CHALLENGES OF TEACHING METALWORK TRADES IN TECHNICALCOLLEGES IN NIGER STATE AND FEDERAL CAPITAL TERRITORY, ABUJA.

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M.TECH/SSSE/ 2008/1907

THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL, FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, NIGERIA
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OFMASTERS OF TECHNOLOGY (\M.TECH) IN INDUSTRIAL AND TECHNOLOGY EDUCATION (METALWORK TECHNOLOGY OPTION)

MARCH, 2014

ABSTRACT

This study was carried out purposely to examine the challenges of the teaching of metalwork trade in Technical Colleges in Niger State and Federal Capital Territory, (FCT) Abuja. To achieve this goal, five research questions were developed and answered while five null hypotheses were formulated. A descriptive survey research design and structured questionnaires were adopted. The population for the study consisted of 29 principals and vice principals, 9 Head of Departments and 59 metalwork trade teachers of technical colleges that offered metalwork trade in Niger State and Federal Capital Territory, Abuja. The entire population was used. The instrument was validated by three lecturers from the department of Industrial and Technology Education Federal University of Technology, Minna. The reliability coefficient computed for the instrument was found to be 0.83 using Kuder Richardson K-R 21 formula. Mean and standard deviation were used to answer the research questions, while t-test was employed to test the hypotheses at 0.05 level of significance. The study revealed that management and instructional delivery are challenges of teaching metalwork trades in technical colleges. Infrastructure/facilities are not available for the teaching of metalwork trades in most technical colleges. The study further revealed that provision of qualified personnel, equipment and facilities, training of principals and metalwork teachers on management and instructional delivery strategies will reduce the challenges faced by the technical administrators, teachers and students. The hypotheses tested revealed that there was no significant difference between the Mean responses of teachers and College administrators on the management, infrastructure/facilities, teachers related and instructional delivery challenges in the teaching of metalwork trade in technical colleges. Consequently, it was recommended among others that equipment/facilities should be supplied to metalwork trades Department in technical colleges and adequate number of qualified teachers should be recruited to handle all the courses offered in metalwork trades section in the technical colleges.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

Technical education is a comprehensive term used for those aspects of education systems involving the acquisition of practical skills, attitudes and knowledge related to occupations in various sectors of economic and social life (Guda, 2008).

Olaitan (1996) explained that technical education is education designed to develop skills, abilities, understanding, attitudes, work habit, appreciation, encompassing knowledge and information needed by workers to enter and make progress in employment in a useful and productive basis. The problems of technical education in Nigeria as enumerated by Guda (2008) are; shortage of qualified and competent personnel; inadequate training facilities among others. The persistent concerned among stakeholders in technical and vocational education about the significant increase in unemployment especially among graduates from Government Technical Colleges due to their lack of manipulative skills and inability to operate modern machine in the industry is yet to be addressed (Miller, 2008).

Okoro (1999) stated that Technical Colleges are regarded as the Principal vocational institutions in Nigeria which is designed to prepare the individual to acquire practical skills, knowledge and attitude required of craftsmen at sub professional level. He stated further that technical colleges give full craftsman training intended to prepare students for entry into various occupations. If graduates of technical colleges especially those of metal work trade in Niger State and Federal Capital Territory are to be self-reliant and be useful in the area of their discipline they must be trained for the jobs in the changing world of work owing to innovations and technological advancement in the metalwork industry. Meanwhile the training of the students can only be

effective and meet the demand of today's metalwork technology when the skills of technical teachers are improved.

In the recent time, the operation of metalwork has evolved from old mechanical technology to a high technology as technological advancement today shows that electronic components, computer software and complex computers have been integrated into every machine systems to run today's metalwork and improve performance and efficiency of the metal worker. The integration of new and emerging components instantly transformed the technology of metalwork, where most major components are being modernized in recent time through the use of sensors, actuators and central unit from a central processing unit (CPU) or on-board computers. Okoro however lamented that the products of technical institutions do not have the knowledge and skills that will enable them to take up the available jobs. The insufficient college training in terms of technical skills required of the various occupations in metalwork trade has deprived or constituted the aparent failure of the college products to secure paid employment.

The National Policy on Science and Technology (1986), stated while many countries are in second phase of industrial revolution in which computer, robots, micro electronics, biotechnology, nuclear technology, etc are common place, we are yet to grasp the fundamental of first phase of industrial revolution which began in Europe in the eighteen century. It is not an understatement to state that the global trend in teaching of technology in school in the world is wheeling round continuous improvement of teacher in technological skills through retraining which is often necessary for sustaining quality performance on the job.

According to Daniel (2005), metalwork technology is the totality of all the process involved in the production of metal articles. The various areas of specialization in metalwork technology are fitting and machining, fabrication, welding, foundry and forging etc. Metalwork trade is one of

the trades offered in most technical colleges in Niger State and Federal Capital Territory in Nigeria. Teaching metalwork trade in Nigeria technical college has been challenging. Technological advancement in the metalwork industry has brought new challenges to the teaching of the courses in recent times.

One popular maxim that has been dwelt on the National Policy on Education is that no education system may rise above the quality of its teachers. It is, however, pitiable or disheartening to imagine the present condition of technical teacher's skill in metalwork trade in technical colleges. Nation policy on Education (FRN, 2004) stated that from all indications, there is a lack of quality in technology teacher training, including metalwork trade teachers in technical colleges. On the need for retraining of technical teachers, Olaitan (1996) in his contribution to retraining to retraining of technical teachers who were trained with obsolete equipment reiterated that these crops of teachers could be retrained through Technical Teacher Training Programme (TTTP). According to him, TTTP was meant to train and retrain technical educators who were either trained on absolute equipment or have worked with such equipment for so long that their skills need to be updated. For technical teachers in technical colleges to perform creditably, they should possess the necessary relevant adequate skills that will enable them tech well. This implies that teachers in technical colleges in metalwork trade must possess relevant and current technical skills in their various specialized occupations. There is obvious need for retraining the long serving metalwork teachers to keep them abreast with the contemporary practices in their arrears of specialization.

The consequence of poorly taught subjects such as metal work trade in the technical colleges is that students are unable to acquire the necessary saleable skills (Doolittle and Camp, 2000). This also accounted for poor performance of vocational education students at public examinations

(Aina 2000) and at the work place when employed on graduation (NABTEB, 2002; Paris, 1998 and Shield, 1996). Since the teaching/learning strategies employed in the technical colleges are inadequate to prepare the students to face the challenges of the world of work, many of these students when they graduate, are found in the street without job because their training is inadequate for social needs (Olaitan, 1996).

Repp and Marcharty (1984), Ludung and McCarthy, (1982) stressed the need for metalwork teachers to have updated knowledge in machine shop practice which involve operational skills in lathe machine, drill press, milling, shaping, planning and grinding machine. The opinion of these experts above buttressed the need for technical teachers to get improvement in their skills and also keeps abreast of technological development in machine operation so as to impact same on their students before graduation. Upon this premise, this study has been designed to identify the challenges of teaching metalwork trade in technical colleges in Niger State and Federal Capital Territory and to further proffer solutions to them.

1.2 Statement of the Problem

Technical education in Nigeria has been recognized as an instrument for meeting the nation's manpower need in various sectors of economy and social life (Okorie, 2001). For this reason, Nigeria government has made some concerted effort towards improving the quality and quantity of manpower especially in technical areas. Part of these efforts is the increased funding and establishment of technical institutions since independence. Today, the number of technical institutions in this country has increased appreciably.

However, there have been numerous complaints about the competency and the qualities of graduates produced in technical colleges in Nigeria today. According to Tundunwada (1981),

most graduates are not properly prepared for work, especially for industries and commerce. Dikko (1998) also observed that there is growing concern among industrialist that graduates from technical institutions do not possess adequate work skill necessary for employment in industries. Presently, there is also a general concern over the apparent perceived falling standards of education and production of unskilled technical graduates who cannot cope with the world of work. The outcry of individuals and groups over the poor quality of technical college graduates being produced including those that studied metalwork trade suggest that there is a problem in the process of teaching the subject (Oloyede, 2010).

Technology in the world over is dynamic. With advancement in technology, many of the machines and equipment that are used in metalwork industries in Nigeria and world over are coming with new devices. For instance, the numerical control machine uses electronic system to control the machines in the form of numbers and letters. The process of controlling the operation of these machines has also been digitalized. Thus, technological development in the metalwork industries is in a constant state of change. The influence of these technological developments in metalwork industries has rendered training received by metalwork students in technical colleges inadequate for work in the industries due to various challenges faced by the students while creating the need for new and often sophisticated skills. Obviously, the metalwork industries need the service of craftsmen who can adapt to the changes in technology in the industries. Greater stress should therefore, be placed on equipping technical colleges with modern techniques and teaching strategies that will provide technical college graduates with broad learning and problem-solving skills in order to prepare them for a wide range of challenges posed by technological advancement (Szczurkwska, 1997).

Technological education is pivoted on the availability of qualified personnel, tools, equipment and machines which the students and staff will be using time to time. But the reverse is the case with technical education at technical college level today. In technical college today, the staffs are not enough, the machines and equipment are not available and where available, they are not adequate or obsolete. Students are expected to do a lot of workshop practice and laboratory experiments/practical. These practical can only take place in an environment where adequate and relevant tools and equipment are available. In a situation where consumable items are not provided, practical may not be effective even if machines and equipment are not in place. Unlike in the 1970s and early 1980 when consumable items were provided by the authorities, students are now expected to purchase these items and at times tools for their personal workshop practice. This is clearly not the best for teaching and learning as many of the students are not financially in a position to buy the items on their own. At the end of the day, no serious practical or workshop practice are done.

Some of the machines in the workshops and laboratories do not function because some part are not available to fix them up and so no practical can be done. It may sound funny that some students do not come in contact with simple machines throughout their stay in school only to be embarrassed when they get into industries. The industries are not willing to employ technical college graduate who are assumed to be "Practically deficient" only to start training them on the use of a lathe machine, for example. Such "skilled" technical college graduates are expected to start being productive the very first day they enter the factory (Szczurkwska, 1997).

In order to bridge the gap, it becomes imperative to identify those challenges in teaching metalwork trades and proffer solution to them. The study is therefore aimed at identifying those challenges in the teaching of metalwork trade in the technical colleges in Niger state and Federal

Capital Territory (FCT), Abuja. Hence, the problem of the study is: what are the challenges of teaching metalwork trade in technical colleges in Niger state and FCT, Abuja, Nigeria?

1.3 Purpose of the Study

The major purpose of this study was to identify those challenges against effective teaching of metalwork trade in technical colleges. Specifically, the study will

1. Identify the management challenges in the teaching of metalwork trade in technical colleges.
2. Identify the teacher related challenges in the teaching of metalwork trade in technical colleges.
3. Identify the facilities/infrastructural challenges in the teaching of metalwork trade in technical colleges.
4. Identify the instructional delivery challenges in the teaching of metalwork trade in technical colleges.
5. Identify ways of reducing these challenges in the teaching of metalwork trade in technical colleges.

1.4 Significance of the Study

The findings of the study will be of immense benefit to the Ministry of Education, curriculum planners, students, technical teachers, parents and society at large. The knowledge of those challenges that militate against effective teaching of metalwork in technical colleges will help the teacher to adequately prepare himself/herself. For the administrator, the result of the study will be of immense importance for organizing conferences, workshops and seminars on those

challenges that affect effective teaching of metalwork trade in technical colleges and try to proffer solution. Also from the benefits derived from the study, the administrator will be able to see the need for providing the necessary resources that will enhance effective teaching of the subject. It will also expose the administrators to the management challenges faced by technical college principals and device means of overcoming these challenges.

The students will be equipped with necessary competency required to face the challenges in metalwork industry. When the challenges are discovered and solutions provided the performance of the students will be enhanced. For textbook writers, the findings will furnish them with useful information for publishing better relevant metalwork materials for use in Nigeria colleges. Finally, the findings will provide empirical evidence on how to tackle the challenges facing the teaching of metalwork trade in technical colleges which could serve as a guide to professional technical teachers, administrators, curriculum planners in their effort to help improve academic achievement of students. The study will help curriculum planners to plan programmes that will encourage, develop and strengthen people's interest towards technical education.

1.5 Scope of the Study

The study was carried out in all the technical colleges that offered metalwork in Niger State and Federal Capital Territory, Abuja. The study was limited in content to such variables like management, human resources, infrastructural/facilities, instructional deliveries that are challenging the effective teaching of metalwork in technical colleges.

1.6 Research Questions

The following research questions guided the study:

1. What are the management challenges facing the teaching and learning of metalwork trade in technical colleges?
2. What are the teachers related challenges facing the teaching and learning of metalwork trade in technical colleges?
3. What are the facilities/infrastructural challenges facing the teaching and learning of metalwork trade in technical colleges?
4. What are the instructional deliveries challenges facing the teaching and learning of metalwork trade in technical colleges?
5. What are the ways of reducing the challenges facing the teaching and learning of metalwork trade in technical colleges?

1.7 Hypotheses

The following null hypotheses were tested at 0.05 level of significance using t-test statistical tool

H_{O1}. There is no significant difference between the mean responses of teachers and College administrators on the management challenges in the teaching of metalwork trade in technical colleges.

H_{O2}. There is no significant difference between the mean responses of teachers and College administrators on the teachers related challenges in the teaching of metalwork trade in technical colleges.`

H_{O3}. There is no significant difference between the mean responses of teachers and College administrators on the facilities/infrastructural challenges in the teaching of metalwork trade in technical colleges.

H_{O4}. There is no significant difference between the mean responses of teachers and College administrators on the instructional delivery challenges in the teaching of metalwork trade in technical colleges.

H_{O5}. There is no significant difference between the mean responses of teachers and College administrators on the ways of reducing challenges in the teaching of metalwork in technical colleges.

CHAPTER TWO

2.0 LITERATURE REVIEW

Literature related to this present study is reviewed under the following sub headings:

2.1 Theoretical Framework

2.2 Metalwork Trade in the Technical Colleges

2.3 Concept and Techniques of Teaching Metalwork in Technical Colleges

2.4 Methods of Teaching Metalwork Trade in Technical Colleges.

2.5 Challenges in Technical Colleges

- Management challenges
- Facilities/infrastructure challenges
- Instructional delivery challenges

2.6 Constraints to Effective Teaching of Metalwork Trade in Technical Colleges

2.7 Review of Related Empirical Studies

2.8 Summary of Review of Related Literature

2.1 Theoretical Framework

The earliest mental-discipline theories of teaching were based on a premise that the main justification for teaching anything is not for itself but for what it trains—intelligence, attitudes, and values. By choosing the right material and by emphasizing rote methods of learning, according to this theory, one disciplines the mind and produces a better intellect (Shirley, 2009).

Learning is a relatively permanent change in behaviour (or behavioural potential) due to experience (Abdullahi, 1982). Ngwoke (2004) supporting this view of learning pointed out that learning is a process which causes a change in behaviour of an individual. This change in

behaviour according to Ngwoke results from experience or interaction between the individual and his environment. He explained further that human learning is a process of adaptation which may lead, hopefully, to better adjustment to the demands of life. Learning is a continuous process which goes on throughout life. It may be observed in the form of development or change of attitude, interests, adjustments, skills, values, beliefs, cognitive structures, insights mannerism, and gesture. However, behavioural change due to maturation or temporary conditions of the organisms (for instance instinct, reflex action, and imprinting, fatigue, the influence of drugs, and so on) are not learning (Nwachukwu, 2001). Learning can be said to have taken place when individual can act or think differently or when he has acquired new knowledge or skills (Abdullahi, 1982). It is determined by events in the individual's living environment.

Learning/Teaching theories if well explained predict behaviour. According to Meril (1997), they open our eyes to other possibilities and ways of seeing the world. Most design decisions are certainly based on the knowledge of learning theories. Shwires (1997) pointed out that the function of instructional design is more of an application of theory rather than a theory itself. Based on this, Gagne's Problem Solving and need assessment theories are reviewed.

2.1.1 Gagne's Problem Solving Theory

Gagne's (1992) proposes the use of intellectual skills as the basic elements of learning. According to this theory which is cumulative in character, every intellectual skill or capacity is made up of sub-ordinate skills. Before a particular skill can be learned the prerequisite skills must be mastered. The knowledge of the subordinate skills is transferred to the super-ordinate skills. Gagne (1992) therefore, believed in vertical transfer of previous learned rules, which are combined with other subordinate rules to arrive at the solution to a problem which according to him is a higher order rule.

Problem solving becomes hierarchical in nature. Instruction in problem is done by analyzing a complex or ultimate capability to simpler skills. After carrying out such analysis the learner is able to see the intermediate and terminal (simpler) capabilities. He is able to see alternative viewpoint through multiple combination of the pre-requisite concepts. The learner is thus guided to discover relationship between what is already known and the new situations.

Gagne (1992) supported his hierarchical theory of learning by an information processing theory of learning. For Gagne, learning is a result of the internal and external conditions contingent on the learner because what the learner already known is used to attend to the unknown and environmental problems. The role of the teacher is to enhance a fruitful combination between the internal and external conditions by the stimulations of previously learned skills, presentation of verbal cues to and ordering and combination of component using a variety of context by posing novel problem.

These internal conditions are postulated to consist of definite places or events which function in line with the information processing model. Alongside the internal conditions are corresponding external conditions which facilitate optimal learning. Gagne (1992) has propounded nine instructional events, which form the external conditions for learning. Those relevant to this study are gaining and controlling attentions, stimulating recall of subordinate skills, informing learning of objectives or goals and using questions.

These are essentially, what PRAS model is designed to achieve. PRAPS models stimulate the exercise of the executive control which oversees the short term memory (STM) and the long term memory (LTM). The technique helps in channelization and transformation of Information input by enhancing and attending the critical features of the problems by encoding analyzing and decoding of the problem input, searching for stored intellectual skills relevant to the problem and

functioning as cues for the retrieval of information for response. Application of rules and conceptual analysis during problem solving, are internal events of the information processing model. They involve a sort of delay recall involving the reconstruction of events and interpretations. Previously stored information in the STM are retrieved into the LTM. This is followed by a transfer phase during which the retrieved information is generalized and applied to the new situation.

2.1.2 Need Assessment Theory

Some individual theories have made great impacts with their conceptual scheme of motivation which have implication for classroom teacher. Madsen (1961) noted that personal development can be described as a combination of a press plus a need, According to Madsen just about every theme in a individual's life is seen as a the existence of your need in relation to a particular press, a government – situation which has a potential have an effect on upon the life of your organism.

In his view, Madsen (1961) saw need gratification as the basis for most human behaviors He argued that needs are arranged in a hierarchy as shown in figure 1

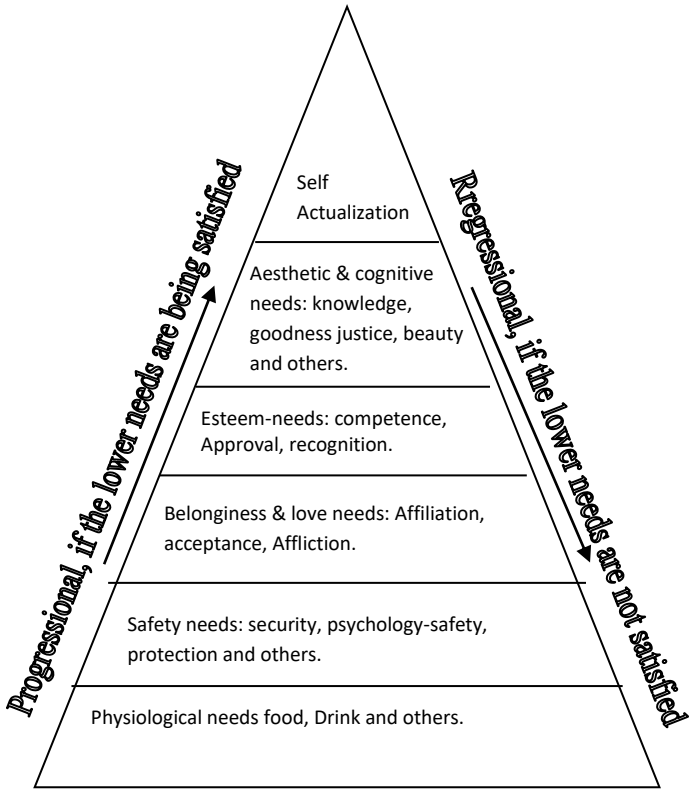

Fig. 1 Maslows Hierarchy of Needs.

Thus as general type of need is satisfied; another higher order of need will emerge and become operative in life. The particular deficiency needs could be satisfied solely by other folks. This implies that an individual can depend upon others seeing that need satisfaction. That connected with self – actualization, want to know or perhaps understand as well as aesthetics needs are classified as the Being requires a need, therefore, develops as well as motivate behavior as long as a person is required to a number of certain press (Mclnes, James & McNaught, (1995), Therefore the prefer to satisfy or maybe gratify these kinds of needs redirects or dictates human behavior.

The above concept of need, have implications, among other things for Automobile technology students in particular. The teacher teaching Automobile Technology should concern with efforts to find out how best to structure his instructional activities so that college student will be opportune and encourage to satisfy their individual needs in terms of given the students the needed entrepreneurial skills that will enable them to be self reliant . Thus the key concept to

bear in mind is the occasional and the need to look for the solution to challenges facing teaching of metalwork in technical colleges.

2.2 Metalwork Trade in the Technical Colleges

A metalwork trade is probably the Mechanical Engineering trades presented in technical colleges. The aim of metalwork trades in Nigeria technical colleges is to produce skilled craftsmen having sound theoretical understanding who must be able to operate equipment and perform other metalwork skills like welding, foundry, casting, metal forming and fabrication for production purposes in private practices or in the industries (NBTE, 2001). Therefore the training provided by the technical college for this trade is designed to produce competent maintenance craftsmen for the industry. According to NBTE (2001) these craftsmen may also wish to take the opportunity for further technical education. The programme as adopted by National Board for Technical Education (NBTE) are offered at two levels leading to the award of National Technical Certificate (NTC) for craftsmen and Advance National Technical Certificate (ANTC) for master craftsmen.

The trainee on completion as outlined by National policy on education (FRN 2004), would have three options.

1. Secure employment either at the end of the whole course or after completing one or more modules of employable skills
2. Set up their own business and become self-employed and be able to employ others.
3. Pursue further education in advance craft/technical institutions such as polytechnics or colleges of education (technical) and universities.

The FRN (2004) also pointed out that the main feature of the curriculum activities for technical colleges shall be structured in foundation and trade modules. The curriculum for each trade shall consist of five components.

i. general education
ii. theory and related courses
iii. workshop practice
iv. industrial training/production work
v. small business management and entrepreneurial training.

In line with this policy statement the revised National Technical Certificate (NTC) and revised Advanced National Technical Certificate (ANTC) programmes curriculum and course specifications were published in 2001 for metal Work trade and other vocational course in the technical colleges by National Board for Technical Education (NBTE). The trade theory and practice component for metalwork is made up of seven (7) modules of NTC level to be taught for a period of 1116 hours and two (2) modules at the ANTC level to be taught for a period of 588 hours.

2.3 Concept and Techniques of Teaching Metalwork in Technical Colleges

Traditionally, teaching is viewed as a process of making impression on passive learners, hammering in facts into the empty/blank heads, the impartation of knowledge, skills and values (Merril, 1997). Today, we frown at this view because it portrays teaching in the sense of ‘mug and jug theory’ which sees the teacher as the receptacle, a reservoir of knowledge, and the learner as devoid of knowledge, unless the knowledge comes from the teacher. Thus, the role of the teacher is to fill the empty heads with facts whether relevant or not, understood or not. He

delivers to students what is required and they have no reason to question but receive what is offered them. The idea here is: the teacher does and gives all to the student who only receives. In fact the teacher has the monopoly of knowledge required to be imparted.

In the modern sense of it, teaching is the attempt to help someone acquire a change of attitude, knowledge, idea, skill, or appreciation (Clark and Starr 1986). It is a process of helping someone to acquire the problem-solving skill and the ability to think for themselves. It is helping the individual learn how to learn, so that he not only knows how and where to obtain needed information, but to develop the habit of enquiry and be a life-long learner. In this way the individual is helped to acquire the ability to benefit from the numerous opportunities for self-improvement. Rogers (1983), sees teaching as permitting the students to feed his or her curiosity, arguing that "merely to absorb facts is of only slight value in the present, and usually of even less value in the future," concluding that "learning how to learn is the element that is always of value, now and in the future." This implies that the teacher is a catalyst who makes pupils desirous of learning. The teacher designs the appropriate learning environment in such a way that the pupils are restless until they have satisfied their curiosity by interacting with other components of the instructional system which includes the content, media, materials, teacher, among others.

Teaching can also be defined as a vehicle for education. Olatunji (1996) described it as a social function that aims at guiding necessary growth in others. Nwachi (1991) defined it as the imparting of knowledge from one person to another and the guiding of someone to behave in a particular manner. Frankena (1965) expressed that teaching cannot be done by just anybody because it involves (a) conscious and deliberate activities (b) less experienced or immature people to be taught and (c) a body of knowledge to be imparted. From the above characteristics,

it is clear that teaching is a unique exercise and it is an occupation that needs to be given attention.

2.3.1 The process of teaching: Teaching is a complex process of co-operation and inter-communication between the teacher and learner(s). It is not a one-way flow of information from teacher to learner. It is a two-way communication process. It consists of setting a stage for the interaction of the teacher and learner(s) so as to affect learning. The process is cyclic and continuous as is shown in figure 1 below.

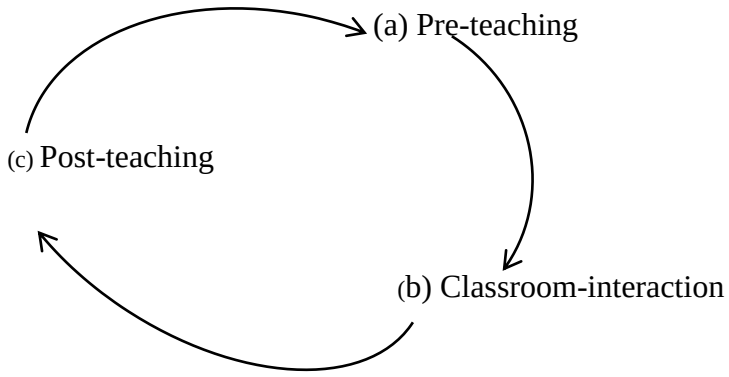

Figure 1: The Cyclic Nature of Teaching (Obanya,1982)

a. Pre-teaching is the period the teacher plans what to teach, prepares and collects the instructional materials to be used in teaching. The end product of this phase is the lesson note/plan and instructional materials for the lesson.

b. Classroom interaction is the actual teaching phase where the teacher goes into the classroom with the end products of pre-teaching. There is therefore a purposeful interaction between the materials, subject matter, the learner and the teacher.

c. Post-teaching involves testing, correcting and reflecting on the task just completed.

The feed-back is used in planning the next lesson. The process thus continues and afinitum.

The teacher sets the stage for learning and learner makes the appropriate responses. Teaching is the creating or providing of opportunities from which learners can gain such experiences that will enable them, acquire the knowledge, skill, attitude, and appreciation that will serve as tools in life. It is that conglomeration of complex but scientifically guided activities which aim at producing educated persons by cultivating their skills.

Teaching is a process of facilitating student learning through a proper management, by the teacher, of the interrelationships among the students' interests, the content for learning, and the methods and materials he or she intends to use in the teaching and learning of the content materials (Yoloye, 1999). It may involve giving instruction to somebody on knowledge, skills and attitudes with the intention that the person will be able to know the information or do something, or act a particular way that is compatible with the instruction. We know the person that gives the instruction as the instructor and the person receiving the instruction may be a learner, a pupil, a student or a trainee. The means employed by the teacher to pass information to the learner would determine ultimately, if he or she is teaching, instructing, training, indoctrinating, and so forth.

For the process of teaching to be successful, the following conditions must be favourable:

1. The teacher must know more than the pupils to establish a knowledge gradient that will make the flow of information to go from an area of high concentration of knowledge, to an area of low concentration of knowledge.
2. The learner does not need to be tabularizing in this case. The learner still has control over how he or she constructs his or her own knowledge.
3. The individual learner must exhibit a favourable disposition toward learning before learning can take place. If this is not, the teacher may be teaching in vain.
4. We must structure the body of knowledge meant for learning in a particular way that facilitate learning. It is better if we structure knowledge with due regard to the logical

structure of the discipline from simple to complex, concrete to abstract, and descriptive through comparative, to quantitative dimensions. We should make this structuring to coincide with the level of psychological development of the learner.

5. The presentation of the body of knowledge to the learner should follow both the logical order and the psychological order to achieve the most effective sequence.
6. An equitable application of a system of rewards and punishments must be part of the instruction to tally with the nature of human beings. We do not imply corporal punishment in this case because we never teach any student teacher how to administer corporal punishment to learners!

The teaching act involves three basic stages:

(a) The planning phase,

(b) The implementation phase, and

(c) The evaluation phase.

All good teachers are good planners. All teaching normally begins with some kind of planning, whether consciously or unconsciously. The first part of the planning stage is the setting of goals for the instruction. Next to this, is the selection of appropriate instructional strategies that match the goals, the content and the students involved? The second stage is the implementation of the instructional plan whereby the instructor and students engage in purposeful activities that we expect to result in learning. The third stage in the instructional process is evaluation. This is an important stage in which the instructor gathers information through tests, quizzes and student's participation in the lesson to find out if his or her instruction has been successful. We determine the success of the lesson by finding out if we achieve the goal of the instruction and if the strategies that we adopt are effective. If the instruction or part of it is not successful, this may

make the teacher to repeat the instruction, go on to new material, or establish new goals in future instructions. All these stages merge into one another imperceptibly with logical relationship, and the three influencing one another in many ways.

Based on Cuban (1984), one strategy for finding how teachers educated over time is to look at if instruction has been teacher centred as well as student structured or a combination of the two in several degrees. Based on him, a"teacher-centered education, means that a teacher controls what exactly is taught, while, and beneath what conditions within their own classroom". Likewise, a"student- structured instruction means that students exercise a substantial degree involving direction and responsibility for what exactly is taught, how it can be learned, and for just about any movement in the classroom". The next criteria based on Cuban (1994) determine the dominant forms of instruction inside a classroom that will enable us determine, on a continuum, if education is teacher-centered as well as student-centered or somewhere between the two:

1. Arrangement of classroom space.
2. Ratio of teacher to student talk
3. Whether most instruction occurs individually, in small groups, or with the entire class.
4. The presence of learning or interest centers that are used by students as part of the normal school day.
5. The degree of students' movement is permitted without asking the teacher.

The term education means teaching or may be training individual with all that is needed in almost any society. This training consists of knowledge, ability, attitudes in addition to values which can be needed of the learner to be able to withstand challenges in the environment. The entire nation's strong interest in technology today is because that technology is the bedrock of the nation. Unfortunately, the accomplishment of students in technological know-how education isn't encouraging. Therefore, for each of our nation to advance technologically there is certainly the call to improve the teaching/learning techniques and strategies in professional and specialized education. Achievement since defined simply by

Akale (1991) is how much knowledge, skills or maybe accomplishment in a area associated with endeavour like Metalwork. Even so, Harbor- Peters (2001), pointed away that students are able to achieve better should the required educational techniques in addition to materials usually are appropriately in addition to effectively employed.

A teaching technique is a channel associated with communication or maybe procedure implemented to convey knowledge, suggestions, skills in addition to values, considering the aims and ambitions of what will be taught. Harbor-Peters (2002) defined teaching method as a path to follow in communicating knowledge with the aim of getting the best result in an individual. Any approach or procedure which a teacher adopts to explain subject content to a learner is called teaching or instructional technique (Obodo, 1990). Some of these techniques according to Owodunni (2010) include reflective inquiry technique, constructivism technique, inductive inquiry technique, authentic learning situation technique.

One of the fundamental roles in the teacher according to Imogie (1998) should be to impact knowledge towards learner. More importantly, he observed that knowledge are not presented towards learner inside vacuum but via a channel. Imogie additionally stressed which the task of transmitting information in the teacher towards learner could best become explained in the context of Berlo's S-M- C-R facts model as follows:

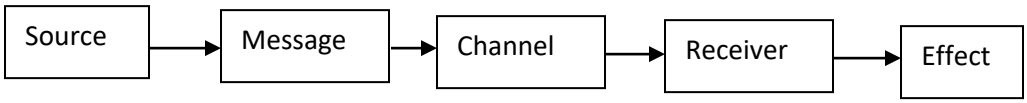

Figure 2. Berlo's communication model (Adapted from Imogie,1998)

S = Teachers as immediate sources of information

M = Contents or messages to be delivered or taught in an instructional setting

C = Channels or vehicles or media through which the contents or messages are transmitted

R = Receivers (learners or audience) of the contents or message from the teacher (source)

E = Effect (outcome)

The broad approach of the S-M-C-R Communication Model to teaching- learning process in this study is Reflective Inquiry Instructional technique. In the Reflective Inquiry Instructional Technique, the teacher assumes the role of a facilitator of the teaching-learning process. The teacher provides the necessary direction to enable the learners decode and or re-arrange the knowledge towards discovering or finding solutions to problems or the answers to questions (Imogie, 1998). The Reflective Inquiry Instructional Technique is is probable likely to deliver good success inside students educational good results. Throughout Reflective Inquiry, students are generally well guided to distinguish difficulties, believe significantly, think on previous understanding, and also acquire facts along with other evidences that can help them resolve the down sides, formulate hypotheses for that option with the difficulties, test the hypotheses and also use the perfect solution is. Onyekwere (2001) acquired expressed that the amount of being familiar with simply by students depends upon several bonding specifics. This individual noticed that will, the students' ability to find out while the trainer is usually training is usually excellent fluxed simply by some other specifics like lack of learning supplies, lack of awareness, college natural environment, training techniques along with other components. This individual consequently highlighted that will professors really should practice to take easy-guide techniques that will can handle lowering divergences on the part of students. One of these easy-guide techniques is usually Reflective Inquiry easy-guide process. Farrant (1976), affirmed that will thinking about training is usually extensively thought simply by individuals who think that understanding is usually pumped into a youngster similar to petroleum into a container understanding that once the youngster is usually total, a child is usually knowledgeable. The particular error with this based on Farrant (1976) is based on their premiss that will learning is often a passive process in which the trainer does the filling and the students are generally filled. This individual likened very good training to help growing plants in which the trainer is usually novel reader and the students are generally vegetation. In this example, the seed increased and also designed underneath the young care with the novel reader who

watered and also weeded, so that they might expand properly. Any time trainer manage the students simply by using very good easy-guide techniques, the educational good results with the students can increase substantially.

In support of the above, Grambs and also Carr (1979) noted the perfect trainer appreciates almost all our students, how they grow, the potential issues that surrounds them, their wants and also features since people at each and every level in their growth. She appreciates the goal of hard work and usually takes suitable gauge to see that her intent is usually satisfied. Their bond that process offers along with teaching is usually with modern techniques similar to Reflective Inquiry instructional endeavors to offer an educational environment; by using question and reflective actions, and also expose students to various written content areas of their learning activities.

2.4 Methods of Teaching Metalwork Trade in Technical Colleges

In vocational and technical education, teaching methods and techniques are aimed at developing in the learners the ability to acquire the knowledge and skills useful for work (Nwachukwu 2001). These methods and techniques can vary in depth and time depending on the level of students and the materials available for instruction.

Nwachukwu (2001) maintained that how to teach the selected element at the classroom level depends on the teacher. Teaching methods are used by all teachers to present skills knowledge and appreciations to the learners in the classroom and to engage learners in the tasks involved while teaching techniques are processes adopted by veteran teachers to inject variety in their teaching stimulate it and maintain the learners' interest in it (Ogwo 2004 Ukoha and Enegwu 1996). They maintained that instructional techniques are subsumed in teaching methods as ancillaries or adjuncts to ensure the effectiveness of the method. However, the common teaching methods used in vocational and technical education of which technical colleges is one includes

lecture methods, project methods (Oranu, 2003), demonstration methods, discussion methods, field trip methods and laboratory methods.

Lecture method is the commonest form of teaching used in most higher institutions. However, it is used badly and teaching is emphasized at the expense of learning (Grambs & Carr 1979). In most of school environments, learners are seen as a "tabular Racer" and all that they need is to listen for the teacher to give all that they require. Although, such methods are still being used in our present schools, but with modifications. Nwosu (1998) recommended the inclusion of reciprocity in lecture method. He supported the idea of teachers exposing the content of lessons to students in an orderly procedure, and allows students to reciprocate and it is only on that note that one can be certain that the teacher has successfully transferred knowledge. In support of Nwosu's (1998) view kayode (2001) emphasized the need for the teacher to adopt a technique that would explore the content of a subject in its entirety, thereby making learning a worthwhile process. Kayode (2001) reaffirmed that teachers have the potentials through training and experience to change the behaviour of a learner irrespective of the learner's characteristic disposition.

This method according to Offorma (1994) facilitates a more functional organization of knowledge. Thus, it promotes transfer of learning because the learner can draw experiences from wider subject areas to solves contemporary problem. Offorma (1994) also noted that this method permits a broader coverage and allows the elimination of excessive factual details which seem necessary when the unit of study is laid out in small segments. The comprehensive knowledge's it provides serves as a good entering behaviour for further studies in affected subject areas.

Lecture methods could be described as those that were once useful, but now when all can read and books are numerous, lectures are compulsory. For example in a situation when attention

fails, and a part of lecture is missing, it is lost there will be no going as it is being done upon a book. Surely this forms a limitation on the part of the instructional method. On economic ground, it can be used because the learner-teacher ratio can be extremely large. In relation to flexibility, the lecture method can be easily adapted to the audience subject matter available time and equipment. In addition to these are the questions and spontaneity and adaptability to teacher schedule, in that the teacher cannot always plan ahead sufficiently to have materials reproduced and sometimes sheer inefficiency (encyclopedia of educational research 4th ed). A good lecture method need to be well introduced, organized delivered in a clear and confident voice, varied in emphasis and intonation aptly illustrated with cogent example accompanied by abundant "eye contact" with the lesson appropriately summarized and so on.

Ukoha and Eneogwe (1996) noted that lecture method is a further extension of the traditional view point that the teacher is an embodiment of knowledge. It is thus, the responsibility of the teacher to dish out or disseminate the knowledge to the learners who are supposedly ignorant and blank. They maintained that expository methods is one-way communication affair which is autocratic and encourages students, passivity rote learning and is in appropriate for teaching and encouraging students to think of themselves. Nwachukwu (2001) opined that good teaching always provides for a two-way communication between the teacher and the students and of this reason other methods such as demonstration are more effective than the lecture method in many situations. However, Nwachukwu said that short talks and verbal explanations are common and necessary in all practical instruction. Okoro (1999) pointed out that lecture method has only limited use in vocational and technical education.

In addition to describing the lecture method as being traditionally employed in schools and colleges for verbal presentation of ideas, concepts generalization and facts, whose objective is to

stuff the students with information Abdullai (1982) said that the method can be used in conjunction with other instructional such as demonstration, discussion (discovery). He noted that among the shortcoming of this method to learning are its inability to promote meaningful learning, the inability to meet the different needs of pupils and the fact that it encourages rote learning and regurgitation of information without necessarily aiding understanding.

Discussion method involves a class in oral exchange of ideas facts and opinions about a topic of mutual concern and interest. The teacher draws upon the experience and knowledge of the group instead of leaving them to rely entirely upon his. He acts as a leader and directs or redirects ideas and information produced by them. Discussion method according to Olaitan and Agusiobo (1982) makes for active participation of students stimulates them to think individually and to learn to express themselves freely. The method helps the teacher to evaluate student's interest and learning encourages them to develop clear thinking self-assurance and sometimes leadership. It is valuable as a way of helping them to realize that many subjects must be taken into account. Farrant (1976) identifies discussion method as the keynotes of modern education but observed that there was very little of it for students. It was noted that, students have to sit up straight with arms folded for lesson after lesson while the teachers droned on teaching, perhaps teaching the food groups and basic nutrients. However all that have changed now and teachers make a note in their lesson notes of what students activities they propose to introduce into their lessons. Teachers use discussion method because they know that students learn best by doing and find interest and enjoyment in participation. Some teachers have too limited ideas of what discussion method is. They think of discussion method only as physical movement and are afraid to use it so as not to lose control of their class. Olaitan and Agusiobo (1982) pointed out discussion method is mainly suitable for older pupils in the secondary schools, who can think about complex

problems without relying too much on the teacher. It is therefore one of the suitable methods in the technical colleges.

The project method is also one of the methods which are predominantly used in teaching in the technical colleges. The project method at the same time is one of the standard teaching methods in vocational and technical education. It is a means by which students develop independence and responsibility, and practice social democratic modes of behaviour (Ericson, 1956). According to Okoro (1999), Ukoha and Eneowe, (1996) project method of teaching is suitable for large group, small group and individual instruction. Ukoha and Eneogwe, explained that the project method originated in the early twentieth century. This was greatly influenced by Dewey's problem method of teaching and it is an original work of W.H. kill Patrick who advocated purposeful activity, problem solving and the needs and interest of the individual child in action learning and conduct. The underlying principle of the method according to them is that learning takes place through direct contact with materials.

The project method of learning according to Olaitan and Agusiobo (1982) helps to stimulate and hold interest and to motivate the study of technical facts and related knowledge in all spheres of learning. It is most suitable for students who are not only inquisitive but also creative and interested in the immediate outcome of their activities though it can be used to stimulate these valuable learning qualities any others. It offers a normal organizing centre for new acquisition of knowledge and skills. It is highly useful in developing modes of thought and understanding of the procedures and characteristics of an occupation. It is very highly adaptable to the exculpations for which vocational and technical education trains the individual in skills of practical value especially those requiring personal initiative and creativity.

Project work can be undertaken separately by each member of a class, or by groups working in co-operation. In either case it should involve every student in active learning and in taking some responsibility for his own work. Group projects also afford opportunities for developing leadership and organizational competence in the teacher to be a success.

Demonstration method of teaching in which sight rather than hearing has been the major means of communication in vocational and technical education. It is effective because most people more easily remember what they see than what they only hear or read. At its simplest it may involve only showing an actual object, model, picture or diagram. Most verbal instruction especially to younger children ought to be accompanied by such use of visual aids. Demonstration, however, usually involves a process in which the learner has to follow a number of steps. It is realists and impressive and is a true learning experience where actual objects, good models or apparatus are used. However, it required skill, considerable time and usually some expense for effective organization. Its effectiveness is limited if insufficient objects are available, or if not all pupils can clearly see the demonstration.

Nwachukwu (2001) pointed out that demonstration method of instruction is one of the effective methods applied by the teachers in achieving objective learning in real life situation. Ericson (1956) also remarks that from the time vocational and technical courses were introduced into the school subject, the demonstration method has stood out as the most definite and valuable means for instruction. Demonstration usually involve a process in which the learner follows a manner of planned and organized steps. These steps help the method become a realistic and impressive one and also prove a true learning experience where actual object, good models or apparatus are used (Nwachukwu 2001).

The importance of demonstration method using the appropriate techniques according to Nwachukwu (2001) is as follows.

1. The demonstration method of instruction helps to enlist the various senses in human being. The senses include the sense of sight, the sense of hearing the sense of feeling and the sense of recall.
2. It helps to motivate student, especially when skilled teacher carry it out. The method helps students to develop interest and attention.
3. The participating nature of the demonstration method helps students for effective communication. No effective learning will take place unless there is a two-way traffic approach to his learning.
4. It saves time and energy especially for the teachers.
5. The method helps to enhance the prestige of the teacher as students get convinced of the teacher's command of the subject.
6. There is measure of positive reinforcement in which case students repeat what the teacher has demonstrated.
7. It gives a real-life situation of the course of study as students acquire skill in real-life situation using tools, materials in actual job situation.
8. it allows process and product evaluation

In the same vein Ericson (1956) explained that demonstration method as performed by the teacher unfailing in developing and maintaining interest among students for the following reasons.

1. There is an appeal to the sense of vision
2. Skillful performance in hand manipulation, always attract attentions.

3. Students see immediately, progress as a result of effort
4. A desire is around to emulate work of the teacher.

Okoro (1999) pointed out that for demonstration to be effective the teacher should.

1. Plan the demonstration
2. Prepare students for the demonstration
3. Carry out the demonstration process and re-state the important point connected with it.

Demonstration method is of three classes (a) class demonstration (b) group demonstration and (c) individual demonstration. According to Erison (1956) the following factors are important for a successful demonstration.

- The class should feel a need for the demonstration.
- Confine the demonstration to a single unit of work
- Make demonstration accessible to learners
- Use effective oral explanation and discussion
- Teacher should not demonstrate on students work.
- Do not quit too soon
- Use common tools
- Give example in accuracy
- Check the success of the demonstration
- The follow up is important

Field trip is another method used in vocational and technical education. Field trip offers students opportunity to study industrial process and relate what they learn in the school with what actually obtained in the world of work. Learning provided by field trip is concrete sensory and basic. This is because students are provided with opportunity to see and observe things, places, peoples and

processes in real life settings (Nwachukwu 2001). He explained that if it is not learning oriented it is not field trip. It is important to note that field trip should not be embarked upon unless there is a fully developed plan with a clear objective for the students. Furthermore, after the field trip teachers should request the students to submit report of what they have learnt and this should be discussed in class. This actively makes the field trip learning experiences rather than mere a site.

A laboratory method of teaching is an activity carried out by an individual or a group for the purpose of making personal observations of processes, products or events. Laboratory exercise has been used in teaching various subjects such as English language, French, History, Geography, Mathematics and the Sciences. For instance, Carroll (1963), in reviewing the research on language teaching, concluded that next to nothing was known concerning the relativeness of the procedures employed in language laboratories. These conclusions seem largely true today. Some valid comparisons have been carried out between conventional methods and language laboratory teaching, but no significant differences in achievement have been reported for either treatment. Student's attitudes, through, are always more favourable to the laboratory situation and teacher time saved, which does favour language laboratories. He found that high school students studying French were significantly superior in fluency and intonation to students who had not been taught in a laboratory. Similarly, after a review of studies carried out between 1912 and 1969, Ogunniyi (1975) came to the conclusion that neither the laboratory nor demonstration has been found to be superior in every case of fulfilling science education objectives. To a large extent, the availability of facilities, time, funds, ability level of teachers and students and other cultural and socio-economic variables will determine what technique or a combination of techniques should be used. Where cost per student is the major concern, should be used. Where cost per student is the major concern, demonstration appears to offer some

advantages over laboratory exercises. On the other hand, if the development of manipulative skills is the objective then individual laboratory exercises are preferable. These teaching methods should be regarded as complementary to each other.

Laboratory exercise which is an empirical work is far more important than lecture, discussion, questions and course content. Also the laboratory exercise includes outdoor activities viz: science clubs, science fairs, visit to places of interest and these can help students to develop interest in science.

Laboratory activity allows students to study their immediate flora and fauna which are more relevant to the students. Also, it tends to re-inforce what is learnt during the theory class and encourages among students a spirit of experimentation, keen observation and such personality qualities as self confidence, critical attitudes and above all perseverance. Furthermore, laboratory exercise tends to inspire students to pursue scientific studies and helps them to develop manipulative skills.

The general practice whereby science laws are taught without concrete props of practical experience is not acceptable. For example, a student is told that at constant pressure all gases obey the gas law-PV = RT. Ogunniyi (1986) citing Rail contends that it would be much better if the student comes to this conclusion through experimentation, e.g. by measuring the volume of a given mass of gas at constant pressure and the temperature of melting ice and boiling water, then plot a graph between volume and temperature. Ogunniyi (1986) defines laboratory exercise as instructional procedure in which cause and affect, nature or property of any object or phenomenon is determined by individual experience generally under controlled conditions. He identifies the function of laboratory exercise and as a means of securing information; determining cause affect relations; verifying certain factors or phenomena; applying what is

known; developing skills; providing drill; helping pupils learn to use scientific methods on solving problems; and carrying out individual investigations. Some of the advantages of laboratory activities include:

1. Stimulating interests in science because students are actively involved:
2. Helping students to develop scientific attitudes, especially in research;
3. Adding reality to textbook material;
4. Providing the right conditions for formulating and solving problems:
5. Helping to cater individual differences;
6. Aiding the development of visual, perceptual and manipulative skills.

In spite of its central role in science instruction, the laboratory method of teaching has some disadvantages. These include:

1. Lack of economy of time and material
2. Students cannot learn about everything through the laboratory exercise;
3. The prevalence of copying; duplicating of results by unserious students;
4. Practical works are difficult to organize;
5. Laboratory period is often misused when there is no proper organization.

2.4.1: Guidelines for Effective Use of Laboratory Work

The success of a laboratory work be it by an individual or a group depends upon good planning by the teacher concerned in terms of adequate preparation, supply and availability of equipment and learning materials. The students should be made aware of the purpose of the activity in question. Apparatus should be accessible to students. This is because the ease with which a laboratory exercise is carried out depends to a large extent upon the ease with which apparatus

and materials are made available to students. Laboratory apparatuses should be stored in places where they can easily be collected and returned after use.

A good practice is to keep apparatus in well labeled position in the laboratory. Students should be allowed to vary the way they keep record of experiments. Teachers should avoid stereotypes such as title, aim, materials, methods, results as if science is a straight-forward process. Teachers should encourage well captioned table and well labeled diagrams. All records should be dated; occasional display of professional journals could help acquaint students on how research studies are reported.

2.5 Challenges in Technical Colleges

A. School Management Challenges.

A School is a social organization. It has its specified objectives-the chief objective being to impart quality education of students. It has its own staff-the human resource; it has its resource-financial, material and physical. The principal or the Headmaster is the manager of the School. The manager has to see that the objectives of the school are achieved in the best and cheapest way. He needs to plan carefully, organize men and material, make best possible use of physical resources (the school building, classroom, etc); he needs to direct people, control and monitor the various activities of the school and take decisions; he needs to evaluate the progress and achievements; in short he needs to manage the human resources, material resources and financial resources to get the objectives achieved. School management is thus, an act of managing an administration of the school. In the words of Kurtz and Boone (1984), School management means the use of people and other resources to accomplish the objectives of the School.

Social Management has two aspects-interval management and external management. Internal management of the schools covers admission, management of library, laboratory, building and

other physical and material resources, financial resources, environmental and promotion, relations with colleagues and students, etc. external management covers relations with the community, department and other persons and agencies connected with the establishment and functioning of the school.

School management is a cooperative human endeavor. Although the head of the school is the manager of this human enterprise, yet the cooperation of teachers, parents, students and the community members is essential for effectively managing the school. Even if computers are now increasingly used in the management process, yet it the human element that lies behind all effective management. Management is the art of getting things done through people. In a broader sense, it is the process of planning, organising, leading and controlling the efforts of organisation members and of using all other organisational resources to achieve stated organisational goals. The definition of management can be broadly classified into four groups:

1. Process School: The process School defines management in terms of functions undertaken by the manager in an integrated way to achieve organisational purposes. According to Henri Foyol, to manage is to forecast and plan, to organise, to command, to cordinate and to control. All other definitions of management related to this school are either marginal additions, deletions, or elaborations of the functions listed out in the above definition.

2. Human Relations School: This school emphasises the human aspect of organisation and conceives it as a social system. It is a social system because managerial actions are principally concerned with relations between people. In fact, management is concerned with development of people and not the direction of things.

3. Decision School: The Decision School defines management as rule-making and rule-enforcing body. In fact the life of a manager is a perpetual choice making activity and whatever a manager

does, he does through his decisions. Moreover, decision making power provides a dynamic force for managers to transform the resource of business organisation into a productive and cooperative concern.

4. System and Contingency School: According to this school, organisations like any living organism must adapt themselves to their environments for survival and growth. Thus, management involves designing organisations adaptable to changing markets, technology and other critical environmental factors. The systems theory of organisations are organic and open systems consisting of interacting and interdependent parts and having a variety of goals. Managers are supposed to maintain balance among the conflicting objectives, goals and activities of members of the organisation. He must achieve results efficiently and effectively. According Contingency School there is no best way to design organisations and manage them. Managers should design organisations, define goals and formulate policies and strategies in accordance with the prevailing environmental conditions. According to Fretwell (2005), the following management challenges are being faced by principals and managers in schools and colleges'. Enrollment challenges b. Benchmarking challenges and c. performance challenges.

B. Facility/Infrastructure Challenges

An effective school facility is responsive to the changing programs of educational delivery, and at a minimum should provide a physical environment that is comfortable, safe, secure, accessible, well illuminated, well ventilated, and aesthetically pleasing. The school facility consists of not only the physical structure and the variety of building systems, such as mechanical, plumbing, electrical and power, telecommunications, security, and fire suppression systems.

The facility also includes furnishings, materials and supplies, equipment and information technology, as well as various aspects of the building grounds, namely, athletic fields, playgrounds, areas for outdoor learning, and vehicular access and parking. The school facility is much more than a passive container of the educational process: it is, rather, an integral component of the conditions of learning. The layout and design of a facility contributes to the place experience of students, educators, and community members. Depending on the quality of its design and management, the facility can contribute to a sense of ownership, safety and security, personalization and control, privacy as well as sociality, and spaciousness or crowdedness. Crowe (2000) agreed that many communities recognize that in addition to school facilities being cost effective, they should be more learner-centered, developmentally and age appropriate, safe, comfortable, accessible, flexible, diverse, and equitable. By location of new facilities in residential neighborhoods and partnering with other community-based organizations, schools are becoming true community centers. When planning, designing, or managing the school facility, Earthman (2000) suggested that these facets of place experience should, when possible, be taken into consideration.

I. Constructing New Facilities

During strategic long-range educational planning, unplanned facility space needs often emerge. The goal of educational planning is to develop, clarify, or review the educational mission, vision, philosophy, curriculum, and instructional delivery. Educational planning may involve a variety of school and community workshops and surveys to identify and clarify needs and sharpen the vision of the district. Long-range planning activities, such as demographic studies, financing options, site acquisitions, and community partnering opportunities are often initiated by the district administration as a response to the results of educational planning. An outcome of long-

range planning is the development of a comprehensive capital improvement program to address unmet facility needs (Lackney, 2000).

II. Facility Management

While the planning, design, and construction of the school facility may take two to three years, the management of it will last the entire life cycle of the facility.

III. Cost Considerations

The construction and operation of a school building according to Brubaker (1998) involves a substantial expenditure of public funds. The investment for construction, however, represents only a fraction of the cost of operating a school over the life of the building. When life-cycle costs of operating a school are considered (including staff salaries and overhead costs, in addition to maintenance and operation of the facility), the initial cost of the school facility may be less than 10 to 15 percent of the life-cycle costs over a thirty-year period. Properly designing and constructing school buildings for the realities of management can often provide cost savings over time that could in turn provide additional funds for education.

C. Instructional Delivery and Teachers Related Challenges.

There are many ways and approaches in which to present information to students. Every student has his or her own unique way of learning. It important for educators to recognize this and provide a wide spectrum of instructional delivery techniques to address the learning needs of their students. Some students learn by doing, some learn visually, some learn though hearing, others learn by kinesthetic means. Instruction is the means in which educators impart knowledge upon students. There are many approaches and aids to instruction. How one teaches depends on the subject at hand, the age of the students, and the nature of the lesson. Using a wide variety of

instruction methods and aids will enhance the classroom curriculum as well as help to aid the variety of learning styles in a classroom

In many schools and colleges, there are no qualifying teachers to deliver the instructions to the students. And in colleges where workshops attendants are needed to support the teachers in the lesson delivery, they are not available.

2.6 Constraints to Effective Teaching of Metalwork Trade in Technical Colleges.

Aduwa-Ogiegbaen (2006) stressed that, many people would agree that there is an observable fall in standard of education in Nigeria, nobody in his widest imagination would have believed that university education in Nigeria has fallen to an abysmally low level as a World Bank study came up with a report that university education in Nigeria has degenerated in the past 15 to 16 years. Graduate skills especially technical college graduates have steadily deteriorated over the past decade". According to the Aduwa-Ogiegbaen, the poor performance of Nigerian graduates is particularly evident in two areas; poor mastery of the English Language and lack of requisite technical skill. It was ascertained in the report that the deficiencies in both vital areas make Nigerian graduates of the past fifteen years unfit for the labour market, and sometimes the larger society. Shortcomings were particularly observed in oral and written communication, and applied technical skills.

Metalwork trade is a science that is greatly influenced by the environment and the society. Its curriculum therefore requires a regular review to meet up with the challenges of the changing times that characterized the turn of the 21st century. A lot has been done to keep the metalwork

trade curriculum at the technical college with the test of time but the teaching of the trade has been hindered with a lot of bottleneck. It is therefore, important to identify these constraints and make suggestions that will help in the effective teaching of the technical colleges' metalwork trade. The following constraints have been identified:

1. Attitude of teachers
2. Attitudes of parents
3. Attitude of school heads of the technical colleges
4. Attitudes of pupils
5. Gross mismanagement of Resources
6. Inadequate/ lack of facilities
7. Poor funding of the course

2.6.1: Teachers' Attitude: A good teacher needs to be patient, resourceful and painstaking in reading, understanding, interpreting and implementing curriculum. This becomes more necessary in a skill-oriented course like metalworks trade that requires observing and doing. If an metalworks trade teacher is ready to do good job, he/she should be ready to sacrifice time and energy to organize facts and materials for effective learning. It is often common to find some metalworks trade teachers skip or abandon topics in the syllabus that require practical and use of instructional materials.

It is true that most technical colleges do not have facilities to conduct practical but the few schools that provide such facilities still have other problems that hinder the implementation of metalworks trade curriculum. Many teachers are not ready to stress themselves to teach the students how to manipulate their fingers and acquire skills related to metalworks trade. Students in many instances are encouraged to buy readymade items and present to teachers for scores.

Some teachers even take a step further to sell these ready-made items to pupils at very exorbitant prices in order to make money. This is very disheartening. There is need for the ministry of education to organize refresher courses for teachers where ethics of education can be taught to all teachers including metal works trade teachers.

2.6.2: Attitudes of Parents: Many parents are very happy to buy ready-made items (instead of carrying out practical) for their wards for onward presentation to their teacher for scores without minding the repercussions. Many parents are too busy in the daytime –struggling for daily bread. The result is that such parents are very tired when they return home and can hardly attend to the educational needs children. Parents of low socio-economic status cannot afford to foot the bills for metal work practical, students from such parents hardly bring any material for practical.

2.6.3: Attitudes of School Heads: Many school heads read art inclined courses and may not know the importance of metalworks education. Little or no efforts are made by such heads to project metal education by sourcing for equipment and materials to enhance the course. Rather, if any metalworks teacher is available, he/she will be made to teach other subjects thereby further subduing the course. Also, some school heads are fond of diverting funds meant for metalworks trade unit for other uses. According to Molokwu (2001)" a common feature is to divert metalworks trade funds to other subjects and even deploy metalworks teachers to teach other courses" metalworks has been marginalized for many years. There is need to bring the course into the limelight. This can be achieved by organizing seminars/symposia for school heads and teachers- teaching them about vocationalism and the importance of metalworks trade as a vocational subject. It is important to stress here, the relevance of metalworks trade as a vocational subject. It is important to stress here, the relevance of metalworks to manpower development, producing craftsmen and advance craftsmen that are self-employed or gainfully

employed in the industries thereby helping to actualize the objective of the technical and vocational which is currently going on in this democratic dispensation.

2.6.4: Attitude of Pupils: Pupils' attitude towards certain areas of metalworks trade curriculum can lead to poor or no implementation of the school curriculum. An enthusiastic metalworks trade teacher at the technical college level may meet very impossible and passive students. The teacher could be full of enthusiasm to sacrifice and teach the pupils but they will simply not cooperate. Some are found backing the class and discussing while the teacher is teaching. Many students belief that metalworks trade is too stressful and may not put in their best. It is the duty of the teacher to draw the students to him/her and encourage them about the course. metalworks trade practical should be done in a relaxed way. The teacher should warm him/herself into the students, be painstaking, carry all the pupils along and accommodate even the course thereby developing interest in the course.

2.6.5: Gross Mismanagement of Resources: The country's educational planners are interested in projecting output target and priorities. The planning and implementation of any educational plan require human and financial resources. However, the scarce but available financial are usually mismanaged through fraudulent practices or through Government policies and the attitude of most Nigerian towards government services. The inadequacy of human resources is aggravated through government policies like quota system and many other dubious devices which are used to deny some Nigerians employment tend to place mediocre at the planning implementation position.

2.6.6: Inadequacy/ Lack of Facilities: One of the most glaring problems of Nigerian educational system, according to Bulama (2000) had been deplorable state of physical facilities in our colleges. According to him, reports about students having classes under trees and broken

down buildings or those who have on the floor for lack furniture and workshops are familiar. Bulama (2000) notes that problems that may arise as a result of poor quality or inadequacy of physical facilities are many and vary in their scope and effects on teaching and learning.

2.6.7: Poor Funding of the Course: Lack of adequate funding for the provision of necessary materials that will enhance teaching and learning has implementation of metalworks trade curriculum in technical colleges difficult. The funding that will lead to improved instructional materials, infrastructural facilities, teachers' salaries and provision students practical materials are not provided by the government.

2.7 Review of Related Empirical Studies

Conducting a research on challenges against successful implementation of Introductory Technology curriculum, Olaniyan and Ojo (2005) investigated the challenges against successful implementation of Introductory Technology curriculum at junior secondary in Zaria, Kaduna State. The population of the study was made up of 1525 Introductory Technology teachers and students and simple random sampling was used to select 125 students and teachers. Four research questions were used for the study. A structured questionnaire was the instrument used for data collection. The instrument was face validated. The instrument had reliability co-efficient of 0.88. The data was analyzed using arithmetic mean. The finding of the study revealed that non-availability of functional workshop had effect on the curriculum implementation. None of the school used for this study had a functional workshop. This was due to poor funding of technology education in Nigeria. Another finding also revealed that lack of instructional

materials, textbooks and training manuals were some of the challenges facing the successful implementation of Introductory Technology. Also lack of alternative textbooks on introductory technology made improvement on teaching and learning of the subject to be difficult. It was also revealed that introductory technology curriculum is not too expensive to implement if the Federal Government of Nigeria is serious about it.

Results of findings on the research study revealed some challenges inhibiting the successful implementation of Introductory Technology in Nigeria. Based on some of these findings, the following recommendations were made.

(1) The Federal Government should make it a point of duty to build workshops in all Secondary Schools across the nation with adequate provision of equipment, and tools. This will make teaching and learning of the subject to be meaningful, as the students will have the opportunity to be engaged in practical works, which is the major aspect of the curriculum.

(2) Instructional materials should be provided and their usage be made compulsory in schools. This will create interest in the students and make learning to be permanent.

(3) Technical Teacher's Training should be restructured in such a way that will make it professional. This will enhance teachers' competency in their teaching subject theoretically and practically and also give quality instruction to students. Government should also encourage experts in technical education to organize training program in form of workshops and seminars for teachers from time to time.

(4) Students should be encouraged to have interest in the subject by providing conducive learning environment.

(5) Proper evaluation of the programme should be done and feedback given to the appropriate authority to ascertain its effectiveness and success.

Conducting a study on the importance of instructional materials to the successful implementation of social studies curriculum at junior secondary school level, Enem (2005) examined the relevance of instructional materials to the successful implementation of social studies curriculum at the junior secondary level in Udi Education Zone of Enugu state. In an attempt to establish the importance of instructional materials to the teaching and learning of social studies, the researcher employed quasi-experimental research design. In the study, he made use of two junior secondary II (JSS II) classes from two co-educational secondary schools. The investigation indicated that students with instructional materials performed better in the post-test than their colleagues in the group without instructional materials. The paper also examined certain peculiar problems militating against the use of instructional materials in social studies. The study showed that for effective realization of benefits of instructional materials, teachers concerned should be given opportunity to attend seminars, workshops and conferences on improvisation techniques.

Okoro (2005) also carried out a research on the availability and utilization of instructional materials in the teaching and learning of accounting in the Department of Vocational Business Education, University of Nigeria, Nsukka. The population of the study was made up of 18 final year accounting students in 2003/2004 session. No sample

was drawn; two research questions and one null hypothesis tested at 0.05 level of significance were used for the study. A structured questionnaire was the instrument used for data collection. The instrument was face validated. The instrument had reliability co-efficient of 0.86. It was found that only few teachers made instructional and utilization in the teaching and learning of accounts in Department of Vocational Technical Education, University of Nigeria, Nsukka.

2.8 Summary of Review of Related Literature

In this chapter, effort has been made to review as much as possible literature related to this study. This was initiated by considering the conceptual and theoretical framework. Theories found to be most relevant were that of Bartlett's schema learning theory, problem and social learning theory and cognitive field and Gagne's and problem solving theory of learning which view learning as being modern character which involves such intellectual processes as thinking, understanding, decision making, language use and problem solving. Also discussed were the concepts that are relevant to the study, concepts such as metalwork trades in technical colleges, concept and techniques of teaching metalwork in technical colleges, methods of teaching metalwork trades in technical colleges. The review also covered the concept of curriculum, curriculum implementation, and teacher's role in curriculum implementation. Most of the studies reviewed were carried out in the area of curriculum implementation and factors militating against effective teaching of some engineering trades in technical education, but there was none on metalwork, thus, the study is geared toward filling this gap. Therefore, this study intends to investigate the challenges against effective teaching of metalwork trade in technical colleges Niger state and FCT, Abuja.

CHAPTER THREE

3.0 MATERIALS AND METHODS.

This chapter describes the methodology adopted in this study under the following sub-headings: Research Design, Area of the Study, Population, Instrument for Data Collection, Validation of the Instrument, Reliability of the Instrument, Administration of the Instrument, Method of Data Analysis, Decision Rule, Hypotheses Testing.

3.1 Research Design

The study adopted a descriptive survey design. Descriptive survey research according to Nworgu (2006) is a systematic means of data collection. It is aimed at collecting data and describing the characteristics, features of facts about a given population using questionnaire, interviews and observation as instrument for data collection. This descriptive survey research design is considered suitable, since this study will solicit for information from metal work teachers and administrators (Principals, Vice principals and Head of Department (HOD)) on the factors responsible for the poor teaching of metalwork trades in technical colleges using questionnaire.

3.2 Area of the Study.

The study was carried out in Niger State and Federal Capital Territory, Abuja, Nigeria. The technical colleges are : Government Science. Technical. College Garki, FCT, Federal Science Technical College, Orozo, FCT, Government Technical. College, Minna, Niger State, Federal Science. Technical. College, Shiroro, Niger State, Government Technical. College, Kotangora, Niger State, Suleiman Barau Technical. College, Suleja, Niger State, Government Technical. College, New-Bussa, Niger State, Government Technical College, Bida Niger State, Government Technical College, Pandogari Niger State..The states have also been experiencing low performance of students in both internal and external examination conducted by NABTEB especially in metalwork trade. Therefore, there is need to ascertain those factors responsible for this low performance.

3.3 Population

The population for this study comprised of 97 teachers and administrators (29 Principals and Vice Principals 9 HODs and 59 metalwork trade teachers) of the nine technical colleges that offer metalwork trade in Federal Capital Territory (FCT), Abuja and Niger state. (See Appendix

A for the distribution of subjects into various colleges). The entire population was used for the study therefore, no sampling was done.

3.4 Instrument for Data Collection.

A structured questionnaire titled "Questionnaire on Metalwork Teaching Challenges" (MTC) developed by the researcher was used in gathering data from technical teachers and administrators (principals/vice principals and heads of department) for the study. The instrument contains six sections. Section A was designed to obtain pertinent background and personal data of the respondents. Section B-E was designed to obtain information from the technical teachers and the college administrators on the challenges facing the teaching of metalwork trade in technical colleges. B was on management challenges, C is on teachers related challenges, D was on facilities/infrastructural challenges, E was on instructional delivery challenges, while section F was designed to obtain information from the college administrators and technical teachers on the ways of reducing challenges against the teaching of metalwork trade in technical colleges

The questionnaire items in section B to E were rated Very Serious Challenge (VSC), Serious Challenge (SC), Not Serious Challenge (NSC) and Not Very Serious Challenge (NVSC), while section F was rated Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD).

The numerical rating is as follows

Very Serious Challenge (VSC)/Strongly Agree (SA)	4 points
Serious Challenge (SC)/ Disagree (A)	3 points
Not Serious Challenge (NSC)/ Disagree (D)	2 points
Not Very Serious Challenge (NVSC)/ Strongly Disagree (SD)	1 point

3.5 Validation of the Instrument.

The instrument "Questionnaire on Metalwork Teaching Challenges" developed by the researcher for this study was subjected to face and content validation by three research experts from Department of Industrial and Technology Education, Federal University of Technology Minna, Niger State. The experts attest to the appropriateness of the instruments in measuring what it intended to measure.

3.6 Reliability of the Instrument

The trial test for determining the coefficient of reliability of the instrument was carried out using test re-test reliability technique. The instrument was administered on equivalent sample of Government Science and Technical College, Mopa, Kogi State. The instrument was scored and the scores obtained in the administration of the instrument were correlated. The reliability coefficient of the instrument was found to be 0.83 using Kuder Richardson K-R 21 formula. Cronbach Alpha was used to determine the internal consistency of the instrument following the same procedure. The internal consistency reliability of the instrument was also found to 0.78

3.7 Administration of the Instrument.

The researcher personally went to the colleges with the assistance of two Research Assistants to administer the instrument for the study. The researcher and the two research Assistants went back to collect the instrument from the respondents after two weeks. The respondents were asked to check (√) to indicate the degree to which they agreed or disagreed with the statements in the questionnaire. The researchers went back after two weeks to collect the questionnaire.

3.8 Method of Data Analysis

The Data collected for this study were analyzed as follows: mean and standard deviation was used to answer all the research questions, while the hypotheses formulated were tested using t-test at 0.05 level of significance. The numerical values of 4-1 were assigned on 4 point rating scale for this study. Thus, VSC=4, SC=3, NSC=2 and NVSC=1

3.9 Decision Rule

A mean of 2.5 and above was accepted as being agree while less than 2.5 was regarded as disagree. The formula for the Mean is

$$X = \frac{\sum x}{N} = \frac{4+3+2+1}{4} = 10/4 = 2.5$$

Where X = Mean

$\sum x$ =sum of scores

and N = total number of scores

For the Null hypotheses, when the t-calculated is greater than the critical table value, the null hypothesis will be rejected, but if otherwise, the null hypothesis will be accepted.

In determining the acceptance, the resulting mean scores was interpreted relatively to the number 1-4 as used on the rating scale adopted for the study. It means that items with mean value of 2.50 and above were considered as accepted while item with value of 2.49 and below were considered as rejected.

CHAPTER FOUR

RESULTS

4.0 Introduction

The chapter presents the result of data analysis for the study. The presentation is orgarnised according to the research questions and hypotheses formulated to guide study.

4.1 Research Questions

Research Question 1

What are the management challenges in the Teaching of metalwork trades in technical colleges?

Table 4.1*:* Mean ratings and Standard deviation of Respondents (College Administrators and Technical Teachers) on the management challenges in the teaching of metalwork in Technical Colleges.

$N_1 = 38$ $N_2 = 59$

N/S	Item statement	Administrators		Teachers		Average Mean	Decision
		$\overline{X}_1$	SD_1	$\overline{X}_2$	SD_2	$\overline{X}_{t\,2}$	
1	Monitoring of teachings	2.22	0.75	2.12	0.67	2.17	NSC
2	Controlling of teachers	2.40	0.66	2.21	0.84	2.30	NSC
3	Insufficient fund for the running of metalwork	2.84	0.79	3.24	0.81	3.04	SC
4	Complex nature of metalwork curriculum	2.41	0.81	2.43	0.82	2.42	NSC
5	Expensive nature of metalwork curriculum	2.52	0.88	2.58	0.66	2.55	SC
6	Attitude of students towards metalwork	2.73	0.71	2.79	0.74	2.76	SC
7	Motivating of teachers	2.37	0.67	2.23	0.89	2.30	NSC
8	Good relationship between the college and						

	industries	2.85	0.72	2.82	0.78	2.84	SC
9	Improper planning by school administrator	2.87	0.71	2.92	0.68	2.90	SC
10	Inadequate utilization of resources	2.78	0.69	2.81	0.68	2.80	SC
11	Managing of human resources	2.58	0.78	2.54	0.83	2.56	SC
12	Inability of the college principals to direct staff on various activities in the school	3.11	0.81	3.18	0.79	3.15	SC
13	Inability of the principals to take valid decisions that will improve the teaching of metalwork	2.75	0.69	2.56	0.78	2.66	SC
14	Managing of financial resources	2.57	0.77	2.53	0.72	2.55	SC
15	Admission of academically poor students into the programme	2.96	0.68	2.78	0.66	2.87	SC
16	Poor attitude of management team towards maintenance of facilities	2.88	0.78	3.21	0.91	3.05	SC
17	There is cordial relationship between management team and teachers	2.14	0.89	2.28	0.81	2.21	NSC
18	Identified problems and promptly attended to.	2.41	0.71	2.39	0.72	2.40	NSC
19	Management involves teachers in purchasing of equipment	2.13	0.87	2.35	0.64	2.23	NSC
20	Management encourages staff development	2.03	0.76	2.23	0.79	2.13	NSC
21	There is effective communication to staff	2.34	0.71	2.23	0,70	2.28	NSC
22	The management team are democratic	2.44	0.87	2.43	0.79	2.44	NSC
	Average Mean and Standard Deviation	**2.51**	**0.75**	**2.56**	**0.76**		

Key
NSC =Not Serious Challenge
SC = Serious Challenge

The data presented in Table 4.1 revealed that 12 of 22 items had their mean values for both college administrators and technical teachers ranged from 2.53 to 3.24. This showed that the mean value of each of the items was above the cut-off point of 2.50, indicating that all those items are the management challenges in the Teaching of metalwork trades in technical colleges. The remaining 10 items has their mean value below the cut-off point of 2.50, indicating that both college administrators and technical teachers disagreed with items as being the management challenges against the Teaching of metalwork trades in technical colleges. The table also showed that the standard deviation (SD) of the items ranged from 0.64 to 0.89. This indicated that the mean response of teachers and administrators were not very far from the mean and from one another.

4.2 Research Question 2

What are the teachers related challenges in the Teaching of metalwork trades in technical colleges?

Table 4.2: Mean ratings and Standard deviation of the respondents on the teachers related challenges in the Teaching of metalwork trades in technical colleges.

$N_1 = 38$ $N_2 = 59$

N/S	Item statement	Administrators	Teachers	Average Mean	Decision

		$\overline{X}_1$	SD_1	$\overline{X}_2$	SD_2	$\overline{X}_{t\,2}$	
1	Inadequacy of qualified teachers	2.87	0.91	3.04	0.93	2.90	SC
2	Provision of in-service training opportunities for teachers	2.74	0.75	2.72	0.67	2.73	SC
3	Teachers are allows to go for short courses like workshops or seminars	2.89	0.88	2.84	0.67	2.87	SC
4	Inability of the teachers to access internet facilities	2.85	0.67	2.87	0.70	2.86	SC
5	Inappropriate use of machine and equipments by the teachers	2.46	0.90	2.30	0.85	2.38	NSC
6	Inadequate plan for retaining qualified teachers	3.13	0.63	2.96	0.71	3.05	SC
7	Too much work load on teachers	2.09	0.73	2.36	0.69	2,25	NSC
8	Teachers are not promoted as at when due	2.96	0.82	3.12	0.75	3.04	SC
9	Appropriate use of teaching method by teachers	2.19	0.77	2.03	0.74	2.11	NSC
	Average Mean and Standard Deviation	**2.69**	**0.78**	**2.52**	**0.72**		

Key
NSC =Not Serious Challenge
SC = Serious Challenge

Table 4.2 above shows that 6 out of 9 items had their mean values for both college administrators and technical teachers ranged from 2.72 to 3.13. This revealed that the mean value of each of the items was above the cut-off point of 2.50, indicating that all those items are the human resources challenges against the Teaching of metalwork in technical colleges. The remaining 3 items has their mean value below the cut-off point of 2.50, indicating that both college administrators and technical teachers disagreed with items as being the human resources challenges against the Teaching of metalwork in technical colleges. The table also showed that the standard deviation (SD) of the items ranged from 0.63 to 0.88. This indicated that the mean response of teachers and administrators were not very far from the mean and from one another.

4.3 Research Question 3

What are the Facilities/Infrastructural challenges in the Teaching of metalwork trades in technical colleges?

Table 4.3: Mean ratings and Standard deviation of the respondents (College Administrators and Technical Teachers) on the facilities/Infrastructural challenges in the Teaching of metalwork in technical colleges.

$N_1 = 38$ $N_2 = 59$

N/S	Item statement	Administrators		Teacher		Average Mean	Decision
		$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}t_2$	
1	In-availability of functional workshops	2.77	0.76	2.89	0.66	2.83	SC
2	Insufficient of basic hand tools	3.23	0.69	3.13	0.75	3.18	SC
3	In availability of machines and equipment	3.23	0.67	3.00	0.68	3.12	SC
4	Epileptic power supply to operate machines	3.12	0.87	3.25	0.85	3.18	SC
5	Inappropriate storage facilities	2.83	0.83	2.89	0.81	2.86	SC
6	Inappropriate safety equipments and devices	2.85	0.62	2.90	0.72	2.88	SC
7	Inadequate consumable materials	3.23	0.73	2.99	0.92	3.11	SC
8	In conducive teaching environment	2.83	0.68	2.81	0.69	2.82	SC
9	Metal workshops are not properly equipped with necessary technology that will aid the use of ICT	3.11	0.88	2.96	0.85	3.04	SC
10	Improper illumination of metal workshop	2.69	0.77	2.81	0.84	2.75	SC
11	Improper accessibility of metal workshops	2.98	0.69	2.88	0.73	2.93	SC
12	Provision of refuse disposal	2.67	0.78	2.70	0.68	2.69	SC
13	Inadequate of security units and devices	2.66	0.75	2.79	0.92	2.72	SC
14	Inadequate ventilation in the workshop	2.78	0.70	2.80	0.80	2.79	SC
15	Provision of proper electrical system	2.88	0.65	2.75	0.82	2.82	SC
	Average Mean and Standard Deviation	**2.90**	**0.74**	**2.92**	**0.78**		

Key
NSC =Not Serious Challenge
SC = Serious Challenge

The data presented in Table 4.3 revealed that all the 15 items had their mean values ranged from 2.66 to 3.25. This showed that the mean value of each of the items was above the cut-off point of 2.50, indicating that Facilities/Infrastructural challenges is one the challenges against the Teaching of metalwork in Nigerian technical colleges. The table also showed that the standard deviation (SD) of the items ranged from 0.62 to 0.92. This indicated that the mean response of teachers and administrators were not very far from the mean and from one another.

4.4 Research Question 4

What are the Instructional delivery challenges in the Teaching of metalwork trades in technical colleges?

Table 4.4: Mean ratings and Standard deviation of the respondents (College Administrators and Technical Teachers) on the Instructional delivery challenges in the Teaching of metalwork Trades in colleges.

$N_1 = 38$ $N_2 = 59$

N/S	Item statement	Administrators		Teacher		Average Mean	Decision
		$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}t_2$	
1	Obsolete equipment	3.41	0.82	3.33	0.81	3.37	SC
2	Insufficient of textual materials	3.21	0.69	3.27	0.68	3.24	SC
3	Non provision of teaching aids	3.33	0.81	3.00	0.89	3.17	SC
4	Inappropriate use of teaching methods	3.18	0.62	3.08	0.66	3.13	SC
5	Insufficient periods on the college time-table	2.52	0.67	2.52	0.75	2.52	SC
6	Excursion and visitations to industries	2.55	0.85	3.23	0.74	2.89	SC
7	Improper pedagogy on the parts of the teachers	2.96	0.67	2.99	0.78	2.98	SC
8	Provision of workable practical activities	2.24	0.87	2.22	0.82	2.23	NSC
9	Students are encouraged for personal initiative	2.47	0.69	2.43	0.71	2.45	NSC
10	Students are encouraged to do a team work	2.37	0.76	2.23	0.72	2.23	NSC
11	Good relationships between teachers and students	2.34	0.73	2.28	0.71	2.31	NSC
12	Students are motivated during instruction	2.38	0.69	2.29	0.75	2.34	NSC
	Average Mean and Standard Deviation	**2.71**	**0.74**	**2.73**	**0.75**		

Key
NSC =Not Serious Challenge
SC = Serious Challenge

Table 4.4 revealed that 7 out of 12 items had their mean values for both college administrators and technical teachers ranged from 2.52 to 3.41. This revealed that the mean value of each of the items was above the cut-off point of 2.50, indicating that all those items are some of the instructional delivery challenges in the Teaching of metalwork trades in technical colleges. The

remaining 5 items has their mean value below the cut-off point of 2.50, indicating that both college administrators and technical teachers disagreed with items as being the instructional delivery challenges against the Teaching of metalwork in technical colleges. The table also showed that the standard deviation (SD) of the items ranged from 0.62 to 0.85. This indicated that the mean response of teachers and administrators were not very far from the mean and from one another..

4.5 Research Question 5

What are the ways of reducing challenges in the Teaching of metalwork in technical colleges?

Table 4.5: Mean ratings and Standard deviation of the respondents (College Administrators and Technical Teachers) on the ways of reducing challenges in the Teaching of metalwork Trades in technical colleges.

$N_1 = 38$ $N_2 = 59$

N/S	Item statement	Administrators		Teachers		Average Mean	Decision
		$\overline{X}_1$	SD_1	$\overline{X}_2$	SD_2	$\overline{X}_{t\,2}$	
1	Provision of qualified teachers	3.37	0.67	3.12	0.70	3.20	Agreed
2	Provision of qualified support staff	3.05	0.76	2.96	0.78	3.00	Agreed
3	Motivation of teachers by the government	3.33	0.80	2.97	0.83	3.15	Agreed
4	Government should employ more guidance and counselors in the college	2.74	0.72	2.81	0.69	2.76	Agreed
5	Allocation of sufficient periods to cater for both practical and theoretical aspect of the subject	3.44	0.88	3.07	0.83	3.25	Agreed
6	Teachers should be encouraged to attend workshops and seminars	2.93	0.92	2.89	0.90	2.90	Agreed
7	In-service training programme should be provided for the teacher	3.04	0.68	2.94	0.78	3.00	Agreed
8	Storage facilities should be provided in all metal workshops	2.85	0.77	2.79	0.92	2.82	Agreed
9	Government should make available sufficient fund for the running of the subject	2.94	0.68	2.89	0.75	2.92	Agreed
10	Textual materials should be provided by government and well-meaning Nigerians	3.23	0.69	3.15	0.73	3.18	Agreed
11	Provision of basic tools, equipment and machines	3.12	0.69	3.05	0.62	3.08	Agreed
12	Motivation of teachers by the school administrators	2.90	0.87	3.07	0.78	2.98	Agreed
13	There should be consistency in government policies no matter the government in power	2.90	0.88	3.17	0.86	3.04	Agreed
14	Priority should be given to professionalism and technical competence when recruiting academic and support staff	3.01	0.78	3.04	0.78	3.03	Agreed
15	Promotion opportunities for academic and support staff should be enhanced	2.83	0.75	2.98	0.67	2.91	Agreed
16	Scholarship should be readily available for metalwork teachers with bounding conditionality.	2.57	0.63	2.60	0.68	2.58	Agreed
17	Scholarship should be readily available for metalwork teachers with bounding conditionality.	2.57	0.63	2.60	0.68	2.58	Agreed
18	Scholarship should be readily available for metalwork teachers with bounding conditionality.	2.57	0.63	2.60	0.68	2.58	Agreed
	Average Mean and Standard Deviation	**2.80**	**0.75**	**2.72**	**0.72**		Agreed

Key

NSC =Not Serious Challenge

SC = Serious Challenge

The data presented in table 4.5 showed that all the 18 items had their mean values above cut-off point of 2.50, indicating that the respondents agreed with the items as ways of reducing

challenges against the Teaching of metalwork in technical colleges. The table also showed that the standard deviation (SD) of the items ranged from 0.58 to 0.92. This indicated that the mean response of teachers and administrators were not very far from the mean and from one another.

4.6 Hypothesis 1

~~HO~~$_1$. There is no significant difference between the mean responses of technical teachers and College administrators on the management challenges in the teaching of metalwork trades in technical colleges.

Table 4.6 t-test Analysis of the mean responses of College Administrators and Technical Teachers on the Management challenges in the teaching of Metalwork Trades in Technical Colleges

Group	N	$\overline{X}$	SD	df	t-cal	t-crit	P < 0.05
College Administrators	38	2.51	0.75	95	0.276	2.00	Not significant
Technical Teachers	59	2.56	0.76				

Key
N = number of respondents
$\overline{X}$ = Mean
SD = Standard Deviation
df = Degree of Freedom

The t-test analysis in table 4.6 above shows that the overall calculated t-value of 0.276 for the items that was lower than the table t-critical of 2.00 at 0.05 level of significance and 95 degree of freedom. Therefore, there is no significant difference in the mean rating of the technical teachers and College administrators on the management challenges in the teaching of metalwork trades in technical colleges.

4.7 Hypothesis 2

HO_2. There is no significant difference between the mean responses of teachers and College administrators on the teachers related challenges in the teaching of metalwork trades in technical colleges.

Table 4.7: t-test Analysis of the mean responses of College Administrators and Technical Teachers on the Teachers Related challenges in the teaching of Metalwork in Technical Colleges

Group	**N**	$\overline{X}$	**SD**	**Df**	**t-cal**	**t-crit**	**P < 0.05**
College Administrators	38	2.69	0.78	95	0.940	2.00	Not significant
Technical Teachers	59	2.52	0.72				

Key
N = number of respondents
$\overline{X}$ **= Mean**
SD = Standard Deviation
df = Degree of Freedom

The t-test analysis in table 4.7 above shows that the overall calculated t-value of 0.940 for the items that was lower than the table t-critical of 2.00 at 0.05 level of significance and 95 degree of freedom. Therefore, there is no significant difference in the mean rating of the technical teachers and College administrators on the teachers related challenges in the teaching of metalwork trades in technical colleges.

4.8 Hypothesis 3

HO_3. There is no significant difference between the mean responses of teachers and College administrators on the facilities/infrastructural challenges in the teaching of metalwork trade in technical colleges

Table 4.8: t-test Analysis of the mean responses of College Administrators and Technical Teachers on the Facilities/Infrastructural challenges in the teaching of Metalwork Trades in Technical Colleges

Group	N	$\overline{X}$	SD	df	t-cal	t-crit	P < 0.05
College Administrators	38	2.90	0.74	95	0.110	2.00	Not significant
Technical Teachers	59	2.92	0.78				

Key
N = number of respondents
$\overline{X}$ = Mean
SD = Standard Deviation
df = Degree of Freedom

The t-test analysis in table 4.8 above shows that the overall calculated t-value of 0.110 for the items that was lower than the table t-critical of 2.00 at 0.05 levels of significance and 95 degree of freedom. Therefore, there is no significant difference in the mean rating of the technical teachers and College administrators on the facilities/infrastructural challenges in the teaching of metalwork trades in technical colleges.

4.9 Hypothesis 4

HO_4. There is no significant difference between the mean responses of teachers and College administrators on the instruction delivery challenges in the teaching of metalwork trades in technical colleges.

Table 4.9: t-test Analysis of the mean responses of College Administrators and Technical Teachers on the Instructional delivery challenges in the teaching of Metalwork Trades in Technical Colleges

Group	N	$\overline{X}$	SD	df	t-cal	t-crit	P < 0.05
College Administrators	38	2.71	0.74	95	0.111	2.00	Not significant
Technical Teachers	59	2.73	0.75				

Key
N = number of respondents
$\overline{X}$ = Mean
SD = Standard Deviation
df = Degree of Freedom

The t-test analysis in table 4.9 above shows that the overall calculated t-value of 0.276 for the items that was lower than the table t-critical of 2.00 at 0.05 levels of significance and 95 degree of freedom. Therefore, there is no significant difference in the mean rating of the technical teachers and College administrators on the management challenges in the teaching of metalwork trades in technical colleges.

4.10 Hypothesis 5

HO_5. There is no significant difference between the mean responses of teachers and College administrators on the ways of reducing challenges in the teaching of metalwork in technical colleges.

Table 4.10: t-test Analysis of the mean responses of College Administrators and Technical Teachers on the ways of reducing challenges in the teaching of Metalwork Trades in Technical Colleges

Group	N	$\bar{X}$	SD	df	t-cal	t-crit	P < 0.05
College Administrators	38	2.80	0.75	95	0.895	2.00	Not significant
Technical Teachers	59	2.72	0.72				

Key
N = number of respondents
$\bar{X}$ = Mean
SD = Standard Deviation
df = Degree of Freedom

The t-test analysis in table 4.10 shows that the overall calculated t-value of 0.895 for the items that was lower than the table t-critical of 2.00 at 0.05 level of significance and 95 degree of freedom. Therefore, there is no significant difference in the mean rating of the technical teachers and College administrators on the ways of reducing challenges in the teaching of metalwork trades in technical colleges.

4.11 Findings of the Study

The following findings emerged from the study based on the data collected and analyzed

The respondents agreed that:

The following challenges are against the teaching of metalwork in technical colleges

(A) Management Challenges against the teaching of metalwork trade in technical colleges include insufficient fund, expensive curriculum, poor attitude of students, poor relationship between college and industries, improper planning.

(B) Teachers Related Challenges such as Inadequacy of qualified teachers, non-provision of in-service training opportunities for teachers, insufficient quality assurances personnel to monitor and inspect the subject, too much work load on staff, staff are not promoted as at when due are challenges against the teaching of metalwork

(C) Infrastructure/Facilities Challenges such as in-availability of functional workshops, insufficient of basic hand tools, in availability of machines and equipment, epileptic power supply to operate machines, inappropriate storage facilities, inappropriate safety equipments and devices, inadequate consumable materials, in conducive teaching environment, improper illumination of metal workshop, improper accessibility of metal workshops, provision of refuse disposal, inadequate of security units and devices, inadequate ventilation in the workshop,

provision of proper electrical system are challenges against the teaching of metalwork in technical colleges.

(D) Instructional Delivery Challenges which include, obsolete equipment, insufficient of textual materials, non provision of teaching aids, inappropriate use of teaching methods, insufficient periods on the college time-table, lack of Excursion and visitations to industries and improper pedagogy on the parts of the teachers are against the teaching of metalwork in technical colleges.

The findings on the hypotheses tested revealed that:

(1)There was no significant difference between the Mean responses of teachers and College administrators on the management challenges against the teaching of metalwork trade in technical colleges

(2)There was no significant difference between the Mean responses of teachers and College administrators on the teachers related challenges in the teaching of metalwork trade in technical colleges

(3)There was no significant difference between the Mean responses of teachers and College administrators on the infrastructural/facilities and challenges against the teaching of metalwork trade in technical colleges

(4)There was no significant difference between the Mean responses of teachers and College administrators on the instructional delivery challenges against the teaching of metalwork trade in technical colleges

(5)There was no significant difference between the Mean responses of teachers and College administrators on the ways of reducing challenges against the teaching of metalwork trade in technical colleges

4.12 Discussion of Findings

The finding of this study revealed that management challenges such as how to monitor and control teachers, insufficient fund for the running of metalwork trade and complex nature of metalwork curriculum are one of the challenges in the teaching of metalwork in technical colleges. This is in line with findings Rychen & Salgonik (2003) who carried out a study on constraints to effective management of technical colleges in India, and discovered that, Insufficient fund for the running of metalwork, expensive nature of metalwork curriculum, attitude of students towards metalwork, poor relationship between the college and industries, improper planning by school administrator and many others factors are constraints to effective management of technical colleges. The findings revealed that monitoring of teachings, controlling of teachers, complex nature of metalwork curriculum, motivating of teachers, cordial relationship between management team and teachers, identified problems and promptly attended to, management involves teachers in purchasing of equipment, encouragement of staff development, effective communication to staff and democratic management team are not management challenges in teaching of metalwork trades in technical colleges

Teachers Related challenges are some of the challenges in the teaching of metalwork trades in technical colleges as revealed by the findings of the study. this is not in consonant with Szczurkwska, (1997) that stated that greater stress should be placed on equipping technical colleges with modern techniques and teaching strategies that will provide technical college graduates with broad learning and problem-solving skills in order to prepare them for a wide range of challenges posed by technological advancement (Szczurkwska, 1997). This is also not in agreement with Harbor- Peters (2002) that pointed out that students will be able to achieve better if the required instructional techniques and materials are appropriately and effectively

used. The findings of the study further revealed that sufficient number of guidance and counselors to guide the students, staff work load and appropriate use of teaching method by teachers are not human resources challenges against the teaching of metal work in technical colleges.

The study also revealed that infrastructure/facilities challenges are one of the challenges in the teaching of metalwork in technical colleges. This finding in agreement with the finding of Essien (1996) who found out that most of the technical graduates are deficient in using tools and equipment related to their areas of specialization. The author also found out that most schools who train these graduates did not have the necessary equipment, tools and materials for students during practical work. He added that the ones available in few schools were not true replica of those found in the world of work. This finding is also in agreement with the submission of Sarkin (1994) where they stated that facilities are not in schools and colleges for teaching the students. The author further stated that the utilization of tools, instrument equipment and machines by teachers to demonstrate learning activities goes a long way to improve students' knowledge, skills and competencies. This situation is in consistent with Ressier (1986) who stressed the need for adequacy of facilities in vocational training. According to him, adequate training facilities enable the learners to actively participate in the learning process and that it has the effect of reducing abstractions to the concrete thereby making learning more meaningful to the learners. Also, this situation is also in consistence with Ezeji (2004) who emphasized that industrial arts education requires a laboratory/workshop setting with adequate training facilities as a unique learning situation in which the learner may experiment, test, construct, assemble, repair, design, create, imagine and study. He stressed that active laboratory/workshop experiences are essential to the study of industrial Arts education.

The study also revealed that instructional delivery challenges are one of the challenges in the teaching of metalwork trades in technical colleges. This finding is in agreement with the submission of Akale (1991) who opined that the success of technical education curriculum depends on the mode of instructional delivery. It therefore means that the success of metalwork curriculum depends on available resources such as personnel, instructional material, teaching method, and infrastructural facilities etc. that are available for its effective implementation. The study revealed that provision of workable practical activities, encouraging students for personal initiative and teamwork, good relationships between teachers and students and motivation of students during instruction are not instructional delivery challenges are one of the challenges against the teaching of metalwork in technical colleges.

The challenges in the teaching of metalwork trades can be reduced when qualified personnel are provided, teachers are motivated and trained, facilities/equipment are provided and allocation of sufficient periods on the college time-table for the teaching of metalwork trade. This will go a long way to reduce some of the challenges faced in metalwork lessons as revealed by findings of the study. This is in lined with the Nation Policy on Education (FRN, 2004) that stated that from all indications, there is a lack of quality in technology teacher training, including metalwork trade teachers in technical colleges. This is also in consistence with Oloyede (2010) that carried out a study on factors responsible for poor implementation of Electronic Works Curriculum in Technical Colleges and He discovered that poor funding, lack of qualified personnel, lack of equipment/facilities among others are majors factors against effective implementation of engineering trades curriculum in Technical colleges.

Fund meant for the purchases of tools and equipment must be used wholly for that, the authorities concerned should cultivate a good maintenance culture, the authorities concerned

should cultivate a good maintenance culture, the security around the workshops should be reinforced in order to ward off thieves, the subject specialists should take part in the purchase of the tools and equipment to ensure accuracy and sufficiency, industries should supply the necessary tools and equipment to the technical colleges, since they are the major consumer of their products, availability of spare parts must be ensured before purchases are made in order to ensure easy maintenance, student admission should be made with particular regard to quantity of tools and equipment available and the capacity of the workshop, the tools and equipment should be multipurpose, workshop rules and regulations especially as it borders on machines and human safety, which must be emphasized, there should be regular supply of duster and chalks and safety posters must be placed on the walls and all other necessary places in the workshop. This is in agreement with the finding of Akale (1991) who found out that placing posters on the wall of the workshops is one of the solutions to the accidents in the workshops.

The t- test analysis for hypothesis 1 revealed that there was no significant difference between the Mean responses of teachers and College administrators on the management challenges against the teaching of metalwork trade in technical colleges. The non –significant difference between the mean responses of the two groups of respondents may be attributed to the quality and type of the training received by the managers of the technical colleges while in schools. This is in conformity with the finding of Miller (2006) who found out that those technical colleges' principals lack effectiveness in managing Technical colleges.

There was no significant difference between the Mean responses of teachers and College administrators on the teachers related challenges in the teaching of metalwork trade in technical colleges. This was indicated by t-test analysis for the null hypothesis 2. The non significant between the two groups may be as a result of lack of qualified personnel in technical colleges.

This is in agreement with the finding of Anunobi, (1998) who found out that qualified personnel were not adequately provided in colleges. The author further found out that some teachers in technical colleges are not qualified, and the few that are qualified are overloaded.

The t-test analysis for hypothesis 3 revealed that There was no significant difference between the Mean responses of teachers and College administrators on the infrastructure/facilities challenges in the teaching of metalwork trade in technical colleges**.** The non significant difference may also be attributed to the fact that good equipment, tools and machines were not available for training students while in schools by their teachers. This is in line with the finding of Hadedang (1997) who discovered that there was lack of appropriate equipment, tools and machines in most technical schools.

The t- test analysis for hypothesis 4 revealed that there was no significant difference between the Mean responses of teachers and College administrators on the instruction delivery challenges in the teaching of metalwork trade in technical colleges. The non significant difference between the responses of the groups may also be attributed to the fact that obsolete equipment are used in technical colleges, insufficient textual materials and improper pedagogy on the parts of the teachers. This is in conformity with the finding of Essien (1996) who found out that teachers lacked adequate practical experience and practical skills. The author further discovered that the schools had no adequate number of equipment and facilities. According to his findings the few technical teachers were not resourceful and understanding and could not motivate the learners and most importantly, they are not using modern teaching methods.

The t- test analysis for hypothesis 5 revealed that there was no significant difference between the Mean responses of teachers and College administrators on the ways of reducing challenges in the teaching of metalwork trade in technical colleges. The non significant difference between the

responses of the groups may be attributed to the fact that the government and stakeholders can come together and provide the necessary facilities and equipment that are needed for the training of students, train the principals and teachers for effectiveness and efficiency in college management and instructional delivery. This in agreement with the findings of Oloyede (2010) that opined that it is the responsibility of Government to train its Citizens' by providing the necessary facilities and qualified personnel in various schools and colleges.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Summary of the Study

The major purpose of this study was to identify those challenges for effective teaching of metalwork trade in technical colleges. Five specific purposes were developed in line with the main purpose of the study. The study answered five research questions and five null hypotheses.

The population of the study consisted 29 principals and Vice principals of technical colleges, 9 HODs, and 59 technical teachers. Due to the manageable size of the population, the entire population was studied. A questionnaire consisting of 76 items was developed and used for data collection. The questionnaire was validated by three experts from the Department of Industrial Technology Education, Federal University of Technology, Minna. The suggestions of the experts were used to improve the instrument used for the study. A total of 97 copies of the questionnaire were distributed to respondents by the researchers and two research assistants. Kuder Richardson

K-R 21 method of establishing reliability was used to determine the reliability co-efficient of the instrument for data collection. The data collected were analyzed using mean for answering the five research questions while t – test statistics was used to test the five null hypotheses at 0.05 level of significance.

Based on the data analyzed, the following findings were made:

1. Management, teacher related, infrastructure/facilities and instructional delivery challenges are challenges against the teaching of metalwork trades in technical colleges. And there are ways of reducing these challenges.
2. There was no significant difference between the Mean responses of teachers and College administrators on the management, teacher related, infrastructure/facilities and instructional delivery challenges against the teaching of metalwork trade in technical colleges.
3. There was no significant difference between the Mean responses of teachers and College administrators on the ways of reducing challenges against the teaching of metalwork trade in technical colleges.

5.2 Implications of the findings

The findings of this study have implications for government, administrators of technical colleges, metalwork teachers, students and Non-governmental Organizations (NGO). The government and administrators will know infrastructure/facilities and human resources challenges that are faced by metalwork teachers and students. This implies that government and administrators in charge of these colleges should provide the necessary tools and equipment, human resources for training of students in order to reduce these challenges.

The findings of the study also have implications for metalwork teachers. The metalwork teachers will be exposed to instructional delivery challenges against the teaching of metalwork. The teachers will also be acquainted with all the various kinds of challenges students are facing during learning in metalwork trade classroom. It will exposed the teachers to various ways that can be used to reduced these challenges. When these challenges are cater for, the teaching and learning of metalwork will be enhanced.

On the part of the students, it will enable them to know the various challenges that they are going to faced in learning metalwork as a trade in technical college. The knowledge of these challenges will keep them abreast of what will happen in future and make adequate plan for the future

The study also has implication for the NGOs in that the NGOs are also stakeholders in education. The knowledge of the challenges against the teaching and learning of metalwork in technical colleges will enable the NGOs to assist in reducing some of these challenges through the provision of infrastructural facilities/equipment, fund and training of the staff. .

5.3 Conclusion

The need to find the best ways to assist metalwork students in reducing learning challenges in metalwork Trade is essential for effective learning of the subject. The study therefore, identified some challenges which include management challenges, teacher related challenges, instructional delivery challenges and infrastructural/equipment challenges that are against effective teaching and learning of metalwork In technical colleges These challenges can also be reduced if the government and stakeholders come together and provide the necessary facilities and equipment for the training of metalwork students, train the principals and teachers for effectiveness and efficiency in college management and instructional delivery.

5.4 Recommendations

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

1. Government, employers of technical graduates and Non-Governmental Organizations (NGOs) in the society should provide modern infrastructure/facilities and equipment to technical colleges for effective training of metalwork students. The teachers and experts in the field should recommend the required facilities.
2. The teaching staff of technical colleges should be exposed to adequate retraining on the skills and the new instructional delivery strategies in metalwork trade.
3. Constant seminars, workshops, and conferences should be organised from time to time for college students and their teachers on innovations in metalwork trades.
4. Adequate number of teachers should be recruited to handle all the courses offered in metalwork trades in the technical colleges.
5. Training courses and seminars should be organized on regular basis for college principals, vice principals and HODs on management of technical colleges.
6. For effective use of the facilities, it should be ensure that every teacher is able to operate and or use every tools and equipment available.
7. Instructional and textual materials should be provided and their usages be made compulsory in technical colleges. This will create interest in the students and make learning pleasurable and permanent.

5.5 Suggestions for further studies

The following related areas have been suggested for further research

1. Similar studies should be conducted in other states in Nigeria on the challenges against the teaching of metalwork trade curriculum in Technical colleges.
2. Constraints to effective implementation of metalwork curriculum in technical colleges.
3. A study should be carried out in private owned technical colleges, trade centers and technical college of education.
4. A study should be carried out to cover a wider area, preferably whole Nigeria

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APPENDIX A

DISTRIBUTION OF TECHNICAL COLLEGE PRINCIPALS, VICE PRINCIPALS,

HEADS OF DEPARTMENTS AND TEACHERS OF METAL WORK TRADES

S/N	Name of Technical Colleges	Number of Principals & Vice Principals	Number of H.O.D.S	Number of Teachers
1	Government Science. Technical. College Garki, FCT.	3	1	6
2	Federal Science Technical College, Orozo, FCT.	4	1	7
3	Government Technical. College, Minna, Niger State.	3	1	6
4	Federal Science. Technical. College, Shiroro, Niger State.	4	1	8
5	Government Technical. College, Kotangora, Niger State	3	1	6
6	Suleiman Barau Technical. College, Suleja, Niger State.	3	1	6
7	Government Technical. College, New-Bussa, Niger State.	3	1	6
8	Government Technical College, Bida Niger State.	3	1	7
9	Government Technical College, Pandogari Niger State.	3	1	7
	Total	**29**	**9**	**59**

Source: Federal and State Ministry of Education Staff Nominal Roll.

METALWORK TEACHING CHALLENGES QUESTIONNAIRE

INSTRUCTIONS.

PART 1.

Personal Data

Please tick (√) the appropriate information that is applicable to you.

Position held: Principal [ ] Vice principal [ ] H O D [ ] Technical teachers [ ]

PART 2

Instruction: Please read the following statements carefully and respond by checking [√] Very Seriously Challenge (VSC), Seriously Challenge (SC), Not Seriously Challenge (NSC) Not Very Serious Challenge (NVSC) against the options that best describe your opinion on the challenges in the teaching of metalwork trade in Technical Colleges. This section is to be answered by the Principal, Vice Principal and Head of Department.

(A) Management Challenges Facing the Teaching of Metalwork Trade in Technical Colleges

	Item statement	**VSC**	**SC**	**NSC**	**NVSC**
1	Monitoring of teachers				
2	Controlling of teachers				
3	Insufficient fund for the running of metalwork				
4	Complex nature of metalwork curriculum				
5	Expensive nature of metalwork curriculum				
6	Attitude of students towards metalwork				
7	Motivating of teachers				
8	Good relationship between the college and industries				
9	Improper planning by school administrators				
10	Inadequate utilization of resources				
11	Managing of human resources				
12	Inability of the college principals to direct staff on				

	various activities in the school				
13	Inability of the principals to take valid decisions that will improve the teaching of metalwork				
14	Managing of financial resources				
15	Admission of academically poor students into the programme				
16	Poor attitude of management team towards maintenance of facilities				
17	Cordial relationship between management team and teachers				
18	Identified problems are promptly attended to.				
19	Management involves teachers in purchasing of equipment				
20	Management encourages staff development				
21	Effective communication to staff				
22	The management team are democratic				

B. Teacher Related Challenges in the Teaching of Metalwork Trades in Technical Colleges.

S/N	Items	VSC	SC	NSC	NVSC
1	Inadequacy of qualified teachers				
2	Provision of in-service training opportunities for teachers				
3	Teachers being allowed to go for short courses like workshops or seminars				
4	Inability of the teachers to access internet facilities				
5	Inappropriate use of machines and equipment by the teachers				
6	Inadequate plan for retaining qualified teachers				
7	Too much work load on teachers				

8	Teachers are not promoted as at when due				
9	Appropriate use of teaching method by teachers				

(C.) Facilities/Infrastructural Challenges in the Teaching of Metalwork Trades in Technical Colleges.

S/N	Items	VSC	SC	NSC	NVSC
1	In availability of functional workshops				
2	Insufficient of basic hand tools				
3	In availability of machines and equipment				
4	Epileptic power supply to operate machines				
5	In appropriate storage facilities				
6	Inappropriate safety equipment and devices				
7	Inadequate consumable materials				
8	In conducive teaching environment				
9	Metal workshops not properly equipped with necessary technology that will aid the use of ICT				
10	Improper illumination of metal workshop				
11	Improper accessibility of metal workshops				
12	Provision of refuse disposal				
13	Inadequate security unit and devices				
14	Inadequate ventilation in the workshop				
15	Provision of proper electrical system				

(D) Instructional Delivery Challenges in the Teaching of Metalwork Trades in Technical Colleges.

S/N	Items	VSC	SC	NSC	NVSC
1	Obsolete equipment				
2	Insufficient textual materials				
3	Non provision of teaching aids				
4	Inappropriate use of teaching methods				
5	Insufficient periods on the college time-table				
6	Excursion and visitation to industries				
7	Proper pedagogy on the part of the teachers				
8	Provision of workable practical activity				
9	Students being encouraged for personal initiative				
10	Students are encouraged to do a team work				
11	Good relationship between teachers and students				
12	Students being motivated during instruction				

(E) Ways of Reducing the Challenges in the Teaching of Metalwork Trade in Technical Colleges.

S/N	Item Statement	SA	A	D	SD
1	Provision of qualified teachers				
2	Provision of qualified support staff				
3	Motivation of teachers by the government				
4	Government employing more guidance and counselors in the colleges				
5	Allocation of sufficient periods to cater for both practical and theoretical aspect of the subject				
6	Teachers being encouraged to attend workshops and seminars				

7	In-service training programme provided for the teacher.				
8	Storage facilities provided in all metal workshops				
9	Government making available sufficient fund for the running of the subject.				
10	Textual materials provided by the government and well-meaning Nigerians				
11	Provision of constant electricity for the running of machines and equipment				
12	Provision of safety equipment and devices.				
13	Provision of basic tools, equipment and machines				
14	Motivation of teachers by the school administrators				
15	There should be consistency in government policies no matter the government in power				
16	Priority should be given to professionality and technical competence when recruiting academic and support staff.				
17	Promotion opportunities for academic and support staff should be enhanced				
18	Scholarship should be readily available for metalwork teachers with bounding conditionality				

APPENDIX B.

Department of Industrial Technology Education
Federal University of Technology
Minna
February, 2012.

Dear Sir/Ma

Request for Face and Content Validation of Research Instrument

I am a postgraduate student in the Department of Industrial Technology Education, Federal University of Technology, Minna. I am currently undertaking a research project titled "Challenges of teaching metal work trades in technical colleges in Niger State and Federal Capital Territory, Abuja"

I humbly request that you validate the attached instrument. Please check the items of the questionnaires to ascertain whether they address the Subject matter.

In addition, please indicate your observations and recommendations, on how the instrument could be improved.

Thanks

Yours faithfully,

Hamzat Bayo Wahab
M.Tech/SSSE/ 2008/1907