

**STRATEGIES FOR ENHANCING EFFECTIVE UTILIZATION OF TOOLS AND EQUIPMENT FOR
SERVICING AND REPAIRS OF MOTOR VEHICLE IN TECHNICAL COLLEGE IN NIGER STATE**

BY

SADIQ, Hassan James

2012/1/42883BT

**DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION,
FEDERAL UNIVERSITY OF TECHNOLOGY MINNA.**

OCTOBER, 2018

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**A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY
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TECHNOLOGY EDUCATION**

OCTOBER, 2018

DECLARATION

I SADIQ, Hassan James, Matriculation Number: 2012/1/42883BT an undergraduate student of the Department of Industrial and Technology Education certify that the work embodied in this project is original and is not been submitted in part or full for any other diploma or of this or any other university.

SADIQ Hassan James
2012/1/42883BT

.....
Signature & Date

CERTIFICATION

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

Dr.A.Rufai
Project Supervisor

Sign and Date

Prof. R.O. Okwori
Head of Department

Sign and Date

External Examiner

Sign and Date

DEDICATION

This research work is dedicated to my lovely family for the abundant and unending love showed upon me and to my beloved twin brother Kehinde.

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The researcher's sincere gratitude goes to God Almighty for His grace, mercy, strength, protected, provided and guided me throughout the course of my academic pursuit.

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ABSTRACT

This study was designed to assess the strategies for enhancing effective utilization of tools and equipment for servicing and repairs of motor vehicle in technical college in Niger state. Two research questions and two null hypotheses were formulated to guide the study. The researcher adopted descriptive research design. The study was carried out in technical college Minna Niger State. A total population of 60 consisting of 45 students and 15 teachers were used for this study. The instrument used for data collection is 20 items questionnaire divided into three sections on a four points structured questionnaire. The instrument used for this study was validated by three automobile technology lecturers in the department of Industrial and Technology Education, Federal University of Technology Minna. The data collected was analyzed using frequency count, mean and standard deviation. The null hypotheses were tested using t-test statistics tool at 0.05 level of significant. The findings on the ways in which tools and equipment for motor vehicle repairs can be effectively utilized in technical colleges in Niger State include among others, providing adequate funds for the maintenance of existing tools and equipment. The findings on strategies needed for maintaining tools and equipment for motor vehicle repair in technical colleges in Niger State include among others, arrangement of tools and materials before and after use, develop a procedure to ensure proper MVM workshop tools and equipment clean up and tools and equipment are used for activities they are designed for. Based on the findings of the study, the following recommendations were made, modern tools and equipment should be adequately supplied and maintained regularly for improving motor vehicle repairs in MVMW in technical colleges and In-service training should be made available for MVMW teachers to further their education in order to keep up with skills changing technology in the society.

TABLE OF CONTENTS

Contents	Page
Cover Page	i
Title Page	ii
Declaration	iii
Certification	iv
Dedication	v
Acknowledgements	vi
Abstract	vii

CHAPTER ONE: INTRODUCTION

1.1 Background to the Study	1
1.2 Statement of the Problem	4
1.3 Purpose of the Study	5
1.4 Significance of the Study	6
1.5 Scope of the Study	6
1.6 Research Questions	7
1.7 Hypotheses	7

CHAPTER TWO: LITERATURE REVIEW

2.1 Technical College	8
2.2 MVMW in Technical College	10
2.3 Strategies needed for maintaining tools and equipment in technical college	16
2.4 Tools and equipment needed in auto repair in technical college	20
2.5 Equipment in Automobile workshop	23
2.6 Review of Related Empirical studies	23
2.7 Summary of Literature Review	25
CHAPTER THREE: RESEARCH METHODOLOGY	
3.1 Design of the study	27
3.2 Area of the Study	27
3.3 Population of the Study	28
3.4 Sample and Sampling Techniques	28
3.5 Instrument for data Collection	28
3.6 Validation of the Instrument	29
3.7 Reliability of the Instrument	29
3.8 Administration of the Instrument	29
3.9 Method of Data Collection	30
3.10 Method of Data Analysis	30
CHAPTER FOUR: RESULTS AND DISCUSSIONS	
4.1 Research Question 1	31

4.2 Research Question 2	32
4.3 Hypothesis I	33
4.4 Hypothesis II	34
4.5 Findings of the Study	36
4.6 Discussion of the finding	37
CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS	5.1
Summary of the Study	39
5.2 Conclusion	40
5.3 Implications of the Study	40
5.4 Contribution to the study	41
5.5 Recommendations	42
5.6 Suggestions for further Study	42
REFERENCES	43
APPENDICES	47

CHAPTER ONE

1.0

INTRODUCTION

1.1 Background to the Study

Technical colleges are regarded as the principal vocational institutions in Nigeria. They give full vocational training intended to prepare students for entry into the various occupations (Okoro, 1993). According to Abdulkadir (2011) the responsibilities of technical college education in Nigeria include: provision of full time or part-time courses of instruction and training in technology, applied science and commerce, in such other field of applied learning, relevant to the needs of the development of Nigeria in the areas of industrial, commercial and vocational agriculture, professional studies in engineering and other technologies and perform such other functions as in the opinion of the society as may serve to promote the objectives of the technical colleges. The Federal Republic of Nigeria in the National Policy on Education (FRN,2004) made the production of craftsmen, artisans and other sub-professional skilled personnel the responsibility of technical college education and maintained that trainees completing technical college programmes shall have three options: Secured employment either at the end of the whole course or after completing one or more modules of employable skill, Set up their own business and become self-employed and be able to employ others and Pursue further education in advance –craft/technical programme and in post-secondary (tertiary) technical institutions such as science and technical colleges, Polytechnics or Colleges of Education (technical) and Universities.

However, the attainment of these goals is largely dependent on the effective utilization of tools and equipment in the workshop. Effective utilization of tools and

equipment refer to various strategies or techniques of managing and making maximum use of a particular tool or equipment to yield an excellent result and also to serve its purpose for a long period of time without breaking down. The major concern of effective tools and equipment utilization is the identification and judicious utilization of available resources to achieve the objective of helping the learners to learn and to encourage them to want to learn (Ogwo & Oranu, 2006). In essence, effective utilization of tools and equipment for servicing and repair of motor vehicle in technical colleges has to do with the process of bringing out the best from the personnel so as to achieve the set goals and objectives of practical works/jobs. Effective utilization of tools and equipment in teaching and learning situation refers to the ability to maintain the use of equipment to solve automobile vehicle faults efficiently (Lofafa & Polongana, 2001). Since utilization as defined by Oxford Advanced Learner Dictionary (2011), involves the usage, the state of being used, therefore, effective utilization of tools and equipment for servicing and repair of motor vehicle.

There is a great need for proper overseeing, controlling and effective supervision of the tools and equipment in technical colleges in Niger State to enable the students to benefit from the programme and become productive citizens. It also entails proper coordinating and overseeing the full works of students by the teachers and school management, overseeing the effectiveness of tools and equipment to enable the students to benefit through the practical aspects of the automobile vehicle education in their respective schools. It was explained that it shows how teacher can prevent misuse by carefully organizing the tools and equipment, stating the function of each and how they are being maintained, establishing clear rules and regulation that are needed for effective utilization of each tool for a specific job. Considering the importance of tools and equipment in service and repairing of motor vehicle, provision there is need to

strategize on how to effectively utilize and maintain the tools and equipment in technical colleges with a view to ascertain whether the strategies adopted affect the student's performances in the technical colleges of Niger State.

The development of automobile vehicle technology and auto repair in our technical colleges cannot be achieved unless tools and equipment are effectively utilized. At present, the Motor Vehicle Mechanics Work Trade (MVMW) as an essential educational programme with structured practical courses has not been fully realized due to inadequate facilities and lack of effective utilization of tools and equipment in the workshops (Makama & Pongu, 2006). It may be necessary for administrators of technical colleges, Universities and Polytechnics to be creative especially in using various strategies for improving the effective utilization of tools and equipment for automobile workshops instead of relying on government alone. Availability of tools and equipment in automobile workshops will eventually lead to improving the teaching and learning of MVMW especially in the service and repair of motor vehicles. MVMW, which is an essential educational programme with structured practical courses, is capable of engaging citizens especially the youths into productivity and making them contributing members of nation building and economic growth. When they are largely involved in production, they contribute knowingly or unknowingly to the economy and benefit from the economy as well.

Hence strategy according to UNESCO (2002) is the systematic process, plans or action of generating ways and technique to accomplish a specific goal. Therefore, strategy in the context of this study is a systematic process, plans or action of generating ways and technique of effectively utilizing tools and equipment for motor vehicles repair plans or action of generating ways and technique. Technical colleges are mainly established for the training of students to acquired practical skills, knowledge and

attitude. However, the major goals of technical college education is to produced efficient and relevant craftsmen and women that will promote and industrial development in the area of maintenance, goods production and general services (Abdulkadir, 2011). Boyi (2008) also opined that the goal of technical college education is develop saleable skills in youths in order to make them useful to themselves, society and also become labour assets in the industries. Incidentally, these technical colleges appear not fulfilling these objectives as noted by Enemali (1994) who lamented that technical colleges are haphazardly managed, they lack the ability to equip students with the requisite skills, knowledge and attitude needed for gainful employment. Also commenting on the performance of technical colleges in the area of skill development and workshop facilities, Gana (1989) stressed that some of the available facilities have been grounded and overstretched. It is probable that the strategy for effective utilization of workshop tools and equipment plans or action of generating ways and technique adopted by the teachers may be responsible for these. Therefore, this study is been conducted to identify the strategies for enhancing effective utilization of tools and equipment for service and repair of motor vehicles in technical colleges in Niger State.

1.2 Statement of the Problem

The quest for self-reliance in industrial and technological growth, and development boils down to the need for skilled personnel who will judiciously utilize abundant resources. Studies have shown that many graduates of MVMW trade in most technical colleges and Higher Institutions are unemployed and cannot be self- reliant due to lack of practical skills during their school days. As an undergraduate student of automobile technology in Federal University of Technology Minna Niger state and the experiences gathered during the teaching practice in a technical college in Niger State, it is obvious that tools and equipment for motor vehicle services and repair in most

technical colleges are short in supply and where available, are not effectively utilized. Inyiagu (2005) postulated that inadequacies in teaching and misused of workshop tools and equipment have contributed to the decrease in quality of technical education graduates in Nigeria. Lack of effective utilization of motor vehicle tools and equipment for service and repair in technical colleges is a contributing factor to these problems. Adebayo (2005) highlighted that no matter how vibrant and well-meaning the programme of technical colleges could be, success and goal achievement largely depend on efficient utilization and management processes. Abdullahi (2005) stressed that MVMW tools and equipment in most technical colleges and other higher institutions are highly underutilized/misused and this therefore affect student performance after graduation as many of them are unable to fit into the labour market and cannot be self-reliant. It is on this basis the study is designed to identify the strategies for enhancing effective utilization of tools and equipment for service and repair of motor vehicle in technical colleges in Niger State.

1.3 Purpose of the Study

The study intends to identify the strategies for enhancing effective utilization of tools and equipment for service and repair of motor vehicle in technical colleges in Niger State. Specifically, the Study is design to identify:

1. The ways in which tools and equipment for motor vehicle repairs can be effectively utilized in technical colleges in Niger State.
2. The strategies needed for maintaining tools and equipment for motor vehicle repair in technical colleges in Niger State.

1.4 Significance of the Study

This study will benefit the Motor Vehicle Mechanic (MVM) students, MVM teachers, Society and the Government. The MVM students would benefit from the findings of the research work more in carrying out adequate training and practical works through proper and effective utilization of tools and equipment in the workshops.

The student would be enlightened on how to effectively utilize tools and equipment to aid smooth performance of service, repair and prolong the life span of the tools and equipment; this is another management skill that would be added to the student.

The findings of this study if properly implemented will aid and equip the teachers with adequate information and knowledge needed to effectively use the available tools and equipment to deliver quality learning and practical lessons.

If the tools and equipment is effectively utilized the government will spend less money in replacing damaged or faulty tools and equipment regularly which will help them to save cost or channel the funds to other pressing issues. Effectively utilization of tools and equipment enhance proper repairs and reduce the risk of incident during the use of any tools and equipment for a particular repair or during training.

Furthermore, the society will benefit at large because motor vehicle owners would be giving quality and standard service during repair and this will reduce the risk of road accidents and sudden breakdown of vehicles

1.5 Scope of the Study

The study is delimited to the strategies for effective utilization of tools and equipment for service and repair in motor vehicle, it is concern with identifying the types of tools, equipment needed for motor vehicle repairs, the ways tools and

equipment can be effectively utilized and the strategies for maintaining each tools and equipment would also be looked in to. Hence the study does not include tools and equipment for fault detector and motor vehicle assembling.

1.6 Research Questions

The following research questions were answered.

1. What are the ways in which tools and equipment for motor vehicle repairs can be effectively utilized in technical colleges in Niger State?
2. What are the strategies needed for maintaining tools and equipment for motor vehicle repair in technical colleges in Niger State?

1.7 Hypotheses

The following null hypotheses were formulated to guide the study.

HO₁: There is no significant difference between the mean responses of the teachers and students with respect to ways in which tools and equipment for motor vehicle repairs can be effectively utilized in technical colleges in Niger State

HO₂: There is no significance difference between the mean responses of the teachers and students on the strategies needed for maintaining tools and equipment use for motor vehicle repair in technical colleges in Niger State.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Technical college

Technical colleges in Nigeria are the institutions that provide technical and vocational education at secondary school level. Technical colleges offer courses in technical areas, among which are automobile technology trades. MVMW is the programme designed to produce automobile technology graduates the necessary skills in production and maintenance of vehicle products and components for the utilization of human and industries. However, technical college graduates are those who has successfully completed the programme. These technical college graduates need experimental skills that will enable them move from school to a relatively stable workplace. When employed in an industry, a graduate of technical college is expected to put into practice what his teachers taught him in the classroom under the supervision of automobile technology industrial supervisor.

Teacher of automobile technology is the one who teaches automobile technology as a course in the technical colleges, on the other hand, automobile technology industrial supervisor is the one whose job is to oversee and guide the work or activities of individual and group of workers in the industry (Lielomg & Fabian, 2002). The programmes of technical colleges in Nigeria are classified as vocational education. FGN (1998) proved this assertion by stating that vocational education is that form of education which is obtainable at the technical colleges. The purpose or goals of vocational education (technical college programmes) in Nigeria according to FGN (1998) in the National Policy of Education are:

- (i) Provide trained manpower in the applied science, technology and business particularly at crafts and technical level.

(ii) Provide technical knowledge and vocational skills necessary for agricultural, commerce and economic development.

(iii) Give training and impart the necessary skills to individual who shall be self-reliant economically.

To ensure that those objectives are achieved, the Federal Government establishes the National Board for Technical Education (NBTE) to accredit the programme of technical and vocational education and training (TVET). The NBTE (1992) defined accreditation as the recognition granted by a National agency (NBTE) to an institution or its programme that has met the minimum national standard laid down for that for that level of institution or programme. The role of the National Board for Technical Education in ensuring standard in technical and vocational education in Nigeria is summarized by NBTE (1992) as follows:

1. Advise the Minister of Education on minimum standard in technical colleges and other technical institutions and thereafter maintain the standard set.
2. Accredit technical and vocational programmes of all institution (except Universities) for the purpose of awarding National Certificate, Diploma and other similar awards for entry into National zonal examinations.
3. Lay down the standard of skills to be attained and to continually review these standards as necessary due to technological changes, and;
4. Review methods of assessment of students and trainees and to develop a scheme of National Certification for technicians, craftsmen and other skilled personnel in collaboration with ministries and organizations having technical training programmes.

The Board further noted that in exercise of its power under the above listed decrease, the board has laid down minimum standard of technical education for the technical colleges through curricular. The curricular were however, revised in 2011 and approved in October, 2003 at Yenegoa in Bayelsa state (NBTE, 2003). In the new curriculum of technical colleges, the Board stated that the curriculum of each programme is broadly divided into three components:

- a) General education, which accounts for 30% of the total hours required for the programme,
- b) Trade theory, trade practice and related studies which account for 65%, and
- c) Supervised industrial training/work experience which accounts for 5% of the total hour required for programme.

This indicates that there is a continuing need for highly skilled woodwork technology teachers in Nigerian technical colleges in the manufacturing trades of the woodwork. Therefore, additional training opportunities should be made available for technical college teachers of MVMW in the safe and efficient use of a wide variety of modern hand and power tools as well as computer-controlled machines used to manufacture MVM products (practical projects).

2.2 MVMW in Technical Colleges

Motor Vehicle Mechanic's Work (MVMW) is a vocational trade that prepares individuals for the world of work. It is one of the automobile trades offered in technical colleges in Nigeria (NBTE, 2011). MVMW in technical colleges is aimed at producing competent vehicle mechanics with sound theoretical knowledge and should be able to diagnose and carryout repairs and/or maintenance on all types of Diesel and Petrol Vehicles (National Board for Technical Education, 2001). In other words, the

programme for MVMW in Nigerian technical colleges is designed to produce competent maintenance craftsmen for all types of motor vehicle. These craftsmen may also wish to take the opportunity for further technical education. (NBTE 2001).

A national curriculum according to Okoro (1993) was adopted in all technical colleges and accredited by the National Board for Technical Education (NBTE). The programme is offered at two levels leading to the award of National Technical Certificate (NTC) for craftsmen and Advanced National Technical Certificate (ANTC) for Master craftsmen. According to Federal Republic of Nigeria (2004), technical college graduates on completion of the Motor Vehicle Mechanic's Work in the technical college shall:

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

In pursuance of the aims and goals of technical colleges, Federal Republic of Nigeria (2004) pointed out in the National Policy on Education that the main feature of the curricular activities for technical colleges shall be structured in foundation and trade modules. In line with the policy statement, the revised National Technical Certificate (NTC) and revised Advanced National Technical Certificate (ANTC) programmes, curriculum and course specifications were published in 2001 for Motor Vehicle Mechanic's Work and other vocational courses in the Technical Colleges by National Board for Technical Education (NBTE). It was sponsored by United Nations

Educational Scientific and Cultural Organization-Nigeria project in support of the Revitalization of Technical and Vocational Education in Nigeria. The trade, theory and practice component for Motor Vehicle Mechanics Work is presented as follows:

CODE	MODULE
CMV 10	Service Station Mechanics
CMV 11	Petrol Engine Maintenance
CMV 12	Diesel Engine Maintenance
CMV 13	Engine Reconditioning (Petrol and Diesel)
CMV 14	Transmission
CMV 15	Suspension, Steering and Braking Systems
CMV 16	Auto-Electricity/Electronics (NBTE, 2003).

CMV 10 - Service Station Mechanics

The goal of service station mechanics is to produce a fore court service mechanics with a thorough knowledge of routine service and ability to carry out fore-court servicing and sales (NBTE, 2003).

General Objectives: On completion of this module, trainees should be able to:

- Understand the layout and function of the principal components of the motor vehicles.
- Understand the sealing and locking method, seal and lock motor vehicle components/parts efficiently.

- Understand the basic services involved and carryout routine maintenance on different types of motor vehicles.
- Understand the basic construction of a battery
- Understand the basic principle of the motor vehicle and carryout general maintenance work on them.
- Maintain types in good working condition and carryout wheel alignment.

CMV 11 – Petrol Engine Maintenance

The goal of this module is to produce a Petrol Engine Maintenance craftsman who should understand the basic principles of operation and carryout general maintenance and reconditioning work on petrol engine.

General Objectives: On completion of this module, trainees should be able to:

- Understand general safety precaution
- Understand the basic working principles of petrol engine and restore it to peak performance.
- Understand the working principles of valves.
- Understand the working principles of the fuel system of the motor vehicle.

CMV 12 – Diesel Engine Maintenance

The goal of this module is to produce Diesel Engine Maintenance craftsmen who will be able to carry out general maintenance work to a fuel injection system and other diesel engine components.

General Objectives: On completion of the module, the trainee should be able to:

- Understand the operation of the compression ignition engine and carryout repairs of the components of fuel delivery system.
- Understand the working principles of in-line and rotary fuel injection pumps, effect overhaul and repairs on them.

CMV 13 – Engine Reconditioning (Petrol and Diesel)

Engine reconditioning which is also known as engine refurbishing. Its goal is to offer trainee knowledge and skills to recondition a worn-out engine (Petrol or Diesel) to a satisfactory working condition.

General Objectives: On completion of this module, the trainee should be able to:

- Understand the safety procedures and their applications in relation to automobile engine reconditioning.
- Understand the operation of all types of automobile engine and recondition worn out engine to good working condition.

CMV 14 – Transmission

The goal of this module is to provide the trainee with the theoretical knowledge and practical ability to carry out effective clutch, gearbox and final drive reconditioning.

General Objectives: On completion of this module, the trainee should be able to:

- Understand the principles of clutch operation diagnose clutch faults and carry out repairs or replacements of clutch assembly.
- Understand the synchronization and carry out major repairs on units of gearboxes.

- Understand the procedure for assembling gear linkages and selector mechanism to manufacturers' specification.
- Understand the principles of operation of propeller/drive shaft reconditioning,
- propeller/drive joint couplings and center bearings.

CMV 15 – Suspension, Steering and Braking Systems

The goal of this module is to provide the trainee with the theoretical knowledge and skills to carry out repairs and overhaul the suspension, steering and braking systems with facility.

General Objectives: On completion of this module, the trainee should be able to:

- Understand the layout of the chassis in relation to frame and fixing, suspension and steering and rectify faults attributable to chassis.
- Understand the basic principles of steering construction and carry out necessary repairs and adjustments to its units.
- Understand the functions of the component parts diagnose and rectify faults in hydraulic, air, vacuum and mechanical brakes.

CMV 16 – Auto- Electricity/Electronics

The goal of this module is to produce trainee who will be able to trace faults in the electrical system of motor vehicle and effect necessary repairs.

General Objectives: On completion of this module, the trainee should be able to:

- Understand the principles of electricity generation as applicable to automobiles diagnose faults and effect repairs to batteries.

- Understand the procedure for effective maintenance and repairs of all units of the charging system in a motor vehicle without supervision.
- Understand the operation of the starter motor, diagnose and effect repairs to a faulty one.
- Understand the operation of all electrical components of a vehicle, trace and rectify faults in them.

Motor Vehicle Mechanic's Work is an occupation that has been affected by the changes in technology and industrial standards. The current trend, innovations and the emerging technology in automobiles is a challenge to fault diagnosis, maintenance and repairs. This advanced and continuously evolving technology will require students of MVMW in the technical colleges to acquire sufficient knowledge and skills in the areas of both maintenance and repair, since individual student of MVMW need advanced knowledge to deal with the changes brought about by latest technology in the automobile industry. Hence, as new development arises, the vehicle system becomes more complex

2.3 Strategies needed for maintaining tools and equipment in technical colleges

Maintenance is essential to reduce failure rate and ensure machine operation (Abdullahi, 2002). Maintenance is the art of carrying out a systematic supporting service on any device or being (Parrish, 1993). Maintenance refers to reactivating activity mainly to preserve existing goods, equipment and services for the betterment of people or the entire society (Fadkini, 1998). Maintenance involves the systematic supply of necessary materials for the continuous operation of a given equipment. These include: Lubricants, grease, fluid and water. Olaitan Nwachukwu, Oyemachi, Igbo and Ekong (1999), defined maintenance as taking specific approved steps and precautions to care for a piece of equipment, machinery or facility to ensure that it attains its specific

maximum functional shelf-life. Makun (2000) remarked that the concern of any programmes of maintenance is to extend the useful life of the assets, ensure efficiency in the functioning of machines at all times, and enhance the readiness of machines. Orikpe (1994) defined maintenance as deliberately planned action aimed at ensuring that a given piece of equipment functions as specified by the manufacturers. This involves planned supply of necessary materials for the continued operation of the equipment. According to the author, maintenance refers to the appropriate and timely steps and precautions taken to ensure that a given piece of equipment attains maximum life span.

Usman (1995) remarked that, maintenance of equipment and other material resources involves: Lubrication, cleaning, care, repair and safety. Maintenance, therefore, denotes all actions, carried out on structures, machines, equipment and tools to keep, restore or improve every facility to an agreed standard, determined by the balance between needs and resources. The actions include:

- i. Keeping and restoring actions, such as repairs, replacement and cleaning.
- ii. Improving, which include refurbishment, rehabilitation, alterations, conversion extension and adaptations.

The U.S. Army Corps of Engineers (1983) stated that maintenance is the action that prevents or delays damage or deterioration, or correct deficiencies that would otherwise lead to early repair or rehabilitation. According to them, repair means restoration of damaged or deteriorated elements of a structure or equipment to continue service, while rehabilitation is major modification of an existing structure or equipment to bring up to prevailing operational requirements and standards. When equipment reaches a certain

level of deterioration or obsolescence, economic or safety reasons may demand slow down, halt or reversal of deterioration process.

Maintenance can reduce deterioration rate while repair can bring the equipment back to an improved state to as-good-as new state. Olaitan (1996) classified maintenance into three groups namely prevention maintenance, predictive maintenance and corrective maintenance. In preventive maintenance, attempt is made to prevent the equipment or facilities from breaking down through regular cleaning, lubricating, painting and servicing. Predictive maintenance on the other hand implies watching out for danger signals, such as unusual noise, danger light indicators and inefficiency of performance; and wresting the situation promptly before there is any major breakdown. This may involves minor errors, which could be corrected by replacement of weak parts. Corrective maintenance involves approaches for rectifying an already damaged or breakdown equipment or machinery. The effort of corrective maintenance is to ensure continuity within the operations and production framework.

Obiegbu (1994) classified maintenance into three kinds: preventive (planned/periodic) maintenance, curative (accidental) maintenance and renovation/refurbishment maintenance. According to the author, preventive maintenance is the type of maintenance carried out at predetermined intervals or other prescribed criteria and is intended to reduce the likelihood of an item not meeting an acceptable condition. This consists of taking corrective or preventive action in order to avoid expected or avoidable failures. Obiegbu on the other hand, used curative maintenance in place of corrective maintenance. This is the maintenance work done to restore, that is carry out repair of the failure that occurred or maintenance action intended to bring back an item to its original appearance or state. Wild (1995) classified maintenance into four groups. These are: Inspection, service, preventive and repair.

According to Wild (1995), maintenance involves inspection of facilities at interval in order to determine whether service and/or preventive maintenance is required soon. Service involves the routine and re-adjustment of equipment, while preventive maintenance is precautionary, and is undertaken to try to prevent or delay breakdowns, and therefore, the need for repair. The author stated that, repair is remedial, taking place after an item has ceased to operate satisfactorily. Oranu (1996) suggested that, an instructor has to be continually 'on his toes' to keep a shop in suitable conditions for instructional purposes. Sharpening, adjusting and repairing broken tools and equipment is continuous process in the workshop. He further stated that after installation of the required equipment, it becomes the responsibility of the technical teachers to keep the equipment in good condition for effective use. This responsibility involves constant checking as well as minor repairs of equipment. Walton (1976) stated that, worn out tools such as oil stones, chisels, screw-drivers and blades of woodwork machines should be reconditioned to perform the functions they are designed for effectively.

William (1990) revealed that little maintenance is needed for most hand tools and portable power tools. Hand saws should be kept free from dust by rubbing the blade with steel wool. A coat of wax or silicon will protect the blade from moisture and reduced friction while sawing. According to the author, portable power saws may or may not need lubrication. Some have sealed bearings and self-lubricating mechanical parts. Generally, you need to put heavy grease in gear driven mechanisms. Apply silicon to adjusting knobs, screws and movable parts outside motors and drives. Keep all saws clean and free from moisture or resin build up. Periodically check all power cords for deterioration and damage. Replace any defective part of the machine and saw blades should be regularly sharpened and set.

Oduh (1999), noted that the negligence on maintenance of various equipment in vocational education hindered the effective training for self-employment. The programme of technical education should be functional to the needs of society. According to Banjo (1974), the most important characteristics of technical education is that it should be selected and designed to cover the spectrum of engineering needs of the community for skills and personnel. The success of MVMW programme depends largely on the effectiveness of MVMW teachers to operate, use and maintain the basic MVMW equipment provided in the school workshops. Where MVMW teachers could not operate, use and maintain MVMW equipment for continuous use in training of MVMW students, technical training will suffer and this will lead to the production of highly unskilled personnel who are unemployable and unproductive. As stated by Uzoagulu (1992), competent MVMW teachers with functional equipment would enable schools achieve functional educational objectives. The functionality of equipment can only be ensured through prompt maintenance because central focus of MVMW teachers is the production of competent and skillful MVMW personnel who would be effective in the performance of woodwork skills (Ekong, 2000).

2.4 Tools and Equipment needed in auto repair in technical colleges

The build quality of cars has significantly improved over the years and this has had a major effect on the frequency of servicing. It has also increased the need for fewer complex services. It is likely that only the increasing size of the vehicle 'parc' has saved this sub-sector from a more pronounced decline than already experienced. The annual number of services and mechanical repairs carried out has declined by 19% from 57.9 million in 1998 to an estimated 46.7 million in 2008. This reduction has contributed to the number of service and repair workshops going down by an estimated 30% between 1998 and 2008. The following skills according to Ogwo, (2004) are needed by

automobile technicians or automobile workshop operators or workers in order to repair and maintain auto vehicles.

1. An understanding of electrical theory and being able to apply it
2. General electrical fault finding skills/procedures, the use of voltmeters, ohmmeters, ammeters, multi-meters, oscilloscopes for diagnosis of faults
3. Understanding what fault codes mean, using diagnostic fault code readers/scan tools
4. Understanding diagnostic methods/procedures if the use of a diagnostic scanner cannot find a fault
5. Understanding scan tool live data, diagnosis and the analysis of the data
6. Reading and interpreting wiring diagrams and electrical data – following test methods/procedures– live data analysis
7. Electrical/electronic systems, how to work on vehicle systems without causing damage
8. Engine starting, charging, battery technology, diagnosing/testing computer controlled engine cooling systems.
9. Understanding turbo charging/super charging systems – their function and operation
10. Test methods/procedures for diagnosing engine faults – fuel pressure tests
11. Understanding modern diesel fuel systems, working safely, understanding high pressures in diesel systems
12. Understanding emission control component operation and function
13. Analysis exhaust gas readings for fault diagnosis

14. Understanding how electrical and electronic systems interface with each other, fibre optics, networking, CANBUS - diagnosis and common faults, specific to vehicle manufacturers and models
15. Braking systems, the function of ABS, regenerative braking, electronic handbrakes, brake assist, brake component technology including ceramic brakes
16. Servicing/repair of braking systems including knowledge of the procedures to bleed systems, how to remanufacture brake pipes
17. Understanding specific health and safety issues related to braking systems.
18. Occupant safety system, working safely with airbags and other SRS components, safe storage methods, safe test methods, safe remove and refit methods
19. Drive train/transmission knowledge, automatics
20. How to make effective fault diagnosis and repairs to automatic transmissions
21. Servicing of transmission components, how to refill systems, how to bleed systems effectively
22. Comfort systems
23. Telematics
24. ICE, digital switch over
25. Alternative/sustainable fuelled vehicles, hybrid / electric vehicles
26. Working safely on hybrid/electric (electrically propelled) vehicles
27. Understanding routine servicing methods/procedures on hybrid and electric vehicles
28. Understanding the implications of an unsafe repair, understanding faults, diagnostic method and procedure to implement a safe repair

29. Steering and suspension systems, using wheel alignment equipment, laser types, understanding technical data and applying it accurately
30. Active suspension systems
31. Electronic/electrical power assisted steering systems

2.5 Equipment in Automobile Workshop

Auto workshop equipment celebrate 25 years of service to the car and commercial vehicle industry. Having built a reputation for quality service, the following are the modern equipment.

1. Automatic computerized air conditioning equipment
2. Computerized break tester
3. Computerized compressed air
4. Computerized emission and diagnostic equipment
5. Computerized jacking equipment
6. Computerized lubrication equipment
7. Computerized mot equipment
8. Computerized tyre and wheel service equipment
9. Computerized wheel alignment.

2.6 Review of Related Empirical Studies

Related empirical studies with respect to the strategies for enhancing effective utilization of tools and equipment for service and repair of motor vehicle in technical colleges in Niger State. However, few studies were found to be relevant to this study as follows:

Robert (2012) conducted a study on Mechanisms for Improving the Provision of Facilities for automobile Workshops in Colleges of Education in the North Central Zone

of Nigeria. The study was carried out in the North central zone which comprised of Benue, Plateau, Nasarawa, Niger, Kogi and Nasarawa State. The population for the study was drawn from the seven colleges of Education that offered woodwork education. The population for the study comprised of provosts of colleges of Education; Dean of school of vocational and technical education; Heads of departments of technical education and woodwork lecturers in the North Central Zone. Therefore, seventy-three respondents were used for the study. This was the total population of the respondents within the zone and all was used for the study. The information regarding the population for the study was received from each school by the researcher through personal visit and two research assistants were used. The choice of the respondents was based on the familiarity of the respondents with the methods of acquisition of facilities for automobile workshops in Colleges of Education. There was no sampling since all the people (respondents) involved in the study were used. This was because the respondents were few within the zone. The findings of his study are among others, PTA levy for improving facilities for automobile workshops, Involve PTA to donate tools and machines to automobile workshops and Involve Parents that are technical workers in the construction of automobile workshops.

it was discovered that if these mechanisms are employed for improving facilities provision for automobile workshops then, there will be abundant equipment and consumable materials for students practical. There is a need for automobile workshops to be adequately equipped so that students can acquire practical skills expected in the labour market. It has become apparent that the oil boom has gone and it is left for individual institutions to scout for alternative sources of improving facilities provision for automobile workshops such as commercializing research results of schools for purpose of purchasing facilities for schools is essential.

In the same vein, Nwoye (1998) disclosed levies and sales of application forms are also sources of revenue for colleges of Education which can be used in providing facilities of their automobile workshops. The gap in educational development between the southern and northern part of Nigeria will continue to be widened if a move to check the situation is not initiated. Daudu (2006) disclosed other ways of improving facilities for workshops in technical education departments without relying on government and such sources include involving community where the school is located and using Associations. Therefore, the efforts of educational administrators in the north is very vital if education in the North has to change. Colleges of Education in the North central zone of Nigeria should strive to produce men and women who can use their hands and brains with equal dexterity and pride. This can be achieved with effective training from school which cannot take place without equipment and materials necessary for teaching and learning.

2.7 Summary of Literature Review

The literature review in this study covers principal skills needed by auto mechanics technician, technical colleges, modern skills and equipment and some related empirical study was reviewed. The increasing sophistication of automotive technology now requires workers who can use computerized shop equipment and work with electronic components while maintaining their skills with traditional hand tools. Skill is a concept, which has since received the attention of scholars from different disciplines. From the technical perspective, skill is referred to as expertness, practiced ability, dexterity and tact. Technical colleges offer courses in technical areas, among which are automobile technology trades. Woodwork technology is the programme designed to produce automobile technology graduates the necessary skills in production and maintenance of vehicle products and components for the utilization of human and

industries. Modern equipment has been produced for quality service auto vehicle repairs, this equipment include the following are the modern equipment, Automatic computerized air conditioning equipment, Computerized break tester, Computerized compressed air, Computerized emission and diagnostic equipment, Computerized jacking equipment and others. The work of some authors related to this research topic were reviewed under related empirical study.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

This chapter is concerned with the description of the research procedures used in the course of the study, it is discussed under the following sub-headings: design of the study, area of the study, population of the study, sample and sampling technique, instrument for data collection, validation of the instrument, Reliability of the Instrument, administration of the instrument, method of data collection and method of data analysis.

3.1 Design of the Study

The research design adopted for this study was descriptive survey research design. Ibrahim (2005) highlighted that survey research is the process of carrying out qualified observation which involve asking of questions to sample the opinion of the public at large or one specific group. The survey research design was chosen as an appropriate method for the research as it seeks the views of respondent about a particular issue that concerns them, give room for researcher to study the group of people by sourcing for information from them.

Therefore, this design is used by the researcher to assess thoughts, opinions and feelings of knowledgeable respondents in identifying the strategies for enhancing effective utilization of tools and equipment for servicing and repairs of motor vehicle in technical colleges in Niger State.

3.2 Area of the Study

The study was conducted in Niger State, Niger State is in central Nigeria and the largest state in the country, the state capital is Minna and other major cities are Bida, Kotangora and Suleja. It has a land mass area of 76,363kmsquare with a total population

of 3,954,772 people. The area to cover includes all the technical colleges in the three (3) senatorial zones of Niger State.

3.3 Population of the Study

Due to the large numbers of population in technical colleges in Niger state, 60 respondents from three technical colleges each from three local governments in Niger State was selected randomly. The random selection for the study consists of 45 students and 15 teachers of technical colleges in Minna, Kontogora and New Bussa area of Niger state. One technical college each will be selected from the three Senatorial Districts. The result of the findings was used to generalize the entire population in technical colleges in Niger State.

3.4 Sample and Sampling Techniques

Three (3) Technical colleges was sampled using simple random sampling technique from each unit of the study area identified in the area of study above. Using simple random sampling technique, teachers and students from the technical college visited was sampled. A total of sixty (60) respondents were therefore used as sample for the study.

3.5 Instrument for Data Collection

The questionnaire was the main instrument used by the researcher for data collection. The questionnaire was divided into three sections. Section A: consists of respondent's personal data. Section B: contains 10 items which deal with the ways in which tools and equipment for servicing and repairs of motor vehicle can be effectively utilized in technical colleges in Niger State and Section C: contains 10 items which deal with the strategies needed for maintaining tools and equipment for motor vehicle repair in technical colleges in Niger State

All the items were responded to by using the following rating scale.

Strongly Agree (SA) = 4 points

Agree (A) = 3 points

Disagree (D) = 2 points

Strongly Disagree (SD) = 1 point

3.6 Validation of the Instrument

The instrument was validated by three experts in the Department of Industrial and Technology Education, Federal University of Technology Minna, Niger state. The validator's suggestions were incorporated in the final draft of the instrument, to ensure that the instrument was capable of eliciting necessary information that is required to carry out the study

3.7 Reliability of the Instrument

In order to ensure the internal consistency of the instrument, the researcher adopted test-retest technique. The instrument was administered to students and teachers randomly selected in the technical colleges used for this study. Copies of the validated instrument was administered on the respondents. After three days, the same instrument was also administered to the same respondents and Pearson Product Moment Correlation (PPMC) coefficient was used in establishing the stability of the instrument at 0.88 coefficient correlation. The responses of the teachers and students

3.8 Administration of the Instrument

The questionnaire was administered by the researcher to the respondents and all questionnaire administered was returned. The respondents who could not submit theirs on the first day are given opportunity on another day for collection.

3.9 Method of Data Collection

A request/permission letter was collected by the researcher from the research coordinator and taken with the questionnaires to individual schools used for this research, the questionnaire was administered to students and teachers of each school and the data was collected by the researcher and with a research assistant from each school. A copy of the validated instrument was administered to each of the respondents with the help of three (3) research assistance. The administered questionnaire was collected back as soon as it been responded to.

3.10 Method of Data Analysis

The data collected was analyzed using frequency count, mean and standard deviation. The research questions were answered using the mean and standard deviation. The null hypotheses were tested using t-test statistics tool at 0.05 level of significance. In other to determine the level of acceptance or rejection of any items, a mean score of 2.50 was used. Therefore, any item with a mean response of 2.49 and below was rejected. Also an inferential statistical t-test was used to test the null hypothesis at 0.05 level of significance to compare the mean responses of the two groups.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

This chapter deals with presentation and analysis of data with respect to research question and hypotheses formulated for this study, the result of data analysis for the research question were presented first then it was followed by those of the hypotheses tested for the study, the findings of the study were pointed out and subsequently discussed.

4.1 Research Question 1

What are the ways in which tools and equipment for motor vehicle repairs can be effectively utilized in technical colleges in Niger State?

Table 4.1:
Mean response of students and teachers on the ways in which tools and equipment for motor vehicle repairs can be effectively utilized in technical colleges in Niger State

S/N	STATEMENTS	\bar{X}_1	\bar{X}_2	Xt	REMARK
1	Providing adequate funds for the maintenance of existing tools and equipment	3.21	3.63	3.42	Agreed
2	Tools and equipment should be planned based on current student enrollment	2.87	2.77	2.82	Agreed
3	Technical manuals should be used to order replacement parts for tools and equipment	2.97	3.12	3.05	Agreed
4	Develop and operate within constraint of a budget	3.23	3.14	3.18	Agreed
5	Borrower-loss replacement should be adopted to Check looses	3.21	3.18	3.20	Agreed
6	Workshop tools and equipment should be in constant use by staff and students to avoid wastage	2.66	2.98	2.82	Agreed
7	Equipment and tools used in teaching MVMW should Planned yearly	3.07	3.66	3.36	Agreed

8	Equipment and tools should be planned based on MVMW curriculum	3.22	3.68	3.45	Agreed
9	There should be regular supervision of MVMW tools inventory to check looses	2.86	2.98	2.92	Agreed
10	Students should be grouped during shop practice to enhance mastery	3.21	3.59	3.40	Agreed

The result presented in Table 4.1 shows that respondents agreed with all the 10 items with average means score ranging between 2.82 to 3.45.

4.2 Research Question 2

What are the strategies needed for maintaining tools and equipment for motor vehicle repair in technical college in Niger state

Table 4.2:

Mean response of teachers and students on the strategies needed for maintaining tools and equipment for motor vehicle repair in technical colleges in Niger State

S/N	STATEMENTS	\bar{X}_1	\bar{X}_2	Xt	REMARK
1	Arrangement of tools and materials before and after use	3.21	3.68	3.45	Agreed
2	Develop a procedure to ensure proper MVMW workshop tools and equipment clean up	3.21	2.95	3.08	Agreed
3	Tools and equipment should be used for the activities they are designed for	3.16	3.14	3.15	Agreed
4	Storing the materials in a lockable cabinet	3.12	2.97	3.05	Agreed
5	Students should be guided in the use of appropriate tools and equipment in the workshop	3.68	3.22	3.45	Agreed
6	Minor repairs (predictive maintenance) of the MVMW tools and equipment should be made to avoid breakdown	3.21	3.18	3.20	Agreed
7	Equipment and tools in the workshop should be well arrange to enhance safety, efficiency and learning	3.23	3.14	3.18	Agreed
8	Safety inspection should be conducted regularly and hazardous condition corrected	3.12	3.62	3.37	Agreed
9	Teachers and workshop staffs should prepare directives for the use of workshop tools,	2.87	2.77	2.82	Agreed

	equipment and materials				
10	Tools and equipment should be properly cleaned up after use before storage	3.47	3.27	3.37	Agreed

The result presented in table 4.2 shows that respondent agrees with all the 10 items with average mean score ranging 2.82 to 3.45

4.3 Hypothesis 1

HO₁: There is no significant difference between the mean response of teachers and students with respect to the ways in which tools and equipment for motor vehicle repairs can be effectively utilized in technical colleges in Niger State

Table 4.3:

t-test analysis of the responses on the ways in which tools and equipment for motor vehicle repairs can be effectively utilized in technical colleges in Niger State

S/N	STATEMENTS	SD1	SD2	t-cal	REMARK
1	Providing adequate funds for the maintenance of existing tools and equipment	0.76	0.74	-1.04	NS
2	Tools and equipment should be planned based on current student enrollment	0.77	0.99	0.26	NS
3	Technical manuals should be use to order replacement parts for tools and equipment	0.15	0.38	1.16	NS
4	Develop and operate within constraint of a budget	1.64	0.41	0.17	NS
5	Borrower-loss replacement system should be adopted to check losses	0.76	0.99	0.07	NS
6	Workshop tools and equipment should be in constant use by staff and student to minimize wastage	0.78	0.47	-1.09	NS
7	Equipment and tools used in teaching MVMW should be planned yearly	0.86	0.48	-1.91	NS
8	Equipment and tools should be planned based on MVMW curriculum	0.71	0.74	-1.42	NS
9	There should be regular supervision of MVMW inventories to check loses	0.68	0.16	-0.53	NS

10	Students should be grouped during workshop practice to enhance mastery	0.91	0.55	-1.11	NS
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The analysis from table 4.4 shows that t-cal value for the 10 items were less than t-critical value of 2.6, therefore the null hypothesis for the 10 items were accepted on the ways in which tools and equipment for motor vehicle repairs can be effectively utilized in technical colleges in Niger State

Key

S.D 1 = Standard deviation of students
 teachers

S.D2 = Standard deviation of

t-cal = T-calculated

X2 = Mean of Teacher

t-critical = ± 2.6

NS= No significant

X1= Mean of students

S = significant

df = (degree of freedom

4.4 Hypothesis 2

HO₂: There is no significant difference between the mean responses of the teachers and students on the strategies needed for maintaining tools and equipment for motor vehicle repair in technical colleges in Niger State

Table 4.4:**t-test analysis of the responses on the strategies needed for maintaining tools and equipment for motor vehicle repair in technical colleges in Niger State**

S/N	STATEMENTS	SD1	SD2	t-cal	REMARK
1	Arrangement of tools and material before and after use	0.76	0.74	-1.40	NS
2	Develop a procedure to ensure proper MVMW workshop tools and equipment clean up	0.57	0.21	1.13	NS
3	Tools and equipment should be used for activities they are designed for	0.77	0.41	0.07	NS
4	Storing the materials in a lockable cabinet	0.38	0.15	1.16	NS
5	Students should be guided in the use of appropriate tools and equipment in the workshop	0.74	0.71	-1.42	NS
6	Minor repairs (predictive maintenance) of the MVMW tools and equipment should be made to avoid breakdown	0.76	0.99	0.07	NS
7	Equipment and tools in the workshop should be well arranged to enhance safety, efficiency and learning	1.64	0.41	0.17	NS
8	Safety inspection should be conducted regularly and hazardous condition corrected	0.48	0.72	0.14	NS
9	Teachers and workshop staff should prepare directives for the use of equipment and tools	0.72	0.99	0.26	NS
10	Tools and equipment should be properly cleaned up after use before storage	0.72	0.45	0.74	NS

From table 4.4 above all the ten items had t-cal below the t-critical value therefore the null hypothesis was accepted on the response of teachers and students on the strategies needed for maintaining tools and equipment for motor vehicle repair in technical colleges in Niger State.

4.5 Findings of the Study

The findings of this study are represented below

Ways in which tools and equipment for motor vehicle repairs can be effectively utilized in technical colleges in Niger State

- i. Providing adequate funds for the maintenance of existing tools and equipment.
- ii. Tools and equipment should be planned based on current students' enrolment
- iii. Technical manuals should be use to order replacement parts for tools and equipment.
- iv. Develop and operate within constraints of a budget
- v. Borrower – loss replacement system should be adopted to check losses.
- vi. Workshop tools and equipment should be in constant use by staff and students to minimize wastage.
- vii. Equipment and tools and materials used in teaching MVMW should be planned yearly.
- viii. Equipment and materials should be planned based on MVMW curriculum.
- ix. There should be regular supervision of MVMW tool inventories to check losses
- x. Students should be grouped during shop practice to enhance mastery

Strategies needed for maintaining tools and equipment for motor vehicle repair in technical colleges in Niger State

- i. Arrangement of tools and materials before and after use
- ii. Develop a procedure to ensure proper MVM workshop tools and equipment clean up
- iii. Tools and equipment should be used for activities they are designed for
- iv. Storing the materials in a lockable cabinet

- v. Students should be guided in the use of appropriate tools and equipment in workshop.
- vi. Minor repairs (predictive maintenance) of the MVMW tools and equipment should be made to avoid breakdown.
- vii. Equipment and tools in workshop should be well arrange to enhance safety, efficiency, and learning
- viii. Safety inspections should be conducted regularly and hazardous condition corrected.
- ix. Teachers and workshop staff should prepare directives for the use of machines, tools and materials.
- x. Tools and equipment should be properly cleaned up after use before storage

4.6 Discussion of the Finding

The findings of this study revealed ten ways in which tools and equipment for motor vehicle repairs can be effectively utilized in technical colleges in Niger State. Providing adequate funds for the maintenance of existing tools and equipment, tools and equipment should be planned based on current students' enrolment, technical manuals should be use to order replacement parts for tools and equipment, develop and operate within constraints of a budget, borrower – loss replacement system should be adopted to check losses, workshop tools and equipment should be in constant use by staff and students to minimize wastage, equipment and tools and materials used in teaching MVMW should be planned yearly, equipment and materials should be planned based on MVMW curriculum. These findings were in agreement with the finding of Elom (2009) that proper planning for equipment based on MVMW is one of the ways for effective teaching to take place in the workshop.

The findings of this study revealed ten strategies needed for maintaining tools and equipment for motor vehicle repair in technical colleges in Niger State. These strategies include Arrangement of tools and materials before and after use, develop a procedure to ensure proper MVM workshop tools and equipment clean up, tools and equipment should be used for activities they are designed for, storing the materials in a lockable cabinet, students should be guided in the use of appropriate tools and equipment in workshop, minor repairs (predictive maintenance) of the MVMW tools and equipment should be made to avoid breakdown, equipment and tools in workshop should be well arrange to enhance safety, efficiency, and learning, safety inspections should be conducted regularly and hazardous condition corrected. These findings were in line with the opinion of Ahmad (2010) that arranging the equipment to facilitate teaching and learning of MVMW, and also in agreement with the opinion of Maiyaki (2002) that adhering strictly to the programme of school workshop activity in MVMW workshop improves technical teaching.

The hypothesis testing for the two hypotheses indicates that teachers and students did not differ significantly in each case. They had the same view in ways in which tools and equipment for motor vehicle repairs can be effectively utilized in technical colleges and strategies needed for maintaining tools and equipment for motor vehicle repair in technical colleges in Niger State.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Summary of the Study

The main aim of this research was to assess the strategies for enhancing effective utilization of tools and equipment for servicing and repairing of motor vehicle in technical colleges in Niger State. The background to the study, statement of the problem, purpose, significance, and scope of the study, the research questions and hypotheses were all stated, tested and discussed properly in line with the research topic. The study also gives a background history of Technical College as regarded as the principal vocational institution in Nigeria. They give full vocational training intended to prepare students for entry into the various occupations.

The responsibilities of Technical College Education in Nigeria include provision of full time or part-time course of instruction and training in Technology, applied science and commerce, in such other field of applied learning, relevant to the needs of the development of Nigeria in the areas of industrial, commercial and vocational agriculture, professional studies in engineering and other technologies and perform such other functions as in the opinion of the society as may serve to promote the objectives of the Technical College in Nigeria and reviewed summary of related literature.

Descriptive Survey research design was used, the three government technical colleges in Niger State were used as the area of study for the research, the instrument for data collection was designed and validated with the help of three lecturers in the department, and the instrument was administered on the spot after which the data was analyzed

5.2 Conclusion

The National curriculum for technical colleges specified the objectives of the technical colleges which include preparation for useful living within the society and preparation for higher education. This implies, enabling MVMW students acquire basic knowledge and practical skills in MVMW and prepare them for occupations in industries among others. These objectives have not been achieved because there is no proper utilization for tools and equipment in order to enhance the repair of motor vehicle in technical colleges. The broad nature of the curriculum in MVMW does not specify the basic knowledge and skills needed in utilizing the tools and equipment available for repairs. For the objectives to be achieved there is the need to improve the curriculum to reflect on the basic knowledge and skills needed by students in the area of tools and equipment utilization in MVMW. To make an input in this direction the study identifies strategies for enhancing effective utilization of tools and equipment for servicing and repair of motor vehicles in technical colleges in Niger State.

5.3 Implications of the Study

The finding of the study has the following implications:

If the strategies identified by the study is acquired by MVMW teachers in technical colleges, they could integrate them into their programme for use in teaching the students the strategies in motor vehicle repair and if the strategies identified by the study is integrated into the curriculum of MVMW in technical schools, it could provide the step-by-step activities necessary for proper motor vehicle repairs. This can enhance students' mastery of the competencies thereby preparing them well for entry into the occupation on graduation. Also, if the Niger State government could package the identified

strategies in into workshop materials, and organize workshop on them for MVMW teachers, it may help to improve their practical performance in motor vehicle repairs.

5.4 Contribution to the Study

This research will contribute to the knowledge of technical teachers in order to enhance their effective utilization of technical skills of tools and equipment, also the technical teachers, with the knowledge that will be acquired from this research will enable them to prepare student to meet the present technical challenges also future constraints as the case may be.

This research will contribute greatly to well-being of the students in their technical skills as it will enable them to study many tools and equipment that is relevant to their area of specialization in order to meet up with the installation of tools challenges that have been rendering most technical schools useless. Secondly, The students would be enlightened on how to effectively utilize tools and equipment to aid smooth performance of service, repair and prolong the life span of the tools and equipment; this is another management skill that would be added to the student.

Government will have a benefit from this research as it will enable them to provide the necessary tools and equipment for technical schools in order to promote the effective technical skills for the students and tutors of the technical institutions also If the tools and equipment is effectively utilized the government will spend less money in replacing damaged or faulty tools and equipment regularly which will help them to save cost or channel the funds to other pressing issues. Furthermore, the society will benefit at large because motor vehicle owners would be giving quality and standard service during repair and this will reduce the risk of road accidents and sudden breakdown of vehicles

5.5 Recommendations

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

1. The National Curriculum for technical colleges should integrate the identified strategies required to enhance the effective utilization of tools and equipment in technical colleges into the curriculum of MVMW in technical colleges
2. Government should organize seminars and workshops for MVMW teachers to update their knowledge and skills for effective utilization of tools and equipment in technical colleges.
3. In-service training should be made available for MVMW teachers to further their education in order to keep up with skills changing technology in the society.
4. Modern tools and equipment should be adequately supplied and maintained regularly for improving motor vehicle repairs in MVMW in technical colleges.

5.6 Suggestions for Further Studies

Based on the limitations of the study, the following are recommended for further studies:

1. Identification of material resources required by MVM teachers for effective practical projects.
2. Professional improvement skill needs of MVW teachers for effective practical projects technical colleges in Niger States.
3. Identification of in-service needs of MWW teachers for effective motor vehicle repairs in technical colleges in Niger States

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APPENDIX A

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA.

DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY

EDUCATION

QUESTIONNAIRE ON

**STRATEGIES FOR ENHANCING EFFECTIVE UTILIZATION OF TOOLS
AND EQUIPMENT FOR SERVICING AND REPAIR OF MOTOR VEHICLES**

IN TECHNICAL COLLEGES IN NIGER STATE

SECTION A: INSTRUCTION AND PERSONAL DATA

INSTRUCTIONS

This questionnaire was designed to assist the researcher in getting relevant information from you on the above subject matter. Kindly provide the necessary information required by filling the space provided and tick () in section A and the appropriate column for section B and C. The information provided will be strictly use for the purpose of this research study.

Please note that the response options for section B and C are as follows:

Strongly Agree = SA 4 points

Agree = A 3 points

Disagree = D 2 points

Strongly Disagree = SD 1 point

Personal Data

Kindly tick () or write the response categories you think is most appropriate for the items below.

Name of institution.....

Status: Teacher () Student ()

SECTION B

What are the ways in which tools and equipment for motor vehicle repairs can be effectively utilized in technical colleges in Niger State?

S/N	STATEMENT	SA	A	D	SD
1	Providing adequate funds for the maintenance of existing tools and equipment.				
2	Tools and equipment should be planned based on current students' enrolment				
3	Technical manuals should be use to order replacement parts for tools and equipment.				
4	Develop and operate within constraints of a budget				
5	Borrower – loss replacement system should be adopted to check losses.				
6	Workshop tools and equipment should be in constant use by staff and students to minimize wastage.				
7	Equipment and tools and materials used in teaching MVMW should be planned yearly.				
8	Equipment and materials should be planned based on MVMW curriculum.				
9	There should be regular supervision of MVMW tool inventories to check losses				
10	Students should be grouped during shop practice to enhance mastery				

SECTION C

What are the strategies needed for maintaining tools and equipment for motor vehicle repair in technical colleges in Niger State?

S/N	STATEMENT	SA	A	D	SD
1	Arrangement of tools and materials before and after use				
2	Develop a procedure to ensure proper MVM workshop tools and equipment clean up				
3	Tools and equipment should be used for activities they are designed for				
4	Storing the materials in a lockable cabinet				
5	Students should be guided in the use of appropriate tools and equipment in workshop.				
6	Minor repairs (predictive maintenance) of the MVMW tools and equipment should be made to avoid breakdown.				
7	Equipment and tools in workshop should be well arrange to enhance safety, efficiency, and learning				
8	Safety inspections should be conducted regularly and hazardous condition corrected.				
9	Teachers and workshop staff should prepare directives for the use of machines, tools and materials.				
10	Tools and equipment should be properly cleaned up after use before storage				

APPENDIX B

FORMULA

Mean

$$\bar{X} = \frac{\sum fx}{\sum f}$$

Where

\bar{X} = Mean

X= Numbers of items

\sum = Summation

f = the frequency of each point in scale

Therefore the mean value is equal to $\frac{4+3+2+1}{4} = \frac{10}{4} = 2.50$

Standard Deviation

$$S.D = \frac{\sqrt{\sum f(\bar{X} - X)^2}}{\sqrt{\sum f}}$$

S.D = Standard Deviation

\bar{X} = Mean

\sum = Summation

X= the score

T- test:

$$T = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S^2}{N_1} + \frac{S^2}{N_2}}}$$

T = T-test

\bar{X}_1 = Ground mean of group 1

\bar{X}_2 = Ground mean of group 2

N1 = Number of respondent in group 1

N2 = Number of respondent in group 2

S.D = Standard of group 1

S.D = Standard of group 2

$N_1 + N_2 - 2$ = Degree of freedom (DF)

APPENDIX C

Result of Reliability Test

Cronbach Alpha

Case Processing Summary

		N	%
	Valid	20	100.0
Cases	Excluded ^a	0	0
	Total	20	100.0

a. List wise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.882	3