ENTREPRENEURSHIP COMPETENCIES NEEDED BY AUTOMOBILE CRAFTSMEN IN NIGER STATE

BY

YAKUBU, Emmanuel Felix

2013/1/48055BT

DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION

FEDERAL UNIVERSITY OF TECHNOLOGY

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

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DECLARATION

I YAKUBU Emmanuel Felix with matriculation number **2013/1/48055BT** 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.

YAKUBU, Emmanuel Felix ……...

2013/1/48055BT **Signature & Date**

CERTIFICATION

This project has been read and approved as meeting the requirement for the award of B.TECH Degree in Industrial and Technology Education of Industrial and Technology Education, department, School of Science and Technology Education, Federal University of Technology. Minna, Niger State.

Dr. B.M. Mohammed — Sign and Date
Project Supervisor

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Head of Department

Prof. H. U. Elobuike — Sign and Date
External Examiner

DEDICATION

I hereby wish to dedicate this project to Almighty God through whose grace and mercy have keep all through sweet and tough times till present date. I also want to dedicate this work to my great, superfluous and wonderful family, for their warmest love, support spiritually, financially and kindly. I also dedicate this to my love OJONUGWA PEACE EMMANUEL, I pray may Almighty God halt-not his blessing, mercy and protection on us (Amen).

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ABSTRACT

This study focuses on entrepreneurship competencies needed by automobile craftsmen in Niger State. Three research questions were formulated to guide the conduct of the study. A descriptive survey research design was employed for the study. The study was carried out in Niger State. A total of 51 respondents comprising forty-three entrepreneur automobile craftsmen and eight automobile industry workers were used as population for the study while sample of the study consist of thirty-seven entrepreneur automobile craftsmen using simple random sampling technique and all eight automobile industry workers since the automobile industry workers are not many. A structured questionnaire developed by the researcher was used for the data collected for study. The instrument was face and content validated by three lecturers in Industrial and Technology Education. Mean, standard deviation and t-test were the statistical instruments used to analyze the data for answering research questions and the hypotheses respectively. The findings of the study revealed among others that the ways and manners automobile entrepreneurial competency adopted needs to be upgraded, automobile craftsmen should take in the technical competencies skills effective operation, lack of managerial skills for self-employment and lack of effective communication skills required. Based on the findings it was recommended that the Auto-workshop manager should provide appropriate new modern tools, machine and equipment for effective and efficient training and National Board for Technical Education (NBTE) should carry out a review on automobile technology curriculum for Technical Colleges with a view to incorporating entrepreneurial skills and competencies into teaching of automobile technology.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

Automobile trade is one of the vocational training offered in Technical Colleges in Nigeria. Classification of automobile trade in Technical Colleges according to NBTE (2011) include: Agricultural Implement Mechanics, Auto Electric Works, Vehicle Body Building and Motor Vehicle Mechanic's Work. Motor Vehicle Mechanic's Work (MVMW) is designed to produce competent automobile craftsmen for the technological and industrial development of Nigeria. The aim of entrepreneurial competencies needed by Automobile craftsmen according to NBTE (2003) is to give training and impart the necessary skills leading to the production of craftsmen, master craftsmen and other skilled personnel who will be enterprising and self-reliant. According to Ede and Olaitan (2010), the establishment of MVMW and other occupational trade geared towards imparting basic Skill as well as training skills leading to the production of skilled craftsmen who will be enterprising, self-reliant and sufficiently competent to meet the demands in the world of work.

The main component of MVMW is structured on foundation and trade modules. These components according to NBTE (2003) include: Service Station Mechanic; Engine Maintenance; Engine Reconditioning; Transmission; Suspension, Steering and Braking Systems, vehicle body paint and Auto-Electricity. In other words, MVMW graduates or trainees are expected to diagnose service and completely repair any fault relating to the conventional automobile assembly main unit to the manufacturers specification as indicated in the technical training curriculum for motor vehicle mechanics work. Craftsmen also, should be structured in foundation and trade modules. The curriculum for each trade consists of workshop practice,

training components, maintenance and small business management and entrepreneurial training. The trade theory and workshop practice cover the major automobile assembly main units and maintenance systems, their functions and principles of operation. This curriculum if adequately implemented is expected to produce competent craftsmen in Motor vehicle mechanics work for industrial and technological development in Nigeria. Such craftsmen can be employable if they possess adequate skills and competencies and thereby reduce unemployment among the youths in Niger State. This make the Niger state youth self-employment calls for the acquisition of entrepreneurial skills and competencies a sine qua non for any meaningful self-employment strategy.

Entrepreneurship according to Nwokolo (1997) is the acquisition of skills, ideas and managerial abilities necessary for personal self-reliance. Nwafor (2007) also defined entrepreneurship as the willingness to seek out investment opportunities in an environment and be able to establish and run an enterprise successfully based on the identified opportunities. Aminu (2008) explained that entrepreneurship is the process of creating something new with value, by devoting the necessary time and effort to bear the company risks, and receiving the resulting rewards of monetary and personal satisfaction and independence. He argued that, a typical entrepreneur is a risk taker, one who's brave uncertainty, strikes out on his own, and through nature with devotion to duty and singleness of purpose, somehow creates a business and industry activity.

Schumpeter in Aminu (2008) also viewed an entrepreneur as an individual or group of individuals who either undertakes the responsibility of making innovations in the economy or carries out a new organization of industry. In other words, an entrepreneur is any one or group of individuals who creates a business, establishes it and nurses it to growth and Profitability or takes over an existing business with sole purpose of introducing new goods and Services or developing

new sources of materials, and continues to build and innovate on it. When an automobile craftsmen set-up a business, and apply the knowledge and skills acquired in the school or outside the school for production of goods and services, such business is known as an enterprise. An automobile craftsman who possesses adequate skills and is competent in the management of business venture or enterprise can become an entrepreneur.

Moody (1992) defined entrepreneur as a person who owns, manages and assumes financial risks in business venture. The individual perceives business opportunities and takes advantage of the scarce resources but requires some skills and competencies for success in the business.

Therefore, entrepreneurial competencies in the context of this study is regarded as the knowledge and attitudes acquired by craftsmen through years of training to identify business opportunities, economic activities for maximized output in business enterprise. In this study, the entrepreneurial competencies needed by automobile craftsmen for self-employment will be identified.

If the to improve the skills are identified and utilized existing curriculum of automobile craftsmen it will help to better equip the craftsmen with skills for sustainable employment and economic gains.

It then follows that if auto mechanic craftsmen are trained in entrepreneurship they can become competent entrepreneurs and be self-employed. Stcinhoff and Burgress (2010) therefore, suggested that a competent entrepreneur should possess technical and problem solving competencies, basic business competencies, planning organization competencies, good leadership competencies and good communication competencies.

Erjavec (2010) entrepreneurial competencies skill can be seen as technologies which arise from new knowledge or the innovative application of existing knowledge leading to the rapid development of new capabilities. Okereke (2009) described entrepreneurial technologies skill as

technologies that are new or fairly well established but yet to be fully exploited by enterprises and individuals. In the opinion of Veletsianos (2010), entrepreneurial technologies skill are tools, concepts, innovations, and advancements utilized in diverse educational settings to serve varied educational related purposes. According to Malone (2006), entrepreneurial technologies skill in automobiles include: Anti-lock Braking System (ABS), Electronic Fuel Injection (EFI), Electronic Ignition System, Electronic Transmission system, Variable Valve Timing Intelligence (VVV-I), On- Board Detection and Diagnostic system (OBD), All Wheel Drive (AWD) system, All Wheel Steering (AWS), Active Suspension System and Emission Control System. With these improvements in vehicle technology, there is an urgent need for regular updating of craftsmen with entrepreneurial competencies in order to understand the technology behind these vehicles and how to repair and established them.

Technology is the application of scientific knowledge in providing solutions to practical problems that plague and puzzle mankind. It is the capacity to ensure that human need are supplied through the utilization of tools and machinery. However, adequate utilization of tools, equipment or machinery requires the acquisition of technology skills. Entrepreneurial competencies can be described as the technical expertise applied in the development and manipulation of devices, machines and techniques for manufacturing and productive processes. According to Osinem (2008), competencies is a type of expertise requiring a good understanding and proficiency in a specific activity, particularly one involving methods, procedures or technique and processes. Medina (2010) defined competency skills as the expertise or technical competence related to the field of the worker, whether engineering or technical. Medina also stated that competency skills are hard skills associated with the use of tools, equipment related to work properly and efficiently, as well as all technical matters. In this study therefore,

entrepreneurial competencies required of automobile craftsmen of modern vehicles according to the manufacturers' specifications. Nna (2001) is of the view that today's modern vehicles contain more embedded electronic components and controls that require a higher degree of sophistication for testing and servicing, as well as special On-Board Diagnostic (OBD) tools and test instruments. Some of these diagnostic tools and equipment according to Fapetu and Akinola (2008) include; scan diagnosis computer, electronic calipers/micrometers, Airbags, ABS scanning tool and off-board detection diagnostic tools. Fapetu and Akinola argued that competence of these new technologies in the automobile system and subsystem components have equally changed their configuration and made their maintenance a more complex task. In order words, the life span of an automobile apparently depends to a large extent on maintenance.

The ability to effectively carry out tort in modern vehicles requires the use of new and entrepreneurial technology skills different from the conventional technical skills already acquired by craftsmen of MVMW in Technical Colleges for entrepreneurship.

It is also follows that if automobile craftsmen are trained in entrepreneurship, they can become entrepreneurs and establish their own enterprise. However, most of these craftsmen are graduating from technical colleges without the necessary competencies and entrepreneurial competencies. Furthermore many of these craftsmen do not possess entrepreneurial competencies that will enable them establish and managed a small. Therefore business enterprise so as to become self-employed and self-reliant on graduation (Okoli, 2009). The study is therefore aimed at determining the entrepreneurial competency needs of Automobile craftsmen for self-employment in Niger State.

1.2 Statement of the Problem

Changes and advancement in technology have continued rapidly across all industries with that of automobile being one of the fastest and advanced in recent years.

The rapid changes in automobile technology as well as social and economic changes of today have changed the job demands of automobile craftsmen making them unemployable or ill fitted for the demands of the jobs market. Thus, the resulting massive unemployment of automobile craftsmen, emphasize the need to investigate the entrepreneurial competency needs of automobile craftsmen. Based on the sizeable vehicular population in Niger States of Nigeria, it is evident that the entrepreneurial competencies of modern automobiles is still lacking thereby increasing the prospects of craftsmen or trainees for effective practice of automobile trade and a successful auto-mechanic career. Contrary to this high aspiration, expectation and hope by these students or trainees to make a good fortune out of the entrepreneurship competencies required by automobile programme in Technical Colleges, majority of them have been graduating with little or no entrepreneurial competency skills to enable them establish self-owned automobile enterprises. This situation could be attributed to the deficiency of MVMW curriculum and module specification as well as insufficient nature of college training on modern automobile technology skills which has equally restricted automobile craftsmen of technical colleges in skillfulness, efficiency, proficiency and productivity. Therefore, the study is undertaken to find out entrepreneurial competencies needed by automobile craftsmen in Niger States of Nigeria.

1.3 Purpose of the Study

The purpose of the study is to identify entrepreneurial competencies needed by automobile craftsmen in Niger State specifically, the study sought to:

- Identify the technical competencies needed by automobile craftsmen in Niger State.

- Identify the managerial skills needed by automobile craftsmen for self-employment.
- Find out the basic communication skills needed by automobile craftsmen in Niger State

1.4 Significance of the Study

The findings of this study would be of immense benefit to artisans, students, motor vehicle mechanic's work (MVMW) graduates, technical teachers, National Board for Technical Education, Automobile Industries, Government and educational researchers. Artisans (road side mechanics) who are products of the informal automobile sector or apprenticeship programme will benefit from the findings of this study by becoming more enlightened on the automobile competencies technologies and strive towards updating their knowledge and skills in line with the identified technology skills. This will enable them to keep pace with technological improvements for performing optimally and remain relevant in the modern automobile industry.

The automobile competencies identified in this study when integrated into the curriculum could help the technical college students of Motor vehicle mechanic's work to acquire new set of skills required for servicing and maintenance of modern vehicles. Students or the trainees will also be exposed to new body of knowledge/content on modern cars so as to enhance their understanding of their working principles and how to handle complex fault in them.

The acquisition of entrepreneurial competencies technology skills identified in this study will enable Automobile craftsmen graduates to become self-reliant, self-employed and employers of labour. The findings will also enable MVMW craftsmen to acquire new competencies for servicing and repair of modern vehicles in order to remain relevant in the automobile industry.

MVMW teachers will benefit from the findings of this study by identifying areas of automobile technology where students are deficient and on which they may need to update their technical entrepreneurial competence for the production of enterprising craftsmen who will be productive

in paid or self-employment. Teachers through the findings of this study will also identify out-dated technologies in curriculum content that should be given less emphasis while the entrepreneurial technologies will be given adequate recognition in the training of MVMW students. MVMW teachers will equally use the findings of the study to master these new technology skills as a means of enhancement towards productivity and adaptability. Hence, updating their skills will remain paramount with constant advancement in frequent changes in automobile technology. This will be attainable when technical teachers attend planned retraining and improvement programmes that takes practical and new skills in automobile technology into cognizance. The National Board for Technical Education which is solely responsible for planning and reviewing the technical college curriculum will through the findings of this study become aware of entrepreneurial technology skills required by MVMW craftsmen in the maintenance of modern vehicles. National Board for Technical Education could use these identified skills to update the pedagogy and components of the curriculum for MVMW in technical colleges. This could make the curriculum more activity centered thereby stimulating the interest and motivation of students or the trainees towards the automobile trade.

Automobile servicing companies will equally find the result of this study very beneficial when incorporated into the curriculum content of MVMW in technical colleges as it will produce a pool of highly skilled automobile graduates (craftsmen) who will be versatile and adaptable to the dynamic nature of modern vehicles, thereby enhancing the performance and productivity of the automobile industry towards the sustenance of Nigeria's economic and industrial growth. The findings of this study will sensitize the government on the performance gap between technical skills acquired by craftsmen of MVMW in technical colleges and the requirements of modern automobile industries. Hence, the government will be encouraged to organize retraining

programmes and skill improvement workshops for instructors of MVMW whose responsibility it is to impart technical skills on students for gainful employment upon graduation.

1.5 Scope of the Study

The study is delimited to entrepreneurial skills needed by automobile craftsmen, challenges faced by students in the acquisition of entrepreneurial skills, challenges encountered by teachers in the equipping of students with entrepreneurial skills and the techniques that could aid the effective mastery of entrepreneurial skills needed by automobile craftsmen in Niger State.

1.6 Research Question

The following research questions were formulated to guide the focus of this study.

- What are the technical competencies needed by automobile craftsmen in Niger State?
- What are the managerial skills needed by automobile craftsmen for self- employment?
- What are the basic communication skills needed by automobile craftsmen in Niger State?

1.7 Hypothesis

The following null hypotheses (HO) were formulated to guide the study and were tested at 0.05 of significance.

$H0_1$: There is no significance difference in the mean response of automobile industry workers and entrepreneur automobile craftsmen on the technical competencies needed by automobile craftsmen in Niger State.

$H0_2$: There is no significance difference in the mean response of automobile Industry workers and entrepreneur automobile craftsmen on the managerial skills needed by automobile craftsmen for self-employment.

$H0_3$: There is significance difference in the mean responses of automobile Industry workers and entrepreneur automobile craftsmen on the basic communication needed by automobile craftsmen in Niger State.

CHAPTER TWO

2.0 LITERATURE REVIEW

The literature reviewed were organized under the following sub headings

Conceptual Framework

- Theory of Needs
- Concept of Entrepreneurship in the Automobile Industry in Nigeria
- Competencies and Skills Required by Automobile Craftsmen
- Automobile Craft Practice in Niger State
- Summary of literature reviewed

2.1 Theory of Needs

1. Classical Capitalist Economic theory- Adam Smith in 1776 described the capitalist as an owner-manager who combined basic resources into successful industrial enterprise. Later and during the 19th century the French word entrepreneur (meaning to undertake) was introduced and used to identify the owner-manager of a new industrial enterprise.
2. Neoclassical Theory-this theory towards the end of the 19th century saw no place for the entrepreneur. They argued that the market consists of many buyers and sellers who interact to ensure that supply equals demand. The market, which they described as a 'perfect market' would therefore be at equilibrium, and this would be achieved by fluctuations in prices with supply levels.

They defined perfect market as:

- Having many buyers and sellers, so no single one has an influence on the market price.
- Prices are set by the operation of the market-by sales.
- Products and services must all be equivalent in content so that they differ only in price.

- All buyers and sellers have complete knowledge of the market and the transactions that take place.

3. The need for achievement theory espoused by Mc Celland (1961) explains the need for achievement as a trait that makes one choose and endure in ventures that have a reasonable likelihood to succeed. Entrepreneurs are driven by this need to achieve the set objective (shaver & scott, 1991), highly need for achievement is based on training from early childhood, training through to adulthood and experiences. This explains why some cultures have a greater need of achievement than others, a person with a great need for achievement will take individual responsibility in decision making, Shaver &Scott, further says that culture and socialization has an influence in determining the degree of need for achievement. The need are learned through socialization and not established biologically. Mc Clelland (1965), the need for achievement leads to creation of a business enterprise. Mc Clelland further proposed that innovation or the use of an invention to create a new product or services was the driving force behind the creation of new demand for goods and services.

2.2 Concept of Entrepreneurship in the Automobile Industry in Nigeria.

An entrepreneur is someone who assumes the financial risk of beginning and managing a new venture, the venture can be based totally on new idea, and new way of doing thugs, a new location or attempting something no one else has done before Entrepreneurship can be defined as the process of creating something different with value by devoting the necessary time effort; assuming the accompanying financial psychological and social risk; and receiving rewards of monetary and personal satisfaction. Tolentino (2004) expanded the scope of the entrepreneurship to include all areas of human endeavor such as politics, engineering, medicine, academia, social

welfare etc going by the content of the life of mankind, not business alone. Entrepreneurial ability or entrepreneurship is centre and critical in every human society; it is through entrepreneurship that society can attain any level of development. Entrepreneurship is said to be that secret behind rapid development of countries like Japan, China, Malaysia etc. while entrepreneurship is also said to be the major cause of under development of most countries in Africa, Asia, and Latin America. In view of the numerous benefit of entrepreneurship development every right thinking individual or nation should develop interested in undergoing or undertaking it. For entrepreneurship development to properly be undertaken and also to make a desired impart, certain basic requirement need to be on ground these requirements include:

- Goal driver and clear vision
- Ambitious, courageous and action oriented
- Confidence and high positive believe for everything that is possible
- Conceptual ability, and global thinking
- Discipline work ethic and high standards for quality
- Passion in his/her work and attraction to challenges
- Costumer-oriented
- Team-oriented
- Skills-oriented
- Techno-knowledgeable
- Flexible minded

Xii Humane emotionally stable, and socially responsible

Entrepreneurship scholars have divided characteristics of entrepreneur in the automobile industry into two different schools of thought: one based on the trait activities and the other on

contingency thinking. In the studies using the trait activities, the basic objective is to answer the question why; certain individuals are successful as entrepreneur in the automobile industry, without looking in the context of the environment or the situations around the individual. The trait activity is: McClelland's (1961) individual innate desire to succeed, accomplish, thrive and achieve. Personality trait: need for achieving the goals has been reviewed and empirical evidence presented and has been found to be associated with entrepreneurial inclination (Landstrom, 1998). Coon (2004) defines personality traits as "stable qualities that a person shows in most situations''.

Other characteristics or behaviors associated with entrepreneur in the automobile industry could not be used as variables in this research because they tend to be more opportunity driven (they nose around), demonstrate high level of creativity and innovation, and show high level of management skills and business know-how but not entrepreneurial.

According to McClelland (1961) entrepreneurs experience a lot of challenges and need constant feedback to be successful. Entrepreneurs take responsibility to tackle problems and set goals and achieve them through personal effort.

Cooper and Gimeno-Gascon (1992) did studies that found there is a relationship between need for achievement and the success of small scale enterprises. Many studies also show that need for achievement is higher in people who start new organizations than managers (Begley & Boyd, 1987). The personality factor is also related to company development (Miners *et al*, 1989). The study also showed that need for achievement fluctuate over time.

According to Johnson (1990) there is a positive relationship between the need for achievement and entrepreneurship. A study done in Niger State revealed a positive character needed by entrepreneur for achieving the set goals. (Ombok, 1990). The study also established that people

with high need for achievement also have a high propensity to risk. However the study did not reveal a correlation between the trait need for achievement with creativity and personal responsibility.

The numerous findings in the trait bring out various indicators that were used to measure this characteristic. The need for precise goal setting was a determinant in evaluating level of need for achievement. Responsibility for own decision making was equally used determine level of N-ach. Those who push themselves to work harder against all odds were deemed to possess this trait. Equally, choosing and enduring in ventures that have reasonable likelihood to succeed or great chance of achieving personal contentment without an excessive risk of failure were viewed as some of the determinants of need for achievement.

2.3 Competencies and Skills Required by Automobile Craftsmen.

In starting a business, one will need a broad array of entrepreneurial skills to succeed in today's competitive market. Some basic skills necessary to enable an entrepreneur to start, develop, finance and market a business enterprise. There are a number of qualities and skills needed that include personal attributes, business skills and management capability. While one may not have all the skills right now, there are five basic skills one really must have to run any kind of business.

These five skills are:

- **Sales Marketing Skills:** Sales and marketing are the two most important skills you must have when you plan to start your own business. A business is nothing if it has no customers. You may have the fanciest computer with the latest graphics software, but if no one is knocking at your door to hire you as a graphic designer, then you better rethink why you are in business in the first place. Maybe you are better off employed by a firm. To have revenues

and profits, you first need to have costumers. To get customers, you must be able to market your business and possess the skills to close the sale. As you plan your business, you must begin to think how to reach your target audience and the people who may need your products or service. This entail understanding the concept of marketing, and using the tools that your budget permits. You must have a knack for understanding what people wants, listening to their needs, and interact well with other people. It would be extremely helpful if you possess excellent written and oral communication skills to help you sell your products and services (more so if you are a solo entrepreneur who will be doing everything by yourself). You need to create a buzz about your business by talking to people and presenting to them your business. You need to write ads, press releases and story ideas about your business. Starting a business is a time to get out of your timid self and begin to aggressively market your venture. That's the only way you can succeed.

- **Financial Management Skills:** You are in business to make money. Therefore, the most important skill you must have is the ability to handle money well. This includes knowing how to stretch the limited start-up capital that you have, spending only when needed and making do with the equipment and supplies that you currently have. You also need to identify the best pricing structure for your business in order to get the best kind of return for your products or services. Success in business is not limited to those who have tons of capital in the beginning. Look at the failed dot-corns with funding of as much as $100 million. Even if they are awash with cash, they still ended up as a failure because they were not able to manage their money well. They lavished themselves with high-tech office furniture and gave their CEOs fance jets to fly, only to have their cash flow depleted in less than a year. If you are able to manage your cash flow well when the business starts to run, you will be able to

survive the ups and downs of self-employment. The important thing is to always focus on the bottom line. For every spending, always ask yourself: “How much will this contribute to my bottom line?” If it will not give your business anything in return financially, better think twice before opening your wallet.

- **Self-motivation Skills:** As an entrepreneur, you do not have the luxury of bosses and bureaucracy to tell you what needs to be done. Everything rests on your shoulder from thinking where to get the money to fund the business, to developing the product, to determining how to reach the customer, and so on. Only you will create the plans, and change them should the situation shifts. You need to be smart enough to know when you need to go ahead, and when to stop. To succeed in business, you must be a self-sarter with a clear desired goal in mind. You must have the confidence in yourself, and in your ideas (how can you sell your ideas to others if you yourself do not believe in them?). More importantly, you must be willing to focus your energy and work hard towards each and every step that will make your enterprise a success. Especially if you work at home, it is doubly hard to get into the work mindset: sometimes, the television is just too tempting that it is hard to get out of your pajamas and being typing in your computer. You therefore must have that extra drive and commitment to make sure that you are taking the necessary steps to make your dream of a successful business a reality.
- **Time Management Skills:** The ability to plan your day and manage time is particularly important for a home business. When you wake up in the morning, you must have a clear idea of the things you must do for the day. Especially if you are running a none-person operation, you must have the ability to multi-task be the secretary at the start of the day typing all correspondences and emails, become the marketing man writing press releases

before noon, make sales call in the afternoon, and become a bookkeeper before your closing hours. Imaging if you are selling products and you still have to create the products, deliver and fulfill the orders, rush to the bank to cash the checks. Lots of job for a simple home-based business! No, you don't have to be a superman (or superwoman). You simply have to know how to manage time and prioritize your tasks. One difficulty of working from home is that you can never seem to stop. There are simply too many things to do, as if work never stops (and it doesn't!). Part of having good time management skills is knowing when to stop and when to leave work, and begin doing your other roles in your family as the husband, wife, mother or father. You must be able to know how to keep your home life separate from your work life, and ensure that there exists a balance between the two.

- **Administrative Skills:** If you can afford to hire an assistant who will organize your office space and file your papers and mails, lucky you! However, most start-up entrepreneurs cannot afford such luxuries. Over and above the tasks of managing, marketing and planning your business, you also need to possess a great deal of administration skills. You need to file your receipts so tax time will not be a trip to hades. You need to do all the work in terms of billing, printing invoices, collecting payments, and managing your receivables. Starting a business is never easy, even if you have the perfect background and possess all the above skills. Having all the needed skills and qualities will not even ensure your success. But having these basic skills will, at least, lessen the pain of the start-up process, giving you greater chance in seeing your business grow and prosper.

2.4 Automobile Craft Practice in Niger State.

Automobile craft practice involved the repairs and maintenance activities, automobile function effectively if they are regularly maintained. Maintenance is the care and up-keeping

of the mechanical parts of automobile according to schedules. Automobile maintenance involves procedures or activities such as oil and filter changes, belt replacement, hose replacement tune-ups lubrication among others. Automobile repairs involve the fixing of parts replacement of worn-out parts brakes and malfunctioning parts. Repairs are also carried out on bolts and nuts, shock absorbers, transmission overhauls among others all automobile are not permanent so continuous serving is required

General Objectives:

On completion of shop practice activities, trainees should be able to:

Understand general safety precaution, apprehend the basic working principles of petrol and diesel engine and restore it to peak performance, grasp the working principles of valves in both engines, understand the working principles of the fuel system of the motor vehicle,

Comprehend the operation of an ignition system and carryout repair and adjustment, understand the working principles of engine cooling system and restore a faulty cooling system to acceptable standard of performance (NBTE, 2003).

Understand the operation of the compression ignition engine and carryout repairs of the components of fuel delivery system, perceive the working principles of in-line and rotary fuel injection pumps, effect overhaul and repairs on both engine, Understand the working principles of a diesel engine and carryout engine tune and test for efficiency, Understand the fuel injection bleeding procedure, Understand the working principles of different types of fuel injection pumps and governors, Understand the constructional difference between petrol and compression ignition engine main component parts, Understand the well sump lubrication system layout and methods of oil distribution, Understand dry sump lubrication system ventilation and the action of pressure gauges and oil warning lights, Understand the cams and camshaft drive arrangement for

side and overhead camshafts, Understand the valves and valve port timing diagram for both spark and compression ignition engine, Understand the principles of camshaft balancing and vibration damping (NBTE, 2003).

understand the safety procedures and their applications in relation to automobile engine reconditioning, Understand the operation of all types of automobile engine and recondition worn out engine to good working condition, Understand the process of carrying out cylinder reboring, Understanding the method of grinding crankshaft to manufacturer's specifications (FGN, 2003).

Understand the principles of electricity generation as applicable to automobiles diagnose faults and effect repairs to batteries, Understand the procedure for effective maintenance and repairs of all units of the charging system in a motor vehicle without supervision, Understand the operation of the starter motor, diagnose and effect repairs to a faulty one, Understand the operation of all electrical components of a vehicle, trace and rectify faults in the. Understand the wiring diagrams of a motor vehicle and be able to use such diagrams, symbols and signs as an aid in rewiring a faulty system, Understand the operation of the coil ignition system, diagnose faults and rectify them, Understand the operation of the transistorized ignition system, diagnose faults and rectify them (FGN, 2003).

The engine is the power plant of a vehicle. Engine system provides the energy to propel (move) the vehicle and operate the other systems. Most engines consume gasoline or diesel fuel. The fuel burns in the engine to produce heat. This heat causes gas expansion, creating pressure inside the engine. The pressure moves internal engine parts to produce power. The engine is usually located in the front portion of the body. Placing the heavy engine in this position makes the vehicle safer in the event of a head-on collision. In a few vehicles, the engine is mounted in the rear to improve handling (Wilcox, 2013).

Automotive engines have gone through tremendous changes since the automobile was first introduced in the 1880s, but all combustion engines still have three requirements that must be met to do their job of providing power – air, fuel, and ignition. The mixture of air and fuel must be compressed inside the engine in order to make it highly combustible and get the most out of the energy contained in the fuel mixture. Since the mixture is ignited within the engine, automobile power plants are called internal combustion engines (Melior, 2007). Erjavec (2010) stated that while trying to produce more fuel-efficient vehicles, manufacturers replaced large eight-cylinder engines with four-cylinder and other small engines. Today's engine control systems are On-Board Diagnostic (OBD II) second-generation systems. These systems were developed to ensure proper emission control system operation for the vehicle's lifetime by monitoring emission-related components and systems for deterioration and malfunction. In addition, by the mid-1980s, all automobiles were equipped with some type of electronic control system; basic engine systems like carburetors and ignition breaker points were replaced by electronic fuel injection and electronic ignition systems. These systems monitor the engine's operation and provide increased power outputs while minimizing fuel consumption and emissions. According to Stephen et al (2011), computers and electronic devices are used to control the operation of an engine. Because of these controls, today's automobiles use less fuel, perform better, and run cleaner than those in the past. Computerized engine control systems control air and fuel delivery, ignition timing, emission systems operation, and a host of other related operations. The result is a clean-burning, fuel-efficient, and powerful engine (Erjavec, 2010).

Engine control system according to Alfred as (2007) uses an Electronic Control Unit (ECU) with a built-in microprocessor. Stored inside the ECU is the data for fuel injection duration, ignition

timing, idle speed, etc., which are matched with the various engine conditions as well as programs for calculation. The ECU utilizes these data and signals from the various sensors in the vehicle and makes calculations with the stored programs to determine fuel injection duration, ignition timing, idle speed, etc., and outputs control signals to the respective actuators which control operation . This allows the car to adapt to environmental conditions such as air density in order to increase the combustion efficiently subsequently improving fuel economy. All decisions made by the ECU are based on the state of sensors that are placed at various places throughout the vehicle primarily around the engine bay. In other words, electronic sensors are used to monitor the engine and many other systems. Vine (2004) stated that due to the regulations demanding lower emissions, together with the need for better performance, fuel economy, continuous diagnosis electronic systems form an inevitable part of engine management. Electronic Engine Management according to Vineet (2004) is the science of electronically equipping, controlling and calibrating an engine to maintain top performance and fuel economy while achieving cleanest possible exhaust stream, and continuously diagnosing system faults. Furthermore, Vineet stated that the engine management ECU would perform the following functions.

- Sense ignition on (input -pin18), then turn on the main relay (output -pin 4), acknowledgement received at (input -pin23).
- Turn on the pump relay (output -pin 16)
- Turn on the sensors (output -pin 12)
- Fire ignition at appropriate time (output -pin 13)
- Send supply voltage to Throttle sensor (output -pin9)
- Sense air flow meter voltage (input -pin 21)

- Sense throttle voltage (input -pin 22)
- Sense temperature sensor voltage (input -pin 10)
- Adjust idle speed by sending pulses to stepper motor of idle adjuster (output –pins 14, 2, 15, 3)
- Turn on fuel injectors at appropriate time (output - pin 1).

The Engine management ECU can be thought of as an electronic system comprising of Electronic Ignition System and Electronic Fuel Injection (EFI) system (Vineet, 2004).

Electronic Ignition System

Wilcox (2013) stated that the ignition system is used on gasoline engines to start Combustion. An ignition system is needed on gasoline engines to ignite the air-fuel mixture. It produces an extremely high voltage surge, which operates the spark plugs. A very hot electric arc jumps across the tip of each spark plug at the correct time. This causes the air-fuel mixture to burn, expand, and produce power. In the opinion of Vineet (2004), the fundamental purpose of ignition systems is to supply a spark inside the cylinder, near the end of the compression stroke to ignite the compressed charge of air- fuel vapour. Bonnick (2001) stated that without a good quality spark, in the right place at the right time, the engine performance will be affected, as will the operation of the emissions control system. A misfire can lead to unburnt fuel reaching the exhaust and this will quickly harm the catalyst, often irreparably. For this reason, modern systems monitor the performance of each cylinder, in relation to combustion. One method of doing this is to sense the angular acceleration of the engine flywheel; a firing cylinder will produce more acceleration than a misfiring one. In order to identify the cylinder that is misfiring, the electronic control module (ECM) requires a reference signal and this is often provided by the camshaft position sensor. On modern systems, the ECM has the ability to detect misfires because

the unburnt fuel that results can cause serious damage to the exhaust catalyst. The ECM achieves this diagnosis by reading the time interval between pulses from the crankshaft speed sensor. Persistent misfires will activate the MIL and a fault code (DTC) will be recorded. Urgent remedial work will then be required if serious catalyst damage is to be avoided (Bonnick, 2001). On most engines, the motion of the piston and the rotation of the crankshaft are monitored by a crankshaft position sensor. The sensor electronically tracks the position of the crankshaft and relays that information to an ignition control module. Based on input from the crankshaft position sensor, and, in some systems, the electronic engine control computer and the ignition control module then turns the battery current to the coil "on and off" at just the precise time so that the voltage surge arrives at the cylinder at the right time. The voltage surge from the coil must be distributed to the correct cylinder because only one cylinder is fired at a time. In earlier systems, this was the job of the distributor (Erjavec, 2010). Today's ignition systems do not use a distributor. Instead, these systems have several ignition coils, one for each spark plug or pair of spark plugs.

When a coil is activated by the electronic control module, high voltage is sent through a spark plug circuit. The electronic control module has total control of the timing and distribution of the spark-producing voltage to the various cylinders. A distributor is driven by a gear on the camshaft at one-half the crankshaft speed. It transfers the high-voltage surges from the coil to spark plug wires in the correct firing order. The spark plug wires then deliver the high voltage to the spark plugs, which are screwed into the cylinder head. The voltage jumps across a space between two electrodes on the end of each spark plug and causes a spark. This spark ignites the air-fuel mixture. According to (Vineet, 2004)**,** the electronic ignition system should provide the spark to ignite the air-fuel vapour with proper timing depending on speed, load, temperature etc.

The spark plug must fire at the correct time during the compression stroke. A crankshaft position sensor or a distributor operates the ignition module. The module operates the ignition coil. The coil produces high voltage for the spark plugs. With the ignition switch on and the engine running, the system uses sensors to monitor engine speed and other operating variables. Sensor signals are fed to the control module. The control module then modifies and amplifies (increases) these signals into on-off current pulses that trigger the ignition coil. When triggered, the ignition coil produces a high voltage output to fire the spark plugs. When the ignition key is turned off, the coil stops functioning and the spark-ignition engine stops running.

Distributorless Ignition System: Until 1984, all gas engines used a distributor driven by the camshaft to send a spark on its way to each cylinder at the proper time. These systems were called Distributor Ignition (DI) systems. Distributor systems since the mid-1970s have used electronic components and were once referred to as electronic ignition.

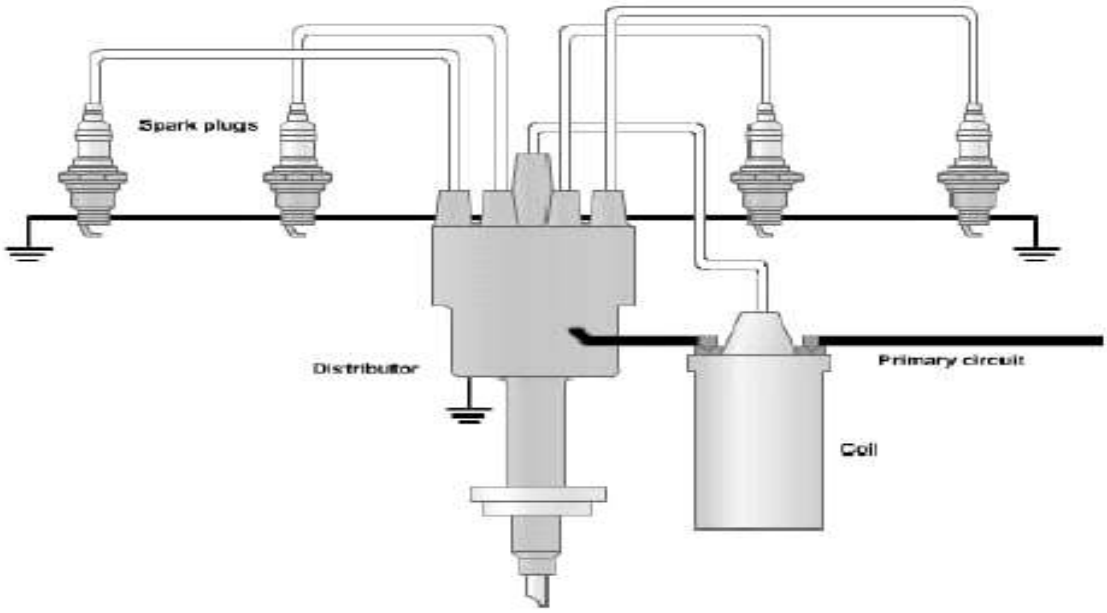

Figure 2.1: Distributor Ignition Melior (2007).

Today, most engines produced are distributor less and rely on engine sensors and electronic components to accomplish this task. The distributor less ignition system is used in the four-cylinder engines of modern vehicles (Bonnick, 2001). There are two ignition coils, one for cylinders 1 and 4, and another for cylinders 2 and 3. A spark is produced each time a pair of cylinders reaches the firing point which is near top dead center (TDC). This means that a spark occurs on the exhaust stroke as well as on the power stroke. For this reason, this type of ignition system is sometimes known as the 'lost spark' system. There are two sensors at the flywheel: one of these sensors registers engine speed and the other is the trigger for the ignition. They both rely on the variable reluctance principle for their operation.

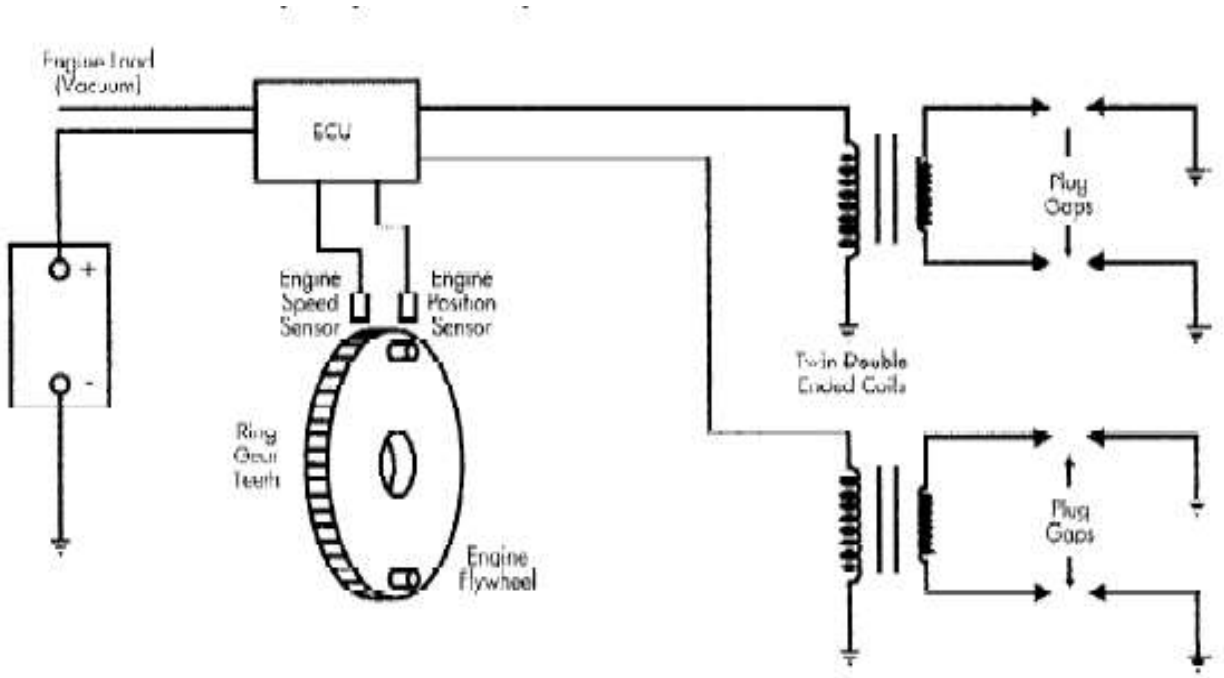

Figure 2.2: Distributorless Ignition System Bonnick (2001)

Electronic Fuel Injection (EFI) Systems

Electronic fuel injection (EFI) has proven to be the most precise, reliable, and cost effective method of delivering fuel to the combustion chambers of today's engines, (Erjavec, 2010). In order to have an efficient-running engine, there must be the correct amount of fuel. To provide this, fuel must be stored, pumped out of storage, piped to the engine, filtered, and delivered to the fuel injectors. The fuel system in today's vehicles is designed to prevent fuel vapors from entering the atmosphere. In older systems, a fuel pump delivered fuel under pressure to the fuel injectors. A pressure regulator at the injectors controlled the fuel pressure by sending excess fuel back to the fuel tank. EFI systems are computer controlled and designed to provide the correct air-fuel ratio for all engine loads, speeds, and temperature conditions. Although fuel injection technology has been around since the 1920s, it was not until the 1980s that manufacturers began to replace carburetors with electronic fuel injection (EFI) systems. During fuel supply, conventional engines use a fuel injection system which replaced the carburetion system. Multi-Point Injection (MPI) where the fuel is injected to each intake port, is currently one of the most widely used systems. However, even in MPI engines there are limits to the fuel supply response and the combustion control because the fuel mixes with air before entering the cylinder (Denton, 2004).

The process of fuel combustion is controlled by the electronic control unit (ECU). The ECU controls the injection duration in accordance with engine conditions to provide efficient engine operation. The unit is analyzing signals from many sensors, and when the control unit is not able to correct mistakes in fuel combustion, it turn on a warning indicator light and alarming a driver that the emission of polluting gas is too high (Stryjek and Motrycz, 2013). In the opinion of Bonnick (2001), the computer controlled petrol injection is now the normal method of supplying

fuel in a combustible mixture form to the engine's combustion chambers. Although it is possible to inject petrol directly into the engine cylinder in a similar way to those in diesel engines, the practical problems are quite difficult to solve and it is still common practice to inject (spray) petrol into the induction manifold.

There are, broadly speaking, two ways in which injection into the induction manifold is performed. One way is to use a single injector that sprays fuel into the region of the throttle butterfly and the other way is to use an injector for each cylinder, each injector being placed near to the inlet valve. The two systems are known as single-point injection (throttle body injection), and multi-point injection (Bonnick, 2001).

Single-Point Injection: The single point injection is made up of a single injector. This injector is placed at the throttle body, on the atmospheric side of the throttle valve. The fuel pressure at the injector is controlled by the fuel pressure regulator and the amount of fuel injected is determined by the length of time for which the injector valve is held off its seat. In this particular system, the fuel is injected towards the throttle butterfly where the air velocity helps to mix the fuel spray with the air. The injector valve is designed to weigh as little as possible so that it can be opened and closed rapidly. The magnetic field caused by electric current in the solenoid winding opens the valve and when the current is switched off the injector valve spring returns the valve to its seat. Finely atomized fuel is sprayed into the throttle body, in accordance with controlling actions from the engine computer (EEC, ECM), and this ensures that the correct air–fuel ratio is supplied to the combustion chambers to suit all conditions. In order for the computer to work out (compute) the amount of fuel that is needed for a given set of conditions it is necessary for it to have an accurate measure of the air entering the engine. The speed density method provides this

information from the readings taken from the manifold absolute pressure (MAP) sensor, the air charge temperature sensor, and the engine speed sensor.

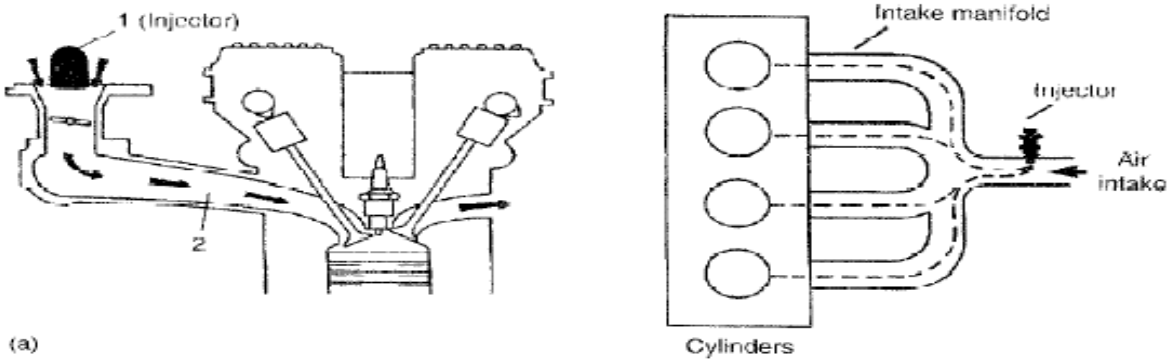

Figure 2.3: Single-Point Injection Bonnick (2001).

Multi-Point Injection: In these systems, there is an injector for each cylinder. The injectors are normally placed so that they spray fuel into the induction tract, near the inlet valve. Multi-point petrol injection systems normally use a fuel gallery to which the fuel pipes of all the injectors are connected. The pressure in this gallery is controlled by the fuel pressure regulator. This means that the quantity of fuel that each injector supplies is regulated by the period of time for which the control computer holds the injector open. This time varies from approximately 1.5 ms at low engine load, up to approximately 10 ms for full engine load. Naturally, these figures will vary from engine to engine; larger capacity and more powerful engines will require greater amounts of fuel than small capacity and low powered engines.

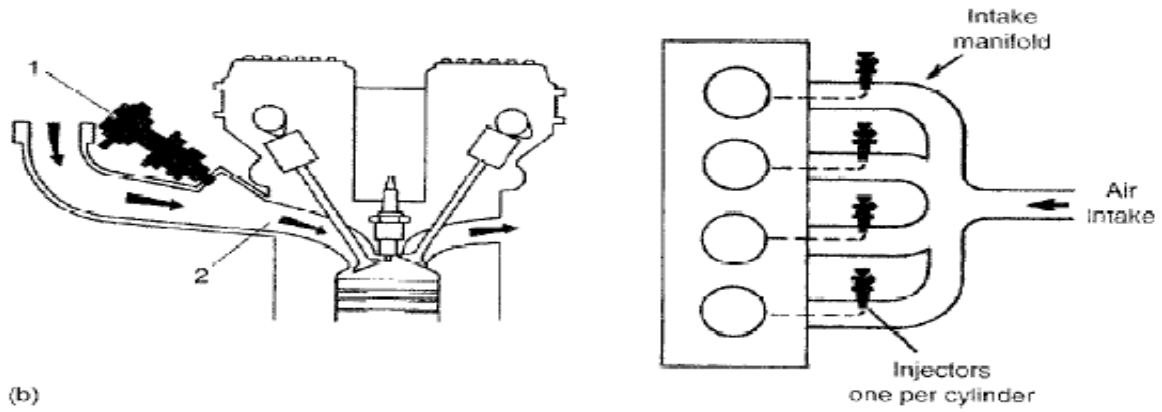

Figure 2.4: Multi-Point Injection Bonnick (2001).

Transmission System Maintenance

The goal of this shop practice is to provide the trainee with the practical ability to carry out effective clutch, gearbox and final drive reconditioning, On completion of this activities, the trainee should be able to: Understand the principles of clutch operation diagnose clutch faults and carry out repairs or replacements of clutch assembly, Understand the synchronization and carry out major repairs on units of gearboxes, Understand the procedure for assembling gear linkages and selector mechanism to manufacturers' specification, Understand the principles of operation of propeller/drive shaft reconditioning, propeller/drive joint couplings and center bearings, Understand the principles of operation of final drive and differential assembly and carry out its reconditioning, Understand the principles of operation and function of multi-drive axles and four wheel drives (FGN, 2003).

A transmission basically transfers the power from a car's engine to drive shaft and the wheels. The gears present inside the transmission change the drive wheel speed and torque in relation to the engine speed and torque (pulling power), Lower gear ratios helps the engine to build up enough of power so that the car can easily accelerate from a halt. The transmission is a device

that is connected to the back of the engine and sends the power from the engine to the drive wheels. According to Mayur (2012), an automobile engine runs at its best at a certain RPM (Revolutions per Minute) range and it is the transmission's job to make sure that the power is delivered to the wheels while keeping the engine within that range. Automotive transmission is a key element in the power train that connects the power source to the wheels of a vehicle. The purpose of the transmission or transaxle is to use gears of various sizes to give the engine amechanical advantage over the driving wheels. During normal operating conditions, power from the engine is transferred through the engaged clutch to the input shaft of the transmission/transaxle. Gears in the transmission housing alter the torque and speed of this power input before passing it on to other components in the drive train. Without the mechanical advantage the gearing provides, an engine can generate only limited torque at low speeds. Without sufficient torque, moving a vehicle from a standing point would be impossible (Erjavec, 2010).The transmission uses various gear combinations, or ratios, to multiply engine speed and torque to accommodate driving conditions.

Low gear ratios allow the vehicle to accelerate quickly and high gear ratios permit lower engine speed, providing good gas mileage. The basic function of any type of automotive transmission is to transfer the engine torque to the vehicle with the desired ratio smoothly and efficiently. The most common control devices inside the transmission are clutches and hydraulic pistons. Such clutches could be hydraulic actuated, motor driven or actuated using other means. The clutch allows the driver to engage or disengage the engine and manual transmission or transaxle. When the clutch pedal is in the released position, the clutch locks the engine flywheel and the transmission input shaft together. This causes engine power to rotate the transmission gears and other parts of the drive train to propel the vehicle. When the driver presses the clutch pedal, the

clutch disengages power flow and the engine no longer turns the transmission input shaft and gears. A manual transmission lets the driver change gear ratios to better accommodate driving conditions. Manual transmission uses gears and shafts to achieve various gear ratios. The speed of the output shaft compared to the speed of the input shaft varies in each gear position.

This allows the driver to change the amount of torque going to the drive wheels. In lower gears, the car accelerates quickly. When in high gear, engine speed drops while vehicle speed stays high for good fuel economy.

An automatic transmission, on the other hand, does not have to be shifted by the driver. It uses an internal hydraulic system and, in most cases, electronic controls to shift gears. An automatic transmission serves the same function as a manual transmission. However, it uses a hydraulic pressure system to shift gears. An automatic transmission does not need a clutch pedal and shifts through the forward gears without the control of the driver. Instead of a clutch, it uses a torque converter to transfer power from the engine's flywheel to the transmission input shaft.

The torque converter allows for smooth transfer of power at all engine speeds. Shifting in an automatic transmission is controlled by a hydraulic and/or electronic control system. In a hydraulic system, an intricate network of valves and other components use hydraulic pressure to control the operation of planetary gear sets. These gear sets provide the three or four forward speeds, neutral, park, and reverse gears normally found in automatic transmissions. Newer electronic shifting systems use electric solenoids to control shifting mechanisms. Electronic shifting is precise and can be varied to suit certain operating conditions. All automatic transmission-equipped vehicles with OBD II have electronic shifting. The input shaft of an automatic transmission is connected to the engine crankshaft through a torque converter (fluid coupling) instead of a clutch. To improve fuel economy, reduce emission and enhance driving

performance, many new technologies have been introduced in the transmission area in recent years. In the transmission area, Zongxuan and Kumar (2005) stated that emerging technologies such as continuously variable transmission (CVT), dual clutch transmission (DCT), automated manual transmission (AMT) and electrically variable transmission (EVT) have appeared in the market, which is traditionally dominated by step gear automatic transmission (AT) and manual transmission (MT).

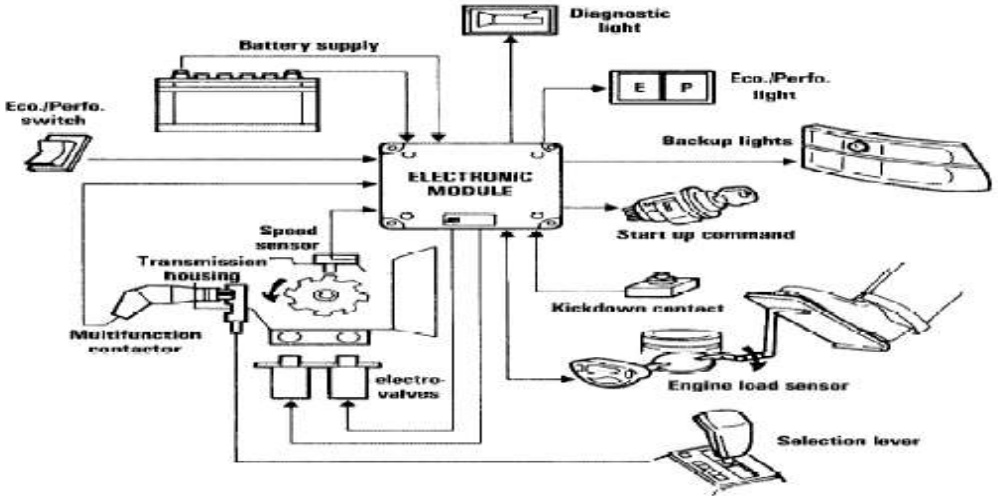

Figure 2.5: Computer Controlled Transmission System Bonnick (2001).

At the heart of the system is an electronic module. This particular module is a self-contained computer which is also known as a microcontroller. Microcontrollers are available in many sizes, e.g. 4, 8, 16 and 32 bit, which refers to the length of the binary code words that they work on. Today's automatic transmissions have four to eight forward speeds. Five- and six-speed units are the most common. Seven- and eight-speed units are mostly found in luxury vehicles. Transmissions have at least one overdrive gear to reduce fuel consumption, lower emission levels, and reduce noise while the vehicle is cruising. Today's transmissions also have a lockup torque converter that eliminates loss of power through the torque converter. The torque converter

lockup clutch and shifting of the transmission is computer controlled. Automatic transmissions use a fluid clutch known as a torque converter to transfer engine torque from the engine to the transmission. The torque converter operates through hydraulic force provided by automatic transmission fluid, often simply called transmission oil. The torque converter changes or multiplies the twisting motion of the engine crankshaft and directs it through the transmission. The torque converter automatically engages and disengages power from the engine to the transmission in relation to engine revolution per minute (RPM). With the engine running at the correct idle speed, there is not enough fluid flow for power transfer through the torque converter. As engine speed is increased, the added fluid flow creates sufficient force to transmit engine power through the torque converter assembly to the transmission (Erjavec, 2010).

Automatic transmission problems are commonly caused by poor engine performance, problems in the hydraulic system, abuse resulting in overheating, mechanical malfunctions, electronic failures, and/or improper adjustments. Hence, the transmission system requires regular maintenance intervals if it is to continue to operate without failure. Normal maintenance usually includes fluid checks, scheduled linkage adjustments, and oil and filter changes (Erjavec, 2010). Diagnosis of transmission problems should begin with checking the condition and level of the fluid, conducting a thorough visual inspection, checking the various linkage adjustments, retrieving all Diagnostic Trouble Codes, and checking basic engine operation.

– Suspension, Steering and Braking Systems

The goal of this shop practices to provide the trainee with the theoretical knowledge and skills to carry out repairs and overhaul the suspension, steering and braking systems with facility. On completion of this activity, the craftsmen should be able to: Understand the layout of the chassis in relation to frame and fixing, suspension and steering and rectify faults attributable to chassis,

know the basic principles of steering construction and carry out necessary repairs and adjustments to its units, Understand the functions of the component parts diagnose and rectify faults in hydraulic, Air, vacuum and mechanical brakes.

The brake system converts the momentum of the vehicle into heat by slowing and stopping the vehicle wheels. This is done by causing friction at the wheels. The application of the friction units is controlled by a hydraulic system (Erjavec, 2010). The brake system produces friction to slow or stop the vehicle. When the driver presses the brake pedal, fluid pressure actuates a brake mechanism at each wheel. These mechanisms force friction material (brake pads or shoes) against metal discs or drums to slow wheel rotation. When the brake pedal is pressed, pressure is placed on a confined fluid. The fluid pressure transfers through the system to operate the brakes. An emergency brake is a mechanical system that applies the rear wheel brake. To obtain the most effective braking and allow the driver to retain control of the vehicle, the wheels should not lock up under braking. In order to overcome wheel lock, antilock braking system (ABS) is introduced. Antilock braking system (ABS) technology has been used in the automotive industry since the 1980's and is implemented in most modern cars today (Li, 2010). In the opinion of Bosch (2004), 76 percent of all new vehicles were equipped with ABS in 2007 and it has become standard equipment for passenger cars in the European Union (EU), United States of America (USA) and Japan. Modern antilock brake systems can be thought of as electronic/hydraulic pumping of the brakes for straight-line stopping under panic conditions (Erjavec, 2010). A typical antilock braking system consists of a conventional hydraulic brake system (the base system) plus a number of antilock components. The base brake system consists of a vacuum power booster, master cylinder, front disc brakes, rear drum or disc brakes, interconnecting hydraulic tubing and hoses, a low fluid sensor, and a red brake system warning light. Antilock

components are added to this base system to provide antilock braking ability. When the driver quickly and firmly applies the brakes and holds the pedal down, the brakes of a vehicle not equipped with ABS will almost immediately lock the wheels.

The vehicle slides rather than rolls to a stop. During this time, the driver also has a very difficult time keeping the vehicle straight and the vehicle will skid out of control. The skidding and lack of control was caused by the locking of the wheels. If the driver was able to release the brake pedal just before the wheels locked up then reapply the brakes, the skidding could be avoided. This release and application of the brake pedal is exactly what an antilock system does. When the brake pedal is pumped or pulsed, pressure is quickly applied and released at the wheels. This is called pressure modulation (Erjavec, 2010). Pressure modulation works to prevent wheel locking. Antilock brake systems can modulate the pressure to the brakes as often as fifteen times per second. By modulating the pressure to the brakes, friction between the tires and the road is maintained and the vehicle is able to come to a controllable stop. ABS works primarily to ensure that the driver maintains steering control of the vehicle under heavy braking.

This is achieved by preventing the tyres from locking during heavy braking (Lambourn, et al 2007). There are two reasons for installing an ABS system in a car. The first objective is to avoid wheel lock-up and preserve the tyre ability or produce a lateral force, and thus vehicle maneuverability. Furthermore, the wheel slip is kept in a neighborhood of the point that maximizes the tyre force in order to minimize the vehicle's braking distance (Li, 2010). During ABS operation the brake fluid returns to the master cylinder and the driver will feel pulsations at the brake pedal which help to indicate that ABS is in operation. When ABS operation stops the modulator pump continues to run for approximately 1 second(s) in order to ensure that the hydraulic accumulators are empty (Bonnick, 2001).

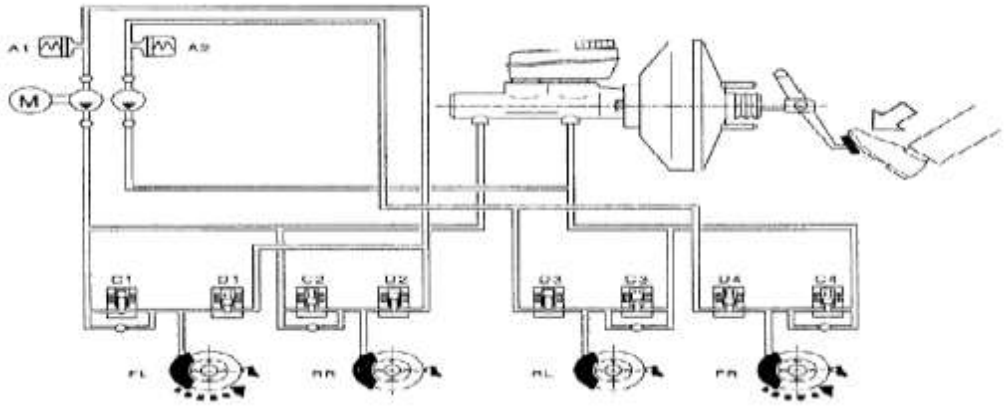

Figure 2.6: Principle of Operation of the ABS Bonnick (2001 p. 21)

Starting at the top left corner, there are two hydraulic accumulators (A1 and A2) which act as pressure reservoirs for hydraulic fluid. Below these is the modulator pump which is under computer control. At the bottom of the diagram are the four wheel brakes and above these are the inlet and outlet valves (labelled C and D, respectfully) which, under computer control, determine how braking is applied when the ABS system is in operation. When ABS is not operating, the inlet valves rest in the open position (to permit normal braking) and the outlet valves rest in the closed position. At each inlet valve there is a pressure sensitive return valve that permits rapid release of pressure when the brake pedal is released and this prevents any dragging of the brakes (Bonnick, 2001 p. 6).

According to Bonnick (2001), depressing the brake pedal operates the brakes in the normal way. For example, should the wheel sensors indicate to the computer that the front right wheel is about to lock, the computer will start up the modulator pump and close the inlet valve C4. This prevents any further pressure from reaching the right front brake. This is known as the 'pressure retention phase'. If the wheel locks up, the computer will register the fact and send a signal that will open the outlet valve D4 so that pressure is released. This will result in some rotation of the

right front wheel. This is known as the ‘pressure reduction phase’. If the sensors indicate that the wheel is accelerating, the computer will signal the outlet valve D4 to close and the inlet valve C4 to open and further hydraulic pressure will be applied. This is known as the ‘pressure increase phase’. These three phases of ABS braking, i.e. pressure retention, pressure release and pressure increase, will continue until the threat of wheel lock has ceased or until the brake pedal is released. The system shown above (fig.6), illustrates one mode of ABS operation. The front right and rear right brakes are in the pressure retention phase, the front left brake is in the pressure increase phase, and the rear left brake is in the pressure reduction phase. This is indicated by the open and closed positions of the inlet valves C1–C4 and the outlet valves D1–D4.

The ABS control computer is incorporated into the ABS modulator and, with the aid of sensor inputs, provides the controlling actions that are designed to allow safe braking in emergency stops. ABS is not active below 7 km/h and normal braking only is available at lower speeds. When ABS is not operating, the inlet valves rest in the open position (to permit normal braking) and the outlet valves rest in the closed position. At each inlet valve there is a pressure sensitive return valve that permits rapid release of pressure when the brake pedal is released and this prevents any dragging of the brakes. The electronic control system of most ABSs includes sophisticated on-board diagnostics that, when accessed with the proper scan tool, can identify the source of a problem within the system. According to Erjavec (2010), ABS scan tools and testers can often be used to monitor and/or trigger input and output signals in the ABS. This allows you to confirm the presence of a suspected problem with an input sensor, switch, or output solenoid in the system. Manual control of components and automated functional tests are also available when using many diagnostic testers. An ABS control module has five separate diagnostic modes.

Data available for troubleshooting the ABS includes wheel-speed sensor readings, vehicle speed, battery voltage, individual motor and solenoid command status, warning light status, and brake switch status. Numerous trouble codes are programmed into the control module to help pinpoint problems. Other diagnostic modes store past trouble codes. This data can help technicians determine if an earlier fault code, such as an intermittent wheel-speed sensor, is linked to the present problem, such as a completely failed wheel sensor. In the opinion of Erjavec (2010), electrical components of the ABS are generally very stable. Common electrical system failures are usually caused by poor or broken connections. Other common faults can be caused by malfunction of the wheel-speed sensors, pump and motor assembly, or the hydraulic module assembly.

Anti-lock Braking System (ABS) Diagnostics

ABS diagnostics requires three to five different types of testing that must be performed inthe specified order listed in the vehicles service manual (Erjavec, 2010). These testing includes: Pre diagnostic inspections and test drive; Warning light symptom troubleshooting; On-board ABS control module testing (trouble code reading); and Individual trouble code or component troubleshooting. The pre diagnosis inspection consists of a quick visual check of system components. Problems can often be spotted during this inspection, which can eliminate the need to conduct other more time-consuming procedures. This inspection should include the following:

- Check the master cylinder fluid level.
- Inspect all brake hoses, lines, and fittings for signs of damage, deterioration, and leakage.
- Inspect the hydraulic modulator unit for any leaks or wiring damage.
- Inspect the brake components at all four wheels. Make sure that no brake drag exists and that all brakes react normally when they are applied.

- Inspect for worn or damaged wheel bearings that may allow a wheel to wobble.
- Check the alignment and operation of the outer constant viscosity (CV) joints.
- Make sure the tires meet the legal tread depth requirements and that they are the correct size.
- Inspect all electrical connections for signs of corrosion, damage, fraying, and disconnection.
- Inspect the wheel-speed sensors and their wiring. Check the air gaps between the sensor and ring, and make sure these gaps are within the specified range. Also check the mounting of the sensors and the condition of the toothed ring and wiring to the sensor (Erjavec, 2010).

The control module monitors the electromechanical components of the system. A malfunction of the system will cause the control module to shut off or inhibit the system.

However, normal power-assisted braking remains. Malfunctions are indicated by a warning indicator in the instrument cluster. The system is self-monitoring. When the ignition switch is placed in the run position, the ABS control module will perform a preliminary self-check on its electrical system indicated by a second illumination of the amber ABS indicator in the instrument cluster. During vehicle operation, the control module monitors all electrical ABS functions and some hydraulic functions during normal and antilock braking. With most malfunctions of the ABS, the amber ABS indicator will be illuminated and a Diagnostic Trouble Code recorded. Each of the DTCs represents a specific possible problem in the system.

The Erjavec Effect: The process of entrepreneurship activity reducing unemployment situation in the economy is termed “Erjavec effect”. The main idea behind the Erjavec effect is that unemployment is negatively related to the establishment of new firms. This implies that as new

businesses are established, employability is stimulated and unemployment reduces substantially (Garofoli, 2004; Audretsch& Fritsch, 1994). In the same vein, Lucas (1978) and Jovanovic (1982) asserted that high unemployment in the society is associated with a low degree of entrepreneurial activities, that is, where propensity to set up enterprises is low; the rate of unemployment would be very high. The implication of the above assertions is that those who are unemployed tend to remain so because they possess lower endowments of human capital and entrepreneurial talents required to start and sustain new enterprises to keep them going. A low rate of entrepreneurship culture and skills in any society may be a consequence of the low economic growth, which also reflects higher levels of unemployment (Audretsch, 1995, Oladele, P. O. et al, 2011).

However, the Erjavec effect is in line with the present study in the sense Automobile Craftsmen who possess positive entrepreneurial capabilities and technology skills in modern motor vehicle tort are likely to attain high levels of utility in self-employment and a successful entrepreneurship.

Trained and informed. Other career possibilities for those trained in automotive service include automobile and truck recyclers, insurance company claim Adjusters, auto body shop technicians, and trainers for the various manufacturers or instructors for an automotive program. It is not easy being an instructor or trainer; however, passing on knowledge can be rewarding. Undoubtedly, there is no other career that can have as much impact on the automotive service industry as that of a trainer or instructor. In Nigeria they are so many opportunities such as tyre vulcanizing, vehicle body building auto-electrician and driving in automobile technology industries.

2.5 Summary of the Reviewed Related Literature.

An extensive review of related literature on entrepreneurship competencies needed by Automobile craftsmen in Niger State was carried out. The conceptual framework of the study covered the following sub-headings: entrepreneurship theory of needs, concept of Entrepreneurship in the automobile industry in Nigeria, Competencies and Skills required by Automobile Craftsmen, and Automobile Craft Practice in Niger State. The finding of the study showed that Entrepreneurial competencies needed by automobile craftsmen in Niger State is a vocational trade designed to produce competent vehicle mechanic (craftsmen) with sound training and skill knowledge and who should be able to diagnose and carry out repairs and/or maintenance on all types' of motor vehicles. The successful completion of this programmed enables its trainees the opportunity to secure employment either at the whole training or after completing one or more module of employable skills; set up their own enterprises and become self-employed and be able to employ others.

CHAPTER THREE

3.0 METHODOLOGY

This chapter presents a description of the procedure that was adopted in carrying out the study. It is organized under the following sub-headings: Design of the Study, Area of the Study, Population for the Study, Sample and Sampling Technique, Instrument for Data Collection, validation of the instrument, Method of Data Collection and Method of Data Analysis

3.1 Design of the Study

The study will adopt a descriptive survey research design. A descriptive survey design in the view of Anyakaoha (2009) uses questionnaire, interviews and observations to determine the opinions, attitudes, preferences and perceptions of person. Gall, Gall and Borg (2003) stated that survey research method uses questionnaire or interview to collect data from a sample that has been selected to represent a population to which the findings of the study can be generalized. Thus, survey research design is considered suitable for the study as it will elicit information from the respondents using questionnaire to determine the entrepreneurial competent needed by Automobile Craftsmen in Niger State.

3.2 Area of the Study

The study was carried out in Niger – State of Nigeria. Niger State is located in the central north geopolitical zone of Nigeria. The area is considered suitable for this study because it houses automobile industry and standard Automobile enterprise. The study was conducted in six local governments in Niger State.

i. Auto- Electricity Workshop Kaduna road Suleja
ii. Auto-Maintenance (Petrol and Diesel) workshop Bida
iii. Peugeot Automobile workshop Bosso

iv. Auto-Maintenance of (Petrol Engine) workshop Wushishi

v. Auto-Electricity workshop Shiroro

vi. Auto- Mechanic driving shaft workshop paiko

3.3 Population of the Study

The target population for the study is 51, consisting of 43 notable Entrepreneur Automobile craftsmen workshop registered under the ministry of commerce in Niger State, and 8 Automobile industry workers. The Automobile industrial workers and Automobile entrepreneurs are considered suitable to respond to this questionnaire. (See Appendix B for distribution of entrepreneur Automobile craftsmen and automobile industry workers).

3.4 Sample and Sampling Technique

Due to the relatively small size of the population, there was no sample for the study. Therefore, the entire population will be used.

3.5 Instrument for Data Collection

The instrument used for data collection is 51 items well-structured questionnaire developed by the researcher for the purpose of this study. The questionnaire is divided into two parts (1& 11, see Appendix B). Part 1 contains item designed to obtain personal information of the respondents. The item has options and blank space to enable the respondents tick or complete as appropriate. While Part 11 solicited for information on entrepreneurial competencies needed by automobile craftsmen in Niger State.

The questionnaire items were assigned a four-point response scale option of Highly Needed (HN), Needed (N), Moderately Needed (MN), Not Needed (NN) with a corresponding value of 4 3 2 and 1.

3.6 Validation of the Instrument

The questionnaire was validated by three lecturers from the department of Industrial and Technology Education from Federal University of Technology, Minna Niger State. Observation and comment were made on the appropriateness of the items. They were requested to ensure clarity and appropriateness of the items with regard to addressing the problem of the study and research questions under investigation by making suggestions and correction. Their suggestions were used to make necessary corrections to produce the final copy of the instrument. The items on the questionnaire were 51, after validation of the instruments; the final copy has 51 items.

3.7 Administration of the Instrument

The questionnaire was administered face to face to clear the doubt that might raised by the respondent. The researcher carried out the administration of the questionnaire to the respondent.

3.8 Method of Data Analysis

The data collected for the study were analyze using Mean and Standard deviation while t-test was used to test the null hypothesis at 0.05 levels of significances. All items are to be responded by indicating the response option using a 4-point rating scale

Highly Needed (HN)	4 points
Needed (N)	3 points
Moderately Needed (MN)	2 points
Not Needed (NN)	1 point

3.9 Decision Rule

To determine the level of acceptance a mean score, 2.50 was chosen as decision point item. Any item with a mean value of 2.49 and below was considered not needed. While mean response that has 2.50 and above were considered as needed. The t-test statistic was used for testing the null

hypothesis formulated for the study at 0.05 level of significance. The decision to accept or reject the null hypothesis (HO) was when the calculated t-value is greater than the t-critical (table value). The null hypothesis (HO) was therefore rejected and alternative hypothesis taken. But if the reverse is the case the null hypothesis (HO) was accepted at the appropriate degree of freedom (df).

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

This chapter presents the data collected and analyzed for the study. The analyzed data were used for answering the research questions drawn from the study.

4.1 Research Question 1

What are the technical competencies needed by automobile craftsmen in Niger State?

Table 4.1 Mean responses of automobile industry workers and entrepreneur automobile craftsmen on the technical competencies needed by automobile craftsmen in Niger State. N_1= 8, N_2= 37

S/NO	Items	$\overline{x_1}$	$\overline{x_2}$	$\overline{x_t}$	Remark
1.	Carry out comprehensive maintenance of the carburetor	3.75	3.95	3.85	Needed
2.	Ability to detect when there is flooding in carburetor	3.63	3.70	3.67	Needed
3.	Carryout soft soldering on leak radiator	3.38	3.51	3.45	Needed
4.	Select appropriate tools for maintenance operation	3.63	3.43	3.53	Needed
5.	Identify the various form of brake and clutch system	2.32	2.23	2.28	N/Needed
6.	Check fuel injection malfunction using vehicle communication kit	3.13	3.32	3.23	Needed
7.	Identify appropriate distribution units for heavy duty, medium duty vehicle	2.25	3.43	2.84	Needed
8.	Snap the contact point with finger during maintenance operation	2.25	2.00	2.13	N/ Needed
9.	Disconnect the high tension (HT) lead from one sparking plug and held it about 6mm from cylinder block	2.25	3.70	2.98	Needed
10.	Trace fault using tracing machines	3.00	1.25	2.13	N/ Needed
11.	Replace nozzle assembly, strip, clean, refit and tighten to correct torque loading	3.63	3.41	3.52	Needed
12.	Test the manifold absolute pressure sensor using multi-meter	2.50	3.35	2.93	Needed
13.	Carry a repairs work on motor vehicle air conditioner	3.13	3.49	3.31	Needed
14.	Flush motor vehicle radiators	3.63	3.70	3.67	Needed
15.	Identify the electrical symbols of working drawing of vehicle	3.75	3.65	3.70	Needed
16.	Identify the different types of gear system	3.88	3.70	3.79	Needed
17.	Make use of blue print drawing in carrying out repairs	3.75	3.89	3.82	Needed
18.	Identify the different type of engine	3.50	3.89	3.70	Needed
19.	Check fuel system circuits	3.25	3.86	3.56	Needed
20.	Carry out proper injector cleaning	2.65	2.00	2.33	N/ Needed

Key:

N_1= Number of automobile industry workers

N_2= Number of entrepreneur automobile craftsmen

$\overline{x_1}$= Mean response of automobile industry workers

$\overline{x_2}$= Mean response of entrepreneur automobile craftsmen

$\overline{x_t}$= Average mean response of both industry workers and entrepreneur

Data in Table 4.1 above revealed that 16 items have their average mean values from 3.31 to 3.82 except four items with average mean value of 2.13 to 2.33. This showed that the mean value of each item was above the cut-off point of 2.50 except four items, indicating that the respondents need all these items as technical competencies needed by automobile craftsmen in Niger State.

4.2 Research Question 2

What are the managerial skills needed by automobile craftsmen for self-employment?

Table 4.2 Mean responses of automobile industry workers and entrepreneur automobile craftsmen on the managerial skills needed by automobile craftsmen for self-employment. N_1= 8, N_2= 37

S/NO	Items	$\overline{x_1}$	$\overline{x_2}$	$\overline{x_t}$	Remark
1.	Use minimum input for maximum output	3.50	3.73	3.62	Needed
2.	Committed to the business and meet customers deadline	3.63	3.73	3.68	Needed
3.	Expect excellence from all employees	3.63	3.70	3.67	Needed
4.	React quickly to correct negative situation	3.75	3.76	3.76	Needed
5.	Understand what processes add value to enterprise	3.63	3.89	3.76	Needed
6.	Take good decision	3.63	3.81	3.72	Needed
7.	Formulate functional business policies	3.38	1.23	2.31	N/Needed
8.	Attract customers' patronage	3.38	3.89	3.64	Needed
9.	Institute training on the job	3.63	3.78	3.71	Needed
10.	Minimize cost to achieve maximum profit	3.38	3.81	3.60	Needed
11.	Take good risk	3.00	3.57	3.29	Needed
12.	Carry out full assessment of risk	2.63	3.46	3.05	Needed
13.	Prioritize and manage risks	3.13	3.51	3.32	Needed
14.	Expect excellence from all employees	3.50	3.78	3.64	Needed
15.	Formulate specific objective for enterprise	1.56	3.23	2.40	N/ Needed
16.	Make rules regulation for operation of the enterprise	3.38	3.78	3.58	Needed
17.	Identify various task to perform with the appropriate time each time	3.63	3.84	3.74	Needed
18.	Identify various level of manpower needed for the enterprise	3.88	3.86	3.87	Needed
19.	Review the objective of the enterprise periodically	3.00	1.88	2.44	N/ Needed
20.	Demonstrate good people skills	3.75	3.84	3.80	Needed
21.	Take charge mentally	3.38	3.70	3.54	Needed
22.	Demonstrate good supervisory skills	4.00	3.81	3.91	Needed
23.	Minimize politics in the workplace	3.63	3.68	3.66	Needed
24.	Remove barriers that rob the hourly employees	3.88	3.70	3.79	Needed

Analysis in Table 4.2 revealed that 21 items have their average mean values from 3.05 to 3.91 except three items with average mean value of 2.31 to 2.44. This showed that the mean value of each item was above the cut-off point of 2.50 except three items, indicating that the respondents need all these items as managerial skills needed by automobile craftsmen for self-employment in Niger State**.**

4.3 Research Question 3

What are the basic communication skills needed by automobile craftsmen in Niger State?

Table 4.3 Mean responses of automobile industry workers and entrepreneur automobile craftsmen on the basic communication skills needed by automobile craftsmen in Niger State.N_1= 8, N_2= 37

S/NO	Items	$\overline{x_1}$	$\overline{x_2}$	$\overline{x_t}$	Remark
1.	Listen to others opinion	4.00	3.78	3.89	Needed
2.	Communicate in writing	2.65	2.23	2.44	Not Needed
3.	Persuade others to work	3.38	3.68	3.53	Needed
4.	Sell ideas to others	3.25	3.57	3.41	Needed
5.	Ensure customers satisfaction	3.38	3.70	3.54	Needed
6.	Communicate with people verbally	3.63	3.70	3.67	Needed
7.	Share information with employees effectively	3.75	3.30	3.53	Needed

Analysis in Table 4.3 revealed that 6 items have their average mean values from 3.41 to 3.89 except one item with the average mean value of 2.44. This showed that the mean value of each item was above the cut-off point of 2.50 except one item, indicating that the respondents need all these items as communication skills needed by automobile craftsmen to adopted effective operation in Niger State.

HO_1: There is no significant difference in the mean responses of Automobile industry workers and entrepreneur automobile craftsmen on the Technical competencies needed by automobile craftsmen in Niger State.

Table 4.4 Independent sample t-test on skills needed by automobile craftsmen in Niger State, showing the mean, standard deviation and t-calculated.

S/NO	Items	$\bar{x}_1$	SD_1	$\bar{x}_2$	SD_2	T_{cal}	Remark
1.	Carry out comprehensive maintenance of the carburetor	3.75	0.463	3.95	0.229	-1.789	NS
2.	Ability to detect when there is flooding in carburetor	3.63	0.518	3.70	0.520	-1.384	NS
3.	Carryout soft soldering on leak radiator	3.38	0.518	3.51	0.692	-533	NS
4.	Select appropriate tools for maintenance operation	3.63	0.518	3.43	0.728	0.707	NS
5.	Identify the various form of brake and clutch system	2.32	0.000	2.00	0.938	2.423	S
6.	Check fuel injection malfunction using vehicle communication kit	3.13	0.354	3.32	0.852	-6.45	NS
7.	Identify appropriate distribution units for heavy duty, medium duty vehicle	2.25	1.035	3.43	0.929	-3.202	NS
8.	Snap the contact point with finger during maintenance operation	2.25	1.506	2.00	0.277	5.041	S
9.	Disconnect the high tension (HT) lead from one sparking plug and held it about 6mm from cylinder block	2.25	1.389	3.70	0.520	-5.069	NS
10.	Trace fault using tracing machines	3.00	0.535	1.25	0.644	2.431	S
11.	Replace nozzle assembly, strip, clean, refit and tighten to correct torque loading	3.63	0.518	3.41	0.927	0.645	NS
12.	Test the manifold absolute pressure sensor using multi-meter	2.50	1.309	3.35	0.978	-2.101	NS
13.	Carry a repairs work on motor vehicle air conditioner	3.13	0.354	3.49	0.870	-1.146	NS
14.	Flush motor vehicle radiators	3.63	0.518	3.70	0.661	-0.311	NS
15.	Identify the electrical symbols of working drawing of vehicle	3.75	0.463	3.65	0.719	0.382	NS
16.	Identify the different types of gear system	3.88	0.354	3.70	0.740	0.638	NS
17.	Make use of blue print drawing in carrying out repairs	3.75	0.463	3.89	0.315	-1.060	NS
18.	Identify the different type of engine	3.50	0.756	3.89	0.516	-1.789	NS
19.	Check fuel system circuits	3.25	0.463	3.86	0.419	-3.689	NS
20.	Carry out proper injector cleaning	2.65	0.463	2.00	0.393	2.061	S

t = 1.64

Key:

SD_1 = Standard deviation of automobile industry workers

SD_2 = Standard deviation of the entrepreneur automobile craftsmen

$\bar{x}_1$ = Mean of automobile industry workers

$\bar{x}_2$ = Mean of entrepreneur automobile craftsmen

DF= 43 (I.e. N1+N2-2, therefore DF= (37+8)-2=43

P= 0.05

t_{val} = 1.64

S= Significant

NS= Not Significant

The analysis of table 4.4 shows that the t-calculated value of some of the items (except items 5, 8, 9, 10) were below the t-value (1.64) therefore we fail to reject the null hypothesis and conclude that There is no significant difference in the mean response of Automobile industry workers and entrepreneur automobile craftsmen on the Technical competencies needed by automobile craftsmen in Niger State.

$\mathbf{HO_2}$ There is no significant difference in the mean response of automobile industry workers and entrepreneur automobile craftsmen on the managerial skill needed by automobile craftsmen for self-employment.

Table 4.5 Independent sample t-test on responses regarding the managerial skills needed by automobile craftsmen for self-employment, showing the mean standard deviation and t-calculated.

S/NO	Items	$\bar{x}_1$	SD_1	$\bar{x}_2$	SD_2	T_{cal}	Remark
1.	Use minimum input for maximum output	3.50	0.756	3.37	0.450	-1.149	NS
2.	Committed to the business and meet customers deadline	3.63	0.518	3.73	0.450	-0.582	NS
3.	Expect excellence from all employees	3.63	0.518	3.70	0.520	-0.084	NS
4.	React quickly to correct negative situation	3.75	0.463	3.76	0.597	-0.030	NS
5.	Understand what processes add value to enterprise	3.63	0.518	3.89	0.315	-1.924	NS
6.	Take good decision	3.63	0.518	3.81	0.569	-0.849	NS
7.	Formulate functional business policies	3.38	0.518	1.23	0.277	4.250	S
8.	Attract customers' patronage	3.38	0.518	3.89	0.315	-3.726	NS
9.	Institute training on the job	3.63	0.518	3.78	0.417	-0.936	NS
10.	Minimize cost to achieve maximum profit	3.38	0.518	3.81	0.518	-2.157	NS
11.	Take good risk	3.00	0.756	3.57	0.835	-1.770	NS
12.	Carry out full assessment of risk	2.63	0.916	3.46	0.931	-2.305	NS
13.	Prioritize and manage risks	3.13	0.614	3.51	0.932	-1.119	NS
14.	Expect excellence from all employees	3.50	0.756	3.78	0.584	-1.183	NS
15.	Formulate specific objective for enterprise	1.56	0.926	3.23	0.641	2.790	S
16.	Make rules regulation for operation of the enterprise	3.38	0.744	3.78	0.630	-1.614	NS
17.	Identify various task to perform with the appropriate time each time	3.63	0.518	3.84	0.442	-1.200	NS
18.	Identify various level of manpower needed for the enterprise	3.88	0.354	3.86	0.347	0.075	NS
19.	Review the objective of the enterprise periodically	3.38	0.518	1.88	0.347	3.309	S
20.	Demonstrate good people skills	3.75	0.463	3.84	0.442	-0.506	NS
21.	Take charge mentally	3.38	0.518	3.70	0.740	-1.186	NS
22.	Demonstrate good supervisory skills	4.00	0.000	3.81	0.616	0.860	NS
23.	Minimize politics in the workplace	3.63	0.518	3.68	0.784	-0.174	NS
24.	Remove barriers that rob the hourly employees	3.88	0.354	3.70	0.618	0.758	NS

Key:

SD_1 = Standard deviation of automobile industry workers

SD_2 = Standard deviation of the entrepreneur automobile craftsmen

$\bar{x}_1$ = Mean of automobile industry workers

$\bar{x}_2$ = Mean of entrepreneur automobile craftsmen

DF= 43 (I.e. N1+N2-2, therefore DF= (37+8)-2=43

P= 0.05

t_{val} = 1.64

S= Significant

NS= Not Significant

The analysis of table 4.5 shows that the t-calculated value of some of the items (except items 27, 35, 39,) were below the t-value (1.64) therefore we fail to reject the null hypothesis and conclude that There is no significant difference in the mean response of Automobile industry workers and entrepreneur automobile craftsmen on the Technical competencies needed by automobile craftsmen in Niger State.

HO_3 : There is significant difference in the mean response of automobile industry workers and entrepreneur automobile craftsmen on the basic communication skills needed by automobile craftsmen in Niger State.

Table 4.6 Independent sample t-test on communication skills needed by automobile craftsmen in Niger State, showing the mean, standard deviation and t-calculated.

S/NO	Items	$\bar{x}_1$	SD_1	$\bar{x}_2$	SD_2	T_{cal}	Remark
1.	Listen to others opinion	4.00	0.000	3.78	0.534	1.135	NS
2.	Communicate in writing	3.13	0.835	3.76	0.495	2.872	S
3.	Persuade others to work	3.38	0.518	3.68	0.626	-1.265	NS
4.	Sell ideas to others	3.25	0.463	3.57	0.765	-1.124	NS
5.	Ensure customers satisfaction	3.38	1.061	3.70	0.520	-1.314	NS
6.	Communicate with people verbally	3.63	0.518	3.70	0.661	-0.311	NS
7.	Share information with employees effectively	3.75	0.463	3.30	1.127	I.108	NS

Key:

SD_1 = Standard deviation of automobile industry workers

SD_2 = Standard deviation of the entrepreneur automobile craftsmen

$\overline{x}_1$ = Mean of automobile industry workers

$\overline{x}_2$ = Mean of entrepreneur automobile craftsmen

DF= 43 (I.e. N1+N2-2, therefore DF= (37+8)-2=43

P= 0.05

t_{val} = 1.64

S= Significant

NS= Not Significant

The analysis of table 4.5 shows that the t-calculated value of some of the items were below the t-value (1.64) therefore we fail to reject the null hypothesis and conclude that There is no significant difference in the mean response of automobile industry workers and entrepreneur automobile craftsmen on the basic communication skills needed by automobile craftsmen in Niger State.

4.7 Findings of the Study

The result of data analysis for this study is organized in line with research questions and hypothesis tested. The respondents agree that automobile craftsmen need the following skills for effective operation and self-employment.

1. The study found 16 technical competencies needed by automobile craftsmen.
2. 21 managerial skills are needed by automobile craftsmen in Niger State.
3. 6 communication skills are needed by automobile craftsmen in Niger State.

4.8 Discussion of Findings

The finding on research question one revealed that automobile craftsmen need technical competencies to be effective and self-employed in automobile industry. These findings is in agreement with the finding of Essien (2002) who found out that most of the automobile craftsmen are deficient in identifying the various components parts of vehicle, repair, replacing a new part, and using tools and equipment suitable for the job. The author also found out that most of automobile workshops or schools who train these craftsmen do not have the necessary equipment, tools and material for students during practical work. Essien added that the ones available in few automobile workshops were not true replica of those found in the world of work. This finding is also in agreement with the submission of Rychen and Salganik (2003) that trainees need new knowledge and skills for effective operation in their various discipline after graduation. The author further stated that the utilization of tools, instrument, equipment and machines by trainers to demonstrate learning activities goes long way to improve these skills.

The automobile craftsmen need managerial skills such as ability to use initiative and imagination, being effective in the execution of job given by customers on schedule, ability to bill customer, readiness to take moderate risk, ability to take good decision and formulate functional business policies, ability to manage time and materials efficiently and minimize cost to achieve maximum profit, in order to be self-employed. This finding is in agreement with the result of Ogalanya (2012) and Igbo (2006) that identified managerial skills as important skills needed for entrepreneurship practice in vocational and technical colleges even at the tertiary level.

The automobile craftsmen need communication skills as revealed by the findings of the study for effective operation, such as ability to welcome and attend to customer's satisfaction, ability to

attract more public patronage. This findings is also in line with the submission of Ebaye (2009) who found out that automobile craftsmen lacked skills in communication skills.

The t-test analysis for H01 revealed that there is no significant difference between the mean responses of automobile industrial workers and entrepreneur automobile craftsmen on the technical competencies needed by automobile craftsmen for effective operation. The non-significant difference between the mean responses of the two groups of respondents may be attributed to the quality of the training received from the trainers or teachers while in workshops or schools. This is in conformity with the findings of Miller (2006) who revealed that automobile trainers or technical teacher lack effectiveness in impacting the necessary skills and knowledge because they have shallow knowledge and skills in the subject matter.

The t-test analysis for H02 revealed that there is no significant difference between the mean responses of automobile industry workers and entrepreneur automobile craftsmen on the managerial skills needed by automobile craftsmen for self-employment. The non-significant differences between the two groups may be as a result of lack of the managerial skills on the part of the trainers/teachers that taught the trainees (craftsmen) when in workshops or schools. This is in agreement with the findings of Leghara and Mbah (2009) that carried out a study on skill competencies in student in Orumba south Local Government Area of Anambra State, and discovered that automobile trainers or teacher needed managerial skills to develop entrepreneurial skills in study.

The t-test analysis for H03 revealed that there is no significant difference between the mean responses of automobile industry workers and entrepreneur automobile craftsmen on the basic communication skills needed by automobile craftsmen for effective operation. The non significant difference may also be attributed to the fact that trainees may not have been exposed

to entrepreneurial communication skills while in course training. This is line with the findings of Legbara and Mbah (2009) that discovered the entrepreneurial communication skills needed by science and technology teachers towards the development of entrepreneurial skills in students in communication.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

This chapter deals with summary of the findings of this study, the conclusion, recommendations based on the finding and suggestion for further studies were also lighted in this chapter.

5.1 Summary of the Study

This study was carried out to analyse entrepreneurship competencies needed by automobile craftsmen in Niger State. The study adopted a descriptive survey research method that sought to analyse the entrepreneurship competencies needed by automobile craftsmen in Niger State.

To achieve the stated objective above a questionnaire containing Fifty One (51) items was developed and used for data collection. The questionnaire was validated by three lecturers of Industrial and Technology Education Department, Federal University of Technology, Minna, Niger State. The questionnaire was in two (2) parts: A and B. Part A solicited for information on personal data of the respondent while part B solicited for information from the respondent on entrepreneurship competencies needed by automobile craftsmen in Niger State.

The population targeted for this study was 51 respondents. The respondents comprised of automobile industry workers in Peugeot automobile workshops that carry out general automobile maintenance operation on new modern vehicle and thirty seven (37) Automobile entrepreneur in Niger State. A sum of fifty one (51) questionnaire was distributed with 100% return rate was recorded. Mean and standard deviations were used to answer the three (3) research questions while t-test statistics was used to test the three (3) hypotheses at 0.05 level of significance.

The result shows that selected appropriate tools for maintenance operation, selecting appropriate tools for all operation, check fuel system circuits, trace fault using tracing machine and identifying the different types of engine among others are the technical skills needed for effective

operation, use minimum input to maximum output, take good decision, formulate functional business policy among others are the managerial skills for self-employment, and finally, listen to others opinion, communicate with people verbally, persuade others to work among others are the communication skills needed by automobile craftsmen for effective operation.

5.2 Implication of the Findings

The findings of this study have implications for the government, technical college administrators, the technicians and students of technical colleges. The government and administrators of technical colleges need to implement the techniques that will aid the acquisition of entrepreneurial skills among students of technical colleges as suggested by this study. The findings of this study have implication for teachers in technical colleges and technicians. These teachers will have to develop themselves and increase their level of practicality based on the challenges encountered by teachers in imparting entrepreneurial skills to students of technical colleges as deduced by this study and employing techniques identified for effective teaching and learning of entrepreneurial skills to students. The findings also have implication for students. The findings of the study will make them know how to go about improving their competencies on technical, managerial and communication skills.

5.3 Contribution to Knowledge

The finding of the study contribute to the knowledge of the possible causes of entrepreneurial skills in Niger state, Nigeria. It also created more awareness to the possible causes of automobile craftsmen and the strategies to enhance entrepreneurial skills for self reliance

5.4 Conclusion

It can be concluded that the ways and manners of entrepreneurial skills adopted by automobile craftsmen needs to be upgraded. Because an entrepreneurship skill is an attribute of employers to have optimal production. For the survival of our industries and nation to realized the vision 2020, there is need therefore to incorporate entrepreneurship work skills into the curriculum of automobile technology in technical colleges.

5.5 Recommendations

1. The identified entrepreneurship work skills and competencies needed should be incorporated into existing curriculum immediately so that they can be used to prepare craftsmen who will fit into labor market.
2. Adequate time should be allocated for the teaching of entrepreneurship work skills in any aspect of the subject.

5.6 Suggestion for Further Research

The following suggestion were made based on the study

1. Strategic ways of developing entrepreneurship work skills in technical colleges in Niger State for automobile craftsmen.
2. Strategic ways of teaching entrepreneurship work skills in technical colleges in Niger State for automobile craftsmen

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APPENDIX B

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION

DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION

OPTION; AUTOMOBILE TECHNOLOGY

ENTREPRENEURSHIP COMPETENCIES NEEDED BY AUTOMOBILE CRAFTSMEN QUESTIONNAIRE (ECNACQ):

PART 1
SECTION I: PERSONAL DATA
Read the following statements carefully and write down your responses in the blank Spaces provided. Please check (√) as appropriate in the boxes provided.

Position/Status:
• Automobile Industry Workers ( )
• Entrepreneur Automobile craftsmen ( )

SECTION II: Options
Instruction: Please indicate the degree to which each item of the entrepreneurship competencies needed by automobile craftsmen are needed
• Highly Needed (HN) - 4
• Needed (N) - 3
• Moderately Needed (MN) - 2
•Not Needed- 1

Research Question 1

What are the technical competencies needed by automobile craftsmen in Niger State?

S/N	Item Statement: Identification of General Automobile Craftsmen should possess ability to:	HN 4	N 3	MN 2	NN 1
1	Carry out comprehensive maintenance in carburetor				
2	Ability to detect when there is flooding in carburetor				
3	Carry out soft soldering on leak radiator				
4	Select appropriate tools for maintenance operation				
5	Identify the various form of brake and clutch system				
6	. Check fuel injection malfunction using vehicle communication kit				
7	Identify appropriate distribution units for heavy duty and medium duty vehicle				
8	Snap the contact point with finger during maintenance operation				
9	Disconnect the high tension (HT) lead from one sparking plug and held it about 6mm from cylinder block				
10	Trace fault using tracing machines				
11	Replace nozzle assembly, strip, clean, refit and tighten to correct torque loading.				
12	Test the manifold absolute pressure sensor using multimeter				
13	Carry a repairs work on motor vehicle air conditioner				
14	Flush motor vehicle radiators				
15	Identify the electrical symbols of working drawing of vehicle				
16	Identify the different types gear system				
17	Make use of blue print drawing in carrying out repairs				
18	Identify the different type of engine				
19	Check fuel system circuits				
20	Carry out proper injector cleaning				

Research Question Two

What are the managerial skills needed by automobile craftsmen for self- employment?

S/N	Item Statement: Entrepreneur Automobile Craftsmen should be able to:	HN 4	N 3	MN 2	NN 1
21	Use minimum input for maximum output				
22	Committed to the business and meet customers deadline				
23	Expect excellence from all employees				
24	React quickly to correct negative situation				
25	Understand what processes add value to enterprise				
26	Take good decision				
27	Formulate functional business policies				
28	Attract customers' patronage				
29	Institute training on the job				
30	Minimize cost to achieve maximum profit				
31	Take good risk				
32	Carry out full assessment of risk				
33	Prioritize and manage risks				
34	Expect excellence from all employees				
35	Formulate specific objective for enterprise				
36	Make rules regulation for operation of the enterprise				
37	Identify various task to perform with the appropriate time each task				
38	Identify various level of manpower needed for the enterprise				
39	Review the objective of the enterprise periodically				
40	Demonstrate good people skills				
41	Take charge mentally				
42	Demonstrate good supervisory skills				
43	Minimize politics in the workplace				
44	Remove barriers that rob the hourly employees				

Research Question Three

What are the basic communication skills needed by automobile craftsmen in Niger State?

S/N	Item Statement: Entrepreneur Automobile Craftsmen should be able to:	HN 4	N 3	MN 2	NN 1
45	Listen to others opinion				
46	Communicate in writing				
47	Persuade others to work				
48	Sell ideas to others				
49	Ensure customers satisfaction				
50	Communicate with people verbally				
51	Share information with employees effectively				