ASSESSMENT OF THE IMPLEMENTATION OF NIGERIA CERTIFICATE IN EDUCATION (METALWORK TECHNOLOGY) CURRICULUM IN POLYTECHNICS AND COLLEGES OF EDUCATION IN KADUNA STATE.

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MAY, 2014

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**A THESIS SUBMITTED TO SCHOOL OF POSTGRADUATE STUDIES,
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MAY, 2014

DECLARATION

I declare that this thesis titled "ASSESSMENT OF THE IMPLEMENTATION OF NIGERIA CERTIFICATE IN EDUCATION (METALWORK TECHNOLOGY) CURRICULUM IN POLYTECHNICS AND COLLEGES OF EDUCATION IN KADUNA STATE" was written by me in the Faculty of Education, Department of Foundation and Curriculum Studies, under the supervision of the late Professor Muhammad Ben-Yunusa, Dr. (Mrs.) Hannah O. Yusuf and Dr, A. Guga. The information derived from the literature has been duly acknowledged in the text and in the list of references provided. To the best of my knowledge, no part of this thesis was previously presented for another higher degree at any university.

_____ _____

Awwal Yahaya ABDULLAHI Date

CERTIFICATION

This thesis titled "ASSESSMENT OF THE IMPLEMENTATION OF NIGERIA CERTIFICATE IN EDUCATION (METALWORK TECHNOLOGY) CURRICULUM IN POLYTECHNICS AND COLLEGES OF EDUCATION IN KADUNA STATE" by Abdullahi Awwal Yahaya, meets the regulations governing the award of the degree of master of education (M.Ed) of Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and presentation.

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DEDICATION

This thesis is dedicated to Almighty God for his mercy and guidance and for sparing my life from the beginning of my course work to the period of this research work. Glory be to God. I thank Him very much.

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ABSTRACT

The purpose of this study was to assess the implementation of Nigeria Certificate in Education (Metalwork Technology) Curriculum in Polytechnics and Colleges of Education in Kaduna State. In the research, five objectives were generated, which were to determine the role of the metal work technology teacher in the implementation of NCE metal work technology curriculum in polytechnics and colleges of education, the role played by the institutions' administrators in the implementation of NCE metal work technology curriculum in polytechnics and colleges of education, to determine the relationship between the role of the NBTE at the polytechnics and that of the NCCE at the colleges of education, the relationship between the use of relevant Teaching methods and the implementation of NCE metalwork technology curriculum in ;polytechnics and colleges of education and also to determine the relationship between the availability, proper utilization of instructional materials in implementing the NCE metalwork technology curriculum in ;polytechnics and colleges of education in Kaduna state. Five (5) research questions and five (5) null hypotheses were formulated in line with the stated objectives to serve as guide for the study. A descriptive survey research design involving the use of questionnaire and checklist was employed for the purpose of this study. The data obtained were analyzed by the use of frequency and percentage. A population of 1492 out of which 150 students including lecturers, NBTE and NCCE officials were proportionally selected and put into Kaduna polytechnic, Kaduna, Nuhu Bamalli Polytechnic, Zaria, College of education Kafanchan, National Board for Technical Education and National Commission for Colleges of Education. The result obtained in this study revealed that there exists significant relationship in the five (5) null hypotheses formulated and tested at 0.05 level of significance. They were all rejected; the rejection was attributed to the responses made by both lecturers, students and NBTE and NCCE officials as well as the checklist used. The finding revealed that proper implementation of metalwork technology, constant electricity power supply, monitoring and supervision of the entire programme, provision availability of instructional facilities have a significant role on the effective dissemination of NCE metalwork technology in order to satisfy the world of work. The study finally recommended ways of ensuring implementation strategies as well as acquisition of instructional aids from the ICT centres in the departments.

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List of Abbreviations

- ITF:------ Industrial Training Fund
- SIWES:—Students' Industrial Work Experience Scheme
- SWEP:----Students' Work Experience Programme
- SQA:-------Society for Quality Assurance
- NUC:------National University Commission
- NCCE:--- National Commission for Colleges of Education
- NBTE:--- National Board for Technical Education
- EDS:------ Education for Sustainable Development

Operational Definition of Terms

Education: - A process of learning and Skill acquisition.

Economy: - The sum total of the sound- Political and economic factors that Interact and operate in several ways to determine the level of income.

Growth: - Increase in status, quality and value.

Economics growth: - An increase in a country's output of goods and Service.

Curriculum Implementation:-Disseminating of the content of learning experience to the target audiences (students).

Technical: - It is a mechanical related trade. It involves manipulation of machine tools, metal forming and fabrication, foundry work, welding, wood work, automobile technology, electricity-electronic, building technology, draftsmanship technology and other co-related fields.

Metalwork:- This involves the process of measuring operations, cutting, Work-holdings, boring, marking-out operations (sheet metal Work/fabrications), machine tools operations, foundry Work, e.t.c.

Evaluation: - This refers to the collection of information/data and using the information to judge the value or worth of the programme and finally taking decision about the programme on the basis of the data collected and the judgment made.

CHAPTER ONE
INTRODUCTION

1.1 Background to the Study

The importance of technology to national development in the life of our country cannot be over-emphasized. This is because knowledge and skills in science and technology are very vital in the development of any society. Mulemwa (2002) points out that, the fast changing applications of science and technology and the global reliance on its processes and products in all areas of human endeavour have made them invaluable that any society or country without them risks being alienated from the global village. In 1977, a document tagged the National Policy on Education was released by the federal government of Nigeria which was revised in 1981, 1998 and 2004 respectively. The Federal Government of Nigeria (2009) states in the National Policy on Education, the aims of technical education which incorporate the metalwork technology as follows;

* That the technical education which includes metalwork as a trade is to provide trained man power in applied sciences, technology and commerce particularly at sub-professional grade. It is also expected that the technical education is to provide the technical knowledge and vocational skills necessary for industrial, agricultural, commerce and economic development, National Policy on Education (2004).
* To provide people who can apply scientific knowledge in the improvement and solution of environmental problems for the use and convenience of man.
* To give an introduction to professional studies in engineering and other technology studies.

* To give training and impart the necessary skills leading to the production of craftsmen,

  technicians and other skilled personnel who will be enterprising and self-reliant.

- To enable young men and women have an intelligent understanding of the increasing complexities in technology studies, FGN (2004).

Attempts have been made by various researchers to evaluate the implementation of the introductory technology, of which Metalwork technology is one of the courses being integrated (NERDC, 1992; Awotunde, 1992; Utulu 1998). In trying to determine whether the implementation of the metalwork technology curriculum which meant to be an integral part of technical education has been in order as stipulated in the national policy on education within the most recent edition in respect to higher institutions, a need for this study arises.

1.2 Statement of the Problem

An Assessment of the implementation of NCE Metalwork technology curriculum in polytechnics and colleges of education offering technical courses in Nigeria has been a matter of serious concern to educators. This is because; the minimum qualification for one to teach in Nigerian schools (pre-primary, primary and post-primary) is the Nigeria Certificate in Education, (FGN, 2009). Therefore, effort should be made to see how the content of it curriculum is being implemented in the institutions mentioned.

The National Policy on Education of (1981) in section 6, defines technical education as that aspect of education which leads to the acquisition of practical and applied skills as well as basic scientific knowledge. It is a special grade of vocational education programme since it involves more use of mathematics. Okorie (2001:24) observed that graduates of technical education

programmes usually bridge the gap between the professional engineers (technologist) and the craftsman. And in addition to that, the curriculum of technical education includes general education. General education is a part and parcel of the overall educational system. It complements technical education curriculum and expands the vocabulary base of the learner towards understanding typical issues in industries, commerce, politics, agriculture and the world of work.

Metalwork technology is one of the disciplines under technical education. Metalwork has to do with operations like cuttings, drillings, grindings, shaping, planing, broaching operations as well as measuring, assembling, fabricating the designed project with harmonized finishing. Aspect of foundry work and various forms of welding or methods of joining metals are also observed in metalwork technology.

Most of the industries do consume technicians who acquired skills of metalwork technology to work for them. But there were frequent out-cry by the people at various social gathering on the shortage and missing of metalwork technology machine tools supplied by the federal government to every state in this country. This was done in the early 1980s, since then no any effort was attempted toward providing other machine tools to those states. Again, there were little or no frequent practical / science and technology exhibitions meant for students from these fields. In addition, the federal government of Nigeria stated in its (2010) national development plan, that there is insufficient technical metalwork man-power in the country. Also no effort was made to identify reasons for the care-free attitude by the government or the implementation sector of the programme.

In view of the above antecedence, this study is geared toward assessing the implementation of NCE metalwork technology curriculum in polytechnics and colleges of education offering technical subjects. The services of such skillful technicians in the world of work are highly needed in the society. In the light of this problem, this study was set to assess the implementation of NCE Metalwork Technology curriculum.

1.3 Objectives of the Study

The objectives of this study were to;

i) determine the role of the metal work technology teacher in the implementation of NCE metal work technology curriculum in polytechnics and colleges of education offering metalwork technology in Kaduna state.

ii) determine the role played by the institutions' administrators in the implementation of NCE metal work technology curriculum in polytechnics and colleges of education offering metalwork technology in Kaduna state.

iii) determine the relationship between the role of the NBTE at the polytechnics and that of the NCCE at the colleges of education offering NCE metal work technology in Kaduna state.

iv) determine the relationship between the use of relevant Teaching methods and the implementing the NCE metalwork technology curriculum in polytechnics and colleges of education in Kaduna state.

v) determine the relationship which exists on the availability, proper utilization of instructional materials in implementing the NCE metalwork technology curriculum in ;polytechnics and colleges of education in Kaduna state.

1.4 Research Questions

i. What is the role of the metal work technology teacher in the implementation of NCE metal work technology curriculum in polytechnics and colleges of education offering metalwork technology in Kaduna state?

ii. What is the role played by institutions' administrators in the implementation of NCE metal work technology curriculum in polytechnics and colleges of education offering metalwork technology in Kaduna state?

iii. What is the role of the NBTE at the polytechnics and that of the NCCE at the colleges of education offering NCE metal work technology in Kaduna state?

iv. What is the relationship between the use of relevant methods and the implementation of the NCE metalwork technology curriculum in polytechnics and colleges of education in Kaduna state.

v. What relationship exists between the availability, proper utilization of instructional materials in implementing NCE Metalwork curriculum in the polytechnics and colleges of education?

1.5 Hypotheses

1. There is no significant relationship between role of the teacher in the implementation of NCE metal work technology curriculum in polytechnics and colleges of education offering metalwork technology in Kaduna state.
2. There is no significant relationship between the role of the institutions' administrators and the implementation of NCE metal work technology curriculum in polytechnics and colleges of education offering metalwork technology in Kaduna state.

3. There is no significant relationship between the role of the NBTE at the polytechnics and that of the NCCE at the colleges of education offering NCE metal work technology in Kaduna state.
4. There is no significant relationship between the use of relevant methods and the implementation of the NCE metalwork technology curriculum in polytechnics and colleges of education in Kaduna state.
5. There is no significant relationship between the availability, proper utilization of instructional materials and the implementation of NCE metalwork technology curriculum.

1.6 Basic Assumptions

In this study, it is assumed that:

i) There are qualified and skillful metalwork technology lecturers in polytechnics and colleges of education offering technical courses in Kaduna state.
ii) There is constant electricity power supply in the metal workshop for machine tools operations and executing practical by the students.
iii) NCE Metalwork technology students do participate in the Student Industrial Work Experience Scheme organized and sponsored/monitored by Industrial Training Fund.
iv) NCCE supervises the polytechnics and colleges of education offering metalwork technology every session/year.
v) NBTE supervises both polytechnics and colleges of education offering metalwork technology every year/session.
vi) Enough instructional materials and proper usage is observed in the metalwork technology shops in the polytechnics and Colleges of Education in Kaduna State.

1.7 Significance of the Study

The findings of this study will be significant in the following:

It will help in deciding what new developments and current issues in the field of technical / technology need to be included in the metalwork technology curriculum as well as those to be expunged from the curriculum. The results will, therefore, benefit curriculum experts, reviewers, developers and implementers. This is because the discoveries made will contribute in the planning of new programmes and in deciding whether to expand, modify or discontinue with the existing programme or reformulate the programme.

The outcome of this research will play a positive role to policy makers. When such result of this study reaches the policy makers, it will serve as important instrument to be taken into consideration in formulating educational policy meant for our educational development.

The result of this research will be useful to the government, since the National Educational Research and Development Council is under government's control. If the federal/ state government places its hand on the result of this study, effort will be made to ensure good governance in terms of delivery of the NCE metalwork curriculum content in the polytechnics and colleges of education offering metalwork technology. Result of this research will foster the image and increase the economic development of this country. It will be in favour of the government.

The outcome of this research will be useful to National Board for Technical Education (NBTE) since they are responsible for accreditation of polytechnics, and funding. It will suggest ways in which short comings or lapses (if any) in the technology curriculum to be overcome. Therefore it

will facilitate smooth transition of metalwork technology graduates to fit in the labour market or world of work. It will also enable the students to compete with other polytechnics students outside the country.

Also the result of this study will be useful to the polytechnic and colleges of education offering NCE Technical. The institutions will check mate both the technicians/lecturers and the various components that made up the acquisition of NCE technical certificate, be it in the Kaduna polytechnics, Nuhu Bamalli Polytechnic, Zaria or college of education Kafanchan. It depends, perhaps, on the problem which has to do with any of the components mentioned earlier. The management of these institutions shall look at the recommendations made at the end of the study to digest and implement areas which affected them in order to compete with similar institutions worldwide.

Most importantly, the National Commission for Colleges of Education (NCCE) will benefit on the outcome of this study since they are responsible for the accreditations of NCE courses in these institutions. Should there be any defined lapses in running the courses within these institutions; the commission will see the need for instant correction or remedy so as to comply with the guidelines stipulated by the commission.

Another organization which will benefit from the result of this study is the National Council of Education (NCE), being the highest policy-making body in education matter in the country. This is because the body consists of the federal minister of education and the state commissioners for

education. It is also assisted by the **Joint Consultative Committee (JCC) on Education,** which is composed of professional officers of the federal and state ministry of education.

1.8 Scope and Limitations of the Study

The study covers the assessment of the implementation of the NCE Metal work Technology curriculum in Kaduna polytechnic, Kaduna, Nuhu Bamalli Polytechnic, Zaria and College of Education Gidan-Waya, Kafanchan. The study covered two polytechnics and one college of education offering NCE metalwork technology. This study hopes to find out the problems of Metalwork Technology implementation processes in the stated institutions. The target population of the study was restricted to 150 respondents (Seventy '75' students, sixteen '16' lecturers, thirty one '31' NCCE and twenty eight '28' NBTE officials. All were from Kaduna polytechnic, Nuhu Bamalli polytechnic, Zaria, college of education Gidan-Waya, Kafanchan and NCCE/NBTE officials).

The researcher noticed that, there was no provision for private polytechnics offering technical courses in the state. The researcher only used the public polytechnics,a college of education offering metalwork technology as a course in their institutions as well as NCCE and NBTE officials. There is a distance of closed to 300 km away from the institutions were this study research was carried out.

Due to the tedious procedure involves in calculating the reliability of the test instrument, the researcher used the value obtained from the statistician.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter is concerned with the review of relevant literatures in respect to the issues surrounding the study at hand. This is to ensure that the present study consults with the work of other researchers. The review therefore, covers the following areas: Roles of science and technology education in Nigeria, significance of science and technology education in relation to the national policy on science and technology, metal work technology curriculum content, objectives, components, teaching method/instructional materials/supervision and evaluation, roles of national commission for colleges of education (NCCE), roles of national board for technical education (NBTE), roles of student`s industrial work experience scheme / students work experience programme, trends in information and communication technology and the concept of curriculum implementation.

2.2 Curriculum Implementation: A Theoretical Framework

The theoretical framework adopted for this study hinges on the theory of education. The theory is associated with the work of one of the great philosophers named John Dewey; Dewey won a greater international following for his educational reforms than for his instrumentalist philosophy. Between the two World Wars, where previously backward countries were obliged to catch up quickly with the most modern methods, as in Turkey, Japan, China, the Soviet Union and Latin America, the reshapers of the educational system turned toward Dewey's innovations for guidance.

Most broadly considered, Dewey's work consummated the trends in education below the university level initiated by pioneer pedagogues animated by the impulses of the bourgeois-democratic revolution. This was especially clear in his views on child education which built on ideas first brought forward by Rousseau, Pestalozzi and Froebel in Western Europe and by kindred reformers in the United States.

Just as society may deny satisfaction to the physical, educational and cultural needs of the young, so their parents and guardians may slight or ignore their rights. Most adults cannot be held individually culpable for such misdeeds; they, too, have been shaped by the society around them and are goaded by its necessities. Through them and others around them the rising generation suffers from the inadequacies of their social inheritance and the evils of their surroundings. Growing children are normally unaware of the remoter social causes of their misfortunes and miseries; even their elders may not know about them. So they direct their resentments, as well as focus their affections, upon the members of their immediate circle. The novels of the past 150 years provide plenty of pathetic tales and tragic descriptions of family conflicts at all age levels.

Also according to Dewey, the educational reformers of the late eighteenth and nineteenth centuries dealt with the two distinct aspects of children's problems. One concerned the claims of childhood as a specific and independent stage in human growth. This perennial problem arises from the efforts of adults to subject growing children to ends foreign to their own needs and to press them into molds shaped, not by the requirements of the maturing personality, but by the external interests of the ruling order. Rousseau had protested against this when he wrote:

This is vividly intended to produce technologically and scientifically literate citizens, since it is observed that without technological and scientific literacy among sizeable proportion of the

world of work and society. The introduction of modern technology/modern magic for achieving modernization will be exceedingly difficult. Indeed, science and teaching and learning for any particular society must be self-generating and it must develop its values and technologies based on the environment. This portrays that the content of the curriculum must comprise curricula based on philosophies, which reflects the environment in which the dispensation of the curriculum content takes place so as to facilitate the needs of the world of work after satisfying learner`s needs.

Dewey's theories blended attention to the child as an individual with rights and claims of his own with a recognition of the gulf between an outdated and class-distorted educational setup inherited from the past and the urgent requirements of the new era.

The educational system had to be thoroughly overhauled, he said, because of the deep-going changes in American civilization. Under colonial, agrarian, small-town life, the child took part in household, community and productive activities which spontaneously fostered capacities for self-direction, discipline, leadership and independent judgment. Such worthwhile qualities were discouraged and stunted by the new industrialized, urbanized, atomized conditions which had disintegrated the family and weakened the influence of religion

A variety of specialized institutions had sprung up alongside this official hierarchy of education. The normal or teachers' training school produced the teachers demanded by the expansion of public education in the nineteenth century. The trade and technical school turned out skilled craftsmen needed for industry and construction.

Thus the various parts of our educational system ranged from institutions of feudal formation like the university to such offshoots of industrial capitalism as the trade g school. But no single consistent principle or purpose of organization unified the whole.

Dewey sought to supply that unifying pattern by applying the principles and practices of democracy, as he interpreted them, consistently throughout the educational system. First, the schools would be freely available to all from kindergarten to college. Second, the children would themselves carry on the educational process, aided and guided by the teacher. Third, they would be trained to behave cooperatively, sharing with and caring for one another. Then this creative, well-adjusted equalitarianism would make over American society in their own image.

Education should give every child the chance to grow up spontaneously, harmoniously and all-sidedly. “Instead of trying to split schools into two kinds, one of a trade type for children whom it is assumed are to be employees and one of a liberal type for the children of the well-to-do, it will aim at such a reorganization of existing schools as will give all pupils a genuine respect for useful work, an ability to render service, and a contempt for social parasites whether they are called tramps or leaders of ’society.’ “Such a definition did not please those who looked upon themselves as preordained to the command posts of the social system.

He therefore urged that manual training, science, nature-study, art and similar subjects be given precedence over reading, writing and arithmetic (the traditional three R’s) in the primary curriculum. The problems raised by the exercise of the child’s motor powers in constructive work would lead naturally, he said, into learning the more abstract, intellectual branches of knowledge. Mechanics institutes were established to provide skilled manpower for industry, which metalwork is inclusive as trade.

In view of the above, this research was built on the theory of education which was developed by this great philosopher, John Dewey. This allows us assessing the content of education that is being implementing in both polytechnics and colleges of education.

2.3 The Role of Lecturers in Curriculum Implementation

Curriculum is the larger blueprint, the broad guidelines and areas or topics of study, the broad objectives, longer time-span. Assessment and evaluation tools, techniques and methods are determined as well as implemented. Lecturer is a professional trained individual who disseminates the content of the curriculum or minimum standard of a given programme in a tertiary level of learning. He/she is the trained personnel that impart facts, values, norms and skills to the target audiences/learners.

A teacher interprets, plans, and executes the curriculum on a day-to-day basis. The theory is put into practice. Objectives & goals become actionable, achievable, objectified and assessable. Lesson plans are drawn up for the purpose. Time lines are fixed - from annual to term/semester to daily. Resources are generated or sourced or created. Teaching and learning aids, activities, and projects are identified. Instructional strategies are determined.

A teacher or lecturer serves as a transformer of the learning experiences to the receivers.

Curriculum implementation is viewed as the process of putting into actual practice what has been planned in the curriculum. The person responsible for examining, synthesizing and dispensing what is contained in the curriculum is lecturer irrespective of being a male or female (lecturer). Lecturers usually take the pain of examining and choosing;

i. the best pedagogy to be implored

ii. appropriate techniques so that the lecture to be interesting

iii. and also ensure that the content of the curriculum are covered

iv. appropriate instructional materials for course

v. relevant practical for the students and many other things that will make effective teaching and learning meaningful.

Now, prior to the curriculum implementation stage, there were many stages that the curriculum content should go through. These should include curriculum planning curriculum organization and curriculum development. Therefore, to assess the implementation of the NCE metalwork technology curriculum in polytechnics and colleges of education in Kaduna state, the role of a teacher or lecturer in the implementation processes should be objectively reviewed.

2.4 Roles of Science and Education Technology in Nigeria

The informal science and education technology serve as part and parcel of us in Nigeria. This is because as Fafunwa (1991) points out, children were involved in practical farming, weaving, knitting, black-smithing, brass work, leather work, metalwork, carpentry work and many others before the introduction of western type of education. These skills were being taught to children, however, their teachings not institutionalized as they are the case today.

During the colonial era, science and technology according to Onweh (1991) were treated as relatively insignificant aspects of the country's educational system. Emphasis was laid on the general education with no particular orientation towards training boys and girls for different vocations on leaving schools. But formal secondary school education at that time have been reported to date back to 1842, (Taiwo, 1980). Most of the schools, according to him were established by missionaries. The first secondary school established in Lagos was the Church of

Missionary Society (CMS) Grammar school, Lagos in 1859. Olarewaju (1994) observes that, nature study which was being taught in these missionary schools at that time, failed to cater for the societal and economic realities of that period.

Technical education, on the other hand, developed less quickly than other forms of education in Nigeria. This according to Fafunwa (1991), was due to the fact that the voluntary agencies pioneered western education in Nigeria were unable to popularize technical education on the same scale as literacy education, since the former was much more expensive in terms of staff and equipment. Some of the mission schools introduced bricklaying, carpentry, etc as part of the curriculum. However, as Thakur and Ezenne (1980) observe, there was lack of enthusiasm on the part of their parents as these skills were not seriously regarded by parents as integral part of western education. As a result, these practices suddenly collapsed except for the Blaize Memorial Industrial School in Abeokuta founded by some Nigerians and West Indians and the Hope Waddel Institute in Calabar established by the Church of Scotland Mission (CSM). The first major recommendation for the introduction of technical and vocational education according to Fafunwa (1991), was in 1945, when the commission on higher education in West Africa proposed that the premises of the defunct Yaba Higher College should be converted into territorial college for Nigeria with a view to meeting the need of government and commercial firms at the post secondary school level, just to say like polytechnics or the present colleges of education. The Federal Government in 1949, appointed F.J. Harlow, principal of Chelsea polytechnic, London and W.H. Thorp, Nigeria Deputy Director of Education to assess the need for establishing colleges of higher technical education. The report led to the establishment of the Nigerian college of Art, science and technology with branches in Ibadan, Enugu and Zaria. To

ensure that certain professional courses taught at the three branches were acceptable to the professional bodies in the United Kingdom, Fafunwa (1991) points out that, the college entered into relationship with London University in collaboration with university college, Ibadan, in running a degree programme in engineering. Other courses (mostly of three years duration) affiliated to recognized bodies in the united kingdom for diploma awards were secretaryship, surveying, teacher certificate, architecture, pharmacy and estate management. Other additional courses include, regular higher school certificate courses in most academic fields particularly in Arts and the majority of students were enrolled in these courses. Indeed, in 1962, however, the colleges were shut down and their assets were taken over, Ife took over the Ibadan branch of the colleges, University of Nigeria, Nsukka, captured the Enugu branch and Ahmadu Bello University, Zaria, took over the Zaria branch of the colleges.

2.5 Significance of Science and Technology Education in Relation to the National Policy on Science and Technology.

Virtually, the Federal Government of Nigeria in 1979 created the ministry of science and technology. The ministry was charged with the responsibility of promoting and developing scientific and technological research in the country. Since the range of science and technology is so vast and it's financing, so costly, there is no doubt that certain guidelines and priorities have to be adopted in pursuing them. Therefore, the need for a policy on science and technology arose. The policy was to bear relevance to the economic and social inspirations of the people and was to display out clearly and the strategy for implementation. The ministry formulated the science and technology policy and was launched in July, 1987. The policy was a product of wide consultations in national conference specialize committee meetings with specific and

technological community including the ministry, polytechnics, research institutes, industrialists and bureaucrats. The National Policy on science and technology (1986:8) recognizes the fact that Nigeria is a technologically underdeveloped country by stating that:

While many countries are in the second phase of the industrial revolution in which computers, robots, microelectronics, biotechnology, nuclear technology etc, are common place, we are yet to grasp the fundamentals of the first phase of the industrial revolution which began in Europe in the eighteen century….. The general public is made aware of the need to use scientific methods in their daily operations.

The National policy on Science and Technology, therefore, is another major effort of government at concerning this situation, thereby, helping to transform Nigeria into a technological self-reliance nation.

The objectives of science and technology as contained in the National Policy on Science and Technology (1986: 11-12) are:

1. Increasing public awareness in science and technology and their vital roles in national development and well being.
2. Directing science and technology efforts along identified national goals.
3. Promoting the translation of science and technology results to actual goods and services.
4. Creating, increasing and maintaining an endogenous science and technology base through research and development.
5. Motivating creative output in science and technology.
6. Increasing and strengthening theoretical and practical scientific base in the society and,
7. Increasing and strengthening the technological base of the nation.

One of the policy statements for science and technology for example, stresses that the educational system should emphasize at all level. The objectives of this, according to the

policy is to reorient the entire society towards scientific thinking in order to develop new technologies and adapt existing ones to improve societal well-being and security.

2.6 Roles of National Commission for Colleges of Education (NCCE) in NCE Metalwork Technology Programme

In every country, higher institutions do have a separate body that monitors activities in terms of recognition and accreditation of courses or programmes in such institutions. Therefore, in Nigeria, the national commission for colleges of education is one of those bodies or commissions responsible for the recognition and accreditation of national certificate in education (NCE) programmes in all colleges of education within the country.

The national commission for colleges of education (NCCE) was established by Decree (now Act) 13 of 17th January, 1989 (Amended Act 12 of 1993) as a completion of tripod of excellence in the supervision of higher education in the country. Actually, the brain behind the establishment of the commission was a resultant effect of the utmost importance accorded to quality teacher education by the federal government of Nigeria.

The National Commission for Colleges of Education has assigned strategic policies and monitoring as well as evaluative strategies developed by the commission. This is aimed at ensuring uniform standard and quality control at the federal, state and private colleges of education. The strategies include;

* National Commission for Colleges of Education accreditation mechanism including pre-accreditation of programmes with interim and denied status. And this exercise is applicable every five years.

* National Commission for Colleges of Education resource inspection visits to colleges of education.
* Special workshop on the review of minimum standard which is done every five years.
* Governing council and expanded management committee of the colleges of education where NCCE`s representation is mandatory.
* Verification exercise to ensure the qualification of staff and students.
* Minimum standard that spell out the dos and don`ts of the colleges, irrespective of the ownership and ensure harmonized curriculum.
`* Establishing standardized measures of considerations of results before issuance of certificates.
* Considerations of feedback from external assessment. All these are inclusive in the national minimum standards for NCE, FGN (2012).

Upon all these strategies/ roles plays by the National Commission for Colleges of Education, there were shortcomings;

i. Lack of regular monitoring of the academic activities of the colleges to ensure that qualitative teacher education programme is obtained.
ii. Lack of adequate motivation by the federal government for teacher trainees, trainers and academic programme officers in charge of curriculum development at the various supervisory agencies such as NCCE.
iii. Inadequate funding.
iv. Poor pedagogical skills on the part of the teacher trainers.
v. Lack of teacher education policy.

vi. Quarks in supervisory agencies that have hijacked the duties of the professionals and have been feeding the system wrong information.

vii. Lack of harmonized regulatory body for teacher education at the tertiary level, i.e colleges of education being regulated under NCCE, and the faculties and the institutions of education of universities regulated under the National University Commission (NUC).

Influx of unqualified personnel into teaching and education.One official remark that even acquiring a Post graduate Diploma in Education (PGDE) does not make a qualified teacher. FGN,2012 (national minimum standard for NCE).

2.7 Metal Work Technology Curriculum

This study reviews the curriculum of metal work technology at NCE level. Under this, the study extracts the objectives of NCE metal work technology curriculum, its relevance and its components for the purposes of the study. Metal work technology involves practical skills acquisition, and it is in line with this Society for Quality Assurance (SQA), 2012, noted that, the metal work technology curriculum is for excellence values, purpose and princes, offers flexibility, encourages more time for learning, more focus on skills and applying learning, and scope for personalization and choice. Metal work technology curriculum places emphasis on the development of skills for learning, skills for life and skills for work. Since metal work technology curriculum dealt with practical skills, it's should allow the students in the field to communicate technical ideas and designs effectively and appropriately. And if this could be enhanced, then perhaps there should be placement in it curriculum the provision for the application of effective decision making, problem solving and design strategies to a project. It

should also take into cognizance, the avenue to help to manage information on the general learning outcome, demonstrate responsibility in the time management, task completion and in meeting the project criteria. It is also in line with this that the making of ethical decision concerning the impact of activities and the use of technology, prepares person to develop action plan relating personal aptitudes and abilities to occupational opportunities. It should also demonstrate safe practices with tools, machines, materials and related processes, Manitoba, (2012). Again, adaptation of strategies to work effectively, independently or as a team member to complete a given task or project as well as understanding of metallurgy-science and processes are to evaluated. The use of metal working measurement and layout tools correctly and safely, applying forming and casting, separation, fastening and finishing processes to the metal considering the environmental impact are to be recognized together with an understanding of current innovation in metal work processes , application and new technologies in the curriculum of metal work technology.

The objectives of the NCE Metalwork Technology program according to (NCCE, 2012) are;

* to provide qualified technical teachers and practitioners of technology capable of teaching introductory technology / basic technology in the junior secondary schools.
* to produce NCE Technical teachers who will be able to inculcate scientific and technological attitudes and values into the society.
* to produce qualified technical teachers motivated to start the so much desired revolution of technological development right from Nigerian schools.
* to produce technical teachers so as to qualify them for post-NCE degree programme in technical education.

2.8 Relevance of Metal work Technology

This study relates the relevance of NCE metal work technology program in many ways;

Metal work technology is designed to allow the students to develop skills in the field of metalworking. Metal work students construct metal projects utilizing appropriate metal materials and supplies, and involving the sufficient and safe use of tools, machines and industrial purposes. Metal work technology explores the area of foundry and sheet metal work, welding (arc and acetylene). Metal work technology is also designed to give students insight into the different development in terms of technology. These technological developments include, the steel work, constructions of underground tanks, surface tanks, as well as overhead tanks. In view of the above, NCE metal work technology is said to be relevant to many fields.

Metal work technology is equally relevant in the field of machine shop. There are a lot of machines that a metal work technology students are expected to manipulate, and these include lathe machine (which is used for taper-turning, step-turning, boring a hole, cutting threads, and other similar operations), milling machine (which is used for cutting gear teeth), shaping machine (it is used for shaping a work-piece and other related work). Other operations or relevant operation, include the use of drilling machine (which is used for obtaining a hole of different diameters/radii).

Entrepreneurship is one of the aspects that metal work technology has relevance to. Metal work technology is a skill acquisition programme; therefore an individual can create a job for himself (self-reliance). Practicals are conducted within the polytechnics or colleges of education "tech" and also students do acquire skills through the ITF program named "students' industrial work experience scheme". So, with such knowledge or skills, perhaps one can reduce the level of unemployment rate in the country.

Metal work technology is also relevance to the industrial purposes. Students receive training from industries which may enable them to know the dos and don'ts in the industry's parameter or setting. Engineers in industries could not work effectively without the assistance of the technicians. Therefore, metal work technology plays an important role toward the Well being of an industry. This is as a result of the students' participation in the prescribed industrial work experience scheme for a given period of months. It has been observed that teaching in various schools could serve as one of the services rendered by a metal work technologist. Metal work technology students do go for teaching practice and can serve as a teacher who can teach introductory technology or basic technology at junior secondary schools in the country. Nigeria Certificate in Education serves as a minimum qualification to teach at primary and junior secondary school level of education in Nigeria.(National Policy on Education, 2005)

2.9 Components of N.C.E Metal Work Technology are;

The prime components of metal work technology include the following;

i. machine tools
ii. welding and fabrications (Arc and Gas/Acetylene)
iii. foundry work/forging
iv. workshop practice
v. students industrial work experience scheme (SIWES)
vi. general education courses
vii. GSE(gens) courses
viii. technical drawing
ix. teaching practice

In other words TED courses (technical), EDU courses (education), GSE (general studies), SIWES and Teaching practice are the defined components of metal work technology.

Then the graduation requirements for NCE Metalwork Technology are;

* Education----------30 credits

* General Studies----------18 ,,

* Teaching practice----------06 ,,

* Technical courses & Siwes----------64,,

118 credits, FGN (2012) excluding electives

2.10 The Role of Supervision and Evaluation in the implementation of NCE Metalwork Technology Programme.

Educationally, at every level of delivery of learning experiences, there should be regular supervision and evaluation of the learning experiences by the authorities. These authorities could be at the higher level or lower level. Authorities at the higher level refer to the federal / state ministry of education / science and technology, National commission for Colleges of Education, National Commission for Polytechnics, and National Board for Technical Education. While the lower authorities simply recognize the Rector, Provost, Dean, Head of department and sectional head, etc.

Constant supervision of materials and human resources is needed. All instructional facilities should be examined. Adams and Dickey (1953) defined supervision as a consciously planned program for the improvement of instruction. On the other hand, Mgbodle (1986) refers to supervision as a service to help teacher to improve instruction, a process of giving and receiving helps to improve performance and to resolve problems that occur between teacher and students, or activities aimed at influencing the quality of teaching and learning. Also Hogman cited by

Igunnu (2007) sees supervision as those functions of administration concerned with the provision of instructions, its continuation, its overall organization, its general planning and its evaluation.

Supervision is a multifaceted technique, and according to Lawal (2008) the areas of supervision are quite varied:

- Supervision of instructional work:- As a planned programme for the improvement of instruction. Supervision checks the effectiveness of the methods of teaching in a particular institution, the audio-visual aids used to make the teaching interesting and effective, the time-table enforce to carry out the instructional work. It also checks the distribution of work among the members of staff.
- Supervision of co-curricular activities, programming and exhibition. Other activities like games (e.g. napuga) are over viewed since they formed part of education today. The supervision also touches the students undergoing SIWES (students industrial work experience scheme)
- Supervision of school plant / environment: - the physical environments of the institutions are supervised to determine the usefulness of the structures and dilapidated ones, if any. Also laboratory equipment and workshops in engineering and technology are given prompt supervision, more especially by the E.T.F, since the E.T.F do give capital or supply these equipment to higher institutions of learning like colleges of education and polytechnics among others.
- Supervision of school records:- records here simply refer to the records of examination, records of funds, records of students files, records of academics staff and non-academic staff, courses contents / learning experiences planned to disseminate to the learners or

students. All these are to be regularly supervised in order to determine whether they comply with the standards laid by either of the supervisory body (NCCE / NBTE) or not.

- Supervision of developmental aspects:- in respect to any development experienced by the polytechnic or college of education, supervisory activity should take place for acknowledgement, recommendations and decision-making. The prime essence of supervision is to ensure proper well being of dissemination of all the three educational taxonomies (cognitive, affective and psychomotor domain). Supervision also ensures that public funds are put into proper use in the polytechnics and colleges of education.

Supervision enables the appropriate authorities (federal, state ministry of education and their agencies to know how well the school is functioning. Supervision also helps to attract grants-in-aids from philanthropies. So, for the polytechnics and colleges of education to excel in terms of good delivery of the content of the curriculum, proper and constant supervision and evaluation of the implementation processes should be x-rayed.

Evaluation is the process by which relevant data are collected and transferred into information for decision making (Alkin 1970). Bloom and others (1956) also viewed evaluation as the systematic collection of evidence to determine whether in fact certain changes are taking place in the learners as well as to determine the amount of degree of change in individual student. Another definition was given by Gronlund (1976), from an instructional stand point, evaluation may be defined as a systematic process of determining the extent to which instructional objectives are achieved by pupils. The two definitions tend to conceive as their central focal point, the goals of evaluation

According to Doggoh (2007: 18) curriculum implementation is the process of putting into actual practice what has been planned in the curriculum. Actually, it is at this stage that the aims and

objectives, the curriculum content, learning experiences and principles are practically pursued to actualization by passing them through the learners and enhancing changes within the learner`s behavior. The practice is always carried out by the institution via the teachers. Indeed, failure of curriculum implementation process usually portrays doom for the curriculum and automatically the entire education system as a whole.

Also, Yunusa (2008) in his book,"Issues on Curriculum", stated that curriculum implementation simply refers to the actual carrying out politics and changes spelt out in the new curriculum. For any curriculum plan or innovation to become fully meaningful, it must be adequately implemented, (Yunusa 2008). The success is determined by the way or how it is implemented. Yunusa (2008) determined three basic Models of curriculum implementation.

i. **Centre periphery model**. He noted that the centre periphery model of implementation is centrally controlled either by the government or agency. The training facilities, resources required, experts that monitor the implementation regularly are all centre periphery model of curriculum implementation of work effectively, there is need for adequate communication network, effective supply of materials and a constant monitoring of feedback for the periphery. An example of education trust fund (ETF)

ii. **Proliferation of centre model:** This model maintains that in implementation there should be both primary and secondary implementation centres. The primary centres are responsible for managing the secondary centre. They provide them with training materials and the resource needed. The secondary centres engage in diffusing or spreading the changes in their individual area of control. This resemble what we have in the National primary Educational Commission means the primary school boards in

the states, while the state Universal Basic Education Boards co-ordinates the affairs in the various Local Governments and send feedback to the commission at the national level.

iii. **Shifting centre Model**: This involves the implementation of an innovation or change/review in a particular place at a time. The idea dies off. Later another locality embraces the innovation and implements it in its own way. This may continue from place to place. This is typically a reflection of the universal primary education (UPE) scheme in Nigeria. It has been acknowledged that in 1954, UPE was introduced in the western region, eastern region in 1959 but with some modifications, then in the year 1973, the Federal Government of Nigeria introduced in it National wide. It has been noted that the experiment in both The West and Eastern regions operated independently. Theseconcepts of curriculum implementation of (Yunusa 2008), is in line with Donald Schon (1971)

There are participant of curriculum implementations within and outside the school. Participants within the school include Local schools board of education, principal / headmasters, teacher / lecturer supportive / non teaching staff parent teacher Association, and the learners / pupils / Students. The teacher is the "decomposer" of the curriculum from its broad, complex, and unwieldy nature to its most simple and behaviourally attainable bits at the classroom level. That is why it has been said that the classroom teacher is the principle executive of any functional curriculum. Without him, there can hardly be any effective curriculum plan and its implementation.

The success for curriculum implementation is determined when;

i. The number of schools implementing the curriculum is limited and the objectives and techniques are few and clearly defined with minimum disruption.

ii. The support of parents, funding agencies and school boards is highly essential for and school board is highly essential for successful implementation of any new curriculum.

iii. The required facilities meant for the implementation are properly generated and utilized as stipulated.

iv. An effective leadership is acquired and projects that are most successful are those whose leadership is committed through the entire program right from inception, and throughout implementation.

v. The less complexity the schools structure is the more likely chances of successful implementation of any viable curriculum innovation in any given institution.

vi. The curriculum innovation that requires major changes in teacher behavior are usually discontinued or poorly implemented. The curriculum innovation that desire to succeed must make minimal and realistic demands on teacher.

Therefore, in implementing the curriculum of the metal work technology, all the learning experiences / contents of the curriculum should be fully acknowledged and implemented in order to achieve what is set to be achieved. In addition to that, Yusuf (2012: 182) noted that "*curriculum materials if creatively, efficiently and effectively used, will enhance learning, improve the teacher's competence and also make learning more meaningful"*.

2.11 Teaching Methods in Technical Education Courses

In disseminating the learning experiences to the students at NCE level, a selection (as appropriate to the students and the topic being treated) is recommended from the strategies for

teaching general education courses, NCCE (2012), and for the purpose of practicalizing theory and enhancing students skills development. It should be emphasized here, as well as stipulated in EDU 113(practicum in classroom management and school organization), also in EDU 214 (introduction to research methods) and most importantly, the practical in TED courses(technical courses). Also lecturers are advised to discard the habit of exclusive reliance on one instructional technique and adopt, rather, the practice of using a combination of two or more techniques that match the students and content they are teaching.

But, in line with the method of instruction in metal work technology, series of method of teaching include:

i. lecture method
ii. practical, excursions, field trips
iii. seminars, tutorials and group discussion
iv. micro-teaching
v. team teaching
vi. unit teaching and modular instruction
vii. group and individual project method / community service / work experience / enquiry method
viii. discussion method
ix. Individualized instruction (e.g. programmed instruction / computer-assisted instruction / learning and any other professionally recognized teaching procedure, national minimum standard for NCE (2012).

2.12 The Role of Instructional Materials in the implementation of NCE Metalwork Technology Curriculum

The following are some of the instructional materials for teaching metal work technology; Standard work bench vices, lathe machine, pillar / table drilling machine, grinding machine, forge, welding machine (arc and gas/acetylene), bench shears, files (assorted), try square, micrometer screw gauge, venier caliper, spring divider, hammer (assorted), anvil, scribers, stakes (assorted), taps and dies, wing divider, odd leg caliper, steel rule, snips, drill bits (assorted), hack saw frame and blades, buffing disc, oil cans, folding and bending machines, shaping machine, milling machine, foundry and forging tools, and venier protractor, NCCE (2012)

Other instructional material includes materials under technical drawing and that of educational technology. In addition to that, metal work technology work shop and first aid accessories remain part and parcel of the instructional materials.

2.13 Roles of National Board for Technical Education (NBTE)

The National Board for Technical Education (NBTE) was established by the decree No 9 of January, 1977 by the Federal Government of Nigeria to co-ordinate all aspects of technical education falling outside the university to ensure that good quality technical man power are provided in adequate numbers to service all sectors of the economy. The functions of the board were;

1. make recommendations on the policy necessary for the training of technicians, craftsmen and the middle level and skilled manpower.
2. determine (after consultation with the national board, industrial training fund) and other bodies as it considers appropriate skills and needs of the country in the industrial, commercial and other relevant fields for the purpose of planning; training

facilities and in particular to prepare a periodic master piece for the balanced and coordinated development of the polytechnics and colleges of technology. Such should includes;

i. general program to be pursued by polytechnics in order to maximize the use of available facilities and avoid unnecessary duplication while ensuring.

ii. Recommendations for the establishment and location of new polytechnics and as when considered necessary.

3. Inquire into an advice the federal government on financial needs, but recurrent and capital of polytechnics and other technical institutions to enable them meet the objectives of producing the trained man power needs of the country.
4. To receive block grants from the federal government and allocate them to polytechnics in accordance with such formula may be laid down by the federal executive council.
5. To act as an agency for channeling all external aids to polytechnics in Nigeria.
6. To advice and take steps to harmonize entry requirement and duration of courses at technical institutions.
7. To laid down standards of all skills to be obtained and how to continually receive such standards as necessitated by technological and national needs,
8. To receive methods of assessment of students and trainees and to develop scheme of national certificate for technicians, craftsmen and other skilled personnel in collaborations with ministries and organizations having technical programs.
9. To undertake periodic review of the terms and condition of service of personnel in polytechnics and to make recommendations there on to the federal government.

10. To collate, analyze and publish information relating to technical and vocational education.
11. To consider any matter pertaining the technical or technological education as may be referred to it from time to time by the minister.
12. To carry out such other activities as are conducive to the discharge of its functions in addition to the above in paragraph 1 and 2 of the education (National Minimum Standard) Decree 16 of August 1985 confers additional responsibilities as follows;
    i. responsible for establishment of minimum standard in the polytechnics, technical colleges and other technical institutions in the country. This shall be vested by the minister after consultations. The NBTE shall have responsibility for the maintenance of such standard.
    ii. The NBTE has power to accredit programs of all institutions mentioned in sub section (1) above for the purpose of award of National Certificates and Diplomas and other similar awards and for entry into National and Zonal examination in respect of such institutions.

During the preparation for the Third National Development Plan,

1975-80, the objectives for education were stated as follows: -

a. To expand facilities for education aimed at equalizing individual access to education throughout the country;
b. To reform the content of general education to make it more responsive to the socio-economic needs of the country;
c. To make an impact in the areas of technological education so as to meet the growing needs of the economy;

d. To consolidate and develop the nation's system of higher education in response to the economy's manpower needs;

e. To streamline and strengthen the machinery for educational development in the country; and

f. To rationalize the financing of education with a view to make the educational system more adequate and efficient, national board for technical education, minimum standard for polytechnics (2010).

The Federal Government also identified the acute shortage to technical manpower as a major constraint towards the execution of the development plan. In response to this, government in 1972 established the then National Science and Technology Development Agency (which later metamorphosed to Federal Ministry of Science and Technology) which set up a working Committee on Scientific and Technical manpower and science Education. The Committee produced a report on middle-level technical manpower and their training. Some of the Committee's recommendations included the following:

a. In order to have a nationally accepted standard in technical education, there should be harmonization of the entry qualifications and diploma standards throughout the nation;

b. In order to eliminate the non-uniformity in natural diplomas issued by existing college of technology, there should be a national certificate in technical education

c. In order to attract the right kind of staff to the technical colleges (now polytechnics) there should be a harmonization of technical staff standards including staff structure, remuneration and conditions of services.

d. In view of the fact that courses in many technical field from which the Development Plans need to draw manpower at the middle-level are not provided for in our existing

colleges, there should be expansion of the courses and facilities in these colleges; and new colleges should take into account the required courses in planning their program;

e. In view of the gaps in the admission capacity and actual enrolment for the existing courses in the technical colleges (now polytechnics) there should be full utilization of these facilities through a review of the admissions policy, including part-time admission, and massive awards of technical scholarships;
f. In order to encourage more enrolment in technical courses, more avenues for practical experience s for newly qualified trainees in public and private industries using, if necessary, the facilities of the Industrial Training Fund, FGN (2010)

The Committee further recommended that a national board for technical education be created which should be charged with the implementation of its recommendations. In August, 1985 and January 1993 respectively, the Federal government enacted Act 16 (Education (National Minimum Standards and Establishment of Institutions) (Amendment) Act). With these Acts, the functions of the Board were extended to include accreditation of academic programs in all Technical and Vocational Education (TVE) institutions. Act No.9 of 1st January 1993 further empowered the Board to recommend the establishment of private polytechnics and Monotechnics in Nigeria.

The National Board for Technical Education is a principal organ of Federal Ministry of Education specifically established to handle all aspect of technical and vocational educations falling outside university education. In addition to providing standardize minimum guide chronicle for technical and vocational education and training (TVET), the board supervision and

regulates, through an acceleration process, the program offered by technical institutions at secondary and post secondary levels. It is also involved with the funding of polytechnics owned by the federal government of Nigeria.

The National Board for Technical Education stated vision is to uphold ideal of a free, united and egalitarian society and promote good quality technical and vocational education: for the purpose of producing competent and relevant technological manpower, needed for sustainable national development. Indeed, the NBTE stated mission is to promote the production of skilled/semi skilled technical and professional manpower to revitalize, and sustain the national economy, induce unemployment and puberty through the setting and maintenance of high standards, provision of current and reliable information for planning and decision making, sourcing and disbursing of funds and adequate linkages with industry. This clearly indicated that the government established as acknowledged the establishment of polytechnics but less emphasis on frequent evaluation of their curriculum content to see if there is any need to revived as change or modify some aspect to compete with the present globalization.

2.14 Relevance of Students' Industrial Work Experience Scheme/Students Work Experience Programme.

Engineering and technology education programme which incorporated vocational and technical education, is the key to economic and societal development of any nation, since it cannot be divorced from any aspect of present day and of the human activities. Kofoworola (2003) noted that in Nigeria, engineering students gain exposure to professional engineering practice through the SWEP and SIWES. SWEP stands for 'Students Work Experience Programme'. This kind of programme is usually conducted within the student`s local university at the end of the second

year and last for four – six weeks and it constitutes part of the requirements for the award of an engineering and technology education degree in most of the universities of technology.

The student's industrial work experience scheme is the exercise supervised by the Industrial Training Fund (ITF). The objectives of the SIWES are outlined by ITF (1994) includes;

1. to expose students to work method not taught in institution and provide access to production equipment not normally available in the college environment
2. to provide students with an opportunity to apply his knowledge in a real situation thereby bridging the gap between college work and actual practice in an establishment or industry.
3. To access the interest of the students in a suitability for the occupation he has chosen
4. To enhance industry`s satisfaction with diplomats of the institutions.
5. To enlist and strengthen employers involvement in industrial activities and in the entire educational process of preparing the students for employment in industry.
6. To make transition from school to the world of work easier and to enhance student for later job placements.

In view of the stated objectives, Dicker (1985) observed that liaison between industry and the school has beenfound useful in several countries. But this cordial bond has been absolutely absent in thecontext of Nigerian situation.

According to Atsumbe (2004) SIWES programme which was designed to familiarize trainers with the world of work and give them required skills necessary for employment or self-employment, is fast degenerating. Prior to that, Mbata (1990) claimed that the programme has fallen short of expectation as a result of poor co-ordination between industry and training

institutions. Also, Olaitan (1992) further lamented that the programme has seriously suffered from inadequate supervision of students by the institutions and industrial personnel which has led to the failure of the programme to backup training of students with relevant job experience. Nevertheless NCE metalwork technology is one of those courses that require its students to go for SIWES before graduation.

2.15 Relevance of Information and Communication Technology to Metalwork Technology

Grabe and Grabe (2007) noted that in the year 1947, an instructional materials production centre was established in Ikeja Lagos. Unesco Sported Nigeria in introducing the internet to the country. This project was named regional informative network for Africa (RIWA) project. This was the first attempt in which Nigeria had experience of new information age. And it came into being at late nineteen century. It has been noted that an electronic network workshop was held at the late Chief ObafemiAwolowo University Ile ife and further gave birth to the Nigeria internet Gray (NIG) which carried out the campaign for internet connection, even though it was a non-governmental organization.

But initially it was observed that in the years 1450 AD significantly marked the revolution of informational technology. John Galten berg invented a printing press. This invention gave rise to the age of book and prompts the printing of the Holy Bible within the years 1456 AD the issue of preserving information came into being during this age and missionaries accelerated the expansion of information technology in Nigeria. Emphasis was made in the use of visual aids like slides charts, maps, film strips, and inclusively audio tapes. Certainly, it wouldn't be void

that the first radio station began in Lagos. The station expatiate the level of information dissemination throughout the Lucky (1984) viewed information technology as the acquisition, processing, storage and disseminating of vocal, pictorial textual and numerical information by microelectronic based combination of computing and telecommunication. In view of the above definition, therefore, information and communication technology can be defined as storage as well as dissemination of all forms of information by Micro-electronics.

Meanwhile, the Nigerian National policy on information technology (I.T.2001) posits that information and communication technology serve as the bedrock of national survival and development in a rapid changing global environment and further more defined it in two ways:

- Information and communication technology means computer auxiliary equipment, software and hardware and similar procedures, service (including support services) and related resources.
- The second definition goes like this, information and communication technology includes any equipment or inter-connected system or sub-system of equipment that is used in the automatic acquisition storage, manipulation, management, or reception of data.

As observed by Adeweyin (1991) the use of information technology gradually evolved the use of visual aids when dates back to ancient time to introduction of mechanical gadgets like projector, radio, films, television, computers, satellite, internets and e-mail. Presently, the information and communication technology play a vital role in almost every disciplines or areas of specialization. In other words, the I.C.T is growing rapidly and massively reflecting every aspect of human Endeavour, educationally, economically, politically socially, religiously, as well as technically. The information and technology has generally turned the world into a global village. The development and the role of information and communication technology in educational sector

normally set the pace for any form of innovation and changes. James (1996) observed that the shifting winds of change in today's educational environment have made information system school on target to meet its educational goals. So, if the various polytechnics would have similar accessibility just as most of the universities have, the labour market needs will match with the implemented technical curriculum in those polytechnics.

This view is in line with Grabe and Grabe (2007) who posit that technology can play a role in students' skill, motivation and Knowledge. They claim that information and communication technology have vital role to play in technical trades and curriculum implementation in polytechnics in order to suit the labour market needs. Information and communication technology can be used to present information to students and help them complete their learning tasks.

2.16 Empirical Studies

Ofuha, (2011), in her research "Assessment of the Implementation of the Secondary School Skill-based Curriculum t o Youth Empowerment in Nigeria" put emphasis on the post-primary level of education instead of the higher level of learning. The set objectives were on the identification of practical (entrepreneurial) skills students have learnt in school with which they can create self-employment. The final objectives was entrepreneurial capability i.e. products and services. Students can successfully produce/market on their own. She further recommended that students should be encouraged to have interest in the skill-based (vocational and technical) subjects which metalwork technology is deeply inclusive. And with reference to the unemployment rate in Nigeria, the federal government should encourage entrepreneurship by ensuring constant power supply in the country. The government should encourage real practical work not alternative to practical. Teachers should be supported towards continuous professional

development and motivation. This study "an assessment of the implementation of the NCE metalwork technology curriculum is undertakenin relation to above study by Ofuha, (2011).

Ogundola (2010), in his research "Effect of Constructivism Instructional Approach on Teaching Practical Skills to Mechanical Related Trade" used the report made by the Federal Ministry of Education (1993). In the report, the federal government reports on the technical colleges revealing that students in technical colleges are always put-off or not been interested in vocational and technical education, because of the non-motivating and unchallenging methods and approach as used by their teachers. The researcher restricted his work on the method of imparting knowledge only, neglecting other co-related aspects like 'the quality of learning experiences/content, quality of teachers, availability of instructional materials, supervision and evaluation. Certainly, there is a need to assess the implementation of NCE metalwork technology curriculum in polytechnics and colleges of education in Kaduna state.

Stephanie (2009), in their research "within the context of education for sustainable development (ESD)", stressed that "current education must be transformed to be inclusive, protective, democratic and child-centred" and it is important "to uphold a vision of quality and access to education for all" "within the context of education for sustainable development (ESD)", which "is particularly well-suited to addressing climate changes in terms of understanding its causes, recognizing its impact, and implementing appropriate response". They highlighted UNICEF's "model for quality education" and other UNICEF Education Initiatives, such as Education in Emergency" that provides "disaster risk education" in more than 25 countries; and "Child Friendly Schools" that include "the promotion of sustainable facilities in schools, including alternative energies, rain water harvesting and school garden". This study reveals the importance

of acknowledgement of child-centred in terms of educational implementation. Therefore, assessing the implementation of NCE metalwork technology curriculum is perhaps a unit of education which requires successful implementation.

Iwuamadi, (2012), in the research "Empirical Analysis of Productivity of Nigerian Power Sector",

reveals that less than 46% of the power sector's plant installed capacity was available for the period under review. The research has shown the reflection of the gross technical insufficiency and technological setback in the power system. According to him, a number of reasons could be adduced to be responsible for this shortfall in performance. In view of the above, it should be known that power generation serves as a factor for successful implementation of any curriculum to be dispensed. The researcher noted that, the role of insufficient operational capacity due to ageing facilities that are poorly maintained on poor service provision is indisputable. Also taken into cognizance if constantly electricity power generation is set, improvement would be acknowledged in the advent of implementation of the metalwork technology curriculum content in the polytechnics and colleges of education particularly in Kaduna state. And the researcher expressed that a routine investigation and evaluation of policies be put in place to periodically ascertain its effectiveness and efficiency.

Atsumber (2012), in their research "Improvement needs of the Theoretical Content of Technical College Mechanical Engineering Craft Practice Curriculum in Nigeria" resulted that there is a gross balance between the 60% mechanical skill content to the 35% theoretical content of technical college mechanical craft practice curriculum. They also noted that the theoretical

content of the curriculum has described as shallow and inadequate. The study also pointed out that as a result of this deficiency; the graduates of this programme suffer unemployment and lack of admission into higher colleges. Nigeria Certificate in Education (metal work technology) is one of those receiving programmes run in the higher colleges. In view of these, the present researcher observed shortfall in terms of technical / mechanical engineering students' enrolment in the higher colleges. Metalwork technology is a course that is closely inter-related with mechanical engineering. Therefore, the assessment of the implementation of NCE metalwork technology curriculum in the polytechnics and colleges of education is in line with the above empirical study.

2.17 Summary

In this chapter, details of the related literature has been discussed includes the theoretical frame work of the study, the roles of science and education technology in Nigeria, significance of science and technology education in relation to the National Policy on Science and Technology, roles of National Commission for Colleges of Education, metalwork technology curriculum implementation, objectives of NCE metalwork technology programme, relevance of metalwork technology, components of metalwork technology, metal work technology curriculum implementation, the learning experiences / content of NCE technical, teaching methods in technical education courses and instructional materials for teaching metal work technology. The chapter also examines the aspect of supervision and evaluation since the content involves teaching and learning, evaluation in metal work technology, types of evaluation, roles of NBTE, relevance of SIWES /SWEP, trends in ICT, the concept of curriculum implementation and lastly the empirical studies about the study.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter focuses on the procedures and methods used in the study of the assessment of the implementation of NCE metalwork technology curriculum in polytechnics and colleges of education in Kaduna State. The chapter outlined the research design, population of the study, sample and sampling techniques, instrument for data collection, pilot study, reliability of the instrument, validity of the research instrument, procedure for data collection and procedure for data analysis.

3.2 Research Design

To assess the implementation of NCE metalwork technology curriculum, a descriptive survey research design has been adopted. Francis (2003) observed that this method enables the researcher to describe an event situation or phenomenon as it is at time of study also help the research to systematically document current opinion and information on research work. In view of this, the descriptive survey research design is appropriately used for this study. Survey design also requires a good deal for research knowledge and sophistication (Nworgu, 1991).The competent survey investigator must know sample questionnaire, and some schedule construction, interviewing, the analysis of data and other technical aspects of the survey. Therefore, in this study, the questionnaire, survey design has been adopted.

3.3 Population of the Study

The population of metalwork students in Federal Polytechnic Kaduna, State College of Education Kafanchan, Nuhu Bamalli Polytechnic, Zaria stood at 747 and metalwork/technical lecturers 152, NCCE officials 313 and NBTE officials 280 bearing a total of 1492.

Table 3.1 Population of the study

S/N	Institutions	metalwork Lecturers	Metalwork Students	Total
1	Federal Polytechnic, Kaduna	122	591	713
2	College of Education, GidanWaya-Kafanchan.	25	146	171
3	Nuhu Bamalli Polytechnic, Zaria	05	10	15
4	National Commission For Colleges of Education, Abuja	Officials 313		313
5	National Board for Technical Education, Kaduna.	Officials 280		280
	Total	745	747	1492

Source: - Statistics units, programme departments and H.O.D`s office of the above institutions.

3.4 Samples and Sampling Techniques

The samples of this study consist of 75 students and 16 lecturers, 31 NCCE officials and 28 NBTE officials, which gives a total of 150 respondents. The selection of this sample sizewas based on a proportional sampling as recommended by Ndagi (1984) in which he states that with proportional sampling, a researcher is able to achieve an even greater representativeness in the sample.

TABLE 3.2 PROCEDURE OF SELECTING A SAMPLE WITHIN EACH STRATUM IN PROPORTIONAL SAMPLING

Population & Sample	Kaduna polytechnic, Kaduna		Kaduna state College of education, Gidanwaya kafanchan		Nuhu Bamalli Polytechnic, Zaria		National Commission for Colleges of Education	National Board for Technical Education	Total
Characteristics	Lecturers	Students	Lecturers	Students	Lecturers	Students	Officials	Officials	
Population in each stratum	122	591	25	146	10	05	313	280	1492
Proportion in each stratum	122/1492 0.08176	591/1492 0.39611	25/1492 0.01675	146/1492 0.09785	10/1492 0.0067	05/1492 0.0033	313/1492 0.2097	280/1492 0.1876	1.50
Number in each stratum to be selected	0.08x150= 12	0.4x150 =60	0.02x150 =3	0.1x150=15	0.01x150 =1	0.00x150= 0	0.21x150=31	0.19x150=28	150

3.5 Instrumentation

The questionnaire, observation schedule and checklist were used for data collection. The questionnaires was in two sections "A" and "B" section "A" consists of personal data of the respondents, this includes age, area of specialization, gender, institution, status, qualification and Teachers Registration Council of Nigeria(TRCN) reg. Section "B" of the questionnaires was based on the research questions stated in chapter one. The questionnaire was for lecturers, NCCE, NBTE Officials and students. There were thirty five (35) items used in the questionnaire (APPENDIX `A`). Also observation schedule and checklist was used as an assessment instrument in the study. The observation schedule and the checklist were merged in APPENDIX B, C and D to facilitate discussion and decision-making.

3.5.1 Validity of Research Instrument

The content validity of the instrument was done. To ensure the effectiveness of this exercise, supervisors as well as lecturers in the curriculum section of Ahmadu Bello University, Zaria were provided with copies of the developed instrument in order to assess and authenticate each item of the questionnaire. Nworgu (1991) suggested that validating instrument requires the service of a panel of experts who ensure that the items correspond with the purpose of the study, research questions as well as hypotheses to be tested.Therefore, the research instrument posses content validity.

3.5.2 Pilot Study

In order to determine the reliability of the instrument for data collection, the researcher conducted a pilot study of ten (10) students and five (05) lecturers, which gave the total of fifteen (15) respondents. Technical students and lecturers were used in Nuhu Bamalli polytechnic, Zaria. The respondents were issued with a copy of the questionnaire each and completed for the purpose of the study. The completed questionnaire were assessed, computed and analyzed.

3.5.3 Reliability of the Instrument

In order to assess the reliability coefficient, the data collected from the pilot study were statistically analyzed. The Cronbach's reliability coefficient was used. Consequently, reliability co-efficient of alpha level of 0.75 was obtained. According to Tuckman (1975), an instrument is said to be reliable when the reliability coefficient can be approximated to one (1). This reliability co-efficient was considered adequate for the internal consistency of the instruments. This was a confirmation of test of reliability according to Spiegel, M. (1992**),** Stevens, J. (1986), Anastasia

and Uzosika (2008). According to them an instrument is considered reliable if it lies between 0 and 1, and that the closer the calculated reliability coefficient is to zero, the less reliable is the instrument, and the closer the calculated reliability co-efficient is to 1, the more reliable is the instrument. So, this shows that the instrument is reliable.

3.6 Procedure for Data Collection

The researcher obtained a letter of introduction from Head of his department for permission before conducting the research. Then administration of the test instrument and data collection was conducted by the researcher and with the help of research assistants who were lecturers and officials from (Kaduna polytechnic, Nuhu Bamalli Polytechnic, Zaria and college of education Gidanwaya, NCCE and NBTE) for the filling of the questionnaires from the respondents.

3.6.1 Procedure for Data Analysis

The summary of the personal data and questionnaires was analyzed using frequency and percentage. Statistical package for social science (SPSS) was used in data analysis and person product moment correlation coefficient was used to test all the null hypotheses at 0.05 level of significant.

In analyzing the responses of the respondents this frequency distribution and percentage method is used. A table is provided in each item or another analyzed. Each table was provided with information and response options on each item, the number of respondents to the item, the frequency, and the corresponding percentages to the frequency. Detailed explanation of the content of each table is given beneath the tables. This was done in chapter four below after collecting and analyzing the data from the respondents of the target stratum. But, since the study

uses survey design, then non-parametric statistic was used in response with the research questions and also tested the hypotheses.

CHAPTER FOUR

PRESENTATION, ANALYSES AND DISCUSSION OF DATA

4.1 Introduction

In this chapter the researcher presented and analyzed the data from his assessment, the chapter covers the results and discussion based on the 150 sampled used in the study. Data analysis was based on the responses received from the sample in the study. The five (5) null hypotheses raised for this study were tested at 0.05 levels of significance. Tables were also used for the presentation of information derived from the analysis.

Also in this chapter, total of one hundred and fifty respondents from Kaduna polytechnic, Nuhu Bamalli Polytechnic, College of education, Kafanchan, NCCE officials and NBTE officials were used. These comprise sixteen (16) lecturers, seventy five (75) students from the institutions as well as fifty nine (59) NCCE and NBTE officials. Below are the analyses of the response collected from the respondents.

Socio-Demographic characteristics of the respondent

In this section, descriptive analyses of the socio-demographic characteristics of the respondents involved in the study were taken into consideration. The demographic variables which includes; status, gender, TRCN reg.: and educational qualification.

Table 4.1 Socio-Demographics characteristics of the respondents.

Demographic Variables of Respondents	Categories	Frequency	Percentage (%)
Status	Lecturers	16	**10.6**
	Students	75	**50**
	NCCE Officials	31	**20.6**
	NBTE Officials	28	**18.6**
Sex	Male	112	**74.6**
	Female	38	**25.3**
Qualification	HND	18	**24**
	B.Ed	31	**41.3**
	M.Ed	16	**21.3**
	Phd	10	**13.3**
Years of experience	1-5	18	**24**
	6-10	29	**38.6**
	11-15	19	**25.3**
	16-above	09	**12**
Teachers` Registration council of Nigeria	Registered	36	**61.0**
	Not Registered	23	**38.98**

Table 4.1 above indicated that 16 (10.6%) out of the total respondents involved in the study were lecturers, 75 (50%) students, NCCE 31 (20.6%),while 28 (18.6%) were NBTE officials.

Also the displayed result of the study shows that out of the total respondents involved in the study, 112 (74.6%) were male while 38 (25.3%) of the respondents were female.

In respect to their educational qualification, there were 18 (24%) of the respondents with HND qualification, 31 (41.3%) of the lecturer were B.Ed holders, 16 (21.3%) out of the total

respondents were masters holders, while 10(12%) was allocated to those with PhD and no professor among the respondents.

In terms of year of experience, 18 (24%) of the total respondents indicated that teachers have working/teaching experience of between 1-5 years, 29 (38.6%) have experience ranging from 6-10 while 19 (25.3%) have experience ranging between 11-16 years and 09 (12%) ranged between 16 years and above experience in the working/teaching profession.

In respect to TRCN registered staff, 36 (61%) emerged, while 23 (38%) of the respondents were not registered with the TRCN.

4.2 Analyses of Responses for Answering Research Questions

Responses used to answer the five research questions of the study were as analyzed in the table 4.2.1 to 4.2.4.

Research Question One: *What is the role of the metal work technology teacher in the implementation of NCE metal work technology curriculum in polytechnics and colleges of education offering metalwork technology in Kaduna state?*

Research Question Two: *What is the role played by institutions' administrators in the implementation of NCE metal work technology curriculum in polytechnics and colleges of education offering metalwork technology in Kaduna state?*

Research Question three: *What is the role of the NBTE at the polytechnics and that of the NCCE at the colleges of education offering NCE metal work technology in Kaduna state?*

To enable the researcher answer these questions, questionnaire item 1 to 12 in appendix 'A' were used. Summary of the responses is shown in the table 4.2.1 below.

Table 4.2.Opinions of the respondents on Research Question One, two & three.

S/NO	Item Description	SA		A		D		SD		UD	
		Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
1	The Curriculum content of metalwork technology is covered within the stipulated period.	18	**12**	59	**39.3**	32	**21.3**	20	**13.3**	21	**14**
2	There are enough metalwork lecturers who are implementing the course in the department.	65	**43.3**	46	**30.6**	26	**17.3**	13	**8.6**	00	**00**
3	Workshops are provided in the school for metalwork practices	93	**62**	42	**28**	15	**10**	00	**00**	00	**00**
4	The lecture time table is rock planned to suit the practical exercise of metalwork course.	47	**31.1**	92	**61.3**	00	**00**	00	**00**	23	**15.3**
5	There is a provision for students' industrial work experiences scheme in the metalwork technology curriculum.	97	**64.6**	46	**30.6**	00	**00**	00	**00**	07	**4.6**
6	Well trained workshop attendants are employed responsible in assisting toward running the metal workshop	76	**50.6**	63	**42**	04	**2.6**	03	**02**	04	**2.6**
7	There is periodic accreditation of the department and courses by the national board for technical education (NBTE) / National Commission for Colleges of Education (NCCE)	78	**52**	42	**28**	20	**13.3**	00	**00**	10	**6.6**
8	The metal workshop is adequately organized in order to train students to acquire middle manpower skills	20	**13.3**	74	**49.3**	35	**23.3**	00	**00**	21	1.4
9	Students are encouraged to participate in metalwork practical.	47	**31.3**	82	**54.6**	21	**14**	00	**00**	00	**00**
10	Education Trust Fund provides funds and facilities for smooth running of the technical education department.	22	**14.6**	31	**20.6**	48	**32**	45	**30**	07	**4.6**
11	Lecturers are encouraged to further their studies on metalwork course.	41	**27.3**	68	**45.3**	28	**18.6**	00	**00**	13	**8.6**
12	There are qualified lecturers in the technical department	84	**56**	66	**44**	00	**00**	00	**00**	00	**00**

The responses in table 3.2 above indicated that 77(51.3%) of the respondents agreed that the Curriculum content of metalwork technology is covered within the stipulated period, 52 (34.6%) disagreed and 21 (14%) remained undecided on the item.

In addition, 111(74%) of the respondents agreed that there are enough metalwork lecturers who are implementing the course in the department, 39(26%) of the respondents disagreed with the item.

In respect to the item that workshops are provided in the school for metalwork practices, 135 (90%) of the respondents agreed while 15(10%) of the respondents disagreed on the item.

On the item which stated that the lecture time table is rock planned to suit the practical exercise of metalwork course, 139 (92.6%) agreed with the item while 11(7.3%) remained undecided with the item.

Considering the item which stated that there is a provision for students' industrial work experiences scheme in the metalwork technology curriculum, 127 (84.6%) of the respondents all agreed with the item, while 23(15.3%) remained undecided.

On the item which stated that well trained workshop attendants are employed responsible in assisting toward running the metal workshop, 139 (92%) of the respondents agreed with the item, 07 (4.6%) disagreed with the item, while only 04 (2.6%) of the respondents was undecided on the item.

But looking at the item that there is periodic accreditation of the department and courses by the national board for technical education (NBTE) / National Commission for Colleges of Education (NCCE), 120 (80%) of the respondents agreed with the item while only 20 (13.3%) disagreed and also 10 (6.6%) of the respondents remained undecided.

Also on the item that the metal workshop is adequately organized in order to train students to acquire middle manpower skills, 94 (62.2%) of the responses read agreed while 35 (23.3%) disagreed and indeed, 21 (14%) of the responses remained undecided.

In addition, on the issue which stated that students are encouraged to participate in metalwork practical, 129 (86%) of the respondents agreed while 21(14%) disagreed.

On the item which stated that Education Trust Fund provides funds and facilities for smooth running of the technical education department, 53 (35.3%) agreed, 93 (62%) of the respondents disagreed with the item while only 04 (2.6%) of them remained undecided.

Considering the item that lecturers are encouraged to further their studies on metalwork course, 109 (72.6%) of the respondents all agreed with the item, while 28 (18.6%) disagreed and only 13 (8.6%) remained undecided.

But, on the item that 'there are qualified lecturers in the technical department 150 (100%) of the respondents agreed with the item.

The table 4.2.1 showed the opinions of the respondents on what is the extent to which the implementation of NCE Metalwork technology curriculum is relevance to the production of competent middle manpower with metalwork skills in the polytechnic and college of education?

Research Question four: *What is the relationship between the use of relevant methods and the implementation of the NCE metalwork technology curriculum in; polytechnics and colleges of education in Kaduna state?*

To enable the researcher answer this question, questionnaire item 13 to 23 in appendix 'D' were used. Summary of the responses is shown in the table 4.2.3below.

Table 4.3 Opinions of the respondents on Research Question Four.

S/NO	Item Description	SA		A		D		SD		UD	
		Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
13	The Head of technical department supervises our metal workshop periodically	63	**42**	59	**39.3**	00	**00**	00	**00**	28	**18.6**
14	There are some difficulties within metalwork courses outline	00	**00**	00	**00**	67	**44.6**	70	**46.6**	13	**8.6**
15	metalwork course is very interesting	74	**49.3**	47	**31.3**	00	**00**	00	**00**	29	**19.3**
16	Many students do change of course to metalwork course	01	**0.6**	00	**00**	51	**34**	00	**00**	98	**65.3**
17	There are fleet of computers in our technical department	02	**1.3**	03	**02**	70	**46.6**	56	**37.3**	19	**12.6**
18	There are functional machine tools in the metalwork workshop	82	**54.6**	63	**42**	05	**3.3**	00	**00**	00	**00**
19	There is provision of sufficient metalwork practical materials for students to exhibit	58	**38.6**	63	**42**	00	**00**	00	**00**	29	**19.3**
20	Metalwork Students do participate in students industrial work experience scheme (SIWES) organized by industrial training fund (ITF)	52	**34.6**	86	**57.3**	00	**00**	00	**00**	12	0.8
21	There is prompt electric power supply in the machine tools workshop	00	**00**	3	**2**	87	**58**	41	**27.3**	19	**12.6**
22	Students are provided with fabrication materials for practical	26	**17.3**	89	**59.3**	13	**8.6**	00	**00**	22	**14.6**
23	Students are encouraged to design and develop practical projects under metalwork	18	**12**	70	**46.6**	42	**28**	00	**00**	20	**13.3**

In respect to the above table while considering the use of relevant methods in the implementation of the NCE metalwork technology curriculum in; polytechnics and colleges of education in Kaduna state, 122 (81.3%) of the respondents agreed that the Head of technical department supervises their metal workshop periodically, while 28(18.6%) of them remained undecided on the item.

On the item which stated that there are some difficulties within metalwork courses outline, 137 (91.3%) of the total respondents disagreed with the item and 13 (8.6%) of the respondents remained undecided. It has been observed that against the item which stated that metalwork course is very interesting, 121(80.6%) of the total respondents agreed with the item and only 29 (19.3%) of the respondents remained undecided.

Also on the item which stated that many students do change of course to metalwork course, 01 (0.6%) agreed with the item, 51 (34%) disagreed, while98 (65.3%) of all the students remained undecided on the item. Consequently, on the item which stated that there are fleet of computers in our technical department, 05 (3.3%) agreed and 126 (84%) of the total respondents disagreed with the item stated, while 19 (12.6%) remained undecided.

Again, on the item which displayed that there are functional machine tools in the metalwork workshop, 145 (96.6%) of the entire respondents agreed with the item mentioned, and 05 (3.3%) disagreed. Similarly, on the item which stated that there is provision of sufficient metalwork practical materials for students to exhibit, 121 (80%) of the respondents agreed with the item while 29 (19.3%) of them remained undecided.

On the item which stated that metalwork Students do participate in students industrial work experience scheme (SIWES) organized by industrial training fund (ITF), 138 (92%) out of the total respondents agreed while 12 (08%) of the respondents remained undecided on the item. On the issue of constant electricity supply in the machine tools workshop, 131 (87.3%) of the respondents disagreed with the item, while 19(12.6%) of the respondents remained undecided.

Considering the item which stated that students are provided with fabrication materials for practical, 115 (76.6%) of the respondents agreed on the item while 13 (8.6%) disagreed and 22 (14.6%) of them remained undecided on the stipulated item.

And on the item which portrayed that students are encouraged to design and develop practical projects under metalwork, 88 (58.6%) of the total respondents agreed with the item, 42 (25%) of them disagreed and 20 (13.3%) of the respondents observed undecided on the item. It shows there is relationship between the use of relevant methods and the implementation of NCE metalwork technology curriculum in polytechnics and colleges of education in Kaduna state.

Research Question Five: *What is the relationship that exists between the availability and proper utilization of instructional materials and the implementation of NCE Metalwork curriculum in the polytechnics and colleges of education?*

To enable the researcher answer this question, questionnaire item 24 to 35 in appendix 'E' were used. Summary of the responses is shown in the table 4.2.4 below.

Table 4.4 Opinions of the respondents on Research Question Five.

S/NO	Item Description	SA		A		D		SD		UD	
		Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
24	There is an information and communication technology center in our departmental library.	00	**00**	60	**40**	31	**20.6**	00	**00**	59	**39.3**
25	Students are exposed to manipulate computers	00	**00**	00	**00**	76	**50.6**	60	**40**	14	**9.3**
26	The lecturers are well-skilled to teach metalwork trade course in the department	58	**38.6**	89	**59.3**	00	**00**	00	**00**	03	**02**
27	Lecturers do supervise students while in Students'	09	**06**	79	**52.6**	03	**02**	06	**04**	59	**39.3**

	industrial work experience scheme (SIWES) at various industries.										
28	Relevant text books are available in the departmental library for metalwork students.	57	**38**	37	**24.6**	00	**00**	00	**00**	56	**37.3**
29	Current reading materials are adequate in the departmental library	11	**7.3**	48	**32**	28	**18.6**	00	**00**	63	**42**
30	All the instructional materials used in the department are relevant to the metalwork course	44	**29.3**	62	**41.3**	12	**08**	10	**6.6**	22	**14.6**
31	Storage facilities for raw materials are provided in the department	43	**28.6**	56	**37.3**	00	**00**	00	**00**	51	3.4
32	The metal workshop is adequate for the acquisition of practical skills	34	**22.6**	91	**60.6**	00	**00**	00	**00**	25	**16.6**
33	The equipment and tools in the metal workshop are adequate to serve the educational purposes.	51	**34**	82	**54.6**	00	**00**	00	**00**	17	**11.3**
34	Safety rules and regulations are placed in the metal workshop in order to protect life and equipment.	45	**30**	86	**57.3**	05	**3.3**	00	**00**	14	**9.3**
35	Students are exposed to the use of ICT in their engineering drawing	00	**00**	00	**00**	53	**35.3**	27	**18**	70	**46.6**

Above table, indicated that out of the total respondents on the item which stated that there is an information and communication technology center in the departmental library, 60 (40%) only of them agreed, 32 (20.6%) of the respondents disagreed while 59 (39.3%) of the respondents remained undecided.

On the item which stated that students are exposed to manipulate computers, 136 (90%) of the respondents disagreed, 14 (9.3%) of the respondents remained undecided on the item.

Considering the item which stated that the lecturers are well-skilled to teach metalwork trade course in the department, 147 (98%) of the respondents agreed with the item, while 03 (02%).

On the item which stated that lecturers do supervise students while in Students' industrial work experience scheme (SIWES) at various industries, 88 (58.6%) out of the total respondents agreed with the item, 09 (6%) of the respondents disagreed with the item while 59 (39.3%) of the respondents remained undecided on the item mentioned. Similarly, on the item which stated that relevant text books are available in the departmental library for metalwork students, 94 (62.2%) out of the respondents ticked agreed with the item and 56 (37.3%) were for undecided portion.

Again, on the item which stated that current reading material are adequate in the departmental library, 59 (39.3%) out of the respondents agreed on them, 28 (18.6 %) of the respondents disagreed while 63 (42%) of them remained undecided on the item.

Also, on the item which stated that all the instructional materials used in the department are relevant to the metalwork course, 106 (70.6%) out of the total respondents on the item agreed,22 (14.6%) disagreed, while 22 (14.6%) out of the respondents remained undecided.

On the item which stated that storage facilities for raw materials are provided in the department, 99 (66%) of the respondents agreed with the item while 51 (34%) of the respondents remained undecided on the item. In respect to the item which portrayed that the metal workshop is

adequate for the acquisition of practical skills, 125 (83.3%) out of the total respondents maintained that they agreed with the item while the remaining 25 (16.6%) of the respondents remained undecided.

Likewise, on the item which revealed that the equipment and tools in the metal workshop are adequate to serve the educational purposes, 133 (88.6%) out of the total respondents agreed while only 17 (11.3%) of the respondents remained undecided on the item.

Again, in respect to the item which stated that safety rules and regulations are placed in the metal workshop in order to protect life and equipment, 131 (87.3%) of the total respondents agreed with the item, 05 (3.3%) disagreed, and 14 (9.6%) of them remained undecided.

Lastly, on the item which stated that students are exposed to the use of ICT in their engineering drawing, 80 (53%) of the respondents disagreed with the item while 70 (46.6%) of the remaining respondents remained undecided.

4.3 Testing of Research Hypotheses

From the findings of this study the five (5) null hypotheses formulated and tested at 0.05 levels of significance were all rejected. Pearson Product Moment Correlation Coefficient was used to test all the hypotheses. The reason in the choice of the statistical method for this study was that it provides an index of measurement of the degree or extent to which variables are related (Francis, 2003). Also, Wiersma (1969) observed that it is the most sensitive measure of relationship between two variables. Similarly, Adegboye (2001) posited that if the sample size is very large (n>30), Pearson and Spearman Correlation Coefficient were the best methods to be adopted. In this analyses, r-critical value was .195 if the r-calculated value is less than or equal to the r-critical, the Null hypotheses cannot be rejected. This implies there is no significance relationship between the two variables. But, if on the other hand, the r-calculated value is greater than the r-

critical value, the Null hypotheses are rejected. This means that, there is significant relationship between the variables.

Null hypothesis 1: *There is no significant relationship between role of the teacher in the implementation of NCE metal work technology curriculum in polytechnics and colleges of education offering metalwork technology in Kaduna state.*

Null hypothesis 2: *There is no significant relationship between the role of the institutions' administrators and the implementation of NCE metal work technology curriculum in polytechnics and colleges of education offering metalwork technology in Kaduna state.*

Null hypothesis 3: *There is no significant relationship between the role of the NBTE at the polytechnics and that of the NCCE at the colleges of education offering NCE metal work technology in Kaduna state.*

Pearson Product Moment Correlation was used to test hypothesis one (1). Respondents stood at 100 with 100 degree of freedom. Results of the finding is presented in table 4.

Table 4.5 Test of Ho 1, 2 and 3

Issue	Mean	S.D	N	r-cal	r-crit	Df	Sig.(2-tailed)
Implementation of metalwork technology	20.2633	4.57820	150	.347	.197	100	.000
Teacher factor, role of institutions' administrators and methods of instructions	17.3241	5.72780					

S.D=Standard Deviation, N=Number of Respondents, r=Coefficient of Correlation, r-crit=r-Critical, Df=Degree of Freedom, Sig.=Probability value

The result revealed that implementation of metalwork technology curriculum had the mean of 20.2633 and standard deviation of 5.57820 while teacher factor, role of institutions' administrators and methods of instructions had the mean of 17.3241 and standard deviation of 5.72780. The r-calculated was .347 and r-critical stood at 0.197. This was also seen in probability value less than the alpha value ($p<0.05$). There, this indicated that there is significant relationship between implementation of metalwork technology curriculum in the polytechnics and colleges of education and the role of the teacher factor, role of institutions' administrators and methods of instructions in the polytechnics and colleges of education in Kaduna state at 0.05 level of significant. Therefore, all the null hypotheses were rejected.

Null hypothesis 4: *There is no significant relationship between the use of relevant methods and the implementation of the NCE metalwork technology curriculum in; polytechnics and colleges of education in Kaduna state.*

Pearson Product Moment Correlation was used to test the relationship between the use of the relevant methods in the implementation of NCE metalwork technology in the polytechnics and colleges of education.

Respondents to questionnaire stood at 150 with 100 degree of freedom. Details of the calculation is in table 4.6

Table 4.6: Test Ho 4

Issue	Mean	S.D	N	r-cal	r-crit	Df	Sig.(2-tailed)
Relevant	19.2423	4.15472	150	.274	.195	100	.000

teaching methods							
Implementation of the curriculum	15.2354	3.62344					

S.D=Standard Deviation, N=Number of Respondents, r=Coefficient of Correlation, r-crit=r-Critical, Df=Degree of Freedom, Sig.=Probability value

Provision of the relevant teaching methods had the mean of 19.2423 with standard deviation of 4.15472 while the mean of Implementation of the curriculum stood at 15.2354 with standard deviation of 3.62344. The r-calculated was .274 and the r-critical value stood at 0.195. This is seen in probability value less than the alpha value (0.000<0.05). This implies that the relevant teaching methods in polytechnics and colleges of education are significantly related with the need for monitoring. The null hypothesis was therefore rejected.

Null hypothesis 5: *There is no significant relationship between the availability, proper utilization of instructional materials and the implementation of NCE metalwork technology curriculum.*

Pearson Product Moment Correlation was used to test the Null hypothesis five. The availability and proper utilization of metalwork instructional materials, and the implementation of NCE metalwork technology curriculum.

Respondents to questionnaire stood at 150 with 100 degree of freedom. This variable had a mean of 20.6443 and standard deviation of 5.26342 against the metalwork technology curriculum implementation with mean of 18.3362 and standard deviation of 3.46211.

Details of the calculation are in table 4.7

Table 4.7: Test Ho 5

Issue	Mean	S.D	N	r-cal	r-crit	Df	Sig.(2-tailed)
Availability of instructional materials	20.6443	5.26342	150	.243	.196	100	.000
metalwork technology curriculum content	18.3362	3.46211					

S.D=Standard Deviation, N=Number of Respondents, r=Coefficient of Correlation, r-crit=r-Critical, Df=Degree of Freedom, Sig.=Probability value

The r-calculated was 0.05 and the r-critical stood at 0.195. This is also seen in probability value greater than the alpha value (0.262>0.05). The result revealed that there is no relationship between the availability, proper utilization of instructional materials and the implementation of metalwork technology curriculum in polytechnics and colleges of education in Kaduna state. The result implies that there is no significant relationship between the availability and proper utilization of instructional materials and the implementation of metalwork technology curriculum in polytechnics and colleges of education in Kaduna state at 0.05 levels of significance. To this end, the null hypothesis which states that there is no significant relationship between the availability, proper utilization of metalwork instructional materials and the implementation of NCE metalwork technology curriculum was rejected.

4.4 Major Findings of the Study

Major findings reveals that students taught using sufficient and relevant facilities in the implementation of NCE metalwork technology curriculum enhances better recapitulations than

implementing the content of the curriculum without taking the sufficient and relevant facilities into consideration. Teaching methods in teaching technical courses are to be taken into cognizance as it involves practical and other defined peculiarities like technical drawing. Another observation includes the absence or inadequately provision of ICT at the departmental levels or sectional levels as the case may be. Also, the issue of supervision and proper evaluation of the implementation of NCE metalwork technology in the polytechnics and colleges of education nationwide should be adequately monitored as the defined exercise surely promote and help to determine development either positive or otherwise. So, absence or poor supervision of programmes in the tertiary level of education compelled for many irregularities or malpractices. The monitoring bodies concerned are to be apt doing in order to curtail any ill-happening in the tertiary education. This study also noticed that there is constant low supply of electricity to the departmental workshops and the in the institutions as well. The machine tools use electricity as their source of power for any practical to be done by the students, or projects, fabrications, and other operations.

The study revealed that;

i. Teacher factor, as a key implementer in the implementation of the NCE metalwork technology curriculum is not adequately and objectively examined to ensure good delivery of the content of the curriculum.

ii. The NCE course content includes practical (psychomotor), and such practicals are not adequately conducted. It only appeared in the time table indicating practical (double periods but are not taken into cognizance.

iii. Majority of these institutions (polytechnics and colleges of education) offering NCE metalwork technology were not having adequate and prompt electricity power supply

to be used particular in the workshops which includes fabrications, foundry and forging and machine shop.

iv. Also it revealed that NBTE has less impact on NCE metalwork programme. The NBTE only emphasized and monitor / supervises the Diploma Programme. And equally revealed that NCCE is responsible for monitoring of any institution offering NCE metalwork technology irrespective of whether it is NCE technical or otherwise. It appeared that the NCE metalwork technology programme is carried out in both polytechnics and colleges of education.

v. TETFUND (Tertiary Education Trust Fund) should be properly utilized by the institutions so that every teacher in those institutions can benefits from the fund. In the course of the analysis, low provision or inadequate provision of instructional materials is noticed during the implementation processes of the NCE metalwork technology curriculum in the polytechnics and colleges of education in Kaduna state. Facilities which include classrooms, offices, laboratories and workshops in these institutions were built mostly by the ETF not state government neither by the institutions' administrators.

4.5 Discussion of Findings

In an attempt to find out the implementation of metalwork technology curriculum in polytechnics and colleges of education in Kaduna state, the result of this study reveals a significant relationship between the stated research question and responses from the respondents. The data collected were categorized into `agreed`, `disagreed` and `undecided`. This was done in order to allow for good analyses of items, better judgment and conclusion. All computations were based on likert scale as earlier mentioned. To achieve the purpose, three specific objectives and

research questions were raised. Data collected were analyzed by the use of simple frequencies and percentages, and correlation was used to test the Null hypotheses.

The first hypothesis, the study revealed that, teacher as a key implementer of the curriculum does always comply with the planned lecture time table in order to ensure that practical are conveyed. And this creates a vacuum in towards achieving desired goals. However, the goals and objectives of metalwork as earlier stated are always reflected. Offorma (2005) noted that, these are laudable goals which if earnestly pursued would produce functional Nigerian citizens who would contribute to the political, social, economic, educational, scientific and technological development of the nation. All these are taken into cognizance in order to assess the implementation of the NCE metalwork technology curriculum in polytechnics and colleges of education offering technical courses. Teacher / lecturer serves as the key implementer of the content of the curriculum. The significant relationship clearly reveals it existence, as such, the hypothesis is therefore rejected.

The second hypothesis, the study revealed that, institutions' administrators were supposed to be having constant monitoring of all the activities undertaken in the implementation of the NCE metalwork technology curriculum in both polytechnics and colleges of education, particularly in Kaduna state. But, due to the fact that rectors in the polytechnics as well as provosts in the colleges of education had a great role to play towards ensuring good delivery and motivating the key implementers of the curriculum, very mild supervision were made according to the response indicated by the respondents. Institutions' administrators serve as co-implementers of the

curriculum content of the curriculum. The significant relationship clearly reveals it existence, as such, the hypothesis is also rejected.

Also, in the third null hypothesis, it was observed in the study that the National Board for Technical Education solely monitors diploma courses in the polytechnics. Even if a polytechnic runs NCE Technical programme, the NBTE has nothing to do with such department in terms of accreditations or other monitoring aspects. But, the National Commission for Colleges of Education was mandated to monitor all NCE Programmes irrespective of whether the programme is carried out in the polytechnics, colleges of education or any higher level of education in Nigeria. Therefore, it has shown that significant relationships exist in all hypotheses discussed above.

In the fourth null hypothesis, the outcomes displayed that there is significant relationship between the use of relevant methods of instruction and the implementation of NCE metalwork technology curriculum in the polytechnics and colleges of education, as a result of that, the null hypothesis was therefore rejected due to the facts that computations and analysis of the data collected proved the decision-taken. The metalwork technology curriculum content requires practical and projects to be carried out by its students, as the methods or pedagogies to be implored need to be taken into account, since relationship exists

In hypothesis five, the outcomes displayed that there is significant relationship between the availability, proper utilization of instructional materials and the implementation of NCE metalwork technology curriculum in the polytechnics and colleges of education, as a result of that, the null hypothesis was therefore rejected due to the facts that computations and analysis of the data collected proved the decision-taken.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the major findings, implications, limitation and suggestions for further studies, it also put forth the conclusion made based on the finding. It is the hope of the researcher that useful recommendation made in the study will be implemented by those concerned (as stated on the significance of the study) in Kaduna state in particular where this study is based and Nigeria in general.

5.2 Summary of the Study

The research study assessed the implementation of the NCE metalwork technology curriculum in the polytechnics and colleges of education in Kaduna state. The population of the study consists of 1492 students and lecturers of Kaduna polytechnic, college of education Gidanwaya, NCCE and NBTE officials.

The study which was divided into five chapters, started with a general introduction, stating the problems, objectives, research questions and hypothesis, purpose of the study, basic assumptions, scope and delimitations of the study were also provided. Relevant literature were taken into cognizance, a theory of education by Dewey, conceptual framework, empirical studies were reviewed. The reviewed literature showed that though there had been some researches on metalwork, little had been done on metalwork at both NCE and polytechnics in Kaduna state.

A descriptive survey research design has been adopted; population of metalwork lecturers / students from the institutions and officials of NCCE officials 313 and NBTE had a total of 1492 respondents. Sample size was based on a proportional sampling as recommended by Ndagi (1984).The samples of this study consist of 75 students and 16 lecturers, 31 NCCE officials and 28 NBTE officials, which gives a total of 150 respondents.

This study made these findings; there are relationships between the role played by the teacher and the implementation of the NCE metalwork technology curriculum in the polytechnics and colleges of education, between the role played by the institutions and the implementation of the NCE metalwork technology curriculum in the polytechnics and colleges of education between the role of NBTE at the polytechnics and that of the NCCE at the colleges of education in Kaduna state, between the use of relevant methods and the implementation of NCE metalwork technology curriculum, and between the availability, proper utilization of the metalwork instructional materials in the polytechnics and colleges of education in Kaduna state

Indeed, the study concluded that all the null hypotheses were objectively rejected and also recommended that government and stake holders on education should put more effort towards proper implementation of the NCE metalwork technology curriculum in the polytechnics and colleges of education in Nigeria at large.

5.3 Conclusion

Having carried out the study on the assessment of the implementation of the NCE metalwork technology curriculum in the polytechnics and colleges of education in Kaduna state, NCCE and the stands of conclusion that all the null hypotheses were objectively rejected and also recommended that government and stake holders on education should put more effort towards proper implementation of the NCE metalwork technology curriculum in the polytechnics and colleges of education in Nigeria at large.

5.4 Recommendations

In view of the finding in this study as enumerated above, it has made it necessary to make some recommendation of certain measures which will help in the supply, acquisition and enhancement of effective implementation of NCE metalwork technology curriculum in polytechnics and colleges of education in Kaduna State and Nigeria in general.

i. The government should employ competent teachers/lecturers who can handle the course very well, because some of the teachers/lecturers were not having teaching qualification. Seminars, conferences and workshops on the relevance of metalwork technology in an instructional situation (machine tools operations) should be mounted by NCCE / NBTE so as to prompt as many teachers as possible because some teachers could not operate some of the available metalwork machines and facilities while some teachers do not know the some machines due to their unavailability in our country. This is mostly affecting those servicing lecturers to the department. Lecturers should be going for attachment on the job training during vocations. With such training, they will be accustomed with the new introduced machine tools that were not in existence

in their institutions. And this issue of attachment by the lecturers was equally suggested by the NBTE Executive Secretary, (Dr. Mas'ud A. Kazaure, 2011).

ii. The administrators of such institutions should pay proper supervisions on all the activities carried out in the institutions. Also, non Governmental Organization (NGO's) should be encouraged towards donating money to technical aspects, since there are prospects in technology and science education. This is because with the knowledge and skills of metalwork technology, the economy of our country would develop. Technology education serves as determining factor for nation's development. Government along cannot shoulder all the responsibilities in the school, there is need for the non- governmental organization to help in running the technical courses, bearing in mind the high cost of materials and equipments in technical courses.

iii. Institutions should always comply with the NBTE and NCCE recommended number of students to be accommodated per session. Proper checking on the usage of the time-table for the dissemination of the curriculum content to the target audiences should be observed. Certainly, will enable the teachers toward meeting the defined aims and objectives for the course or programme of study. The workloads for the NCE Technical Students programme need to be reviewed simply because the courses for a semester are many. Technical students offer 16 to 18 different courses for a single semester.

iv. Method of instruction plays a vital role in dissemination the content of the planned curriculum. Similarly, no matter how well designed NCE metalwork technology curriculum is, it requires a teacher who is prepared for the job to teach the course. A widely held assumption is that teachers with a lot of subject-matter knowledge do

perform more effective job than those with less preparation or commitment. Teacher's preparation certainly enables him to adopt flexible instrument approach to accommodate varied abilities and learning styles.

v. Most of the available metalwork text books used in schools were not the recommended or current ones, meanwhile, recommended text books should be purchased and supplied to the school/departmental library and strict adherence for their use should be made. Computers and ICT centre should be established in metalwork technology section / department. This would give access to both students and lecturers to manipulate those computers and to be able to go with the modern world. Students should spend one year for Students Industrial Work Experience Scheme. If students are forced to do so, the scheme will prepare them to be competent middle manpower with metalwork technology knowledge and skills. With the subsequent training received during this period will surely enable the students to acquire technological skills and attitudes that will be useful to the society and the country at large. The new Gurara Dam (Electricity Generating Station constructed by Kaduna state government), should supply electricity directly to Kaduna polytechnic, Nuhu Bamalli Polytechnic and college of education, kafanchan. This will surely curtail the issue of constant power failure by the present PHCN (power Holdings Company of Nigeria).

5.5 Suggestions For Further Study

A study of this nature can not cover every area; hence the following suggestions for further studies have been made:

i. The study was carried out in polytechnics and colleges of education in Kaduna state. It should be extended to the entire geo-political zones, particularly north-west, since Kaduna state is within the zone.

ii. The study may also be extended to include implementation of B.Ed metalwork technology in polytechnics and colleges of education, technical in the north-west zone of Nigeria.

iii. The assessment of the role of National Board for Technical Education on NCE Technical programme in Nigeria.

iv. More assessment in this field should be conducted by other researchers because there is very little literature in this area.

5.6 Contribution to Knowledge

This study has clearly revealed that the role of NCE metalwork technology teacher in the implementation of NCE metalwork technology curriculum would not be properly achieved unless, emphasis was placed on the availability of practical facilities for NCE students, multiples of practical, elongation of Students Industrial Work Experience Scheme and full participation of lecturers / Teachers Industrial Work Experience Scheme during long vocation. Teacher factor and monitoring bodies are to be rehabilitated.

The study revealed another frontier for curtailing obstacles to the implementation processes by suggesting the use of Gurara Dam to supply required electricity power to the mentioned tertiary institutions as well as providing prompt supervision by the bodies concerned.

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APPENDIX A

QUESTIONNAIRE
AHMADUBELLOUNIVERSITY, ZARIA
FACULTY OF EDUCATION
DEPARTMENT OF EDUCATION

QUESTIONNAIRE ON:

"*Assessment of the Implementation of Nigeria Certificate in Education (Metalwork Technology) Curriculum in Kaduna Polytechnic, Nuhu Bamalli Polytechnic, Zaria and College of Education Gidan waya Kafanchan in Kaduna state.*"

To whom it may concern

This questionnaire is drawn for an academic research and it is geared towards the fulfillment of a thesis work on "assessment of the implementation of the NCE metalwork technology curriculum in Kaduna polytechnic, Nuhu Bamalli Polytechnic, Zaria and college of education Kafanchan in Kaduna state. It is in three segments as shown below.

Please, the following items are designed to provide information for the study. You are requested to respond to all items as stated. Your opinion will be kept and treated confidentially.

Thanks.

AwwalAbdullahi Yahaya
(M. Ed Student)
M.ed/Edu/02119/2008/2009

PART A

PERSONAL DATA

Age: - (a). 16-18 ( ) (b) 19-21 ( ) (c) 22-24 ( )

(d) 25 and above ( )

Area of Specialization (lecturers)……

Year of experience; 1-5 ( ), 6-10 ( ), 11-15 ( ), 16- above ( )

Gender: - (a) Male ( ) (b) Female ( )

Institutions: - (a) Kaduna polytechnic ( ) (b) college of educ. kafanchan ( )

(c) NCCE Official ( ) (d) NBTE Official ( )

Status: - (a). Lecturer ( ) (b) Student ( )

Qualification (lecturer): - (a) HND ( ) (b). B.Ed ( ) (c) Masters ( )

(d) PhD ( ) (e) Professor ( )

Teacher's registration Council of Nigeria "TRCN" (lecturer)

(a) Registered ( ) (b) Not registered ( )

QUESTIONNAIRE RATING SCALE

SCALE	CODE	RATING POINT
Strongly agreed	SA	5
Agreed	A	4
Disagree	D	3
Strongly disagree	SD	2
Undecided	UD	1

Opinions of respondents on the role of a metalwork technology and the implementation of NCE metalwork technology curriculum in the polytechnic / colleges of education, determine the role plyaed by institutions' adminstrators and the implementation of NCE metal work technology curriculum in polytechnics and colleges of education offering

metalwork technology in Kaduna state and the the role of the NBTE at the polytechnics and that of the NCCE at the colleges of education offering NCE metal work technology in Kaduna state.

S/N	Item	SA	A	D	SD	UD
1	The Curriculum content of metalwork technology is covered within the stipulated period.					
2	There are enough metalwork lecturers who are implementing the course in the department.					
3	Workshops are provided in the school for metalwork practices					
4	The lecture time table is rock planned to suit the practical exercise of metalwork course.					
5	There is a provision for students' industrial work experiences scheme in the metalwork technology curriculum.					
6	Well trained workshop attendants are employed responsible in assisting toward running the metal workshop					
7	There is periodic accreditation of the department and courses by the national board for technical education (NBTE) / National Commission for Colleges of Education (NCCE)					
8	The metal workshop is adequately organized in order to train students to acquire middle manpower skills					
9	Students are encouraged to participate in metalwork practical.					
10	Education Trust Fund provides funds and facilities for smooth running of the technical education department.					
11	Lecturers are encouraged to further their studies on metalwork course.					
12	There are qualified lecturers in the technical department					

Opinions of the respondents on the use of relevant methods and the implementation of NCE metalwork technology curriculum.

13	The Head of technical department supervises our metal workshop periodically					
14	There are some difficulties within metalwork courses outline					
15	metalwork course is very interesting					
16	Many students do change of course to metalwork course					
17	There are fleet of computers in our technical department					
18	There are functional machine tools in the metalwork workshop					
19	There is provision of sufficient metalwork practical materials for students to exhibit					
20	Metalwork Students do participate in students industrial work experience scheme (SIWES) organized by industrial training fund (ITF)					
21	There is prompt electric power supply in the machine tools workshop					

22	Students are provided with fabrication materials for practical					
23	Students are encouraged to design and develop practical projects under metalwork					

Opinions of respondents on the availability, proper utilization of instructional materials in implementing NCE Metalwork curriculum in the polytechnic and college of education.

24	There is an information and communication technology center in our departmental library.					
25	Students are exposed to manipulate computers					
26	The lecturers are well-skilled to teach metalwork trade course in the department					
27	Lecturers do supervise students while in Students' industrial work experience scheme (siwes) at various industries.					
28	Relevant text books are available in the departmental library for metalwork students.					
29	Current reading materials are adequate in the departmental library					
30	All the instructional materials used in the department are relevant to the metalwork course					
31	Storage facilities for raw materials are provided in the department					
32	The metal workshop is adequate for the acquisition of practical skills					
33	The equipment and tools in the metal workshop are adequate to serve the educational purposes.					
34	Safety rules and regulations are placed in the metal workshop in order to protect life and equipment.					
35	Students are exposed to the use of ICT in their engineering drawing					

APPENDIX B

Observation schedule and checklist to facilitate the assessment of the implementation of the NCE metalwork technology curriculum in;

Kaduna polytechnic

S/N	Items	Available	Not Available	Yes	NO
1	Lecturers with PhD under metalwork Technology	✓			
2	Lecturers with MEd under metalwork Technology	✓			
3	Lecturers with B.Ed Tech under metalwork Technology	✓			
4	Lecturers with B.Eng.	✓			
5	Lecturers with HND		✓		
6	Is there any metal workshop in the department?			✓	
7	Is the metal workshop functional?			✓	
8	Are there machines in the workshop working effectively?			✓	
9	Is there any on-going practical during this observation?			✓	
10	Are there enough practical materials for the students?				✓
11	What is the availability of practical materials?	✓			
12	What is the availability of machine tools in the workshop?	✓			
13	Does the departmental library have recent and relevant reading materials?			✓	
14	Is there constant electric power supply in the metalwork shop?				✓
15	Are there available numbers of metalwork shop attendants?			✓	

APPENDIX C

Observation schedule and checklist to facilitate the assessment of the implementation of the NCE metalwork technology curriculum in;

Nuhu Bamalli polytechnic, Zaria.

S/N	Items	Available	Not Available	Yes	NO
1	Lecturers with PhD under metalwork Technology		✓		
2	Lecturers with MEd under metalwork Technology	✓			
3	Lecturers with B.Ed Tech under metalwork Technology	✓			
4	Lecturers with B.Eng.		✓		
5	Lecturers with HND		✓		
6	Is there any metal workshop in the department?				✓
7	Is the metal workshop functional?				✓
8	Are there machines in the workshop working effectively?			✓	
9	Is there any on-going practical during this observation?			✓	
10	Are there enough practical materials for the students?			✓	
11	What is the availability of practical materials?	✓			
12	What is the availability of machine tools in the workshop?	✓			
13	Does the departmental library have recent and relevant reading materials?				✓
14	Is there constant electric power supply in the metalwork shop?				✓
15	Are there available numbers of metalwork shop attendants?			✓	

APPENDIX D

Observation schedule and checklist to facilitate the assessment of the implementation of the NCE metalwork technology curriculum in;

College of Education GidanWaya, Kafanchan

S/N	Items	Available	Not Available	Yes	NO
1	Lecturers with PhD under metalwork Technology	✓			
2	Lecturers with MEd under metalwork Technology	✓			
3	Lecturers with B.Ed Tech under metalwork Technology	✓			
4	Lecturers with B.Eng.		✓		
5	Lecturers with HND		✓		
6	Is there any metal workshop in the department?	✓			
7	Is the metal workshop functional?	✓			
8	Are there machines in the workshop working effectively?				✓
9	Is there any on-going practical during this observation?			✓	
10	Are there enough practical materials for the students?				✓
11	What is the availability of practical materials?		✓		
12	What is the availability of machine tools in the workshop?		✓		
13	Does the departmental library have recent and relevant reading materials?				✓
14	Is there constant electric power supply in the metalwork shop?				✓
15	Are there available number of metalwork shop attendants				✓

The above result obtained from these institutions shown that proper provision of practical materials should be taken into cognizance. Also separate metal workshop need to be constructed for effective implementation of the metalwork technology curriculum

APPENDIX E

TABLE SHOWING METHOD OF SELECTING A SAMPLE WITHIN EACH STRATUM IN PROPORTIONAL SAMPLING

Population & Sample	Kaduna polytechnic, Kaduna		Kaduna state College of education, Gidanwayakafanchan		Nuhu Bamalli Polytechnic, Zaria		National Commission for Colleges of Education	National Board for Technical Education	Total
Characteristics	Lecturers	Students	Lecturers	Students	Lecturers	Students	Officials	Officials	
Population in each stratum	122	591	25	146	10	05	313	280	1492
Proportion in each stratum	122/1492 0.08176	591/1492 0.39611	25/1492 0.01675	146/1492 0.09785	10/1492 0.0067	05/1492 0.0033	313/1492 0.2097	280/1492 0.1876	1.50
Number in each stratum to be selected	0.08 x150=12	0.4x150 =60	0.02x150 =3	0.1x150=15	0.01x150 =1	0.00x150=0	0.21x150=31	0.19x150=28	150

From the above 150 stands as sample of this study

APPENDIX F

Socio-Demographic characteristics of the respondent

In this section, descriptive analyses of the socio-demographic characteristics of the respondents involved in the study were taken into consideration. The demographic variables which includes; status, gender, t.r.c.n reg., and educational qualification.

Table 3.1 Socio-Demographics variables of the respondents.

Demographic Variables of Respondents	**Categories**	**Frequency**	**Percentage (%)**
Status	Lecturers	16	**10.6**
	Students	75	**50**
	NCCE Officials	31	**20.6**
	NBTE Officials	28	**18.6**
Sex	Male	112	**74.6**
	Female	38	**25.3**
Qualification	HND	18	**24**
	B.Ed	31	**41.3**
	M.Ed	16	**21.3**
	Phd	10	**13.3**
Years of experience	1-5	18	**24**
	6-10	29	**38.6**
	11-15	19	**25.3**
	16-above	09	**12**
Teachers` Registration council of Nigeria	Registered	36	**61.0**
	Not Registered	23	**38.98**

APPENDIX G

Table 3.2 Opinions of respondents on the implementation of NCE Metalwork technology curriculum and preparation of competent middle manpower with metalwork technology knowledge and skills in the polytechnic / colleges of education, determine the role of the teacher in the implementation of NCE metal work technology curriculum in polytechnics and colleges of education offering metalwork technology in Kaduna state and the relationship between the role of the NBTE at the polytechnics and that of the NCCE at the colleges of education offering NCE metal work technology in Kaduna state.

S/NO	Item Description	SA		A		D		SD		UD	
		Freq	%	Freq	%	Freq	%	Freq		Freq	%
1	The Curriculum content of metalwork technology is covered within the stipulated period.	18	**12**	59	**39.3**	32	**21.3**	20	**13.3**	21	**14**
2	There are enough metalwork lecturers who are implementing the course in the department.	65	**43.3**	46	**30.6**	26	**17.3**	13	**8.6**	00	**00**
3	Workshops are provided in the school for metalwork practices	93	**62**	42	**28**	15	**10**	00	**00**	00	**00**
4	The lecture time table is rock planned to suit the practical exercise of metalwork course.	47	**31.1**	92	**61.3**	00	**00**	00	**00**	23	**15.3**
5	There is a provision for students' industrial work experiences scheme in the metalwork technology curriculum.	97	**64.6**	46	**30.6**	00	**00**	00	**00**	07	**4.6**
6	Well trained workshop attendants are employed responsible in assisting toward running the metal workshop	76	**50.6**	63	**42**	04	**2.6**	03	**02**	04	**2.6**
7	There is periodic accreditation of the department and courses by the national board for technical education (NBTE) / National Commission for Colleges of Education (NCCE)	78	**52**	42	**28**	20	**13.3**	00	**00**	10	**6.6**
8	The metal workshop is adequately organized in order to train students to acquire middle manpower skills	20	**13.3**	74	**49.3**	35	**23.3**	00	**00**	21	**14**
9	Students are encouraged to participate in metalwork practical.	47	**31.3**	82	**54.6**	21	**14**	00	**00**	00	**00**
10	Education Trust Fund provides funds and facilities for smooth running of the technical education department.	22	**14.6**	31	**20.6**	48	**32**	45	**30**	07	**4.6**
11	Lecturers are encouraged to further their studies on metalwork course.	41	**27.3**	68	**45.3**	28	**18.6**	00	**00**	13	**8.6**

12	There are qualified lecturers in the technical department	84	**56**	66	**44**	00	**00**	00	**00**	00	**00**

APPENDIX H

Table 3.3 Opinions of the respondents onto what extent does the delivery of NCE metalwork technology curriculum content enhances industrial purposes or world of work?

S/NO	Item Description	SA		A		D		SD		UD	
		Freq	%	Freq	%	Freq	%	Freq		Freq	%
13	The Head of technical department supervises our metal workshop periodically	63	**42**	59	**39.3**	00	**00**	00	**00**	28	**18.6**
14	There are some difficulties within metalwork courses outline	00	**00**	00	**00**	67	**44.6**	70	**46.6**	13	**8.6**
15	metalwork course is very interesting	74	**49.3**	47	**31.3**	00	**00**	00	**00**	29	**19.3**
16	Many students do change of course to metalwork course	01	**0.6**	00	**00**	51	**34**	00	**00**	98	**65.3**
17	There are fleet of computers in our technical department	02	**1.3**	03	**02**	70	**46.6**	56	**37.3**	19	**12.6**
18	There are functional machine tools in the metalwork workshop	82	**54.6**	63	**42**	05	**3.3**	00	**00**	00	**00**
19	There is provision of sufficient metalwork practical materials for students to exhibit	58	**38.6**	63	**42**	00	**00**	00	**00**	29	**19.3**
20	Metalwork Students do participate in students industrial work experience scheme (SIWES) organized by industrial training fund (ITF)	52	**34.6**	86	**57.3**	00	**00**	00	**00**	12	0.8
21	There is prompt electric power supply in the machine tools workshop	00	**00**	3	**2**	87	**58**	41	**27.3**	19	**12.6**
22	Students are provided with fabrication materials for practical	26	**17.3**	89	**59.3**	13	**8.6**	00	**00**	22	**14.6**
23	Students are encouraged to design and develop practical projects under metalwork	18	**12**	70	**46.6**	42	**28**	00	**00**	20	**13.3**

08

APPENDIX I

Table 3.4 Opinions of the respondents onto what extent does the availability and proper utilization of instructional materials helps in implementing NCE Metalwork curriculum in the polytechnics and colleges of education offering technical courses?

S/NO	Item Description	SA		A		D		SD		UD	
		Freq	%	Freq	%	Freq	%	Freq		Freq	%
24	There is an information and communication technology center in our departmental library.	00	**00**	60	**40**	31	**20.6**	00	**00**	59	**39.3**
25	Students are exposed to manipulate computers	00	**00**	00	**00**	76	**50.6**	60	**40**	14	**9.3**
26	The lecturers are well-skilled to teach metalwork trade course in the department	58	**38.6**	89	**59.3**	00	**00**	00	**00**	03	**02**
27	Lecturers do supervise students while in Students' industrial work experience scheme (siwes) at various industries.	09	**06**	79	**52.6**	03	**02**	06	**04**	59	**39.3**
28	Relevant text books are available in the departmental library for metalwork students.	57	**38**	37	**24.6**	00	**00**	00	**00**	56	**37.3**
29	Current reading materials are adequate in the departmental library	11	**7.3**	48	**32**	28	**18.6**	00	**00**	63	**42**
30	All the instructional materials used in the department are relevant to the metalwork course	44	**29.3**	62	**41.3**	12	**08**	10	**6.6**	22	**14.6**
31	Storage facilities for raw materials are provided in the department	43	**28.6**	56	**37.3**	00	**00**	00	**00**	51	
32	The metal workshop is adequate for the acquisition of practical skills	34	**22.6**	91	**60.6**	00	**00**	00	**00**	25	**16.6**
33	The equipment and tools in the metal workshop are adequate to serve the educational purposes.	51	**34**	82	**54.6**	00	**00**	00	**00**	17	**11.3**
34	Safety rules and regulations are placed in the metal workshop in order to protect life and equipment.	45	**30**	86	**57.3**	05	**3.3**	00	**00**	14	**9.3**
35	Students are exposed to the use of ICT in their engineering drawing	00	**00**	00	**00**	53	**35.3**	27	**18**	70	**46.6**

APPENDIX J

Table Indicating credit units offered per every semester by NCE Metalwork Technology Student in Polytechnics and Colleges of Education including elective courses.

YEAR		.No. of TED Courses C/Units	No. of EDU Courses C/Units	No. of GSE Courses C/Units	Teaching Practice C/Units	SIWES C/Units	Total Credits Units
1	First Semester	13	5	3	-	-	21
	Second Semester	13	7	4	-	-	24
2	First Semester	14	6	4	-	-	24
	Second Semester	12	7	5	-	2	26
3	First Semester	=	-	-	6	-	6
	Second Semester	13	6	4	-	-	23
	TOTAL=					**GRAND**	**124 Credits**

Source:-NCCE National minimum standard for NCE (2012)

APPENDIX K

Year One First Semester Technical courses

Course code	Course Title	Credits
VTE 110	Intro. to voc/tech Education	1C
TED 111	Intro to metalwork	1c
TED 112	Intro to woodwork	1c
TED 113	Intro to electricity/electronics	2c
TED 114	Intro to Building construction.	2c
TED 115	Intro Automobile Technology	2c
TED 116	Fundamentals of Technical Drawing	2c
TED 117	Applied Mechanics	2c
MTH 118	Algebra	1c
	Total	13c

Source:- NCCE National minimum standard for NCE (2012)

Year One First Semester Education Courses

EDU 111	History of Education in Nigeria	1c
EDU 112	Educational Psychology 1 (Child Development)	2c
EDU 113	Principles and Methods of Teaching at junior secondary level	2c
	Total	5

Source, FGN (2012)

Year One First Semester GSE General Studies Education

Course code	Course Title	Credits
GSE 111	General English 1	1c
GSE 112	Intro to Library Studies	1c
GSE 113	Basic General Mathematics 1	1c
	Total	3

Source, FGN (2012)

Year One Second Semester Technical courses

Course code	Course Title	Credits
TED 121	Sheet metalwork, fabrication and Welding	2
TED 122	Wood Technology	2
TED 123	Magnetism and Electro Magnetism	2
TED 124	Building Science/Material Technology	1
TED 125	Auto Mechanics I (Transmission System)	1
TED 126	Descriptive Geometry/Pictorial Drawing	1

TED 127	Fluids Mechanics	1
MTH 128	Calculus	1
PHY 123	Mechanics and Properties of matter	2
	Total	13c

Source, FGN (2012)

Year One Second Semester Education Courses

EDU 121	Sociology of Education	1c
EDU 122	Intro to Teacher Education	1c
EDU 123	Philosophy of Education	1c
EDU 124	Theory and practice of child Friendly Schools	2c
EDU 125	Educational psychology II (Human Learning)	2c
	Total	7

Source, FGN (2012)

Table 2.6 Year One Second Semester GSE General Studies Education

Course code	Course Title	Credits
GSE 121	General English II	1
GSE 122	Basic General Mathematics II	1
GSE 123	Intro to Computer Studies I	1
GSE 124	FLEHI-Family Life & Emerging Health Issues	1
	Total	4

Source, FGN (2012)

Table 2.7 Year Two First Semester Technical courses

Course code	Course Title	Credits
TED 211	Foundry and Forging	2
TED 212	Machine wood working 1 wood working	2
TED 213	Construction Methods 1	1
TED 214	Auto Braking, Suspension and steering System.	2
TED 215	Graphics	2
TED 216	Heat Engines	1
TED 217	Auto Electrical System, repairs and computer	2
CHEM 111	Intro to Physical Chemistry	2
	Total	**14**

Source, FGN (2012)

Table 2.8 Year Two First Semester Education Courses

EDU 211	Practicum in classroom management and organization	1c
EDU 212	Educational Technology: Theory and Practice	2c
EDU 213	Micro-Teaching Practicum	1c
EDU 214	Intro to Research Methods	1c
EDU 215	Education for a specific Target Groups (ELECTIVE	1c

	Total	6

Source, FGN (2012)

Table 2.9 Year Two First Semester GSE General Studies Education

Course code	Course Title	Credits
GSE 211	General English III	1
GSE 212	Basic General Mathematics III	1
GSE 213	Intro to computer Studies II	1
	Total	4

Source, FGN (2012)

Table 2.10 Year Two Second Semester Technical courses

Course code	Course Title	Credits
VTE 220	Entrepreneurship in VTE I	1
TED 221	Machine shop practice I	2
TED 222	Woodwork Design, Construction and Finishing	2
TED 223	Electrical and Electronics Devices	2
TED 224	Elementary Structural Design	2
TED 225	Automobile Engine	1
TED 226	Electrical/Electronic Drawing	1
TED 227	Special Methodology	1
TED 228	SIWES	2
	Total	14

Source, FGN (2012)

Table 2.11 Year two Second Semester Education Courses

EDU 221	Curriculum Studies I	1c
EDU 222	Measurement and Evaluation	2c
EDU 223	Micro-Teaching Practicum	1c
EDU 224	Educational Administration, Planning and supervision	2c
EDU 225	Introduction to Special Education	1c
	Total	7

Source, FGN (2012)

Table 2.12 Year two Second Semester GSE General Studies Education

Course code	Course Title	Credits
GSE 221	General English IV	2
GSE 222	Basic General Mathematics IV	1
GSE 223	Citizenship Education	1
GSE 224	Entrepreneurship	1
	Total	5

Source, FGN (2012)

Table 2.13 Year Three First Semester For all Trade courses

Course	Course Title	Credits

code		
EDU311	Teaching practice (**Only)**	6
	Total	**6**

Source, FGN (2012)

Table 2.14 Year Three Second Semester Education Courses

EDU 321	Curriculum Studies II	1c
EDU 322	Adolescent Psychology	1c
EDU 323	Research Project	2c
EDU 324	Intro to Theory and Practice of Guidance and Counseling	1c
EDU 325	Introduction to Adult and Non-Formal Education **(ELECTIVE)**	1c
	Total	6

Source, FGN (2012)

Table 2.15 Year Three Second Semester GSE General Studies Education

Course code	Course Title	Credits
GSE 321	General English V	1
GSE 322	Basic General Mathematics V	1
GSE 323	Science and Technology in Society **(ELECTIVE)**	1
GSE 324	Political Economy **(ELECTIVE)**	1
	Total	4

Source, FGN (2012)

Table 2.19 Year Three Second Semester Metal work Technology courses

Course code	Course Title	Credits
VTE 320	Entrepreneurship in Vocational and Technical Education II	1
TEM 321	Machine shop Practice II	2
TEM 322	Advanced Fabrication and Welding	2
TEM 323	Practical Project	2
TEM 324	Mechanical Drawing	2
TEM 325	Maintenance and Repairs of Machine Tools	1
TEM 326	School workshop Management	1
TEB 324	Building Drawing	2
	Total	13

Source, FGN (2012)