.	Using argon in proportion of other gases				
5.	Selecting electrodes with the correct diameters				
6.	Choosing the correct angle of MIG gun				
7.	Using the right manipulation pattern				
8.	Determining the stick out of the electrode				
9.	Manipulating the weld pool when welding in an overhead position				
10.	Controlling the shielding gas and the type and size of the electrode				
11.	Performing a zig-zag pattern while welding				
12.	Replacing a new consumable bare wire electrode to the torch while welding				
13.	Directing the electrode and shielding gas to the arc area from the torch				
14.	Controlling the gun tip-to-work distance (stickout)				
15.	Ability of including consumable tungsten electrode of bare wire on a spool				

Section D: What are the Strategies for enhancing adequate Practical Competency needed by formal and informal apprenticeship in arc welders trained in Minna, Niger state?

S/N	Skill Items	Scale			
		SA	**A**	**D**	**SD**
1.	Skills Recognition through Competency Standards				
2.	Apprenticeship Learning Organization				
3.	National Skills Standards should be the basis for further curricula development				
4.	Provision of incentives for both employers and potential apprentices to participate in an apprenticeship system				
5.	System of simple logbooks based can be used to track the progress of learning during apprenticeships				
6.	Use and maintenance of informal social networks in shoring business activities and regulating the use of improved training methods such as apprenticeship				
7.	Make awareness of the benefit attached to apprenticeship so as to increase the apprentice in the programme				