

**WORKSHOPS OF TECHNICAL COLLEGES IN LAGOS STATE**

**BY**

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## **CERTIFICATION**

I, MUSTAPHA OLOYEDE with matric No. 2007/1/27279BT an undergraduate student of the department of industrial and technology education certify that the work embodied in this project is original and has not been submitted in part or full for any other diploma or degree of this or any other university.

.....

Name

.....

Signature

## APPROVAL PAGE

This project has been read and approval as meeting the requirement for the award of B. Tech degree in Automobile Technology of the department of Industrial and Technology Education. School of Science and Science Education Federal University of Technology Minna

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## **Dedication**

This project is dedicated to the Alpha and Omega, the God who knows the end of a thing right from the beginning. And also dedicated to my beloved family Mr Adewale Mustapha, Mrs Oluwafunmilayo Mustapha, Mrs Oluwabusayo Adewale, Mrs Oluwabukola Afolabi, Mrs Irebowale Olusanya Robert and my baby sister Miss Aderayo Mustapha

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## **ABSTRACT**

This study is aimed at identifying the problems hindering maintenance culture in automobile workshop of technical colleges in Lagos State. The study also provides solution to the identified problem. This study was motivated by the ways these workshops are underutilized due to poor maintenance culture in order to collect data for the above stated problem, three research questions were formulated. A questionnaire was designed for the respondents. The data collected from these questionnaire items were statistically computed using the frequency count, mean, standard deviation and t-test to answer the research questions and t-test statistic to hypothesis. The population of 100 staff was chosen from the five technical colleges with the principals, heads of departments, sectional heads, instructors and automobile technicians as respondents. From the findings conducted the following were some of the causes found to be responsible: Lack, of financial and material support from the government, lukewarm attitudes of heads of departments, instructors and technicians, poor funding of these workshops. Suggestions were also made after the findings as listed below: our attitude towards maintenance should be changed positively, government on their part should make provision for these colleges during the yearly planned budget, government should also procure broken down components to restore grounded machines, principals should also allocated part of the money realized for maintenance of these workshops and suggestions for further finds was also taken care of in this work.

# CHAPTER 1

## INTRODUCTION

### **Background of the Study**

The lack of maintenance culture has created a big problem of capital equipment and infrastructure in all sectors of the nation. The failure of facilities and the need for replacement of capital assets is a dented signal on the road to industrialization; it is also an indication of a bleak economic future for the country. The problem of maintenance should be a source of great concern to whosoever has the responsibility of providing fund for the procurement or provision of capital assets both at the public and private state of the nation's economic situation.

Olaitan (2002) stated that “maintenance culture is an attitude that is sadly lacking in Nigeria whether in the home, school, office or factory”. Every effort should be made at all levels particularly in the vocational/technical schools to imbibe the maintenance culture. We have to engage in the relentless battle against lack of maintenance culture because absence of maintenance culture is clear manifestation of ignorance and indiscipline, which brings corruption and inhibits economic development.

Maintenance is an art of carrying out a systematic supporting service on any device, tool, machine or infrastructure to be maintained for optimum productivity. Honby (1974) Porcter (1980), Parish (1973). Maintenance in engineering

equipment and machines are three types. These include: predictive, preventive and corrective maintenance. The method of using modern instruments or devices to predict and impending breakdown in machines equipment is called predictive maintenance.

The type carried out machines, equipment and building infrastructure even before the need arises is termed preventive. Repair work when equipment and machines have developed fault is referred to as corrective maintenance. Prediction of impending breakdown in machines and equipment should be our cultural heritage. Preventive maintenance forestalls the possibility of a major breakdown of the equipment and machines are installed. Predictive and preventive should be our cultural heritage to avoid breakdown of our machines, equipment and building infrastructure. If predictive maintenance is properly used it will prolong the life span of the aforementioned.

One of the goals of vocational education as stated in the NPE (1998) is to provide the technical knowledge and vocational skills necessary for agriculture, commercial and economic development. Based on his goal, the technical colleges within Lagos state have equipped their workshops with tools, building structures, machines and equipment that need the above types of maintenance. For students to acquire adequate skills, the workshop tools and machines have to be well maintained. The problem of maintenance should be a source of great concern to

technical colleges. Lee (1976) stated that lack of maintenance causes maximum disruption of production and may lead to serious financial losses.

Effective maintenance of workshop enhances our national economic development. There had been remarkable improvement in concerted efforts toward improving maintenance. For this purpose, series of seminars have been organized at local, state and national levels on the real status of maintenance culture. The plans to improve maintenance culture have revealed Federal government's desire to achieve technology emancipation through effective maintenance in all sectors of technical college facilities. Presently, the federal government has evolved another agency known as FERMA (Federal Road Maintenance Agency) whose function among others is to take care of all federal roads in the country. However, the government plan has been neglected by our non-challant attitudes towards maintenance culture.

In the past and even now, maintenance activities have been under rated, unappreciated and disregarded up to the level of total failure. Maintenance has lost its status, attraction and glamour of new construction. The study therefore investigates the status of maintenance culture in automobile workshops of technical colleges in Lagos State.

### **Statement of the Problem**

Many technical instructors in charge of maintenance as well as parents and teachers association (PTA) have expressed concern about the deteriorating building

infrastructures and workshop facilities in technical colleges. This deplorable state of workshops facilities has affected technical college programmes.

Workshop equipment and machines in most of the departments of technical colleges tend to have maintenance problems. Some are known to have mechanical faults while others have electrical faults. Non – availability of spare parts has worsened the situation and has prevented machines and equipment from functioning. Further non-functioning workshop equipment has affected student's skills acquisition thus dragging the development of technical education into a backward position. Based on the researchers investigation and preliminary studies lack of maintenance culture in technical colleges, lukewarm of the principals, technical/commercial instructors towards maintenance of building infrastructure, machines, equipment and tools, non- availability of funds for maintenance and other factors militating against maintenance culture led to the graduation of unskilled manpower into the labour market. Other problems of maintenance culture include, lack of data and poor information on the equipment, absence of efficient inventory which often result in frequent shortage of materials, indiscipline and ignorance on the part of the users of equipment and lack of maintenance skill and poor appreciation of dynamics of maintenance Olateju,(2002).

Based on the foregoing therefore, this study is designed to find out the status of maintenance culture in automobile workshops of technical colleges in Lagos state.

## **Purpose of study**

The purpose of this study is to find out the status of maintenance culture in technical colleges within Lagos state with special consideration for automobile workshops. Specifically, the study investigated:

1. The causes of poor maintenance culture in automobile workshop.
2. The sources of funds for effective maintenance of infrastructure in automobile workshop in technical school.
3. Ways of improving maintenance culture in automobile workshops.

## **Significance of the study**

The study will state how maintenance culture could be enhanced in the automobile workshops of these selected technical colleges for the social economic development of the state.

Similarly, the study would also contribute to solving problems of maintenance culture in automobile workshops. It will go a long way in improving the deplorable state of our workshops. If carefully followed, it will change the carefree attitudes of instructors and workshop technicians.

The result of the study would determine the quantity of maintainable items supplied to the department of automobile workshop. It will also penetrate deeply to know how adequate these supplied equipment, tools, machine and workshop buildings are maintained. The study would also contribute to broaden the



automobile instructors' horizon in planning on how to engage themselves on the day to day maintenance activities of their equipment, machines, tools, workshop buildings among others. In effect, the result of the study will increase strict observance of maintenance culture by providing fundamental guidelines that facilitate the maintenance of equipment. The result will also create awareness in the maintenance culture in relation to basic demands of the different subjects on maintenance areas.

Members of the educational service and inspectorate divisions of the ministry of education. Technology unit and vocational/technical education planners will finally make the students of the automobile department to be aware of the importance of maintenance culture and work towards its achievement.

### **Scope of the study**

The study is centre on the maintenance of tools, equipment, machines and building structures in automobile workshops of technical colleges in Lagos state.

### **Assumption of the study**

In carrying out this study, the following assumptions were made:

- i. Principals, technical instructors and workshop assistants in technical schools Lagos constitute a valid source of the data needed in this study.

- ii. The respondents would give honest and unbiased responses to the questionnaire.

## **Research Questions**

The following research questions have been formulated to guide this study:

- i. What are the causes of poor maintenance culture in automobile workshop?
- ii. What are the possible sources of funds for effective maintenance of infrastructure in automobile workshops in technical colleges?
- iii. What are the ways of improving maintenance culture in automobile workshop

## **Hypotheses**

Based on the research questions, the following hypotheses were tested at the 0.05 level of significance.

1. There will be no significant difference ( $>0.05$ ) in the responses of the principals of technical colleges and technical instructors on the causes of poor maintenance of automobile workshops.
2. There will be no significance difference ( $p < 0.05$ ) in the responses of technical instructors and principals on the possible sources of funds needed for the maintenance of funds needed for the maintenance of automobile.

3. There will be no significant difference ( $p < 0.05$ ) in the opinion of technical college principals and instructors on the ways and means of improving maintenance culture in automobile.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

Related literature on maintenance culture based on the three research questions are reviewed under the following headings:

1. The concept of maintenance.
2. The causes of poor maintenance culture of automobile workshop
3. The source of funds for effective maintenance of infrastructure of automobile workshop in technical colleges.
4. The maintenance culture employed in these workshops and source of improvement.
5. Summary of literature review.

#### **The Concept of Maintenance**

Maintenance is the means of taking specific steps and precautions to care for a piece of equipment, tool, machinery or facilities and ensure that it attains its specific maximum functional self-life. Maintenance is also seen as regular regard recognition accorded to machines, tools, equipments, facilities towards making sure that its life is prolonged and provide maximum satisfaction in production line.

## **Objectives of Maintenance Culture**

The aims and objectives of maintenance culture in any organization or institution, industry or service institution grossly include the following.

1. To ensure maximum satisfaction of a machine that is put into production.
2. To provide quality control.
3. To meet the demand of production of an institution or industry.
4. To prolong the life span of a machine in production line.
5. To facilitate the respect for honest and strengthen the ideas of the dignity of labour.
6. To ensure that the production system operates of a functional and an acceptable level capable of sustaining efficient production above all.

## **Approach of Maintenance Culture**

In an effort to guarantee effective maintenance culture procedures, five (5) preliminary approaches to maintain machines, equipment, tools and infrastructure have been identified by Bronwer (1977).

These preliminary approaches include:

1. The vendor – contract approach: this is when the equipment supplier signs a contract to maintain the equipment for given period of time.

2. The vendor-per-call approach: this is when the vendor supplies the equipment needed and is been paid for time and material consumed.
3. The third party-per-call contract approach: this is when the third party is paid for time and material used.
4. The third party contract approach: this is when maintenance is provided by specialized companies where the equipment is not supplied by them.
5. The in-house approach: this is when maintenance is done internally by the institution or industry that owns the equipment. This type of maintenance as the advantage of prompts attention being given to the machine or equipments and has low cost potential.

### **Types of Maintenance Culture**

Primarily, there are three (3) common maintenance cultures normally practiced by industries and service institutions. These maintenance culture are; Preventive maintenance, Predictive maintenance and Corrective maintenance.

**Preventive Maintenance:** This type of maintenance involves inspection, lubrication, cleaning and testing of equipments, tools and machines used in an institution. It is a task carried out by operational staff in the institution. It has low cost to maintain equipment. This type of maintenance does not wait until the machine, equipment or tools has collapsed or broken down before being attended to. The effort is rather to prevent a break down which could affect the production

of the institution. It is always advisable for an institute to embrace and embark on this particular maintenance to be sure of prompt, effective and continue production.

**Predictive Maintenance:** Predictive as the name implies, is concerned with the application of useful strategies to forestall a breakdown when danger signals are observed. In this circumstance, it means that when danger signals are observed in the operation of the equipment, tool or machine, an immediate attention is necessary to arrest the situation and prevent the equipment from breaking down. This form of maintenance is similar to the prevention kind of maintenance.

**Corrective Maintenance:** Corrective maintenance is costlier than preventive and predictive maintenance. It involves approaches for rectifying an already damaged or broken down equipment or machinery, steps to be taken maybe replacement of already damaged parts or repair and servicing. This type of maintenance is cost effective because it has to do with total repair or replacement of complete firm or part.

### **Causes of poor maintenance of culture of automobile workshop**

The success of the above mentioned facilities is solely dependent on the good attitude toward maintenance culture. In order to achieve the above objective, there should be an adequate programme directed towards grassroots development through intensive and extensive culture, encouragement of small scale industries and active integration between researches in various fields of maintenance culture.

Tudnalle (1997) added that the layout and equipment selection with consideration of the skilled knowledge and economic factor is the responsibility of production engineers to maintain the processing machines, equipment testing and inspections.

Clark (1963) highlighted that other important requirements are adequately trained machine operators, a keen observation and sympathy to the job. Olateju (2002) maintenance activities are organized regularly rather than on ad-hoc basis. Lawler (1969) attention has been drawn to the theory that the re-design of work and jobs as a strategy for organizational change is expected to enhance good maintenance culture motivation and performance.

Priel (1974) noted that engineering institution in developing countries can play important roles in their attitudes towards maintenance exercises.

Lee (1976) threw more light that, it is clear that unplanned maintenance causes the maximum disruption of production that may lead to loss of products, quantity or consequently serious financial loss.

### **The sources of funds for effective maintenance of infrastructure of automobile workshop in technical colleges**

The purpose of funding the technical college is to maintain the existing equipment, machines, tools and workshop buildings as well as individual maintenance of craftsmen and technicians in order to enhance better productivity.



The acquaintance of students with maintenance culture is an ideal way to develop their understanding for future growth and better technological skill enhancement.

Alfred (1969) stated that planned maintenance involves a lot to time, money and dedication to duty. The purpose of maintenance requires the availability of adequate funding for its realization of implementation. Also negotiation for the same old equipment at the most favourable price is important. Knowles (1970) outlined that the quality of maintenance attracts regular funding system, which cannot be overlooked.

Lee (1976) noted that it is clear that unplanned maintenance causes reduction in maximum production quantity or consequently serious financial loss. Gonwalk (1986) said the true estimate of adequate funding for maintenance culture should be determined and included in the state's yearly budget for effective maintenance implementation.

Smith (1988) state that provided that safety is not jeopardized, it is possible to make a conscious choice between the quality levels of work undertaken and the cost incurred.

### **The maintenance culture employed in automobile workshop for improvement in Lagos State**

The improvement of maintenance culture in automobile workshops of technical colleges are based on national economic development, adequate

culturalization of maintenance will enhance national economic development. The sources of the maintenance are inclusion of spare parts during the importation of equipment; adequate funding and judicious utilization of the available funds. Remuneration of staff will create time for training on machines and equipments usages, thus training creates awareness of the importance of maintenance to the national economic developments.

Olalateju (2002) contributed that a country that cherishes maintenance culture, ensures prompt repair of equipment and infrastructure production or procurement of spare parts, undertake research and experimentation etc. Through personal conviction and census of values

Codd (1986) said that in the maintenance services, a combination of different resources are usually required and these resources are usually required and these resources consist mainly of “MAN, MONEY and MATERIALS: and for efficient running and maintenance of water utilizing essential tools, spare parts workshop facilities and skill must be provided.

Acha (1978) noted that these type of remuneration offer the participants wish to pursue a career in maintenance of workshop tools, equipment, machines, workshop building structure and other facilities. An opportunity to develop these skills, abilities and understanding will enable them enter, perform and progress in maintenance career.

Sardines (1990) on his research studies, findings and experiences have shown that maintenance craftsmen/technicians productive capacity increase with any rise in their interest and morale. Since remuneration is an incentive and encouragement to stimulate maintenance towards maximum output, it implies that the productivity of the people concern will be relative to the degree of such incentives provided.

### **Summary of Literature Review**

All the literature reviewed emphasized on importance of maintenance. Thus, the first imperative is to identify the maintenance of basic work, unit by unit. This identification will streamline the maintenance skills into maintenance culture thus eliminating like causes of poor maintenance of automobile workshop equipment.

The review of literature demonstrated the importance of the supply of high quality types of equipment to production unit. These machines and equipment should be duly maintained for high efficiency. As Robert (1964) noted, the outward or inner manifestation which gives the sense of enjoyment or accomplishment in the performance of the machine and equipment rest on regular maintenance.

Another point stressed is the issue of staff remuneration which creates time for training on machines and equipment usage and foster efficiency in the attainment of aims and objectives of the programme Sardinas (1990).

Development of technical colleges training adequately in maintenance skills appear to grow faster than improvement of training in the maintenance skills in these institutions.

Towards this direction, technical college principals/instructors requires training in order to maintain and operate efficiently. The modern maintenance technology requires a higher degree of maintenance ability and operating skills. All workshops personnel are required to possess some degree of maintenance skills in addition to their technical knowledge.

Maintenance culture cannot prevail without skilled manpower. The amount of skills required depends upon the availability of maintainable items in automobile workshops and its cultural level of development. Maintenance officers must possess adequate maintenance culture, similarly, there should be an up to date good maintenance relationship with the acquired skills. The machines available in the automobile are obsolete. For this reason, they no longer serve the purpose of which they were installed.

A good quality and functioning equipment and machines apart from having reliability index should be valid objective and comprehensive when placed on regular maintenance activities. The present systems of lukewarm attitude to maintenance activities generally need to be reviewed vice versa with the objective of the programme. This is because it does measures the degree of skills acquisition

or development and does related the technical instructor's experience with the actual world of work. There is need to review the objectives of the maintenance of technical college's automobile workshop equipment machines, tools, workshop structures (building) and other facility for teaching practical lessons which should develop technology in our education systems. This would enhance man power productivity that has ever our problem in Nigeria economy.

From the review literature, various factors have been identified on the basis of maintenance culture. It is necessary therefore at this point to identify the relation between availability of automobile equipment their supply and utilization, funding the automobile workshops for the purposes of maintenance activities and improving maintenance culture in these workshops. The existing review of related literature on maintenance has shown that there is no literature on appraisal of maintenance culture in technical colleges. The deteriorated state of equipment, machine, tools, workshop building and other infrastructural facilities, which affected our automobile workshops programme motive the researcher to undertake study

## **CHAPTER THREE**

According to Itanyi (2004), research methodology gives the specification for research process. That is it provides the step to be followed when conducting a research. This chapter presents the procedures employed in the study and in the analysis of data that were collected. Also included in this chapter are: the design of the study, the area of the study population, sample techniques, instrument for collection, and validation of instrument and method of data analysis.

### **Design of the study**

The study is a descriptive survey research. A descriptive survey research is one studying a group of people or items by collecting and analyzing data from only few people or items considered to be representative of the entire group. In other contributions, Ogbazi and Okpala (1994) indicated that survey design involves the use of questionnaires and interview to obtain the attitude and perception of people about issues. The survey design is suitable for this study since the study involves soliciting information from a sample of technical instructors on the criteria that could be employed to improve maintenance culture in automobile workshops of technical colleges.

### **Area of the study**

This study was conducted in the five (5) technical colleges within Lagos State.

## **Population of the study**

This population of the study comprised Principals of all the five technical colleges, their heads of Automobile departments, sectional heads, instructors and automobile workshop technicians. The table below shows the distribution of the populations of the five (5) colleges under survey.

<b>S/N</b>	<b>Name of School</b>	<b>Population Sampled</b>
1	Government Technical College, Agidingbi.	20 person (Staff only)
2	Government Technical College, Epe, P.M.B. 1021, Epe.	20 person (Staff only)
3	Government Technical College, Ado-soba.	20 person (Staff only)
4	Government Technical College, Ikorodu, P.M.B 1011, Ikorodu.	20 person (Staff only)
5	Government Technical College, Ikotun.	20 person (Staff only)

## **Sample of the Study**

Simple random sampling was used in selecting 20 staffs from each technical college. Therefore the study sample size is 100. According to Itanyi (2004), the sample is that portion of the population from which data were actually collected including the sampling technique used.

Based on the above, the researcher has used these categories of persons (staff) for reliable information:

- i. Principal and Vice Principal
- ii. Head of Departments.
- iii. Sectional Heads
- iv. Instructors and
- v. Technicians and Workshop Attendants.

### **Instrument for Data Collection**

The name of the instrument the researcher developed and used to collect the data is called Maintenance Culture Appraisal Questionnaire (MCAQ). This instrument consist of 30 questionnaires items for all the respondents. No section has been singled out for the particular class of respondents. All the principals, heads, sectional heads of departments, instructors and workshop attendants/technicians have answered all the questions.

The breakdown of the designed questionnaire is as structured below:

The questionnaire was divided into 2 sections. Section I was designed to obtain information on the personal data and Section II was sub divide into section A, B, C which consists of the following.

1. The causes of poor maintenance culture of automobile workshop
2. The possible sources of funds for effective maintenance of infrastructure in automobile workshops in technical colleges.
3. The strategies/ways for improving maintenance culture in these workshops.



Questions were distributed on these sections as follows:

- a. 11 questions focusing on causes of poor maintenance culture of automobile workshop
- b. 6 questions on the possible sources of funds for effective maintenance of infrastructure in automobile workshop in technical colleges
- c. 13 questions (items) on ways of improving maintenance culture in automobile workshop.

A four (4) point rating scale was employed by the researcher.

### **Frequency Count:**

The frequency count was used for the collection of the role data from questionnaire as answered by the respondents.

### **Mean**

The four (4) points rating scale was developed and used by the researcher for data collection using the structure as shown below:

Strongly Agree            (SA) =     4

Agree                      (A) =     3

Disagree                  (D) =     2

Strongly Disagree        (SD) =    1

## **Validation of Instrument**

The instrument for this study was validated with respect to face authenticity. The validation was done by the one lecturer in the department of Industrial and Technology Education, Federal University of Technology, Minna. Their comments were used in improving the questionnaire.

## **Method of Data Analysis**

The data for the study were analyzed using the frequency count, mean, standard deviation and t- test statistics to answer the research questions and also test the hypothesis. The mean of the responses was used to ascertain the central tendency of the respondent's opinions to decide on the items and answer the three research questions as being agreed or disagreed. The standard deviation was used to determine the measure of the variability of responses. The t-test statistics was used to test the null hypothesis at 0.05 level of significance.

The calculation for the mean was done using this formula as indicated beneath:

### **Mean**

$$\bar{X} = \frac{\sum FX}{\sum F}$$

Where

$\bar{X}$  = the mean

$\sum$  = "the sum of"

X = the normal value of the option (scores)

F = the frequency of the occurrence.

### Standard Derivation

The standard derivation for each group of respondent was calculated using this formula:

$$SD = \sqrt{\frac{\sum F (X - \bar{X})^2}{\sum F}}$$

Where

$\bar{X}$  = the mean

$\Sigma$  = "the sum of"

X = the normal value of the option (scores)

F = the frequency of the occurrence

### t-test Formula

t-test was used to compare the mean of the groups. The formula used for the t- test was stated below:

$$\frac{\bar{X}_p - \bar{X}_t}{\sqrt{\frac{S_p^2 (N_1 - 1) + S_t^2 (N_2 - 1)}{N_p N_t - 2} \left( \frac{1}{N_p} + \frac{1}{N_t} \right)}}$$

Where,

$\bar{X}_1$  = mean score of principals.

$\bar{X}_2$  = mean score for instructors and technicians.

$S_p^2$  = variance of Principals.

$S_t^2$  = Variance of Technical instructors and technicians.

$N_1$  = Total population of principals.

$N_2$  = Total population of instructors and technicians.

$N_1 + N_2 - 2$  = Degree of Freedom (df).

### **Decision Rule**

To determine the rejection or acceptance level of each item in each of the sections, a mean score of 2.5 was worked out as the cutoff point which means that any responses with a mean of 2.50 and above was accepted and less than 2.50 was rejected or disagreed. The null hypothesis is accepted when t-test calculated is less than t-critical value and is rejected when t- calculated is greater than t-critical value.

## **CHAPTER IV**

### **PRESENTATION AND ANALYSIS OF DATA**

This chapter deals with the presentation and analysis of data with respect to research questions and Hypotheses formulated for this study, the result of data analysis for the research question were presented first follow by the hypothesis tested for the study.

#### **Research Question One**

What are the causes of poor maintenance in automobile workshops?

**Table 1**

Mean responses of the respondents on causes of poor maintenance of automobile workshops

S/N	ITEMS	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_3$	$\bar{X}_4$	$\bar{X}_5$	AVERAGE	REMARKS
1	Technical instructors have lukewarm attitude towards the maintenance of automobile workshop equipment	3.25	2.50	3.50	2.67	2.91	2.97	Agreed
2	Principal of the Technical Colleges are not interested in the automobile maintenance activities	2.25	1.50	2.00	2.67	2.67	2.21	Disagree
3	Serviceable facilities like machines lack financial support from all sectors for maintenance	3.25	3.00	3.50	3.25	3.17	3.23	Agreed
4	State Government has carefree attitude towards maintenance activities	3.75	3.00	4.00	3.00	2.50	3.25	Agreed
5	Machines and equipment are sophisticated that special experts are required	2.75	2.00	3.50	2.15	3.08	2.71	Agreed
6	Technical colleges lack the required maintenance skills to solve maintenance problems	3.00	2.00	2.50	2.08	2.08	2.35	Disagree
7	There are acute shortage of qualified skilled maintenance assistants in the auto- workshops	3.53	2.52	3.01	2.19	2.19	2.99	Agreed
8	Auto workshops lack machines and equipment to be used and equipment to be maintained	3.75	3.00	3.00	3.08	2.59	3.33	Agreed
9	There is no financial incentives for the available technical instructors	3.26	3.01	1.60	3.58	3.08	2.88	Agreed
10	Workshop attendants are not allowed to participate in workshop maintenance activities	3.25	3.00	1.50	2.33	2.25	2.85	Agreed
11	Auto instructors detect faults and report to the appropriate authorities	2.50	1.50	3.00	3.17	2.83	2.60	Agreed

**KEYS**

$N_1$  = Number of Principals (8)

$N_2$  = Number of Heads of Departments (4)

$N_3$  = Number of sectional heads (4)

$N_4$  = Number of instructors (32)

$N_5$  = Number of Technician/Attendant (32)

$\bar{X}_1$  = representing principals

$\bar{X}_2$  = representing HODs

$\bar{X}_3$  = representing Sectional heads

$\bar{X}_4$  = representing instructors

$\bar{X}_5$  = representing Technicians/Attendants.

The data presented in table 1 reveals the obtained mean of 2.86, 3.23, 3.25, 2.71, 2.98, 3.23, 2.88, 2.84 and 2.60 respectively exceeds the 2.50 cut off point, the researcher concluded apart from questions 2 and 6 the remaining items are the causes of poor maintenance of automobile workshop in technical colleges while items 2 and 6 are not responsible for poor maintenance of automobile workshop in technical colleges.

**Research Question Two**

What are the possible sources of funds for effective maintenance of infrastructure in automobile workshop in technical colleges?

**Table 2**

Mean responses on Possible Sources of Funds for effective maintenance of infrastructure automobile workshop.

S/N	ITEMS	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_3$	$\bar{X}_4$	$\bar{X}_5$	AVERAGE	REMARK
1	Funds should be raised through fees generated internally from students	1.50	3.00	3.00	3.09	3.00	2.73	Agreed
2	Auto mobile department school also raise funds through services given to automobile engines and vehicles	3.00	2.50	3.50	2.50	2.75	2.85	Agreed
3	Parent teachers Associations should provide funds for the proper maintenance of automobile workshops.	2.50	3.00	3.50	3.17	2.83	2.95	Agreed
4	Individuals should help to fund automobile workshops through selfless donation	3.50	3.50	3.00	3.00	2.75	3.00	Agreed
5	Voluntary agencies should also assist to fund for the proper maintenance of automobile workshops	3.00	3.00	3.50	3.42	3.25	3.32	Agreed
6	Revenue allocation and fiscal commission should also allocate funds for the maintenance of automobile workshop	3.50	3.00	2.50	3.33	3.00	3.07	Agreed



**KEYS:**

$N_1$  = Number of Principals

$\bar{X}_1$  = representing principals

$N_2$  = Number of Heads of Departments

$\bar{X}_2$  = representing HODs

$N_3$  = Number of sectional heads

$\bar{X}_3$  = representing Sectional heads

$N_4$  = Number of instructors

$\bar{X}_4$  = representing instructors

$N_5$  = Number of Technician/Attendant

$\bar{X}_5$  = representing Technicians/Attendants.

The data presented in table 2 revealed

that the mean scores of all the respondents are above the cutoff point of 2.50 it therefore implies that the respondents have all agreed that funding should be a team work of Federal, State and Local levels. The result also shows that other agencies should also assist in the procurement and maintenance of automobile workshop infrastructures in technical colleges.

**Research Question three**

What are the ways of improving maintenance culture in automobile workshops of technical colleges in Lagos state?

**Table 3**

The responses on the possible ways of improving maintenance culture in automobile workshops of technical colleges in Lagos State

S/N	ITEMS	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_3$	$\bar{X}_4$	$\bar{X}_5$	AVERAGE	REMARK
1	Spare parts for faulty machine parts should be supplied by the State Government	3.75	3.00	3.00	3.58	3.08	3.28	Agreed
2	Spare parts of high or standard quality are available in the market	3.29	2.50	3.00	3.17	2.83	3.00	Agreed
3	Spare parts should be bought in the market	3.25	3.50	3.50	2.91	2.33	3.10	Agreed
4	Sufficient monthly financial allocations should be made available for maintaining equipment and machines	3.25	3.00	2.50	3.50	3.47	3.14	Agreed
5	Machines and equipment as well tools should be on a regular preventive and predictive maintenance	3.50	3.00	4.00	3.58	2.83	3.38	Agreed
6	Obsolete machines and equipment should be replaced with the new ones	3.75	3.00	4.00	3.25	2.83	3.37	Agreed
7	Improving maintenance techniques in technical colleges is the responsibility of the Federal Government	3.25	3.00	1.50	2.58	2.67	2.59	Agreed
8	The importance of maintenance for national technological and economic development should be made available for both the principals, departmental	3.50	3.50	3.00	3.08	3.17	3.25	Agreed
9	The importance of the maintenance culture should be emphasized at the federal, state and local Government	3.50	3.50	4.00	3.75	3.00	3.55	Agreed
10	For the purpose of technological development maintenance culture should be our cultural heritage	3.50	3.50	4.00	3.33	2.92	3.45	Agreed
11	There are needed skills to improve maintenance activities in auto mobile departments of technical colleges	3.50	3.00	3.50	2.91	3.08	3.20	Agreed
12	Automobile instructors should be able to service and improve the operation of machines and equipment and should organize general workshop cleaning 3 times per term	3.25	4.00	4.00	3.33	3.25	3.57	Agreed
13	Principals should develop interest	3.75	4.00	3.50	3.25	3.08	3.52	Agreed

**KEYS:**

N<sub>1</sub> = Number of Principals  
 N<sub>2</sub> = Number of Heads of Departments  
 N<sub>3</sub> = Number of sectional heads  
 N<sub>4</sub> = Number of instructors  
 N<sub>5</sub> = Number of Technician/Attendant

$\bar{X}_1$  = representing principals  
 $\bar{X}_2$  = representing HODs  
 $\bar{X}_3$  = representing Sectional heads  
 $\bar{X}_4$  = representing instructors  
 $\bar{X}_5$  = representing Technicians/Attendants.

The above data in table 3 shows that the respondents agreed with all the suggested ways of improving maintenance culture as shown by the mean scores which is above the cut-off point of 2.50.

**Hypothesis 1**

There will be no significant difference (P> 0.05) in the responses of the principal of technical colleges and those of technical instructors on the causes of poor maintenance in automobile workshop.

**Table 4:**

The causes of poor maintenance in automobile workshop below is the t- test table analysis answering the null hypothesis 1

Group	No	Mean	Standard deviation SD	t- cal	T- cit	Df	Level of Sign
Principals	8	3.25	0.83				
Technical instructors	32	2.75	1.06	1.43	2.02	38	P < 0.05

Since t (critical) in table 4 is 2.02 (p<0.05) and higher than t (calculated) which is 1.43 at the degree of freedom of 38, the null hypothesis is accepted while the

alternative hypothesis is rejected. Therefore there was no significant difference in the mean responses of the principal and technical instructor on the causes of poor maintenance in automobile workshop.

## Hypothesis 2

There will be no significant difference ( $P > 0.05$ ) in the responses of the technical instructors and the principals on the possible sources of funds needed for effective maintenance of infrastructure in automobile workshop in technical colleges

**Table 5**

The possible sources of funds for effective maintenance of infrastructure in automobile workshop of technical colleges

Group	No	Mean	Standard deviation SD	T- cal	T- cit	Df	Level of Sign
Technical instructors	32	1.75	1.09	9.40	2.02	38	$P > 0.05$
Principals	8	3.63	0.57				

Since the t-calculated of 9.40 in table 5 has exceeded the given critical value of 2.02 at degree of freedom of 38 and 0.05 level of significance, the null hypothesis is rejected and the alternative hypothesis is accepted. Therefore, there was significant difference in the mean responses of the technical instructors and principal on the possible sources of funds for effective maintenance of infrastructure in automobile workshop of technical colleges.

### Hypothesis 3

There will be no significant difference ( $P < 0.05$ ) in the opinion of technical college principals and those of technical instructors on the ways and means of improving maintenance culture in auto mobile workshops.

**Table 6**

The ways of improving maintenance culture in Automobile workshops of technical colleges

Group	No	Mean	Standard deviation	SD	t- cal	T- cit	Df	Level of Sign
Principals and Head of Departments	10	3.08	0.92		1.58	2.02	40	$P < 0.05$
Technical instructors	32	2.56	1.12					

The t-calculated is 1.58 in table 6 is below the given critical value of 2.02 at degree of freedom of 40, therefore, the null hypothesis is accepted and alternative hypothesis is rejected. Therefore there was no significant difference in the mean responses of the principals, head of department and technical instructors on the ways of improving maintenance culture in automobile workshops of technical colleges

### Discussion of findings

The purpose of this study was carried out an appraisal of maintenance culture in automobile workshops of Lagos State.

Based on the results derived from the representation and data analysis, the discussion of some of the major findings of the study is made.

The results obtained from the analysis is research question 1, shows that the causes of poor maintenance was as the result of the lukewarm attitude of state government and technical instructors. This is noted in the mean responses of the respondents in research question 1 in table 3.

The findings, of Nwachukwu (2002), shows that technological education since 1840 had always been treated relatively insignificant aspect of the country's education system. Ogbanna (1990), further stressed out that part of the difficulties which technical instructors encounter in maintenance activities has to do with the fact that the technical equipment and machine are obsolete that there are not used for practical lesson to be aware of their operating systems and repairs.

Maintenance is suffering neglect because of the suffering negative impact on the development of technical education. This was evident by the colonial master, who pioneered Western Education in Nigeria.

The analysis of research question 2 as presented in table 4 revealed that there are no funds for maintenance of automobile workshops. If there is no budgetary provision from the federal, state and local governments, then the issue of funds from such quarters for maintenance is ruled out. Okoro (1994) identified poor

financing of technical education as some of the problems facing technical education in Nigeria.

Technical instructors are fully aware of maintenance culture and that government at all levels should assist them to realize their goals. The issue of skill is another area identified to be eating deep into maintenance culture of our automobile workshops. There is need for skill innovation and technological oriented manpower resources for a sound based economy. The insufficient manpower or personnel training in technology is as a result of lack of appropriate equipment, tools and machine. In order for this trend to be eradicated, the spirit of maintenance must be restored in the minds of all Nigerians so as to manage what we have.

## **Chapter V**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

This chapter summarizes the research process and major findings. It also provides conclusion and recommendations on the research findings. This is as a result of poor maintenance activities of both the instructors, principal and technical assistants.

This is also evident by the poor maintenance strategies evolved by the personnel concerned. Poor maintenance incentives as caused by the government also contributed greatly to this problem of automobile workshop, equipment and tools.

#### **Summary of the procedures Used**

The study sought to determine or establish the appraisal of maintenance culture in our automobile workshop base on the three formulated research questions.

The data collected from these questionnaire items were statistically computed using the frequency distribution, mean, standard deviation and t-test calculations.

#### **Major findings:**

Based on the data collected and analyzed, the following major findings were made:



1. Insufficient machines equipments and other facilities as a result of grounded ones.
2. Scarcity of skilled man-power to handle maintenance problem
3. Lack of financial support from all sectors for maintenance of the above mentioned facilities.
4. Unskilled technical assistants.
5. Funding of the automobile workshop equipment, tools and machines should be a joint responsibility of the federal, state, local, and voluntary agencies.
6. Poor budget planning of those in authorities.
7. Non inclusion of technology personnel in policy planning and execution.

### **Implication of the study**

The data presentation, analysis and interpretation provided the background for the discussion of this study. One of this result shows that the cause of poor maintenance in automobile workshop of the stated area was borrowed from the attitude of colonial master towards technical education. More attention was focus on secondary school at the expense of technical education as it was evidence in the white collar job employment opportunities. Following this trend, the skilled maintenance technicians were neglected.

The non functionality of this automobile workshop implies that, this graduating under this status are half baked or unskilled technicians.

The deteriorating state of maintenance calls for government's quick intervention towards reconditioning of the grounded machine and re-ordering of new ones to salvage the poor state of automobile workshops.

This study has revealed that the shortage of maintenance skilled technical instructors have resulted to lack of expansion of the existing ones.

The findings also gathered that technical colleges have not fully assumed its proper place in our educational system.

The study also proved that identified measures as necessary strategies for Lagos State technical colleges to follow. The result of the null hypothesis 1 shows that there was no significance difference in the mean of principal and technical instructors on the problems hindering the development of maintenance culture in automobile workshop of the five schools.

## **Conclusion**

Finally, the finding of this study led to the following final conclusion:

It is necessary to have sufficient machines, equipment and tools in automobile workshops for effective teaching and learning of practical works.

Proper maintenance of these facilities will facilitate good practical acquisition of skills. Proper maintenance of these workshop equipments would also avoid sudden

failure of machines and equipment as this would enhance efficiency in their operation.

The automobile products of technical colleges no longer acquire the desirable skills needed for further training in technology. The practical skill acquired at this level, could not even sustain any meaningful employable skills.

## **Recommendation**

On the basis of the finding of this study and its implications, the following recommendations have been established:

1. Government should draw her own attention to the provision of relevant machines, equipment tools and other infrastructure facilities use in automobile workshops.
2. Policy makers should organize workshops with emphasis on maintenance culture aimed at re training of technical instructors.
3. The status quo of maintenance which is preventive, predictive and corrective should always be followed strictly by the automobile technicians.
4. In order to solve the problems of poor maintenance culture competent technical instructor/assistance training should be the direct responsibility of the state and federal Governments.
5. The federal ministry of education in collaboration with the federal Government should equipped federal university of technology for effective

training of graduates who would in turn handle these maintenance problems at the technical college level.

6. There should be a co funding of these colleges by federal state, local and public spirited organizations.

### **Suggestions of further Research**

The following areas suggested for further research studies:

1. A replication for this is recommended to be carried out in other state of the federation
2. Another study to investigate the extent to which students are involved in maintenance and practical works in Lagos state.
3. A study could also be conducted on the adequacy of machines, equipment and building infrastructures for the teaching of technical courses in Lagos State.

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## Appendix I

### FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

#### SCHOOL OF SCIENCE AND SCIENCE EDUCATION

#### DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION

#### MAINTENANCE CULTURE APPRAISAL QUESTIONNAIRE (MCAQ)

Information about the respondent

Name of school -----

Sex of respondent-----

Age-----

Years of experience-----

Tick the option that agrees with your rank

- a. Principal
- b. Head of department
- c. Sectional head
- d. Instructors
- e. Workshop technician / attendant

Instruction:

Please tick ( ) as appropriate and be honest in answering these questions

An appraisal of maintenance culture in automobile workshop of technical colleges in Lagos State

### Section A

#### WHAT ARE THE CAUSES OF POOR MAINTENANCE IN AUTOMOBILE WORKSHOPS?

S/N	ITEMS	RESPONSE			
		SA	A	D	SD
1	Technical instructor have lukewarm attitude towards the maintenance of automobile workshop				
2	Principal of the technical colleges are not interested in the automobile maintenance activities				



3	Servicable facilities like machine lack financial support from all sectors for maintenance				
4	State government has carefree attitude towards maintenance activities				
5	Machines and equipment are sophisticated that special expert are required				
6	Technical colleges lack the required maintenance skill to solve maintenance problems				
7	There is acute shortage of qualified skilled maintenance assistants in auto-workshops				
8	Auto-workshop lack machines and equipment to be used and equipment to be maintained				
9	There is no financial incentives for the available technical instructor				
10	Workshop attendants are not allowed to participate in workshop maintenance activities				
11	Auto instructors detect faults and report to appropriate authorities				

## SECTION B

### WHAT ARE THE POSSIBLE SOURCES OF FUNDS FOR EFFECTIVE MAINTENANCE OF INFRASTRUCTURE IN AUTOMOBILE WORKSHOP IN TECHNICAL COLLEGES?

The following are the possible sources of funding the maintenance of automobile.

S/N	ITEMS	RESPONSE			
		SA	A	D	SD
1	Funds should be raised through fee generated internally from student				
2	Automobile department should also raise funds through service given to automobile engines and vehicles				
3	Parent-teacher association should provide funds for proper maintenance of automobile workshop				
4	Individual should help to fund automobile workshop through selfless donation				
5	Voluntary agencies should also assist in funding for the proper maintenance of automobile workshop				
6	Revenue allocation and fiscal commission should also allocate funds for the maintenance of automobile workshops				

## SECTION C

### WHAT ARE THE WAYS OF IMPROVING MAINTENANCE CULTURE IN AUTOMOBILE WORKSHOPS OF TECHNICAL COLLEGES?

S/N	ITEMS	RESPONSE			
		SA	A	D	SD
1	Spare parts for faulty machines parts should be supplied by the stae government				
2	Spare parts high or standard quality are available in the market				
3	Spare part should be bought in the market				
4	Sufficient monthly financial allocations should be made available for maintenance equipment and machine				
5	Machines and equipment as well as tools should be on a regular preventive and predivive maintenance				
6	Obsolete machines and equipment should be replaced with new ones				
7	Improving maintenance techniques in technical colleges is the responsibility of federal government				
8	The importance of maintenance for national technological and economic development should be made available for both the principals, department heads, technical instructor and assistance				
9	The importance of vthe maitenance culture should be emphasized at the federal, state and local government				
10	For the purpose of technological development maitenance culture should be our cultural heritage				
11	There are needed skills to mprove maintenance activities in automobile departments of technical colleges				
12	Automobile instructors should beable service and improve the operation of machines and equipment and should organize general workshop cleaning 3 times per term.				
13	Principal should develop intrest and strategies for mointoring the improvement of maintenance programmes in technical colleges.				

## APPENDIX II

Mean calculation

Section A: Mean for Principal

X	F	FX
1	0	0
2	2	4
3	2	6
4	4	16
	8	26

$$\bar{X} = \frac{\sum FX}{\sum F} = \frac{26}{8}$$

$$\bar{X} = 3.25$$

X	F	FX	X - $\bar{X}$	(X - $\bar{X}$ ) <sup>2</sup>	F(X - $\bar{X}$ ) <sup>2</sup>
1	0	0	-3.25	10.56	0
2	2	4	-1.25	1.563	3.126
3	2	6	-0.25	0.063	0.126
4	4	16	0.75	0.563	2.252
	8				5.504

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

$$= \sqrt{\frac{5.504}{8}} = \sqrt{0.688}$$

$$= 0.83$$