

**ASSESSMENT OF HEALTH AND SAFETY PRACTICES IN AUTOMOBILE
WORKSHOP IN MINNA, NIGER STATE**

BY

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2014/1/52147TI

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

AUGUST, 2021

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**A RESEARCH PROJECT SUMMITTED TO THE DEPARTMENT OF INDUSTRIAL
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AUGUST, 2021

DECLARATION

I, EKPA, Achile Audu with matriculation number 2014/1/52147TI 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.

EKPA ACHILE AUDU
2014/1/52147TI

Signature & Date

CERTIFICATION

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

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DEDICATION

This research work is dedicated to my parents Mr. and Mrs. Samuel Audu Ekpa and Audu Ladi.

ACKNOWLEDGEMENT

I appreciate most sincerely and humbly the Almighty God for bestowing His mercies blessing, protection, good health and wisdom upon me. I thank the Almighty God the cherisher, the sustainer, the avenger and compassionate.

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ABSTRACT

The study assessed the health and safety practices in Automobile Workshop in Minna, Niger State. Four research questions and four hypotheses guided the study. The research design that was used in carrying out this study is survey research design. The study was conducted in Niger state; it covers all automobile workshops situated in Minna metropolis. The targeted Population for this study was 86 respondents, consisting of 46 automobile students, and 40 automobile mechanics apprentice in Minna, Niger state. The entire Population was used for the study. Questionnaire was used as the instrument for data collection. The instrument was validated by three experts in the Department of Industrial and Technology Education, Federal University of Technology Minna. The questionnaire was personally administered by the researcher to the respondents and the completed questionnaires were also collected by the researcher after one week. The data collected was analyzed using mean, standard deviation and t-test. From the findings, it revealed that; bolt and nut are to be checkmated to avoid any thing out of control, and also personnel should properly checkmate their health to ensure that they are in a good condition. The study further shows that when tools are not used for its specification during auto repair, it could end up damaging the car or even the personnel. The findings also shows that there should be need to invite expert from other company to technical colleges to train the teachers, and also a workshop seminar should be organized in order to build the potentials within the teachers. Based on the findings, it is concluded that personnel in automobile workshop be trained with new and modem tools, when this is achieved, there will definitely be a reduction of hazardous situation in the future, and that will promote professionalism in the workshop. Based on the findings, it is therefore recommend that; automobile personnel should be encouraged by the government in providing a workshop seminar that will build their knowledge in the area of automobile technology, Government and nongovernmental organization like auto industries should provide funds to procure material needed and re-equip and open new automobile workshops to enable personnel to effectively adopt the best practice to avoid health hazard from occurring among others.

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CHAPTER ONE

1.0

INTRODUCTION

1.1 Background to the Study

The history of automobile began in 1769, with the creation of steam powered automobiles capable of human transport. In 1806 the first car powered by internal combustion engines running on fuel gas appeared which led to the introduction of petrol or gasoline fuel internal combustion engine in 1897. Oloruntoba and Ogunbunmi, (2020) defined Automobile as a vehicle which is used to transport people and goods from one place to another on ground.

Automobile play an important role in people's life whether it is used for daily transportation or it is used for pleasure. In this regard the development of automobile mechanic workshop is instrumental for the maintenance of automobiles as well as personal life and development of the nation at large.

Automobile workshop is a place where repairs, servicing and maintenance of automobile are carried out by auto mechanics and auto electricians. The automobile workshops are shops specializing in certain parts such as brakes, mufflers, exhaust systems, transmissions, chassis, tires, automobile electrification, wheel balancing and alignment among others. There is also automotive repair workshop that is specializing in vehicle modification and customization. These are central agents that manage pattern of technological changes. The automobile workshop has been in existence for over 100 years. Most of these activities are carried out at motor vehicle repair garages or workshops and 'fast – fit' center's, but also at commercial and domestic customer's premises and the roadside. In this regard, the work that is been carried out in the automobile mechanic's workshop also leads to occupational health hazard which is very dangerous to human lives. As the name implies occupational health hazard can be defined as hazards of exposure to pollution, noise and vibrations in the working environment.

The importance of occupational health and safety (OHS) in the small industry is gaining attention all around the globe. As safe and healthy workplaces promote physical, mental and social well-being along with enormous monetary benefits attributed to medical bills, insurance claims, and loss of work, experienced personal and corporate reputations and integrity of organization (Ahmad *et al.*, 2017). A small industry has particular characteristics such as they are owned and controlled by independent owners who are the sole decision makers and predominantly contribute the operating capital in the business. Owners and supervisors have little awareness of occupational health and safety legislation and associated regulation and give low priority towards it. Motor Vehicle Repair Workshops (MVRW) are often small-scale enterprises. It is a labor-demanding sector and the workshop size, workers number and their job description differ significantly. Various studies showed that workers at small workshops face a range of workplace risks, hazards, and exposure. The use of cost-effective personal protection and other engineering controls have been well cited. However, other aspects of workplace safety (fire explosion, electric and machine-related hazards, chemical exposures) and programs needed to manage, control or minimize these issues are yet required to be explored further. The workers at motor vehicle repair workshops face many physical, accidental, chemical, biological and ergonomic hazards along with toxic pollutant exposure from poly-aromatic hydrocarbons (PAHs), volatile organic compounds, heavy metals, particulate matter (PM), dust, exhaust, sulfur and nitrogen oxides. The commonly reported occupational health issues among mechanics are respiratory ailments, hearing loss, acute injuries, accidents, eyes injuries and musculoskeletal symptoms. Mechanics at motor vehicle repair workshops may inhale fumes, vapors, and mist of used gasoline engine oil containing poly-aromatic hydrocarbons that carry the risk of cancer. Other reported health effects associated with long and short-term occupational exposure to crude or petroleum oil, dust, and other related pollutants are tumors, blood disorders and reproductive problems, reduction in

growth, morphological problems and nephron-toxicity. Workers at motor vehicle repair workshops work in unhygienic conditions have little or no awareness of routine chemicals exposure and other hazards and do not regularly use Personal Protection Equipment's (PPEs) which can minimize the occupational health hazards. These hazardous substances are very dangerous to the auto mechanic's health and it takes a long time before the damage these substance cause can be detected which by then it's always too late. They are either absorbed through the skin or inhaled through the nose. Through this means they get into the mechanic's blood stream and central nervous system where they gradually cause havoc over the years. Ailment they can cause are Kidneys and liver damage, Mesothelioma, Lung cancer, Urinary tract, Brain cancer, Lead poisoning which has no cure and so on.

The assessment and regular monitoring of health and safety standards at motor vehicle repair workshops in Minna, Niger state is rarely published. This study aims to examine and compare the occupational health and safety practices, facilities, standards, workplace exposures, conditions and environment in the local workshops and multinational companies' workshops e.g. Peugeot company Nigeria limited. Moreover, there is dearth of information regarding the extent of occupational safety and health risks and standard practices associated with workers in the informal sector including auto mechanics and allied artisans. This paper examines the exposure to work-related injury and illnesses, access to first aid, use of personal protective equipment (PPE), fire safety measures and hygiene practices among vehicle repair and allied artisans. These workers, by the nature of their work, are exposed to numerous health risks resulting from key activities such as fixing car engines, vulcanizing, straightening, spraying, welding, cutting, grinding, among others. This study informs the development of health and safety standards and sensitization programs that relate to auto mechanics in workshop.

Often times, the automobile mechanics workshops or garage where the upkeep exercises are done, are of low capital base and are alternative foundation either situated on dangerous

landscapes, under tree shed, overhanging made of banana or palm fronds, etc. No powerful support can happen in such situations. With all these facts therefore they are a need for assessment of occupational health hazard in automobile mechanic's workshops. As the name implies appraisal is the efficient premise for making deductions about learning and advancement of understudies. It is the procedure of characterizing, selecting, planning, gathering, deselecting and utilizing data to expand understudy's learning and improvement. Evaluation can likewise be the procedure of social event and talking about data from numerous and various sources keeping in mind the end goal to add a profound comprehension of what understudies know, comprehend and can do with their instructive encounters. *Ahmad et al.* (2017) defined assessment as a process that involves the use of empirical data on student learning to refine programs and improve student learning most of the automobile workshops don't have any safety precautions in place to protect their workers as well as their customers.

1.2 Statement of the Problem

The automobile mechanics has become one the major professional work in Nigeria and understandingly one of the most hazardous profession in most economics (*Abioye et al., 2006*). Today's automobile mechanics face a stark reality eroding health threatening endemic. Automobile mechanics are often exposed to poor working environment including inadequate premises and unsatisfactory hygiene facilities and occupational health services are not available. There is hardly or no concern on the part of government, teachers and students for the development of the present state of automobile mechanics workshops. Therefore, researcher believes that there is need to assess an occupational health and safety practice which leads to precautions taken to avoid injuries and illness in automobile mechanic's workshop especially in Minna, Niger state.

1.3 Purpose of the study

The aim of the study is to assess the occupational health and safety practices in automobile mechanic's workshop in Minna, Niger state. Specially, the study is designed to:

1. Identify the current health hazard in automobile workshop in Minna Niger state.
2. Identify the causes of health hazard in automobile mechanic's workshops in Minna Niger state.
3. Identify the safety practices in automobile mechanics' workshops in Minna, Niger state.
4. Determine the strategies for improving safety practices in automobile mechanics' workshop in Minna, Niger state.

1.4 Significance of the Study

Upon the completion of this study, findings of the study will be of great benefit to the following: Automobile mechanics, State government, Automobile students and the general public.

Automobile mechanics will benefit from this research when completed, it will assist in enlightening automobile mechanics on the dangers involved in the workshops as a result of their exposure to chemical, unhygienic environment and the work related illness caused by those chemicals, also help them with the use of safety device in their specified area.

The state government will be a beneficiary of this research when completed because it will help the state government in creating more awareness through the mass media on the occupational health hazard in auto mechanics workshops and the work related illness and injuries these hazard leads to. The necessary safety measures to take and the need to use the right tools and protective kits when working on any vehicle in the workshop.

The findings of the study will be of benefit to automobile student because it will help them when carrying any practical work in the workshop, in today's contemporary setting, most

students always neglects safety measures and this has led to high death rate in the workshop. These finding will definitely help in informing students about the dangers involved in work related illness and injuries caused as a result of occupational health hazard in automobile mechanic's workshops due to poor working environment, unsatisfactory hygiene facilities among others. It will also be of great benefit to the general public, because it will educate them on occupational health hazard involved in automobile mechanic's workshops and the necessary safety measures to take. And also give them reason not to embark on any practical work in the workshop when their health is abnormal.

1.5 Scope of the Study

The study is designed to assess occupational health hazards in automobile mechanics workshops in Minna metropolis with respect to determining current health hazards, their causes and identity, safety practices and strategies for improving safety practices in automobile workshops.

1.6 Research Questions

1. What are the health and safety hazard experienced in automobile mechanics workshops in Minna Niger state?
2. What are the causes of health and safety hazard in auto workshop in Minna Niger state
3. What are the safety measures and precautions to be observed in automobile mechanics workshops in Minna Niger state?
4. What are the strategies to be encouraged in automobile mechanic workshop to improve safety measures and practices in Minna, Niger state?

1.7 Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance.

- H₀₁** There is no significant difference in the mean responses between automobile mechanics and automobile students on the health hazard in automobile mechanic workshops in Minna, Niger state.
- H₀₂** There is no significant difference in the mean responses of automobile mechanics and automobile student on the causes of health hazard in automobile workshops in Minna Niger state.
- H₀₃** There is no significant difference in the mean response between automobile mechanics and automobile students on the safety measures that is to observed in automobile mechanic's workshop in Minna Niger State.
- H₀₄** There is no significant difference in the mean responses between the automobile mechanics and automobile students on the strategies for improving safety practices in automobile mechanics in Minna Niger State.

CHAPTER TWO

2.0 LITERATURE REVIEW

The review of related literature is organized under the following sub-heading;

- History of Automobile technology
- Occupational safety and Health hazard
- Types of safety precautions in automobile workshops
- Strategies to enhance safety in automobile workshops
- Summary of literature review

2.1 History of Automobile Technology

In the late 1700's European specialists started tinkering with engine controlled vehicles. Steam, burning and electrical engine has all been endeavors by the mid 1800's. By the 1900's, it was dubious which kind of motor would have controlled the car. At the first place the electric-auto was the most prominent however at that time they were no battery that would permit an auto to move with great speed or over a separation despite the fact that a percentage of the prior pace records were set by electric-auto, they didn't stay under the way past the first decade of the car kept going into the 1920's. Then again, the cost on steam fueled motors, either to construct or keep up was unique to the gas controlled motors. Was the value an issue, as well as the danger of a heater blast additionally kept the steam motor from getting to be prevalent. The burning motor constantly beat out the opposition, and the early American vehicles pioneers like Ransom E. Olds and Henry Ford assembled dependable burning motors, dismissing the thoughts of steam or electrical force from the beginning. Automotive production on a commercial scale started in France in 1890. Commercial production in the United States began at the beginning of the 1900's and was equal to of Europe's. In those days, the European

industry consisted of small independent firms that would turn out a few cars by means of precise engineering and handicraft methods (Raphael *et al.*, 2020).

Toward the start of the century the car entered the transportation market as a toy for the rich. Be that as it may, it turned out to be progressively well known among the all-inclusive community on the grounds that it gave explorers the flexibility to make a trip when they needed to and where they needed. Subsequently, in north American and Europe the vehicles got to be less expensive and more open to the white collar class. This was encouraged by Henry Ford who did two essential things to begin with he valued his auto to be as moderate as could be expected under the circumstances and second he paid his laborers enough to have the capacity to buy the autos they were assembling. This pushed wages and vehicle deals upward the comfort of the vehicles liberated individuals from the need to live close rail lines or stations; they could pick areas anyplace in an urban region the length of streets was accessible to interface them to different spots (Raphael *et al.*, 2020).

Numerous states in the United states set up engine fuel imposes that were utilized just to construct and keep up thruways helping the auto park ways framework to help to be self-supporting. Notoriety of the car has reliably moved with the condition of the economy, developing amid the blast period after World War 1 and dropping unexpectedly amid the great depression, when unemployment was high. World War II saw a substantial increment in mass travel in light of the fact that occupation was high and vehicles were rare. The fast development of auto proprietors after World War II, especially in the United States and Western Europe exhibited the populace's support towards cars. Amid the war, vehicles engines, fuel, and tires were hard to come by. There was an unsatisfied interest when the war finished and a lot creation limit as industrial facilities killed the war machine. Numerous individuals had cash in light, of the fact that there was little to purchase, past necessities, in the war years. Specialists depended on mass transportation amid the war and ached for the opportunity and adaptability of the

vehicles. A student of history has said that Henry ford liberated regular individuals from the restriction of their topography. The car made versatility on a scale never known, and the aggregate impact on living properties and social tradition is interminable. In the times of steed drawn transportation, the useful further reaches of wagon travel were 10 to 15 miles, so that implied any group or individual homestead more than 15 miles from a city, a railroad, or a safe conduit was disengaged from the standard of financial and social life. Engine vehicles and cleared streets have limited the crevice in the middle of provincial and urban life. Ranchers can send effectively and financially by truck and can drive to town when it is helpful. What's more, such establishments as provincial schools and doctor's facilities are presently available by transport and automobile (Oloruntoba *et al.*, 2020).

Yet the impact on city life has been, if anything, more conspicuous than the impact on the homesteads. The car has profoundly change city life by quickening the outward extension of populace into suburbia. The rural pattern is accentuated by the way that roadway transportation urges business and industry to move outward to locals where area is less expensive, where access via auto and truck is less demanding than in swarmed urban communities and where space is accessible for their maybe a couple story structures. Better Street was built which further expanded go all through the country. Similarly, as with other vehicle related marvels the pattern is most detectable in the United States however is quickly showing up somewhere else on the planet. Prior to the vehicles individuals both lived in the city and worked in the city or lived in the nation and chipped away at a ranch. On account of the vehicles, the development of rural areas has permitted individuals to live on the edges of the city and have the capacity in the city by driving new occupation because of the effect of the vehicles, for example fast food, city/roadway development, state watch/police, accommodation stores, corner stores, auto repair shops and so forth permit more jobs for the word developing populace (Oloruntoba *et al.*, 2020).

2.2 Health Hazard and Safety Practices

Word related security and wellbeing additionally normally alluded to as word related wellbeing and security is a territory worried with the wellbeing, wellbeing and welfare of individual occupied with vehicles workshop (Ahmad *et al.*, 2017). The objectives of the word related wellbeing and wellbeing projects. Incorporate to cultivate a sheltered and solid workplace. Word related security and wellbeing may likewise ensure associates, individuals, managers, client and numerous other people who may be influenced by the working environment like the workshop.

In the United States and non-word related wellbeing can be critical for good, legitimate, and ability reasons. In vehicles workshop wards, specialists have a typical obligation to take sensible watch over the wellbeing of their self and that of other people who are inside of the workshop (Khadka *et al.*, 2020). Great OSH practices can likewise lessen mischances that could prompt harm and ailment related expenses, including medical consideration, debilitated leave and incapacity advantage costs as characterized by the world health organization (WHO) word related wellbeing manages all part of wellbeing and security in the workshop and has an in number spotlight on essential avoidance of perils Johnson and Bassey (2016). Health has been defined as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, occupational health is a multidisciplinary field of healthcare concerned with enabling an individual to undertake their occupation, in the way that causes least harm to their health. Health has been defined as it contrasts for example, with the promotion of health and safety at workshop which is concerned with preventing harm from any incidental hazards, arising in the workshop. Since 1950, the international labor organization (ILO) and the world health organization (WHO) have shared a common definition of health at its first session in 1950 and revised at its twelfth session in 1995. The definition reads: “The principle center in word related wellbeing is on three unique targets: (i) the upkeep and

advancement of specialists' wellbeing and working limit; (ii) the change of workplace and work to wind up helpful for security and wellbeing and (iii) improvement of work associations and working societies in a bearing which underpins wellbeing and wellbeing at work and in doing as such likewise advances a positive social atmosphere and smooth operation and may upgrade efficiency of the endeavors. The idea of working society is proposed in this setting to mean an impression of the key worth framework embraced by the endeavor concerned. Such a society is reflected by the administrative framework, work force strategy, standards for interest, preparing arrangement and quality administration of the endeavor, e.g. workshop staff. Those in the field of word related wellbeing originated from an extensive variety of orders and callings including pharmaceutical brain science, the study of disease transmission, physiotherapy and restoration, word related treatment, word related medication, human elements and ergonomics, and numerous others. These incorporate how to stay away from specific previous conditions bringing about an issue in the occupation, right stance for the work, recurrence of rest breaks, deterrent activity that can be attempted, et cetera. Word related health & wellbeing ought to go for the advancement and support of the most noteworthy level of physical, mental and social prosperity of laborers in all occupations; the anticipation amongst specialists of takeoffs from wellbeing danger their working conditions the security of specialists in the workshop from dangers coming about because of components antagonistic to wellbeing; the setting and upkeep of the specialist in a word related workshop adjusted to his physiological and mental capacities; and, to compress the adjustment of work to man of every man to his job (Fumilayo *et al.*, 2020).

As work developments emerged in light of laborer worries in the wake of the mechanical upheaval, specialist's wellbeing entered thought as a work related issue. In 1833, HM factory inspectorate was framed in the United Kingdom with a dispatch to investigate production lines and guarantee the contractive action of harm to kid material specialists. In 1840 a royal commission distributed its discoveries on the condition of conditions for the specialists of the

mining business that reported the horrifyingly unsafe environment that they needed to work in and the high recurrence of mischances. The commission started open stock which bought about the Mines Act of 1842. The demonstration set up an inspectorate for mines and collieries which bought about numerous indictments and wellbeing enhancement, and by 1850, controllers could enter and assess premises at their tact.

2.3 Workshop Hazards

In spite of the fact that workshop practice gives numerous financial and different advantage a wide cluster of workshop dangers additionally present dangers to the wellbeing and security of individuals at work. These incorporate yet are not restricted, to chemical, organic specialists, physical components, antagonistic ergonomic conditions, allergens, a perplexing system of dangers, and an expansive scope of psychosocial danger elements.

2.4 Physical and Mechanical Hazards

Physical dangers are a typical wellspring of wounds in numerous workshop. They are maybe unavoidable in specific commercial enterprises or workshop, most particularly vehicle innovation workshops, yet after some time individuals have created wellbeing techniques and methods to deal with the dangers of physical risk in the workshop. Falls are a typical reason for word related wounds and fatalities, particularly when there is have to convey instruments starting with one point then onto the next furthermore amid exchange of parts (Oche, 2020). A car workshop has practical experience in the manufacture, altering mechanical part and welding of segments needs to take after the personal protective Equipment (PPE) at work regulations 1992. In a car workshop a business would be required to give face and eye insurance, wellbeing footwear, overalls and other vital assurance (Khadka *et al.*, 2020). Machines are regular in numerous business and workshop, including assembling and development, can be risky to laborers who have a tendency to be indiscreet. Numerous machine in car workshop include

moving parts, sharp edges, hot surfaces and different perils with the possibility to squash, blaze, cut, shear, cut or generally strike wound specialists if utilized hazardously. Different security measures exist to minimize these risks, including lockout-tag out techniques for machine support and move over insurance frameworks for vehicles. According to United States Bureau of Labor statistics, machine – related wounds were in charge of 64,170 cases that required days from work in 2008. More than a quarter of these cases required over 31 days spent far from work. That same year, machines are likewise regularly included by implication in specialist passing's and wounds, for example, in cases in which a laborer slips and falls, potentially upon a sharp or pointed article. The transportation division bears numerous dangers for the wellbeing of business drivers, as well for instance from vibration, long stretches of sitting, work anxiety and fatigues. These issues happen in Europe yet in different parts of the world the circumstance is surprisingly more dreadful. Limited spaces additionally show a work danger.

The National Institute of Health and Safety (2000) characterizes kept space as having restricted openings for passage and exit and unfavorable characteristic ventilation, and which is not proposed for constant worker inhabitance. Spaces of this kind can incorporate capacity tanks, ship compartments, sewers and pipelines. Limited spaces can represent a risk to specialists, as well as to individuals who attempt to safeguard them. Commotion additionally introduces a genuinely regular working environment risk word related listening to misfortune is the most widely recognized business related in the United states, with 22 million laborers presented to risky clamor levels at workshop and an expected \$242 million spent every year on specialist's remuneration for listening to misfortune; presentation to chemicals, example, fragrant solvents and metals including lead, arsenic, and mercury can likewise bring about listening to misfortune. As indicated by *Oloruntoba et al* (2020) said that temperature extremes represent a risk to specialists in the workshop. Warmth anxiety can bring about warmth stroke, depletion, spasms, and rashes. Warmth can likewise mist up security glasses or cause sweat-soaked palms

or wooziness, all of which expand the danger of different wounds. Specialists close hot surfaces or steam additionally are at danger for smolder. Drying out may likewise come about because of overexposure to cool conditions or great icy can prompt hypothermia, frostbite, trench foot, or chilblains. Power represents a threat to numerous laborers. Electrical wounds can be partitioned into four sorts: lethal electric shock, electric stun, smolders and falls bought on by contact with electric vitality.

2.5 Types of Safety Precaution in Automobile Workshop

Distinctive workshops have diverse work practices and diverse machines; notwithstanding there are sure decides that apply to any mechanical workshop of the world. Continuously wear wellbeing rigging while working in the workshop. Hand gloves, security shoes, head protectors and eyeglasses are compulsory for workshops employments like pipes, machines fitting, welding or carpentry. For example, a few individuals don't wear security boots while managing vehicles works. This may bring about transitory or perpetual visual impairment in light of the fact that welding sparkles can mutilate the tissues of the human eye.

Malfunctioning machines can occur any time: It could happen during the process of screw tightening or replacing the motor of the machine irrespective of the type of break down, never try to work on it while the machine is on and running. Electrical components always have a scope of error, irrespective of their design, make or technology. Even if the break down is normal and requires just screw tightening, it is always advisable to switch off the machine and then do the repair. Electrical shocks can be fatal or at least capable of damaging human cells due to the workshop machines very high power rating. While dealing with vehicles, always ensure that common safety guidelines are observed. Pull the hand brake, choke the rear wheels, and fit fender covers. Always jack the vehicle on a hard surface else use spreading blocks for

load spreading. Non-slip mats should be used in front of machines where necessary, and machines should be sensibly placed to avoid overcrowding and suitably anchored to vibration.

Maintain all the service records of machines and equipment: It won't just spare time additionally offer you to bring some assistance with caring of monotonous break downs. Every one of the apparatuses and extras must be kept back at their pertinent spots. Setting them anyplace will prompt tumult and wasteful working.

Smoking and drinking ought to be denied in the workshop: the passage through the workshop must be kept clear. Any oil or oil spillage must be cleaned all the time.

2.6 Safety and Fire Precautions

Workshops are inclined to mishaps by and large yet terminate can be deadliest, injury drills are an indispensable piece of workshop and they offer representatives some assistance with avoiding them and for the situation that there is one having a readied staff is the most ideal approach to minimize the harm done. These are a percentage of the principles and rules that keep a mind wounds and mischances. Continuously participate in fake security drills workshops are encased structures; at the season of crisis you may get yourself struck. At whatever point mock security drills are directed take an interest in them in light of the fact that is the most ideal approach to set you up for crises. Before starting any welding operations, ensure that a suitable flame quencher is promptly open. Every one of the specialists must know how to utilize fire quenchers, albeit clear guidelines are constantly composed on them. Inflammable materials should dependably be went with flame dozers. Owner must know the distinction between water dousters and carbon dioxide quenchers and when to utilize them too. For electrical flames, water quenchers ought not to be utilized. Legitimate preparing exhorted so that no perplexity emerges at the season of crisis. Managing chemicals requires additional wellbeing in light of the fact that chemicals have infectious impacts and they can spread starting

with one individual then onto the next. Washing hands. Wearing gloves and covers, and utilizing obstruction creams are all fitting. At the first look of any skin or breath issue, counsel a specialist. Working with lethal materials like lead, manganese, and nickel and so forth likewise requires exceptional consideration on the grounds that these materials have long haul unfriendly impacts on human wellbeing metalworking liquids can likewise bring about wellbeing issues like work related asthma. Guarantee all the fumes fans and respirators are working appropriately before you begin.

Working with synthetically dangerous substances. In particular, each individual inside the workshop must know the contact number of rescue vehicle and fire administrations. Most importantly, wellbeing is the essential concern. Besides, enhancing work productivity with least bothers is the thing that workshop directors might want to accomplish. In the event that the aforementioned wellbeing rules and work watched and took after painstakingly, one can accomplish both the objectives. It is constantly imperative to say arranged for therapeutic or unintentional crisis in light of the fact that inconvenience never comes reported and that is the thing that mechanical workshop security tenets do.

2.7 Strategies to Enhance Safety Automobile Workshop

Specialists training project initially created in the 1930s, turned out to be progressively across the board in the United States between the 1940s and the 1970s, as indicated by Richard Compton, who gave an outline of the historical backdrop of this security procedure research on its adequacy, and momentum patterns. An essential model of 30 hours of classroom guideline, regularly given at wellbeing insurances class, in addition of six hours of direction in taking care of the devices for vehicle repairs. In the interceding decades, be that as it may, these project did not decrease mischance contribution in the workshop hones (Maxwell *et al.*, 2015). Perceiving that no distinctions developed in the mischance records of car specialists and those

of identical gatherings in other workshop who figured out how to handle the hardware without formal instruction, mechanical segment downsized financing for these projects. From a crest in 1976, when 3,200,000 understudies in 17,000 state funded schools took security safety measures courses, the number has consistently increments. In any case, numerous still require formal preparing to comprehend the requirement for wellbeing and wellbeing practices to avert peril, which prompt the preparation of new car specialists about the risk in repairman workshop (Osinaike & Oke, 2018).

The objective foe wellbeing training classes are for the most part clear to show faculty the principle in the workshop, the essential aptitudes they have to handle machines and successful wellbeing needs. Exploration directed amid the early years (1940 through 1960) for the most part yielded the positive finding that the projects created wellbeing administration in the workshop.

In addition, more current studies demonstrated that the accessibility of car faculty would help in legitimate preparing and this will give a fruitful rivalry of experts with alert to recognize what is more right than wrong to do or not, and it will diminish rate of mishap ion the workshop. At the point when individuals are not legitimate taught the rate which setback will be shown, will very high. Singh *et al.* (2016) utilized randomized task to assess the effect of the preparation and introduction in the workshop. Because of that study, wellbeing safeguard was presented in school (Singh *et al.*, 2016). Wellbeing insurance some of the time path men don't esteem it, and they wind up not teaching others on the need to abstain from putting themselves at danger while in the workshop, here and there some car laborer doesn't even put on their cover before leaving on any occupation (Ahmad *et al.*, 2017). Proposal have been made that these project could address security in new courses, by tending to accessible faculty, propensity toward danger increasing so as to take and pomposity and parental contribution, for instance workshop members stressed the significance of presenting wellbeing training inside of a more

extensive structure of graduation, making qualifications between building up the manual aptitudes that are important to repair an unpredictable vehicle and gaining the skill and judgment to perceive perils and to practice alert when repairing under hazardous conditions. While customary projects have a tendency to underscore the previous, the last zone stays undressed in the educational module of numerous wellbeing instruction programs.

In investigating the benefits of wellbeing training, the security safety measure book manages the need in surveying open doors for development and is considering new educational programs rules and additionally principles for instructors. Likewise, such guide is adding to a national and global survey to distinguish instructional apparatuses, preparing routines, and educational program that improvement of private courses that emphasis on upgrading security aptitudes in dangerous conditions. Regularly taught in optional level furthermore in specialized universities, these courses may utilize innovation to mimic such perils as hastiness with the utilization of hand apparatuses, or they may present oversight with real dangers in safe settings and this require the need to learn security precautionary measure in the workshop. While these project are engaging numerous folks, few information are accessible to show their adequacy. Without a doubt, a couple studies have demonstrated that the mischance rate for youthful staff in the workshop, particularly young fellows, who get slip preparing is higher than for the individuals who don't (Adewoyin *et al.*, 2017).

A few members said that taking such a course may really cultivate arrogance in some in youthful specialists, who may exhibit hotshot conduct and practice less on the grounds that they trust new aptitudes will permit them to handle any peril (Adewoyin *et al.*, 2017). On one hand, this worry predictable with the acknowledgment that youthful work force may search out novel chances to experiment with new aptitudes, and this could bring about them their lives when they felt they comprehend it all. Then again, involvement with specific sorts of risk may be of genuine advantage to numerous youthful staff however. Proceeded with utilization of

comparable projects to those altogether field, proposes that a few parts of these project legitimacy further investigation to decide their potential advantages for youthful faculty in car workshop.

2.8 Summary of Literature Review

At the beginning of the century the automobile entered the transportation market as a toy for the rich. However, it became increasingly popular among the general population because it gave travelers the freedom to travel when they wanted to and where they wanted. As a result, in North America and Europe the automobile became cheaper and more accessible to the middle class. This was facilitated by Henry ford who did two important things. First he priced his car to be as affordable as possible and second, he paid his workers enough to be able to purchase the cars they were manufacturing. Health and safety practices can be important for moral, legal and skill reasons. In automobile workshop jurisdictions, workers have a common duty to take reasonable care for the safety of their self and that of others who are within the workshop (Maxwell *et al.*, 2015). Good OSH practices can also reduce accident that could lead to injury and illness related costs, including medical care, sick leave and disability benefit costs. As defined by the world health organization (WHO) health practices deals with all aspects of health and safety in the workshop and has a strong focus on primary prevention of hazards. Ahmad *et al.* (2017) health has been defined as a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity. Individual to undertake their occupation, in the way that causes least harm to their health. Health has been defined as it contrasts, for example with the promotion of health and safety at workshop, which is concerned with preventing harm from any incidental hazards, arising in the workshop.

According to the United States Bureau of labor statistics, machine-related injuries were responsible for 64,170 cases that required days away from work in 2008. More than a quarter

of these cases required more than 31 days spent away from work. That same year, machines were the primary or secondary source of over 600 work related fatalities. Machines are also often involved indirectly in workers deaths and injuries, such as in cases in which a worker slips and falls, possibly upon a sharp pointed object. Safety precautions sometimes lane men don't value it and they end up not educating others on the need to avoid putting themselves at risk while in the workshop, sometimes some automobile worker doesn't even put on their apron before embarking on any job (Ahmad *et al.*, 2017). Suggestions have been made that these programs could address safety skills in new ways, by addressing available personnel, tendency towards risk taking and overconfidence and by increasing parental involvement for example. Workshop participants emphasized the importance of introducing safety education within a broader framework of graduation, making distinctions between developing the Manual skills that are necessary to repair a complex vehicle and acquiring the expertise and judgment to recognize hazards and exercise caution when repairing under risky conditions.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

This chapter described the research design, area of the study, instrument for data collection, validation of the instrument, administration of the instrument, method of data analysis and decision rule.

3.1 Research Design

The research design that was used in carrying out this study is survey research design. Survey research design according to Creswell (2009) gives a quantitative description of phenomenon such as trends, attitudes, or opinion of population. Based on the results obtained, generalization to the population is possible. The survey research design was chosen as an appropriate design for the research as it solicits the views of people about a particular issue that concerns them, give room for researcher to study the group of people and items to source for information from the respondents.

3.2 Area of the Study

The study was conducted in Niger state; it covers all automobile workshops situated in Minna metropolis.

3.3 Population of the Study

The targeted Population for this study was 86 respondents, consisting of 46 automobile students, and 40 automobile mechanics apprentice in Minna, Niger state. The entire Population was used for the study.

3.4 Instrument for Data Collection

The questionnaire was the main instrument used by the researcher for the data collection for study. The questionnaire provided the required information. The structured under two sections

(A and B). Section A consisting of respondents' personal data, while Section B consists of respondents' view on items of questionnaire which are numbered from 1 to 28, the items are grouped into I, II and III.

Section I contains ten items which dealt with safety and health hazard in automobile mechanics workshops and their causes.

Section II contains nine items which dealt with the safety measures that should be practice in automobile mechanics' workshops.

Section III contains nine items which dealt with how safety measures should be encouraged in automobile mechanic's workshops in Minna metropolis of Niger state.

3.5 Validation of the Instrument

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

3.6 Administration of the Instrument

The questionnaire was personally administered by the researcher to the respondents and the completed questionnaires were also collected by the researcher after one week.

3.7 Method of Data Analysis

The data collected was analyzed using mean, standard deviation and t-test. A four-point rating scale was used to analyze the data collected for the study as shown below.

Strongly Agree (SA) = 4 Agree (A) = 3

Disagree (D) = 2 Strongly Disagree (SD) = 1

Standard deviation for each group of respondents was computed as shown in appendix A.

3.8 Decision Rule

In order to determine the level of acceptance or rejection of any items, a mean score of 2.50 is used. Therefore, any item with a mean response of 2.50 and above was accepted and any item with a response of 2.49 and below is rejected.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

This chapter presents (lie analysis of (he data collected as well as the results of the study through the use of Tables for clarity and easy comprehension. The tables are presented in accordance with the research questions and hypotheses that guided the study.

The data collected in respect of the three research questions presented where as follows:

4.1 Research Questions One

What is health hazard and their causes in auto workshop?

Table 4.1

Mean Response of the Respondents on Health hazard and their Causes in Auto Workshop.

		N = 40 N = 46			
S/no	Items	\bar{X}_1 L	\bar{X}_2 2	\bar{X}_t T	Remarks
1	Poor use of protective devices	3.45	2.24	2.85	Agree
2	Spilling of oil without proper cleaning	2.88	3.10	2.99	Agree
3	When moving parts is not oiled properly	2.45	3.00	2.73	Agree
4	Poor use of tools for it specification	2.87	2.67	2.77	Agree
5	When car engine is not checked before working on it	2.40	2.33	2.37	Disagree
6	Overheating parts	3.66	2.54	3.10	Agree
7	When bolt and nut are not well fixed	2.34	3.34	2.84	Agree
8	When an automobile engineer is not well trained	3.22	2.38	2.80	Agree
9	When the workshop is scattered	2.10	2.45	2.28	Disagree
10	When car jack is not well placed	3.01	3.90	3.46	Agree

Key

\bar{X} = mean of members of the Automobile Machines.

\bar{X} = mean of Automobile Trainees

\bar{X}_t = Average mean

The data present in Table 4.1 shows that the respondents agreed with the items 2,3,4,6,7,8,10 with a mean score ranging between 2.73 - 3.46. While the respondents disagreed with items 5 and 7 with a mean score ranging between 2.28 - 2.37.

4.2 Research question Two

Table 4.2: Mean Response from the Safety Measures that should be practice in Auto Workshops.

S/no	Items	\bar{X}	\bar{X}	\bar{X}	Remark
11	Using tools for its specification	3.90	3.00	3.45	Agree
12	Do not touch moving parts	2.60	3.10	3.45	Agree
13	Bolts and nuts should be properly checked	3.45	3.68	3.57	Agree
14	Do not overheat engine parts	2.50	2.10	2.30	Disagree
15	Oil parts frequently	2.50	2.12	2.31	Disagree
16	Using apron properly	3.00	2.07	2.53	Agree
17	Do not leave spilled oil on the floor	2.90	3.67	3.29	Agree
18	Avoid horse play	3.90	3.16	3.53	Agree
19	Avoid sleeping in the workshop	2.98	3.73	3.36	Agree

The data present in Table 4.2 shows that die respondents agreed with the items 12,13,16,17,18, and 19 with a mean score ranging between 2.53 3.57. While respondents disagreed with items 14 and 15with a mean score ranging between 2.30- 2.31.

4.3 Hypothesis One

There is no significance difference in the mean responses between automobile mechanics and automobile students on the health and safety practices and causes of health hazard in automobile mechanics workshops in Minna metropolis of Niger State.

Table 4.3: T-test analysis of respondent regarding the health and safety practice and causes of health hazard in automobile mechanics workshops in Minna metropolis of Niger State.

S/no	Respondents	Number	df	X	SD	T-cal	T-eri	Decision
1	Automobile mechanics	40	84	3.67	3.24	0.59	1.67	NS
2	Automobile students	46	84	2.79	3.60	0.59	1.67	NS

Key:

NS = Not significance

The analysis in Table 4.3 shows that the t-cal value was below the t-crit. Therefore, null hypothesis was accepted for each of the items. Hence the opinion of the respondents differed in one items but did not differ in relation to the health and safety practice and causes of health hazard in automobile mechanics' workshops in Minna metropolis of Niger State.

4.4 Hypotheses Two

There is no significance difference in the mean responses between automobile mechanics and automobile students on the safety measures that should be practice and the strategies for improving safety practices in automobile mechanics' workshops in Minna metropolis of Niger state.

Table 4.4: t-test analysis of respondent regarding the safety measures that should be practice and the strategies for improving safety practices in automobile mechanics' workshops in Minna metropolis of Niger state.

S/no	Respondents	Number	df	X	SD	T-cal	T-eri	Decision
1	Automobile mechanics	40	84	2.88	3.40	1.62	1.67	NS
2	Automobile students	46	84	3.75	3.21	1.62	1.67	NS

Key:

NS = Not significance

The analysis in Table 4.4 shows that the t-cal value was below the t-crit. Therefore, null hypothesis was accepted for each of the items. Hence the opinion of the respondents differed in one items but did not differ in relation to the safety measures that should be practice and the strategies for improving safely practices in automobile mechanics' workshops m Minna metropolis of Niger state.

4.5 Findings of the Study

The following are the principle finding of the study, they are organic based on the research questions and hypothesis.

4.5.1 The finding related to the health and safety practices and their causes in auto workshop:

Poor use of protective devices, spilling of oil without proper cleaning, poor use of tools for it specification, overheating parts, when an automobile engineered is not well trained and when car jack is not well placed.

4.5.2 Finding related to the safety measures that should be practice in auto workshops:

Using tools for it specification, don't touch moving parts, bolts and nuts should be proper check, using apron properly, avoiding horse play and avoid sleeping in the workshop. ^

4.5.2 Finding related to strategies should be encouraged in automobile mechanic workshop to improve safety measures.

Proper training of automobile workers, frequently organize forum for orientation, supervising the activities of the workers in the workshop and awareness about the need for safety in the workshop.

4.5.4 Hypotheses

H₀₁: - The findings on hypotheses 1 as revealed in Table 4.4 indicate that there is no significance difference in the mean responses between automobile mechanics and automobile students on the health and safety hazard and causes of health hazard in automobile mechanic workshops in Minna metropolis of Niger State.

H₀₂: - The findings on hypotheses 2 as revealed in Table 4.5 indicate that there is no significance difference in mean responses between automobile mechanics and automobile students on the safety measures that should be practiced and strategies for improving safety practices in automobile mechanic workshops in Minna metropolis of Niger State.

4.6 Discussion of Findings

The discussion of findings are based on the research questions posed for the study and the hypothesis.

The current health hazard and causes of health hazard in automobile mechanics' workshops

The findings are on current health hazard and causes of health hazard in automobile mechanic workshops. In Table 4.1 revealed that the respondents agreed with all the items listed as follows; Poor use of protective devices, spilling of oil without proper cleaning, poor ' use of tools for it specification, when automobile engineer is not well trained and when car jack is not well placed. The study further shows that when tools are not used for its specification during auto repair, it could end up damaging the car or even the personnel. This has resulted in several challenges, including deficient standard, poor law enforcement, discrepancies (Adewoyin *et al.*, 2017). The findings also show that some of this amount as a result of poor training of automobile personnel in carrying out their duty effectively.

The safety practices in automobile workshops

The findings are on the safety practices in automobile mechanics' workshops, the table 4.2 revealed that the respondents agreed with the items listed as follows; Using tools for it specification, don't touch moving parts, bolts and nuts should be proper check, using apron properly, do not leave spilled oil on the floor, avoiding horse play and avoid sleeping in the workshop. The findings revealed that bolt and nut are to be checkmated to avoid any thing out of control, and also personnel should properly checkmate their health to ensure that they are in a good condition. According to *Singh et al.* (2016) apart from physical injuries, there is the possibility of other non-physical work-related injuries in the workshop area.

The strategies for improving safety practices in automobile mechanics' workshops

The findings are on the strategies for improving safety practices in automobile mechanics' workshops, the Table 4. 3 revealed that the respondents agreed with the items listed as follows; Proper training of automobile workers, investing finance for proper arrangement of workshop, frequently organize forum for orientation, awareness about the need of safety in the workshop, making sure that the equipment are properly packed, should have availability of qualify workers in skill management, in-service expert staffs from other companies should be patronized and allocation of qualitative material used to service the engine. The findings show that there should be need to invite expert from other company to technical colleges to train the teachers, and also a workshop seminar should be organized in order to build the potentials within the teachers. According to *Ahmad et al.* (2017) the absence of adequate basic first aid items and personnel with rudimentary first aid skills at the workshops is an affront to the general welfare of these artisans. The findings also revealed that first aid should be made available for any situation, with this there will be an improvement in hazard management. Entire Population was used for the study. The

instrument was validated by three lecturers from the department of industrial and Technology Education. Federal University of Technology Minna. The data collected was analyzed using mean, standard deviation and t-test. A four-point rating scale was used to analyze the data collected for the study.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The main purpose of this study is to assess the health and safety practice in Automobile Workshop in Minna Niger State.

Literatures were reviewed based on history of Automobile technology, occupational safety and health hazard, types of safety precautions in automobile workshops, strategies to enhance safety in automobile workshops.

The study was conducted in Niger state; it covers all automobile workshops situated in Minna metropolis. The targeted Population for this study was 86 respondents, consisting of 46 automobile students, and 40 automobile mechanics apprentice in Minna, Niger state. The data collected was analyzed using mean, standard deviation and t-test.

In addition, the findings revealed that bolt and nut are to be checkmated to avoid any thing out of control, and also personnel should properly checkmate their health to ensure that they are in a good condition. The study further shows that when tools are not used for its specification during auto repair, it could end up damaging the car or even the personnel

5.2 Implication of the Study

The findings of this study had implications for government, technical teachers and workshop operators. Government through various agencies will build the capacity of technical teachers for effective implementation of Health and Safety Practice in Automobile in Niger State. The capacity can be built through organizing workshop and seminars for technical teachers. It is expected that training institutions such as technical colleges should review their curricula for the training of individuals for health and safety practices of automobile workshop.

5.3 Conclusion

Base on the findings of the study and considering the assessment of health and safety practices in automobile workshops, it is expected that there should be proper assessment to ascertain the cause and a way out of any hazardous situation that could occur in future. The findings also suggest that the personnel in automobile workshop be trained with new and modem tools, when this is achieved, there will definitely be a reduction of hazardous situation in the future, and that will promote professionalism in the workshop.

5.4 Recommendations

The following recommendations were made for implementation; based on the findings of the study.

1. Automobile personnel should be encouraged by the government in providing a workshop seminar that will build their knowledge in the area of automobile technology.
2. Government and nongovernmental organization like auto industries should provide funds to procure material needed and re-equip and open new automobile workshops to enable personnel to effectively adopt the best practice to avoid health hazard from occurring.
3. There should be need to supervise the activities of automobile personnel and discourage the use of outdated tools in order to avoid hazardous situation.
4. Safety boots and apron should be made compulsory to all automobile personnel in their workshop.
5. A training program should also be organized in promoting the awareness of automobile mechanics on health hazards in auto mechanic workshops.

5.5 Contribution to knowledge

The study helps to improve the health and safety practice of automobile workshop. Automobile technicians need improvement in health and safety practices in their various workshops.

5.6 Suggestion for Further Study

The following are suggested for further studies:

1. Assessment on Health and Safety Practice in Automobile Workshop in other states.
2. Assessment on Occupational Health and Safety Hazard in Automobile Workshop in Minna, Niger State.

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APPENDIX A

**FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA SCHOOL OF SCIENCE AND
TECHNOLOGY EDUCATION DEPARTMENT OF INDUSTRIAL AND
TECHNOLOGY EDUCATION**

**QUESTIONNAIRE ON ASSESSMENT OF HEALTH AND SAFETY PRACTICE IN
AUTOMOBILE MECHANICS WORKSHOPS IN MINNA OF NIGER STATE**

SECTION "A"

INTRODUCTION: Please complete this questionnaire faithfully as possible and sincerely tick (√) the column that best represents your perception about the above topic.

The questionnaire is for research purpose and your view will be treated confidentially.

PERSONAL DATA

Respondent

Automobile Students () Automobile Mechanic ()

Location:

INTRODUCTION: A four point rating scale is used to indicate your opinion, tick the word which best describe your agreement as shown below.

STRONGLY AGREE (SA)

AGREE (A)

DISAGREE (D)

STRONGLY DISAGREE (SD)

What strategies should be encouraged in auto workshop to improve safety measures?

	ITEMS	SA	A	D	SD
20	Proper training of automobile workers.				
21	Investing finance for proper arrangement of workshop.				
22	Frequently organize forum for orientation.				
23	Awareness about the need of safety in the workshop.				
24	Supervising the activities of workers in the workshop.				
25	Making sure that the equipment are properly packed.				
26	Should have availability of qualify workers in skill management.				
27	In-service expert staffs from other companies should be patronized				
28	Allocation of qualitative material used to service the engine.				

APPENDIX B

Mean (\bar{X}) Formula

$$\text{Mean } (\bar{X}) = \frac{\sum fx}{\sum f}$$

\bar{X} = Mean response of each group of respondents

\sum = The Sum of

X = The Score on the rating scale

F = The Frequency of each point on the rating scale

Standard Deviation (SD) Formula

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

\bar{X} = Mean response of each group of respondents

\sum = The Sum of

X = The Score on the rating scale

F = The Frequency of each point on the rating scale

t - test Formula

$$t\text{-test} = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}$$

\bar{X}_1 = Mean response for First group of respondents

\bar{X}_2 = Mean response for Second group of respondents

S_1 = Variance of First group of respondents

S_2 = Variance of Second group of respondents

N_1 = Number of First group of respondents

N_2 = Number of Second group of respondents.