AN ASSESSMENT OF STUDENTS KNOWLEDGE OF LATHE MACHINE OPERATION STRATEGIES IN TECHNICAL COLLEGE IN KADUNA STATE

BY

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2016/1/63794TI

DEPARTMENT OF INDUSTRIAL TECHNOLOGY EDUCATION

SCHOOL OF SCIENCE EDUCATION

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

APRIL, 2023

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A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION, FEDERAL UNIVERSITY OF TECHNOOGY, MINNA IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF BACHELOR OF TECHNOLOGY DEGREE (B. TECH) IN INDUSTRIAL AND TECHNOLOGY EDUCATION

APRIL, 2023

DECLARATION

I, Luka Nehemiah Akwital with Matriculation Number 2016/1/63794TI an undergraduate student of the Department of Industrial and Technology Education certify that the work embodied in this project is original and has not been submitted in part or in full for any other diploma or degree of this or any other university.

_____ _____

Luka Nehemiah Akwital **Date**

2016/1/63794TI

CERTIFICATION

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

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DEDICATION

This project work is dedicated to Almighty God.

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ABSTRACT

The study is to investigate into an assessment of student's knowledge of lathe machine operation strategies in technical college in kaduna state. The need for the study roots from the fact that some graduate of technical college lack mandatory skills for the means of increasing industrious power of the nation, hence the Nigeria society should recognized the fact that every citizen should be well equipped to contribute effectively to country's welfare. They rather fail to acquire accurate skills due to our nation's regular curriculum review and implementation, teaching methods used by some of our teachers and student failure to participate fully in practical's. In this case, the fact remain partly that students employed after training do not have the knowledge and industrial skills that will enable them take up available jobs. Five research questions and five kill hypotheses are formulated for the study.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

Technical colleges are institutions where students are trained to acquire relevant knowledge and skills in different occupations for employment in the world of work. Okorie (2001) explained that technical colleges in Nigeria are established to prepare individuals to acquire practical skills and basic scientific knowledge within the confinement of a technical institution or industrial technical education unit. According to the National Board for Technical Education (NBTE, 2004), Technical colleges in Nigeria are established to produce craftsmen at the craft (secondary) level and technicians at the advanced craft (post-secondary) level. Lathe machine is one of the machines that are used for teaching in technical colleges in Nigeria. Considering the various importance of lathe machine to everyday life and also the overall objective of vocational and technical education which offers training in skill for self-reliance, self-sufficiency and employment into the world of work, lathe machine has become an important machine to be taught to students.

The need for improvement in technical education development is an area which is in focus of both the professional and lay public in Nigeria. There are different areas of technical education that needs improvement, but the importance of the ability of students to competently operate machines or use tools effectively cannot be overemphasized. Competency according to Grove (1993) is a quality or state of being functionally adequate or having knowledge, skill or strength. Olaitan (2003) said to be competent implies that

an individual has acquired the knowledge, skills, attitudes and judgments which he requires in order to perform successfully at a specified proficiency level in a given work. The future of educational and technological development of Nigeria depends on the quality of ability of the students to practicalize what they are being taught, because they are expected to be productive workers and leaders of tomorrow. The success of any educational system no matter how well it is planned is only visible in how the students practically applies the knowledge. The greatest obstacle encountered in Nigerian schools is the overconcentration on theoretical contents at the detriment or practical. Most students in technical colleges have insufficient and inadequate knowledge in the use of machines which make them incapable to perform their functions to their employees efficiently and effectively.

1.2 Statement of the Problem

Changes in technology have caused the relationship between education and work in modern societies to become extremely complex. The use of lathe machine in the industry is not in line with the content of teaching in technical institutions and this has become a problem for the industries because students lack the required skills needed in using these machine tools. Adebayo (2007) stated that changes in technology have caused graduates of metalwork technology in Nigeria not to fit into the present world of work without being re-trained. This has made employers of labour to be reluctant in engaging the services of technical college graduates because such graduates are unusable in the modern industries without further training. This according to Dawodu (2002) is as a result of the fact that most technical college students do not possess the requisite skills needed in using new

technologies. To help solve this problem, it is important to know how competent the students of technical colleges are in the use of lathe machine tools.

In whatever way an educational policy appears to be, and at whatever level, its success is a function of an assessment of students' knowledge in theory and practice. Technical education programmes generally, require appropriate assessment towards facilitating maximum attainment of the set objectives. For Nigeria to attain technological excellence, it requires an assessment of students' knowledge in science and technical colleges. This means that their interest and performances must be assessed for greater achievement in relation to resources available. The United Nations Educational Scientific and Cultural Organization (UNESCO, 2003) reported that the provision of basic resources as well as the effective utilization are the important issues in science education programmes.

1.3 Purpose of the Study

The general purpose of this research is to determine the areas where students of technical colleges need improvement in the use of lathe machine tools. The research goals are to study and find the improvement needs of technical college students in use of lathe machine tools in technical colleges in Kaduna State, Nigeria.

In order to achieve the above stated purpose, the research will seek to address the following objectives:

i. Identify the activities performed by students that will influence their knowledge of lathe machine in technical colleges in Kaduna State.

ii. Identify the facilities/equipment used in the colleges that will enhance the students' knowledge of lathe machine in technical colleges in Kaduna State

iii. Assess the facilities/equipment used in the colleges that will enhance the competences of students' knowledge of lathe machine in technical colleges in Kaduna State

iv. Determine the improvement needs of technical college students in using lathe machine

1.4 Research Questions

In order to achieve the objective of the study, the following research questions are formulated to guide the study:

1. What are the activities performed by students that will influence their knowledge of lathe machine operation strategies.

2. How does acquisition of students' knowledge of lathe machine enhance operation strategies?

3. What are the facilities/equipment used in laboratories/workshops for training that will influence students' knowledge of lathe machine operation strategies?

4. To what extent is the efficacy of skills in lathe machine operation strategies?

5. What are the activities required of the students in operating modern tools and equipment?

1.5 Hypotheses

The following null hypotheses which will be tested at .05 level of significance to guide this study:

Ho_1: There is no significant difference in the mean responses of the students of technical colleges in Kaduna on the nature of activities perform by the students that will influence Assessment of Students' Knowledge of Lathe Machine Operation Strategy.

Ho_2: There is no significant difference in the mean responses of the students of technical colleges in Kaduna on skills acquisition in lathe machine by students to enhance Assessment of Students' Knowledge of Lathe Machine Operation Strategy.

Ho_3: There is no significant difference in the mean responses of students of technical colleges in Kaduna on facilities/equipment used in the school Laboratory/workshop that will influence students' knowledge of lathe machine operation strategies?

Ho_4: There is no significant difference in the mean responses of students of technical colleges in Kaduna on the extent of efficacy of their skills in lathe machine operation strategies

Ho_5: There is no significant difference in the mean response of the students of technical colleges in Kaduna on the activities required of students in operating modern tools and equipment.

1.6 Significance of the Study

The result of this study will be of vast advantage to students of technical colleges as it will help them to be aware of the identified short-falls inherent in their knowledge of lathe machine. It will also help them to enhance accuracy in diagnosis and maintenance of lathe machine.

The findings of this study will reveal whether the skills imparted into the students of technical colleges are relevant to industries or the world of work in general.

If the findings of this study are properly implemented, both the government, administrators of science and technical colleges, organizations/industries, society, future researchers, parents and individuals will benefit from the study and it will help to improve knowledge at the science and technical college level in Nigeria.

Since the solution to whatever problem lies first in its assessment and identification, the study will promote teachers' effectiveness and consequently students' knowledge and achievement both in theory and practice of the use of lathe machine. The study will not only add but also stand as the foundation for subsequent literature in the use of lathe machine.

Moreso, the findings of the study will provide information which will be utilized by the curriculum developers for update or adjustment in the curriculum. The information will hopefully influence future trends in the use of lathe machine curriculum development for rapid economic development.

1.7 Scope of the Study

This study is strictly on the topic “An assessment of students’ knowledge on lathe machine operation strategies in Technical Colleges in Kaduna State”.

It is however the view of the researcher that, since the operating environment of technical colleges, its set-up and circumstance are identical across the various states in Nigeria, findings of this study can apply at this level throughout Nigeria.

CHAPTER TWO

2.0 REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter discusses the theories relating to an assessment of students' knowledge of lathe machine operation strategies. Other related literatures of researchers' works that have been made relating to this topic have been critically reviewed.

2.2 Theoretical Framework

A theory is a contemplative and rational type of abstract or generalizing thinking, or the results of such thinking. The set of related statements may take the form of description or functional constructs, assumptions, postulations, laws and theories such as theory of need assessment. The theoretical framework of this study is based on cognitive field theory.

2.2.1 The Theory of Skill Development

Newell (1991) propounded skill development theory which states that "as a learner acquire skills, changes, may be observed that reflect strategies that an individual uses to achieve specific movement outcomes". He further observed that skill development is a process in which a performer learns to control and integrate posture, locomotion and muscle activations that allows the individual to engage in a variety of motor behaviours that are constrained by a range of task requirement. A learner may show a change in the special orientation of body limbs as well as exhibit a change in the timing and sequencing

of movement. This implies that, motor skill acquisition follows a pattern which learning accumulates with practice.

The theory of Huffman (2002) classified skill development into three categories that are related to acquiring, organizing and assessing information. This skill includes both information on what is happening outside the business or workshop, and what is happening inside the business or workshop. There is an attitude or motivated component to this area as well as a skill component. The technicians have to be motivated to go beyond their usual or traditional source of information and also the "step-outside their paradigm" when evaluating information. The second category of skill according to Huffman is skill related to making good product or business decisions. He expressed this as the one that requires good information and strongly analytical abilities. He said there is an attitude component to this skill area as well. It is an aid of making better decisions managers or technicians have to be willing to seek the advice and opinion of others. Huffman further viewed the first two skills areas of information management, entrepreneurship and strategic thinking and good planning for skill development. The third skill is referred to as skill that related to using and organizing resources to implement decision. This skill depends on the type of decision. It is the skills that are required in any or all the management areas of operations, management, finance, marketing, human resources and production.

Newell's theory is related to this study as it emphasized that skill development occur through the acquisition of skill which will result to changes that may be observed and

reflect strategies that an individual uses to achieve specific movement outcome. One common feature of all the components is that the skills deal with the acquisition of performance ability which enables a skilled individual to perform at the most economic level.

2.2.2 Robert Theus Cognitive Field Theory (CFT)

The Cognitive - Field - Theory (CFT) was stated in Britain. The theory was propounded by Robert Theus in the year 1968. The theory states that “a person’s insight collectively constitutes the cognitive structure of his life space”. Theus explained cognitive structure to mean the way of perception of a person’s psychology of himself and his social world; which life space refers to a person’s world which consists of all his facts, concepts, beliefs, and expectations, development of languages, motions, actions and social interactions.

This theory is relevant to this study because CFT explains a person’s ability to see elements of a problem situation in new relationship i.e. if a person is faced with a new problem situation he takes a logical step to get an insight into the problem and react intelligently to solve it. The graduates need to either develop new skills or change their perspective of old skills and work on improving on them in order to meet up with the challenging situation.

2.3 Conceptual Framework

Concept is an idea or principle that is connected with something. To conceptualize is to formulate concepts, that is, to communicate precisely the meaning of a term, one owns construct of that term. Conceptual framework is an organized way of thinking about how a project takes place and how its activities can be understood. In the view of Muller (2003), conceptual framework refers to as set of coherent ideas or concepts organized in a manner that makes it easy to communicate to others.

2.3.1 The Concept of Assessment

According to Nitko (1996), assessment is a process of obtaining information that is used for making decisions about trainees, curricula, and programmes. According to Capper (1996), assessment is a process of investigating an individual, a group or a programme performance with reference to set objectives and expected outcome. For Adedokun (2009), assessment is a process of determining whether or not an individual has gained from an instruction (i.e. in a teaching and learning process). Assessment is the collection, synthesis, interpretation and use of information to aid the teacher in taking decision before, during, and after instruction. Assessment is central in overall quality of teaching and learning which is seen by Alogne (2004) as a lesser form of evaluation.

Assessment means the same thing as evaluation in this study and includes all the approaches i. e. use of questionnaire / interview, focus group discussion, review of literature and observation that would be adopted in ascertaining; the level of attainment

of both expected and unexpected goals of an assessment of students' knowledge of autotronics servicing strategies among others, challenges that may be facing the scheme and possible strategies in improving the scheme if need be. Strategies according to Rex and Patrick (1999) as cited in Ajala (2011) is an act intended to effectively resolve a difficulty or improve a situation. Similarly Rundel (2003) explained that a strategy is a new plan or process that has been put in place in order to achieve a particular motive or solve a particular problem.

Udoh (2003) has suggested the following procedures which could be used by technical teachers for assessing performances of their students:

- Performance or practical tests
- Oral responses and examinations
- Written tests and examinations this should be essay type or objectives
- Self-evaluation by students
- Individual score card and check lists
- Completed assignment or projects
- Personal interviews and observations
- Note books
- Record books

This review will help the teacher to determine the geniuses of the procedure used by the students to carry out the work, the problems encountered during the work and the information on experiences gained by the student's on completion of work.

According to Nwachukwu (2001), what the teacher really needs to find out following the review of students perspective is whether:

- The materials required for practical in the workshop were sufficiently supplied and then the quantity used for work.
- There is any particular step in the procedure for doing work that is not clear to the students.
- There is any particular step in the procedure for doing the work that is particularly difficult and hazardous for students during the work experience.
- There are tools or equipment that were particularly difficult to operate or did not function in the work.
- There are certain aspects of the work experience that should require more time to be completed.
- The information collected after the work experience was clear and useful to the students.
- The students can organized and analyze the information so collected.

- There are some resources of misinformation in the work experience that has been completed.

- There are some steps in the procedure to complete the work experience that should be modified.

It is the responsibility of the teacher to assess the students so as to ensure that they have achieved the objectives of their lessons. When these students are in individual workshop work, it is always necessary for them to discuss their individual results, data collected and experiences gained. The idea is to ensure that these students expose themselves to various problems - solving techniques in the workshop. Results of workshop experiences can help students formulate generalization focus on concepts and evaluate the importance and relevance of the work experience they have done. After this review, the teacher can now critically analyze and evaluate the effectiveness of the students' work experiences. To properly evaluate the workshop instructions, the teacher should use the present behavior of the students to determine if there are behavioural changes as a result of the working experiences. In the view of Nwachukwu (2001), for the successful assessment of the effectiveness of work experience, it is necessary for the teacher to find out:

- How much knowledge, skills and problems-solving experience the students have acquired. This can be done by assigning similar tasks to the students and recording their performances on the new task.

- How the materials provided were used to finish the work, that is, how accurate the finish work is.

- How much time was used in completing the work?

- How convincing and useful is the information gathered from the work experiences by the students.

- The levels of competencies with which students can now perform similar task in the same or related occupations.

When students in the workshop perform different tasks, the teacher should evaluates the effectiveness of each of these jobs and decide if the procedure for carrying them out was clear enough. In other words, the teacher must evaluate students' work experiences immediately after completion to determine the value of building in such experiences in the programme of the school, as well as determining what further activities these students can accomplish.

2.4 Concept of Lathe Machine

Lathe machine is a general-purpose machine tool, which is used for machining different round objects. We can do different operation on the job by lathe machine. It is commonly used in the mechanical field. It makes the work easier and simplify. Mostly the simple jaws we can make on lathe machine tool. It is easy to install and easy to work on it.

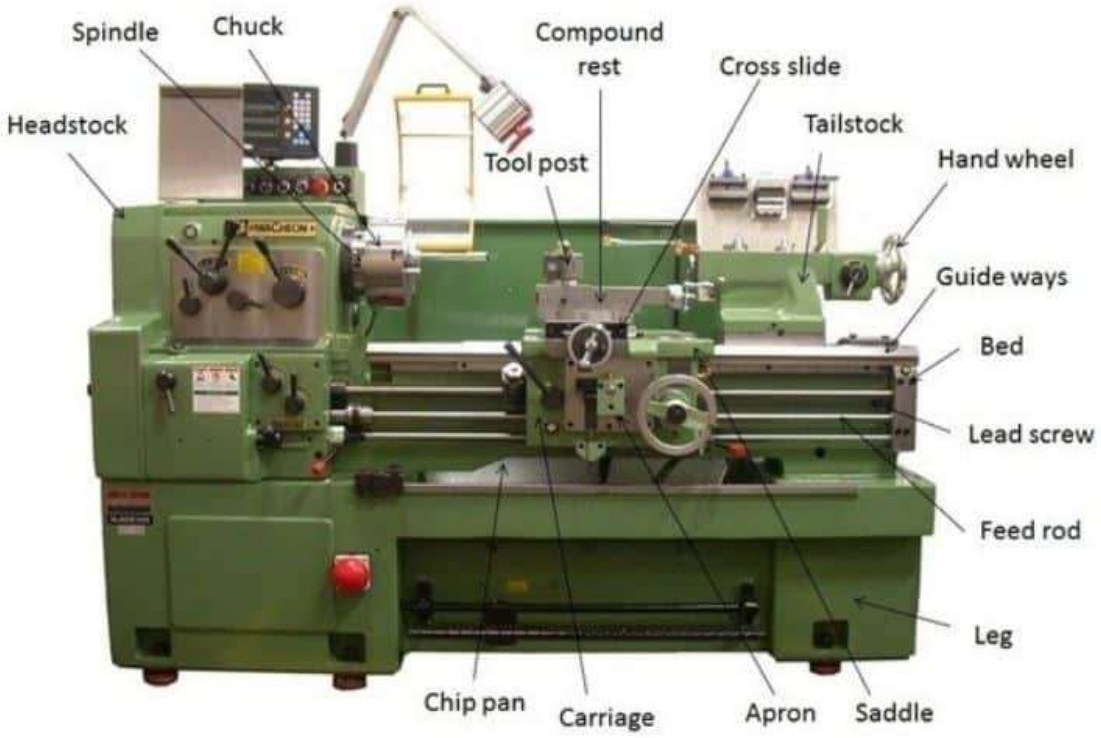


Plate 1: A typical Lathe machine

2.4.1 Construction of Lathe Machine

Lathe machine manufacturing is difficult, so first we make parts of the lathe machine, then we assemble all part of the machine. Mostly of the parts of lathe is made of cost iron and we cast one by one all the parts of lathe machine.

There are five majors' parts of lathe machine.

- Headstock
- Tailstock

- Bed
- Carriage
- Feed mechanism
- Gears

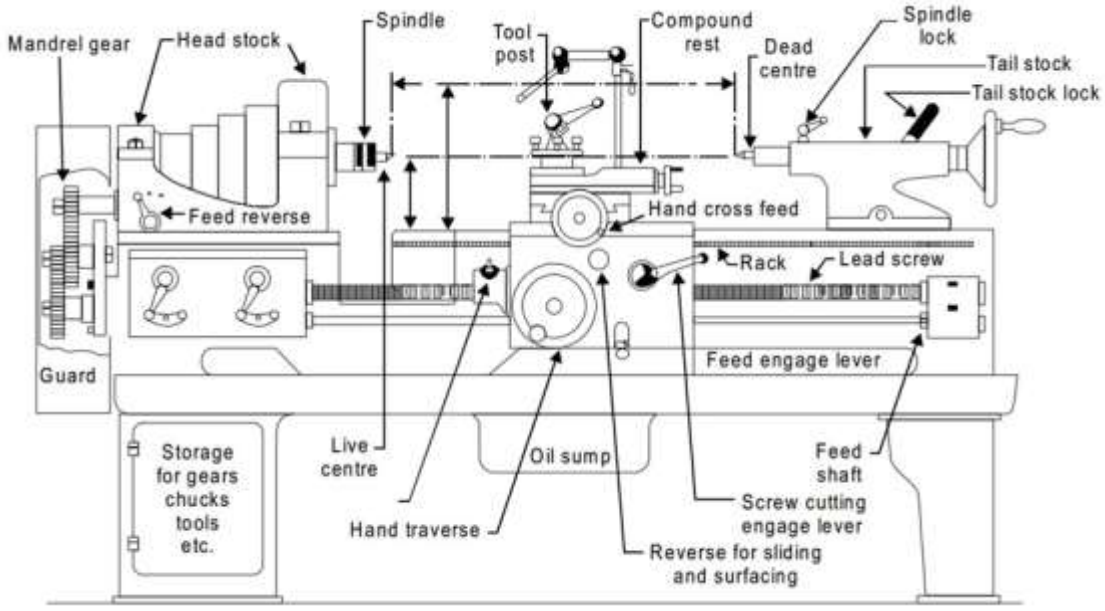


Plate 2: The major Parts of Lathe Machine

2.4.2. Headstock

Headstock is a major part of lathe machine which is on the left side of the lathe machine. This part of lathe machine is made up of cast iron. In this part the all mechanism of consolation of machine available in this part. All gears and mother which is used to start

and stop to the machine available in this part. There is some sub part of the headstock which is important to discuss like (motor, gears, chuck, spindle, clutch) etc.

2.4.3 Tailstock

Tailstock is the one of most important part of lathe machine. It is on the right side of the machine. It is made up of cast iron by casting. It is also consisting of some sub part's like (tailstock spindle, tailstock lock lever, tailstock wheel, tailstock lock spindle lock lever) etc.

2.4.4. Bed

Bed is base of lathe machine which is consist of two or four feet. All the structure of lathe machine is based on the bed of lathe machine. It is made up of cost iron by the casting. Under the bed of lathe machine there are some racks are available for the putting tool's, jaws, or the other parts of the lathe machine.

2.4.5. Carriage

Carriage is also a main part of the lathe machine which is in between the headstock and the tailstock. It is also made up of the cast iron by the casting. It slides on the bed ways which are on the bed of the lathe machine. Its motion is too and frown between the headstock and the tailstock on the bed ways. It is also consisting of some subparts like (carriage wheel, carriage auto feed lever, cross slide, compound slide, tool post, tool post lock lever) etc.

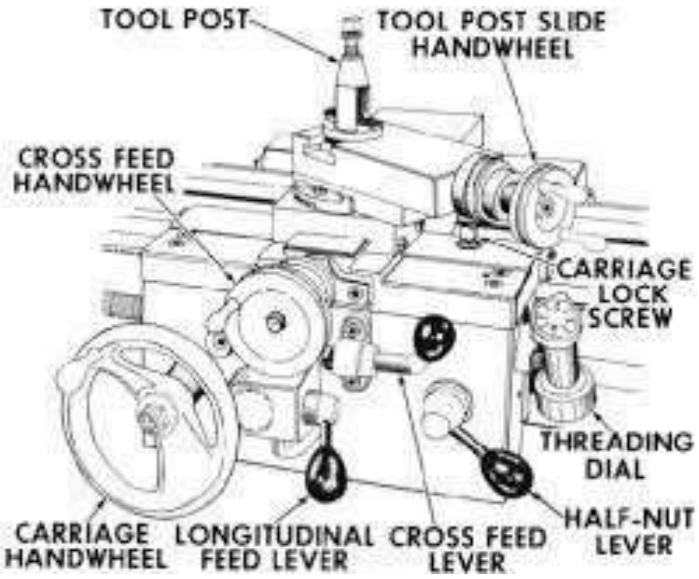


Plate 3: Carriage

Cross slide: The Cross-slide move on the cross-slide keyways on the carriage. It moves vertical to the jab. The purpose of the cross slide is the make the depth of the cut of tool on the jab. we can rotate it at any angle when we need mostly on the tapper cutting etc.

Compound slide: The compound slide offers a way to turn tapers and cut angles on a lathe without rotating the headstock. cutting tool can be mounted across the front or on either side of the head.

Tool post : Tool post is used for the clamping the tool on the lathe machine. We can clamp any tool for the operation in the tool post. There are many types of the tool post which we use on the lathe machine.

2.4.6. Gears.

Gears of the lathe machine is in the headstock. It is providing the power for the lathe machine. It can speed up and the slow down the machine and we use them for the different process on the lathe. It should completely cover otherwise it can damage anything like body of man.

2.4.7 Feed Mechanism

Feed always governed by spindle speed as both should be synchronized for a smooth and steady machining process of a component. The speed and feed will be coarse for a conventional machine since the spindle is driven with an induction motor and speed is regulated with different ratio gear meshing. Whereas in a CNC lathe the spindle speed and feed will be optimum as both spindle speed system and feed system is controlled with servo drives. Hence while describing feed mechanism, it should be separately explained. In a conventional machine the drive through a gear is given to feed box having number of gear ratio meshing combinations give drive to output feed shaft. This rotation of feed shaft is transmitted to a pinion in the apron mechanism fitted on the saddle. Toothed rack throughout the length of bed but under the longitudinal guide way is meshed with this pinion resulted to longitudinal feed. Feed rate can be selected by three selection control levers on feed box. A lever is fitted on the apron mechanism engages or disengages the feed pinion gear causes feed engage or disengage.

In a CNC machine the feed is employed with servo drive mechanism. A servo drive mechanism consists of a command feeder, a command controller called servo drive, a servo motor and a feed beck mechanism. The command given through a computer is analysed in feed servo drive unit pass instruction to drive motor to move in steps of 0.001 mm order as set in system parameters. The movement will be counted with an optical instrument called encoder which give feedback to controller how much is the speed, then how much to be moved will be calculated by the controller to give further instruction and which will be continued until it reaches the commanded point. This system is called closed loop system.

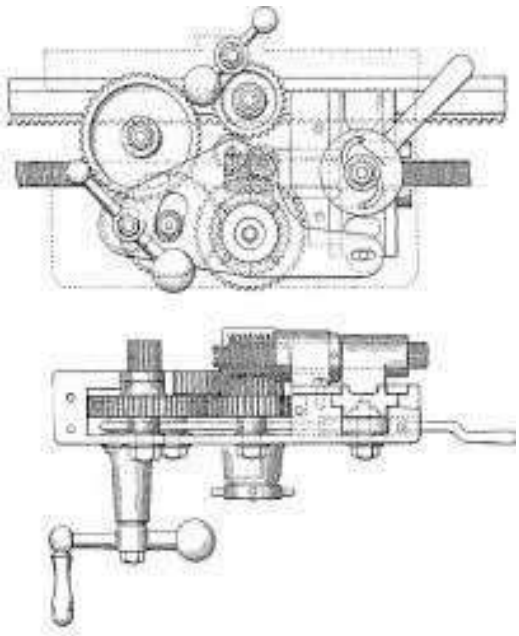


Plate 4: Showing the Gear

2.4.8 Accessories and Attachments of Lathe

Accessories are the tools and equipment used in routine lathe machining operations. Attachments are special fixtures that may be mounted on the lathe to expand the use of the lathe to include taper cutting, milling, and grinding.

Accessories

- Chuck
- Lathe faceplate
- Lathe centers
- Mandrels
- Tapper attachments

Chuck : Workpieces are held to the headstock spindle of the lathe with chucks, faceplates, or lathe centers. A lathe chuck is a device that exerts pressure on the workpiece to hold it secure to the headstock spindle or tailstock spindle.

- Independent chuck
- Universal scroll chuck
- Combination chuck
- Drill chuck

- Collet chuck
- Step chuck

Lathe faceplate: A lathe faceplate is a flat, round plate that threads to the headstock spindle of the lathe. The faceplate is used for clamping and machining irregularly shaped workpieces that cannot be successfully held by chucks or mounted between centers.

Lathe centers: Lathe centers are the most common devices for supporting workpieces in a lathe. Most lathe centers have a tapered point with a 600 included angle to fit the workpiece holes with the same angle. The workpiece is supported between two centers, one in the headstock spindle and one in the tailstock spindle.

- Lathe dogs
- Male center
- Pipe center
- Female center
- Half male center
- V center

Mandrels: A workpiece that cannot be held between centers because its axis has been drilled or bored, and which is not suitable for holding in a chuck or against a faceplate, is usually machined on a mandrel. A mandrel is a tapered axle pressed into the bore of the workpiece to support it between centers. A mandrel should not be confused with an arbor, which is a similar device used for holding tools rather than workpieces.

- Solid machine mandrel
- Expansion mandrel

Taper attachments: The taper attachment is used for turning and boring tapers. It is bolted to the back of the carriage saddle. In operation, it is connected to the cross-slide so that it moves the cross-slide laterally as the carriage moves longitudinally. This action causes the cutting tool to move at an angle to the axis of the workpiece to produce a taper.

Attachments

- Taper Turning Attachment for Lathe
- Milling Attachment for Lathe
- Grinding Attachment for Lathe
- Gear Cutting Attachment for Lathe
- Spherical Turning Attachment for Lathe

Taper Turning Attachment for Lathe: Many modern lathes have a taper bar fitted at the back of the bed. This can be set to different angles to the spindle axis. The bar carries a sliding block which, during taper turning, is attached by a link to the back of the cross-slide. The lead screw of the cross-slide is released so that it no longer controls the setting of the depth of cut and the slide is now free. When the saddle is moved along the bed, the cross-slide follows the taper bar, so that the tool moves parallel to the bar and a taper is produced. The top slide is swung through 90° to lie at right angles to the work so that it can be used to apply the depth of cut.

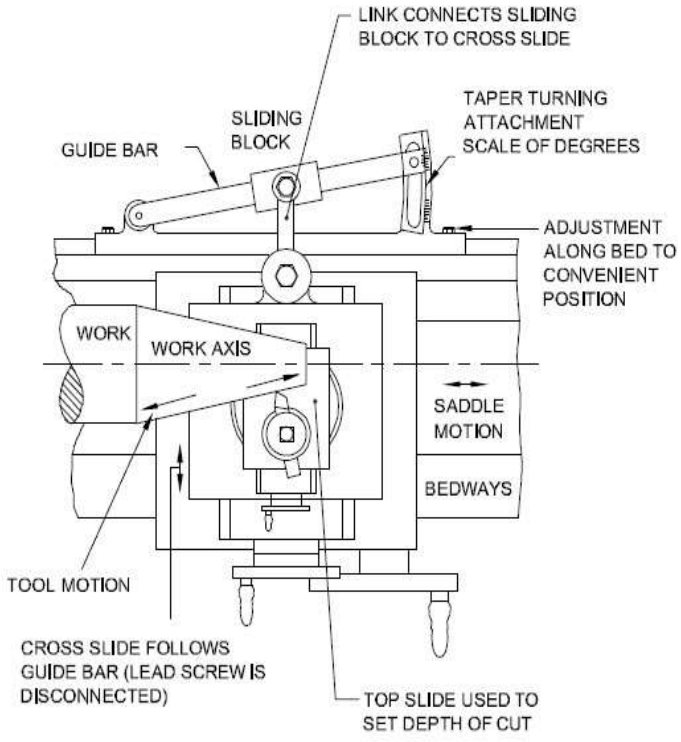


Plate 5: Showing the Turning Tapper of the Lathe Machine

Milling Attachment for Lathe: This attachment is fitted on to the cross-slide of a lathe in the place of the compound rest. The Milling attachment holds the job at right angles to the milling cutter, which is mounted in the chuck or collet. In the other type of attachment, the workpiece is held between centers. The milling cutter and the indexing head are mounted on the compound rest. It is provided with a driving unit. Both these attachments have provisions to feed in all the three directions, and it is, therefore, possible to perform operations like keyway cutting, angular milling, Tee slot cutting, and thread milling etc.

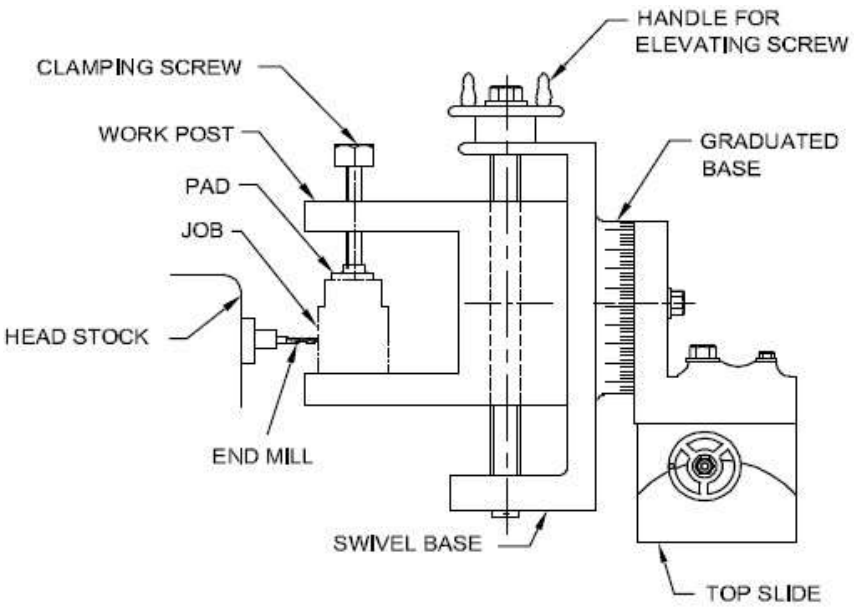
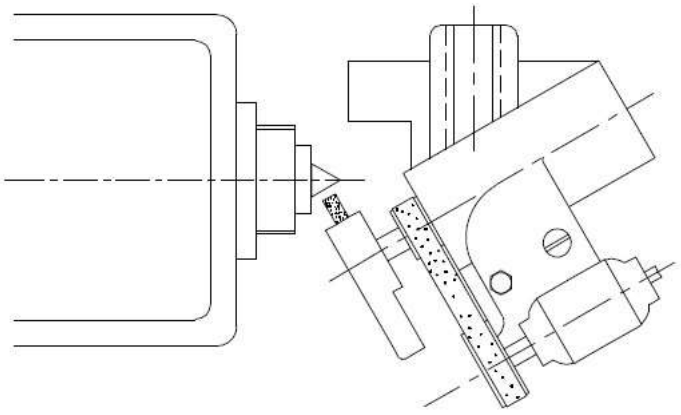


Plate 6: showing the milling attachment

Grinding Attachment for Lathe: With the help of a good electric grinding attachment the lathe can be used for re-sharpening reamers and milling cutters, grinding hardened bushings and shafts, and many other grinding operations.



GRINDING A CENTER ON THE LATHE

Plate 7: Showing Grinding attachment

2.4.9 Specification of Lathe

- Length between the centers
- Height of the centers
- Swing diameter over the bed
- Swing diameter over the carriage
- Maximum bar diameter

- Good working
- Maximum production minimum time
- Low cost purchasing

2.4.11 Lathe Operations

Types of Lathe Machine Operations

The lathe machine operations are classified into three main categories and are as follows.

Following are the Lathe machine operations done either by holding the workpiece between centres or by a chuck:

1. Turning Operation

1. Plain or Straight Turning
2. Rough Turning
3. Shoulder Turning
4. Taper Turning
5. Eccentric Turning

2. Facing Operation
3. Chamfering Operation

4. Knurling Operation

5. Thread cutting Operation

6. Filing Operation

7. Polishing Operation

8. Grooving Operation

9. Spinning Operation

10. Spring Winding

11. Forming

Lathe machine operations which are performed by holding the work by a chuck or a faceplate or an angle plate are:

1. Drilling

2. Reaming

3. Boring

4. Counterboring

5. Taper boring

6. Tapping

7. Undercutting

8. Internal thread cutting

9. Parting-off

The operation which is performed by using special attachments are:

1. Grinding

2. Milling

Turning: It is the most common type of operation in all lathe machine operations. Turning is the operation of removing the excess material from the workpiece to produce a cylindrical surface to the desired length. The job held between the centre or a chuck and rotating at a required speed. The tool moves in a longitudinal direction to give the feed towards the headstock with proper depth of cut. The surface finish is very good.

Facing: It is an operation of reducing the length of the workpiece by feeding the perpendicular to the lathe axis. This operation of reducing a flat surface on the end of the workpiece. For this operation, regular turning tool or facing tool may use. The cutting edge of the tool should set to the same height as the centre of the workpiece.

- Facing consist of 2 operations

- Roughing: Here the depth of cut is 1.3mm • Finishing: Here the depth of cut is 0.2-0.1mm.

Chamfering operation: It is the operation of getting a bevelled surface at the edge of a cylindrical workpiece. This operation is done in case of bolt ends and shaft ends. Chamfering helps to avoid damage to the sharp edges and protect the operation getting hurt during other operations. Chamfering on bolt helps to screw the nut easily.

Knurling operation: It is an operation of obtaining a diamond shape on the workpiece for the gripping purpose. This is done to provide a better gripping surface when operated by hands. It is done using a knurling tool. The tool consists of a set of hardened steel roller, and it is held rigidly on the tool post. Knurling is done at the lowest speed available on a lathe. It is done on the handles and also in case of ends of gauges. The feed varies from 1 to 2 mm per revolution. Two or three cuts may be necessary to give the full impression.

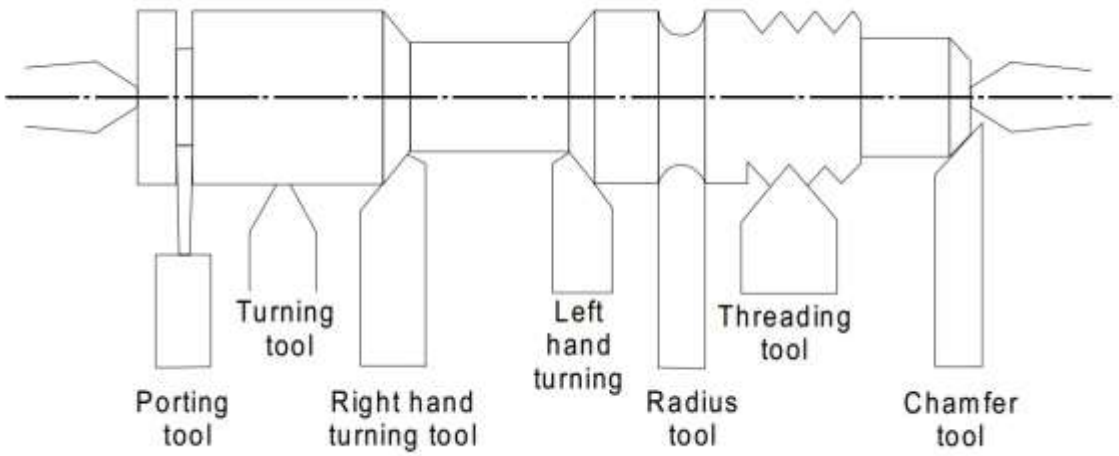
Thread cutting: It is the important operation in the lathe to obtain the continuous ”helical grooves” or ” threads’‘. When the threads or helical grooves are formed on the out surface of the workpiece is called external thread cutting. When the threads or helical grooves are formed on the inner surface of the workpiece is called internal thread cutting. The workpiece is rotating between the two centres i.e., live centre and dead centre so the lathe. Here the tool is moved longitudinally to obtain the required type of the thread. When the tool is moved from right to the left, we get the left-hand thread. Similarly, when the tool is moved from left to the right, we get the right-hand thread. Here the motion of the carriage is provided by the lead screw. A pair of change gears drives the lead screw and by rotating the handle the depth of cut can be controlled.

Grooving: It is the process of reducing the diameter of a workpiece over a very narrow surface. It is done by a groove tool. A grooving tool is similar to the parting-off tool. It is often done at the end of a thread or adjacent to a shoulder to leave a small margin.

Forming: It is the process of turning a convex, concave or of any irregular shape. Form-turning may be accomplished by the following method:

- Using a forming tool.
- Combining cross and longitudinal feed.
- Tracing or copying a template.

Forming tools are not supposed to remove much of the material and is used mainly for finishing formed surfaces. Generally, two types of forming tools are used straight and circular. Straight type is used for wider surface and the circular type for narrow surfaces.



CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter describes the method adopted by the researcher in carrying out the study. The chapter is subdivided into the following subheads: Design of this study, Area of study, Population for the study, and Instrument for data collection. Others are Validation and Reliability of the instrument, Method of data Collection and Method of data analysis.

3.1 Research Design

This study adopted a survey research design. A survey research is one in which a group of people or items is studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group. The survey plan or design specifies how such data will be collected and analyzed since the study entails the collection of data from the respondents through the use of questionnaire to identify an assessment of students' knowledge on autotronics servicing strategies in technical colleges in Benue State, this research design is therefore most suitable for the study.

3.2 Area of the Study

This study is carried out in Kaduna State. Kaduna Sate is located in the northern Guinea savannah zone of Nigeria. It lies between latitudes 10 and 11 degrees north and longitude 7 and 8 degrees east at an altitude of 645 m above sea level. The State's central location

makes communication with the rest of Nigeria relatively easy (Fig. 1). Two major weather systems regulate Kaduna's climate. These are the Sahara high pressure system and the Atlantic low-pressure system. The interface between the two, known as the Inter-tropical Convergence Zone, is a front which moves irregularly in March up to October when it retreats. After October, the Sahara system dominates the weather. The rainy season in the Kaduna State starts around April and ends in October. Annual rainfall averages around 1200 mm. The rainfall pattern is traditionally characterized as monomodal with peak precipitation between July and August. The drainage pattern is dominated by the River Kaduna with its seasonal variation between flood conditions in the wet season and almost dry exposed river beds in the dry season. Its tributaries provide useful recharge opportunities and traditional ''fadama'' development. The Kaduna area is characterized by a dry season with dry, cold conditions from November to February when the ''Harmattan'' wind blows from the east–northeast; and a rainy season with warm, humid conditions with southwest winds from March through to October. The mean monthly temperature generally varies between 26 C and 34 C with maximum temperatures occurring in February, March and April and minimum temperatures in the ''Harmattan'' months of November, December and January. Kaduna's mild climate owing to its location in the guinea Savannah vegetation belt, a rainy season that lasts from April to October and abundance of fertile land that supports agriculture act as magnets that draw more and more people to the city.

3.4 Population of the Study

The population for the study consisted of 2379 students selected from six science and technical colleges in Kaduna State. Data obtained from Kaduna State Science and Technical Schools Management Board in (2022) has shown that there are nine science and technical colleges in Kaduna State. The study selected two each from the three Senatorial district of the State as shown in table 1 below:

Table1: Distribution of population

S/No	Name of College	Number of Students
1.	Government Technical College, Abet	200
2.	Federal Science and Technical College, Kafanchan	348
3.	Government Technical College, Malali	1064
4.	Government Technical College, Kajuru	348
5.	Government Technical College, Soba	202
6.	Government Science and Technical College, Kufena	217

Total 2379	

Source: Kaduna State Science and Technical Schools Management Board

3.5 Sample and Sampling

A sample of 120 respondents is selected from two colleges within the senatorial district. This study adopts a random sample method where 20 respondents are selected from two of the colleges in all the three senatorial district of the state. The respondent will be selected without any form of bias to regard tribe, culture, religion, and gender. The sampling to be used is stratified random sampling.

S/No	Name of College	Number of Students	Number of Students sampled
1.	Government Technical College, Abet	200	20

2.	Federal Science and Technical College, Kafanchan	348	20
3.	Government Technical College, Malali	1064	20
4.	Government Technical College, Kajuru	348	20
5.	Government Technical College, Soba	202	20
6.	Government Science and Technical College, Kufena	217	20

3.6 Instrumentation

The instrument used for data collection in this study was structured questionnaire. The questionnaire contains twenty items sub-divided into six sections "A," "B", "C", "D",and "E". Section "A" seeks for Personal data of the respondent. Section "B" comprised of 5 items designed to find out the activities performed by students that will influence their knowledge of lathe machine operation strategies. Section "C" comprised of 5 items designed to solicit information on how acquisition of students' knowledge of lathe machine enhance operation strategies. While, Section "D" containing 5 items is designed to find out the facilities/equipment used in laboratories/workshops for training that will influence students' knowledge of lathe machine operation strategies. Section "E"

contains 5 items that sought information on the activities required of students of technical colleges in Kaduna in operating modern tools and equipment.

The response option of the questionnaire is structured on four-point Likert type scale as follows; Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree with values of 5, 4, 3, 2 and 1 respectively. This is illustrated below:

Response Categories		**Point**	**Limits**
Strongly Agree	(SA)	4	4.50-5.00
Agree	(A)	3	3.50-4.49
Disagree	(D)	2	1.50-2.49
Strongly Disagree	(SD)	1	1.00-1.49

3.6.1 Validation of the Instrument

The instrument faced validation by three experts from the Department of Vocational and technical Education, Faculty of Education, Ahmadu Bello University, Zaria. These experts made suggestion and corrections used in modifying the instrument, to ensure that the items are clearly stated and appropriate for the stated research questions and hypotheses. The validated questionnaire items was used for data collection and data analyses.

3.6.2 Reliability of the Instrument

Cronbach Alpha reliability test was used to establish the internal consistency of the instrument. Data will be generated by collation of administered questionnaire to science and technical colleges in Kaduna State which is the area of study.

3.7 Method of Data Collection

The questionnaire was administered by the researcher with the help of two research assistants. Twenty copies of the questionnaire will be administered to each of the selected colleges and collect back at completion. The researcher explained the module of administration and the contents of the instrument to the research assistants.

3.8 Method of Data Analysis

Data relating to the research questions was analyzed using mean and standard deviation while the Chi-square statistic will be used for testing the hypotheses at 0.05 level of significance. For calculating the mean and standard deviation for the items, the response modes will be assigned numerical value as follows: SA - Strongly Agreed - 4 points, A - Agree - 3 points, , D – Disagree - 2 points, SD - Strongly Disagree - 1 point. For answering the research question, any item with a mean response of 2.50 and above was considered as Agree while those below 2.50 will be regarded as Disagree. This is because 2.50 is the lower true limit of Agree. For testing the hypotheses, if the calculated chi-square value is equal or greater than the t-table value (t-critical), the null hypothesis will be rejected at 0.05 level of significance otherwise will be accepted.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter deals with the data presentation, analysis, interpretation and discussion of findings of the research work. The research was on the topic "An Assessment of Students Knowledge of Lathe Machine Operation Strategies in Technical Colleges in Kaduna State"

4.2 Data Analysis and Interpretation

A total of 120 copies of the questionnaire were taken to the field and administered to the respondents and 120 were returned. The presentation, analysis and interpretation were organized around the research questions and research hypotheses. The data obtained from the questionnaire was presented, analysed, and interpreted. Mean and standard deviation

were used to answer the research questions. The mean scores up to the cut-off point of 2.50 and above were accepted to have positive influence on the items (i.e. in agreement with the research question), while the mean scores below 2.50 were negative (i.e in disagreement) and not accepted as having any positive influence on the research question. The four research hypotheses were tested using t-test at 0.05 level of significance.

The four research questions were analysed and interpreted as stated below.

4.2.1.1 Data Presentation, Analysis and Interpretation Based on Research Question one.

Research Question One:

1.What are the activities performed by students that will influence their knowledge of lathe machine operation strategies.?

The data that provided answer to the research question one were as presented on Table 2.

Table 1: Mean scores and standard deviation of respondents on the activities performed by students that will influence their knowledge of lathe machine operation strategies.

S/No	ITEM STATEMENT	X	SD	Remark
1	Lathe machine method of holding work pieces	3.62	0.53	Agree
2	Straight turning and facing	3.45	0.58	Agree

3	Boring	3.51	0.61	Agree
4	Spinning	3.43	0.64	Agree
5	Knurling	3.56	0.54	Agree

Source: Field Work 2023

Symbol Keys: $\bar{x}$ = Mean, St.D = Standard Deviation

Table 1: The data presented on Table 1 shows that the respondents' scored items 1-5 with means of 3.62, 3.45, 3.51, 3.43and 3.56 with the corresponding standard deviations of 0.53, 0.58, 0.61, 0.64, and 0.54. Based on the cut-off point of 2.50 the respondents agreed that all the activities performed by students influenced their knowledge of autotronics servicing strategies in science and technical colleges in Kaduna State.

4.2.1.2 Data Presentation, Analysis and Interpretation Based on Research Question two.

Research Question Two:

How does acquisition of students' knowledge of lathe machine enhance operation strategies?

The data which provided answer to the research question two were presented on Table 3.

Table 2: Mean scores and standard deviation on how the acquisition of students' knowledge of lathe machine enhance operation strategies **in technical colleges in Kaduna State.**

S/No	ITEM STATEMENT	X	SD	Remark
6	Sharpening cutting tools	3.12	0.84	Agree
7	Use of steady rest and flower rest	3.37	0.78	Agree
8	Choosing cutting speed	3.49	0.59	Agree
9	Drilling and reaming	3.47	0.61	Agree
10	Polishing and filling	3.38	0.72	Agree

Source: Field Work, 2023

The data presented on Table 2 shows that the respondents' scored items 6-10 with means of 3.12, 3.37, 3.49, 3.47 and 3.38 respectively with the corresponding standard deviations of 0.84, 0.78, 0.59,0.61 and 0.72 respectively. Based on the cut-off point of 2.50, the respondents agreed that the acquisition of students' knowledge of lathe machine skills enhanced operation strategies in Technical colleges in Kaduna State.

4.2.1.3 Data Presentation, Analysis and Interpretation Based on Research Question three.

Research Question Three:

What are the facilities/equipment used in laboratories/workshops for training that will influence students' knowledge of lathe machine operation strategies?

The data that provided answer to the research question three were as presented on Table 4.

Table 3: Mean scores and standard deviation on the facilities/equipment used in laboratories/workshops for training that will influence students' knowledge of lathe machine operation strategies**.**

S/No	ITEM STATEMENT	X	SD	Remark
11	Locomotive frames and engine	3.58	0.65	Agree
12	Forging-hammer blocks	3.63	0.49	Agree
13	Rolling-mill part	3.50	0.59	Agree
14	Parts for large hydraulic press	2.99	0.89	Agree
15	Feed mechanism	3.55	0.52	Agree

Source: Field Work 2023

Table 3 shows that items 11-15 were rated by respondents with mean scores of 3.58, 3.63, 3.50, 2.99 and 3.55 respectively with corresponding standard deviations of 0.65, 0.49,

0.59, 0.89 and 0.52 respectively. Based on the cut-off point of 2.50, the respondents agreed on the facilities/equipment used in laboratories/workshops for training that influenced students' knowledge of lathe machine enhance operation strategies in technical colleges in Kaduna State.

4.2.1.4 Data Presentation, Analysis and Interpretation Based on Research Question four

Research Question Four:

To what extent is the efficacy of skills in lathe machine operation strategies **in technical colleges in Kaduna State?**

The data which provides answer to the research question four were as presented on Table 5.

Table 4: Mean score and standard deviation on the efficacy of skills in lathe machine operation strategies in technical colleges in Kaduna State

S/No	ITEM STATEMENT	X	SD	Remark
16	Grooving turning operation	3.51	0.62	Agree
17	Profile finishing	3.60	0.58	Agree
18	Thread turning operation	3.26	0.67	Agree

19	Ramp rough turning operation	3.60	0.54	Agree
20	Sequential turning operation	3.60	0.52	Agree

Source: Field Work 2023

Table 4 shows that items 16-20 have mean ratings of 3.51, 3.60, 3.26, 3.60 and 3.60 respectively with the corresponding standard deviations of 0.62, 0.58, 0.67, 0.54 and 0.52 respectively. Based on the cut-off point of 2.50, the respondents agreed on efficacy of skills in lathe machine operation strategies in technical colleges in Kaduna State

4.2.1.5 Data Presentation, Analysis and Interpretation Based on Research Question five

Research Question Five:

What are the activities required of the students in operating modern tools and equipment?

The data which provides answer to the research question four were as presented on Table 6.

Table 5: Mean score and standard deviation on the activities required of the students in operating modern tools and equipment in technical colleges in Kaduna State

S/No	ITEM STATEMENT	X	SD	Remark
21	Interpreting technical and engineering drawings	3.68	0.48	Agree

22	Generating hole on metals with twist drill or reamer held in the lathe tailstock.	3.56	0.52	Agree
23	AUTOCAD production of the specimen to be machined.	3.50	0.69	Agree
24	Knowing how to pick position points from the AUTOCAD drawing of the specimen to be machined.	3.40	0.62	Agree
25	General knowledge of computer programming	3.59	0.55	Agree

Source: Field Work 2023

Table 5 shows that items 21-25 have mean ratings of 3.68, 3.56, 3.50, 3.40 and 3.59 respectively with the corresponding standard deviations of 0.48, 0.52, 0.69, 0.62 and 0.55 respectively. Based on the cut-off point of 2.50, the respondents agreed on the activities required of technical college students in operating modern tools and equipment in technical colleges in Kaduna State

4.2.2 Hypotheses Testing

In order to test the hypotheses the t-test was used to test the mean responses of students of technical colleges in Kaduna for any significant differences on the responses and results were as presented on Tables 6 – 10.

Data Presentation, Analysis and Interpretation Based on Hypothesis one

Hypothesis one:

Ho_1: There is no significant difference in the mean responses of the students of technical colleges in Kaduna on the nature of activities perform by the students that will influence Assessment of Students' Knowledge of Lathe Machine Operation Strategy.

The result of the t-test on hypotheses number one is as presented in Table 6.

Table 6: chi-square result of respondent on the technical colleges students on the nature of activities perform by the students that will influence Students' Knowledge of Lathe Machine Operation Strategy.

Mean of Respondent	Calculated –R value	Critical –R value	df	Remark
3.51	0.85	21.026	12	Accepted

Decision Rule: if the calculated value>tabulated value the hypothesis is not accepted

Data presented in Table 6 revealed that each of the activities performed by the students to influence knowledge of lathe machine operation strategies has their calculated R- value of 0.85 which is less than critical value of 21.026 at 0.05 level of significance and at 12 degree of freedom (df). This indicated that there was no significant difference in the mean responses of the technical colleges students on the nature of activities perform by the students that will influence Students' Knowledge of lathe machine operation Strategy. Therefore, the null hypothesis of no significant difference was upheld.

Data Presentation, Analysis and Interpretation Based on Hypothesis Two

Hypothesis Two:

Ho_2: There is no significant difference in the mean responses of the students of technical colleges in Kaduna on skills acquisition in lathe machine by students to enhance Assessment of Students' Knowledge of Lathe Machine Operation Strategy.

The result was as presented in Table 7.

Table 7: chi-square result of respondent of the technical colleges students on skills acquisition in lathe machine by students to enhance Assessment of Students' Knowledge of Lathe Machine Operation Strategy.

Mean of Respondent	Calculated –R value	Critical –R value	df	Remark
3.37	0.30	21.026	12	Accepted

Decision Rule: if the calculated value>tabulated value the hypothesis is not accepted

Data presented in Table 7 revealed that each of the skills acquired by students to enhance knowledge of lathe machine operation strategies has their calculated R- value of 0.30 which is less than critical value of 21.026 at 0.05 level of significance and at 12 degree of freedom (df). This indicated that there is no significant difference in the mean responses of the auto-mechanics students on skills acquisition in lathe machine by students to enhance Assessment of Students' Knowledge of Lathe Machine Operation Strategy. Therefore, the null hypothesis of no significant difference was upheld.

Data Presentation, Analysis and Interpretation Based on Hypothesis Three.

Hypothesis Three:

Ho_3: There is no significant difference in the mean responses of students of technical colleges in Kaduna on facilities/equipment used in the school Laboratory/workshop that will influence students' knowledge of lathe machine operation strategies?

The result was as presented in Table 8

Table 8: Chi-square result of respondent on the technical colleges students on facilities/equipment used in the school Laboratory/workshop to influence Assessment of Students' knowledge of lathe machine operation Strategies.

Mean of Respondent	Calculated –R value	Critical –R value	df	Remark
3.45	0.45	21.026	12	Accepted

Decision Rule: if the calculated value>tabulated value the hypothesis is not accepted

Data presented in Table 8 revealed that each of the facilities/equipment used in the school Laboratory/workshop to influence Assessment of Students' Knowledge of Lathe Machine Operation Strategy has their calculated R- value of 0.45 which is less than critical value of 21.026 at 0.05 level of significance and at 12 degree of freedom (df). This indicated that there was no significant difference in the mean responses of technical colleges students on facilities/equipment used in the school Laboratory/workshop to influence Assessment of Students' Knowledge of Lathe Machine Operation Strategy. Therefore, the null hypothesis of no significant difference was upheld.

Data Presentation, Analysis and Interpretation Based on Hypothesis Four

Hypothesis Four:

Ho_4: There is no significant difference in the mean responses of students of technical colleges in Kaduna on the extent of efficacy of their skills in lathe machine operation strategies

The result was as presented in Table 9.

Table 9. Chi-square result of respondent of the technical college students on the extent of efficacy of skills in Lathe Machine Operation Strategies

Mean of Respondent	Calculated –R value	Critical –R value	df	Remark
3.51	0.93	21.026	12	Accepted

Decision Rule: if the calculated value>tabulated value the hypothesis is not accepted

Data presented in Table 5 revealed that each of the skills is effective in lathe machine operation strategy has their calculated R- value of 0.93 which is less than critical value of 21.026 at 0.05 level of significance and at 12 degree of freedom (df). This indicated that there was no significant difference in the mean responses of technical college students on the extent of efficacy of skills in lathe machine operation strategies. Therefore, the null hypothesis of no significant difference was upheld.

Data Presentation, Analysis and Interpretation Based on Hypothesis Five

Hypothesis Five:

Ho_5: There is no significant difference in the mean response of the students of technical colleges in Kaduna on the activities required of students in operating modern tools and equipment.

The result was as presented in Table 10.

Table 10. Chi-square result of respondent on the technical college students on the activities required of students in operating modern tools and equipment

Mean of Respondent	Calculated –R value	Critical –R value	df	Remark
3.55	0.16	21.026	12	Accepted

Decision Rule: if the calculated value>tabulated value the hypothesis is not accepted

Data presented in Table 10 revealed that each of the activities required of students in operating modern tools and equipment in lathe machine operation has their calculated R-value of 0.45 which is less than critical value of 21.026 at 0.05 level of significance and at 12 degree of freedom (df). This indicated that there was no significant difference in mean response of technical colleges students on the activities required of students in operating modern tools and equipment. Therefore, the null hypothesis of no significant difference was upheld.

4.3 FINDINGS OF STUDY

The discussion of finding as contained herein is done table by table based on each research question

Tables 1,2,3,4 and 5 shows that majority of the respondent agreed with the following

1. That the activities performed by the students influenced their knowledge of autotronics servicing strategies in science and technical college in kaduna state

2. That acquisition of students knowledge of lathemachine skills enhanced operation strategies in technical college in kaduna state

3. The facilities/equipment used in laboratory/workshops for training that influenced students knowledge of lathe machine enhance operation strategies in technical college in kaduna state

4. The efficacy of skills in lathe machine operation strategies in technical college in kaduna state

5. The activities required of technical college students in operating modern tools and equipment in technical college in kaduna state

4.4 Discussion of Findings

The findings of this study based on research question one revealed that all the 5 activities performed by students influenced their knowledge of lathe machine operation strategies. The leading activities include Lathe machine method of holding work pieces, Straight turning and facing, Boring This finding is in line with Usman, (2007) who revealed that the orthodox skills of technicians have

been rendered valueless by emergence of automated technology, and technicians lack knowledge and high technical skills needed to operate modern machines.

The findings of this study based on research question two revealed that all the 5 items enhanced students skills acquisition knowledge of lathe machine operation strategies in technical colleges in Kaduna State. The leading items on the question were: Choosing cutting speed, Drilling and reaming and Polishing and filling. The knowledge of Lathe Machine Operation Strategies now posed a challenge to teachers in such field of study to meet up with the demands of modern technologies.

The findings of this study based on research question three revealed that all the 5 items on facilities/equipment used in laboratories/workshops for training influenced students'

knowledge of lathe machine operation strategies in technical colleges in Kaduna State. This assertion is in cycle with the position of Muhammad, Latib and Rufai (2014) who observed that there are skills divergence between the skills of graduates of auto technical colleges and the expectation of the labour market. They traced the mismatch of skills to the obsolete equipment/facilities used in training the graduates and the inadequate skills of lathe machine operation teachers to cope with modern repair/maintenance of equipment which they cannot manipulate nor use it to teach skills to the students.

The findings of this study based on research question four revealed that all the 5 items on the efficacy of skills in lathe machine operation strategies in technical colleges in Kaduna State are useful.

These findings confirm the necessity of improving the skills of technical college graduates who are not performing as expected according to Ogbuanya and Fakorede (2009). They traced the inability of technical college graduates to perform to lack of skills needed to operate lathe machines and identify or repair faults. This assertion is collaborated by Jika (2010) who observed that technical college graduates complete their training as half-baked technicians. Improvement in these skills will help the self-employed graduates to perform better than relying on the traditional method.

The findings of this study based on research question five revealed that all the 5 items on activities required of technical college students in operating modern tools and equipment were found useful. These findings were in consent with Matthew and Ede (2010) who have traced the incorporation of new technologies with new sub-systems and system

components into modern machines as one of the reasons for the inadequate skills of technical colleges graduates for transmission reconditioning work. They noted that the curriculum content for training technical college students needed to be reviewed to capture the new trends and innovations so that the graduates will fit into the labour market or offer services to their clients satisfactorily

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter briefly highlights the summary of procedure used, conclusion, recommendations, limitations and suggestions for further studies, lastly the chapter ends with contributions of the research work to knowledge.

5.2 Summary

This study is organized into five chapters. Chapter one covers the introduction to the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, scope of the study and definition of significant terms. In Chapter two the research unfolds the review of related literature on the concept of Skills acquisition. It covers theoretical and Conceptual framework where theories of skills

acquisition and development are discussed. Lastly the chapter treats empirical literature of related works and summary of literature review.

The third chapter examines the method adopt in the research under; introduction, research design, population, sample and sampling, research instrumentations, validity of research instruments, reliability of research instruments, data collection procedure and data analysis procedure. Chapter four presents data that is captured from the field. Analysis and Interpretation of this data is organized in themes based on research questions, where the findings are discussed. While Chapter five presents summary, conclusions and recommendations, limitations, suggestions for further studies and contribution to knowledge.

The study is to investigate into an assessment of students' knowledge of lathe machine operation strategies in technical collegesin kaduna state. The need for the study roots from the fact that some graduates of technical colleges lack mandatory skills for the means of increasing industrious power of the nation, hence the Nigerian society should recognized the fact that every citizen should be well equipped to contribute effectively to the country's welfare. They rather fail to acquire accurate skills due to our nation's regular curriculum review and implementation, teaching methods used by some of our teachers and student failure to participate fully in practical's. In this case, the fact remains partly that students employed after training do not have the knowledge and industrial skills that will enable them take up available jobs. Five research questions and five null hypotheses are formulated for the study. A twenty five (25) item study questionnaire was developed

and administered to one hundred and twenty (120) students selected randomly from the six (6) technical colleges selected for the study in Kaduna State.

The data collected was analyzed with regard to each research question using mean scores. A mean score of 2.50 was adopted as the cut-off point or acceptable level for the statements. The Chi square (X^2) statistics was employed in testing the null hypotheses formulated for the study. The analysis indicates that students who responded to the items agree that there is need to enhance on an assessment of students' knowledge of lathe machine strategies in technical colleges in Kaduna State.

Implication of the Study

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

5.3 IMPLICATIONS OF THE STUDY

The research reviews that technicians lack knowledge and high technical skills needed to operate machine. Government and industries should implement policies that facilitate guards for use and operations of machines

5.4 Conclusion

Based on the study, the following conclusions are drawn:

The motivation for effective strategies of teaching practical skills in vocational and technical education colleges in Nigeria is to impart the basic scientific knowledge, attitudes and practical know-how necessary for self-reliance and national development. The practical skills can only be imparted through the use of appropriate and effective teaching methods and techniques that are capable of spurring the learners to creatively explore their potentials and maximize them for the betterment of the society.

Vocational and technical education colleges in Nigeria should not rely on the traditional methods of teaching, because imparting practical skills is paramount. Therefore, they should exhaust all effective measures to imparting the knowledge, attitudes and skills required for the individual to function effectively in the society. In order for students to acquire these skills, teachers are required to teach relevant skills to students by employing appropriate teaching and evaluation strategies.

5.5 Recommendations

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

1. Technical colleges teachers should be sent for further training in Lathe Machine Operation in order to acquire more knowledge/competencies and transmit to leaners.
2. Technical laboratories/workshops should be provided with machines and equipment for practical training at technical college levels.

3. Emphasis should be made on these deficiencies in the curriculum by the curriculum planners to take care of technological changes that are taking place globally.
4. Government and members of society should equip the technical colleges with modern tools, machines, equipment and qualified personnel for effective teaching and learning.
5. The findings of the study should be made available to policy makers like the National Board for Technical Education (NBTE), educational institutions and other cooperate bodies/agencies of education to enable them effect necessary changes in the technology programme with respect to its theories and practical's.

5.6 Limitations

The data collection for this study was based on questionnaire, dealing with self-rating of respondents. This method has major drawbacks, restricted boundary as it confines respondents to items prepared ahead, and responses of respondents cannot be independently confirmed. These drawbacks may limit the generalizability of the findings of this study. The initial attitude of the students in most of the technical colleges used was un-cooperating as most of them were not ready to participate in research works.

5.7 Suggestions for Further Studies

The following are suggested for further research:

i. A similar study should be conducted in other vocational and technical subjects such as autotronics, technical drawing, and

ii. building technology.

iii. Similar studies should be carried out in other states on assessment of students' knowledge of lathe machine operation strategies in Colleges of Education, Polytechnics and Universities.

5.8 Contributions to Knowledge

This research work has contributed to the knowledge existing by further remarkable fundamental assessment of students' knowledge of lathe machine operation strategies in Technical Colleges in Kaduna State which were discussed in section 4.3 discussion of findings. The methodology adopted for this research is structured questionnaires distributed among respondents that further sincere the findings and recommendations of the research.

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