

CONCEPTUAL MODEL FOR LEARNING AUTOMOBILE TRANSMISSION
SYSTEMS IN NIGERIAN TERTIARY INSTITUTIONS OFFERING AUTOMOBILE
ENGINEERING COURSE

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ENGINEERING COURSE

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Specially dedicated to the families of Dagala Wazamda Medugu

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ABSTRACT

The experimental learning approach in Nigerian tertiary institutions offering Automobile Engineering (AE) faces criticism for various documented limitations and deficiencies in meeting with the desired expectations and in addressing the current challenges. The AE departments place less emphasis on Automobile Transmission Systems (ATS) due to apparent lack of conceptual model that can guide its implementation through Hausa medium of instruction. Hence, this research aims to develop a conceptual model for learning automobile transmission systems in Nigerian tertiary institutions offering AE course. Accordingly, the design of the research is applicable to determine ATS topics and their respective areas for the development of the model for successful learning of ATS in Nigeria. Quantitative research design, specifically non-equivalent controlled groups design, comprises the research basis. Three hundred and thirty one (331) participants, comprising 325 students and 6 AE experts underwent a selection process using a census sampling technique from three AE departments of three tertiary institutions in the Northeastern geopolitical zone of Nigeria. A researcher-made concept maps assessment test and structured questionnaire of four major topics of ATS that comprise the instruments used for data collection. The validation and reliability of the instruments proved satisfactory from the scrutiny of experts and pilot study assessments. Descriptive statistics, stepwise linear regression analysis and structural equation modelling proved suitable to analyze the research questions. The findings discovered a conceptual model for learning ATS in Nigerian tertiary institutions offering AE course that include gearbox, clutch propeller shaft and drive axle, which collectively comprise 19 areas of ATS. Therefore, the researcher recommends the implementation of the conceptual model in Nigerian tertiary institutions offering AE course for maximum understanding and successful application of the knowledge and skill learned in the subject.

ABSTRAK

Pendekatan pembelajaran eksperimen di institusi pengajian tinggi Nigeria yang menawarkan Kejuruteraan Automobil (AE) berhadapan dengan kritikan kerana pelbagai kekangan dan kelemahan dalam memenuhi jangkaan dan cabaran-cabaran semasa. Jabatan-jabatan AE kurang memberikan penekanan kepada sistem transmisi automobil kerana kurangnya model konseptual yang boleh dijadikan panduan untuk menggunakan medium pengajaran berasaskan Hausa. Maka, kajian ini bertujuan untuk membangunkan model konseptual bagi pembelajaran sistem transmisi automobil (ATS) di institusi-institusi pengajian tertiar Nigeria yang menawarkan kursus Kejuruteraan Automobil. Oleh itu, reka bentuk kajian yang digunakan adalah bertepatan dengan topik-topik ATS dan bidang-bidang yang berkaitan dengannya bagi tujuan membangunkan model pembelajaran ATS di Nigeria. Reka bentuk kajian kuantitatif ini berasaskan kelompok terkawal kuasi tak setara. Tiga ratus tiga puluh satu (331) orang responden yang merangkumi tiga ratus dua puluh lima (325) orang pelajar dan enam (6) orang pakar daripada tiga jabatan AE di tiga (3) institusi pengajian tinggi dalam zon geopolitik Timur Laut Nigeria dipilih secara kelas utuh (*intact class*). Peta konsep dan soal selidik bagi empat topik utama ATS merupakan instrumen yang digunakan dalam pengumpulan data. Kesahan dan kebolehpercayaan instrumen yang diperolehi melalui penilaian pakar dan kajian rintis adalah memuaskan. Statistik deskriptif, analisis regresi berperingkat (*Stepwise*) dan model persamaan struktur, terbukti berkesan untuk menilai persoalan kajian. Dapatan kajian menghasilkan model konseptual pembelajaran ATS di institusi-institusi pengajian tinggi Nigeria yang menawarkan kursus AE terdiri daripada kotak gear, cekam, aci perejang dan gandar pacu, yang secara keseluruhan mengandungi 19 bidang ATS. Justeru itu, penyelidik mencadangkan supaya model konseptual pembelajaran ini digunakan di institusi pengajian tinggi Nigeria yang menawarkan kursus AE supaya kefahaman dan pengaplikasian pengetahuan dan kemahiran mata pelajaran ini dapat dimaksimumkan.

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LIST OF ABBREVIATIONS

LE	-	Learning Environment
AE	-	Automobile Engineering
FRN	-	Federal Republic of Nigeria
NPE	-	National Policy on Education
ATS	-	Automobile Transmission System
FGN	-	Federal Government of Nigeria
UNESCO	-	United Nation Educational Scientific and Cultural Organization
ATI	-	Automobile Technical College
FCMA	-	Federal College of Mechanization Authority
DCI	-	Dagavent Construction Institution
TVE	-	Technical and Vocational Education
NLDA	-	National Language Development Agency
NL	-	National Language
IT	-	Industrial Training
NUC	-	National Universities Commission
CV	-	Constant Velocity
CGPA	-	Cumulative Grade point Average
RMSEA	-	Root Mean Square Error of Approximation
CMAT	-	Concept Maps Assessment Test
CFI	-	Comparative Fit Index
RMR	-	Root Means square Residual
CFI	-	Comparative Fit Index
IFI	-	Incremental Fit Index
TLI	-	Tucker-Lewis Index

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CHAPTER 1

INTRODUCTION

1.1 Problem background

Experimental learning practices have proven to be very important in Automobile Engineering (AE) from its emergence to date. Learning by doing is facilitated through a successful experimental learning practice, guided by a medium of instruction which is full of learner-centred activities that have direct association with the student's intellectual development which is the major focus of AE. Currently, students' intellectual development through medium of instruction constitutes the basic mechanism in the recent shift to knowledge acquisition. This may suggest why employers of labour are in dire needs of graduates from tertiary institutions who are well equipped to function effectively in contributing to the development of the society.

Therefore, medium of instruction in this context refers to the language of communication used for teaching and learning (Mirza *et al.*, 2013). As it relates to this study, it is the first language that is generally used for communication by all citizens in the areas of the study. Its use for learning especially, in AE in the North-Eastern zone of Nigerian is one of the most essential areas of concern among the Nigerian stakeholders of education. This is right from the level of the policy makers

or administrators to the level of parents that are undergoing training in different academic fields of specialization. This has been described by Aguilar and Munoz (2014) in Spain; Costa and Coleman (2013) in Italy and Fafunwa (1990) in Nigeria. For this reason, Automobile Transmission Systems (ATS) topics - gearbox, clutch, propeller shaft and axle drive in AE needs to be studied in order to achieve the objectives of this research.

In view of the AE programme requirement for its graduates to compete favourably in the present labour market, and the role medium of instruction is playing in all aspects of educational system, its assessment remains of paramount importance. Therefore, this research is set out to assess the students' academic performance, identify the most important areas of ATS of AE in which the medium could be incorporated. After the assessment, the important areas identified under each topic are used in developing a conceptual model that could to serve as a guide for successful learning in Nigerian tertiary institutions offering AE course. Linguistically, in Nigeria there are three major indigenous languages for communication namely Hausa, Igbo and Yoruba. In the North-Eastern zone the area for this research, Hausa is the medium used for communication and is universally accepted by all. Learning environment refers to the locations, or settings and the climatic conditions of the settings where learners receive the required knowledge (Johnson, 2002; Turel and Johnson, 2012). It comprises of classrooms, laboratories workshops, library and lecture theatres.

Generally, it is understood that learners with the accepting attitudes in a favourable environment would at all time struggle for merit in their learning career (Bogler *et al.*, 2013). According to them, in acquisition of knowledge that involves a teacher and the learners, communication has a primary role in the acquisition process. The students employ the wisdom of developing conversation, reading, writing, studying and assessment, and then captivate the instruction. In addition, students need favourable learning environment, communicate very well with the instructor through the procedure that information is shared. This therefore, demands an exchange of acceptable languages. Nowadays, there are approximately over 5,000 languages in use, and that every country has its own medium as the means for

communication that allows people conveying ideas, feelings, facts and their communication requirements (Mirza *et al.*, 2013)

Today, the world has been transformed into economy nations. This is why employers of labour need graduates from institutions that are well equipped to function effectively for the development of the work force. This considerable shift has posed serious challenges to educational institutions. Well-informed based economy workforce implies and requires sound preparation of higher education students to work. In addition that the tertiary institutions must reinforce personal and social responsibility inside and outside of institutions, and simultaneously seek opportunity for students to participate in educational activities that is relevant in the changing world (Lungu *et al.*, 2012). It can therefore be agreed that it is the capacity and ability of the higher institutions to generate and transform new ideas, methods and products that can change these into monetary value or wealth.

Evidence with this development, AE at the forefront of economic, social and technological development must strive to provide viable opportunities to change the structural systems of teaching and learning. This will prepare the students to enter into a competitive global workforce. It is because students' academic and skill achievements have always been argued upon among educators and researchers in order to meet the learning conditions of this preparation (Nasri and El-Shaarawi, 2006).

However, for students to learn there are several external factors that should be considered and appraised continuously. These include: medium of instruction, learning environment, student-teacher relationship, socioeconomic factors, student aptitude, attitudes and administration must be considered (Weiner, 2005). According to the scholar, the internal factors like student's ability and effort are the most important factors that play great role in determining the students' academic achievement. In line with this observation, the scholar emphasized that, medium of instruction and learning environment which are flexible and dynamic in approach as experimental instructions and for encouraging learning can be redesigned and integrated into the teaching and learning of engineering disciplines. Therefore, in order to respond appropriately to the present challenges, the instruction structures

where teaching and learning of the engineers takes place need to be considered and overhauled. Unfortunately, the demand for engineers have continued to increase following the collapse of the education systems in Nigeria, where flood disasters destroyed many buildings, the collapse of rail transport systems in the country, increase in technological advancement, and a very high cost of air transport plagued by high rates of casualties (Akintola *et al.*, 2002).

In education systems, training of all engineers for the engineering services of all types is the responsibilities of the tertiary institutions (UNESCO, 2013). However, the products of the present and past programmes especially engineering graduates lack the basic skills and efficiencies needed by the employers for effective productions in nowadays engineering industries (Backa and Wihersaari, 2014). According to them, the gaps created between the principles or methods of teaching and learning used, and the new technological innovations have made the needed skills for effective services for new technological industries, and to continue to avoid the products of the past.

Globally, the primary mission of tertiary institutions is to provide sequence functions of teaching and learning, research and development for public services (Trowler and Cooper, 2002). According to these researchers, the significance of graduate engineers is underscored by many. The manpower structure of every nation demands a large number of skilled labours like engineers, technicians, technologists and others who work together to provide the required services for the national development. It is the skilled personnel that provide working skills and the experiences for the development of a nation through the use of infrastructure, and also the needed services to achieve economic and technological development, and even the stability for the development.

Automobile engineering programme being at the forefront of professional development is supposed to respond positively towards the accomplishment of such a mission. For the programme to contribute towards this development, it requires proper training that can involve the graduate engineers in highly relevant experiences. This can make the program to contribute meaningfully and effectively to the development of the society. Supporting this assertion, UNESCO (2014)

highlights that educational programmes must strive to meet the needs of the society through students' participatory activities that can enhance the achievement of the students for national development.

1.2 Problem statement

From time immemorial, tertiary institutions in Nigeria have acknowledged and developed policy documents that give a clear understanding of essential services. This include automobile engineering as a potential means for transforming tertiary institutions to provide the societal needs, and enable students acquire the necessary skills to cope with the demand and challenges of our contemporary world. However, no available researches within the reach of the researcher have discovered any existing model for learning automobile transmission systems in the literature with sufficient information about automobile transmission systems specifically, toward enhancing students' learning through Hausa medium of instruction in Nigerian tertiary institutions.

This therefore, has prompted the researcher to raise question that reveals the existing literature gap pertaining to this study as: what is the appropriate conceptual model for learning automobile transmission systems in Nigerian tertiary institutions offering automobile engineering course?

Despite research evidences that support and highlight on the importance of engineering services toward facilitating tertiary institutions to guarantee employment opportunities and students' commitment, yet there is a strong resistance to automobile engineering learning as a core function in the academic arena (Takset *et al.*, 2014). Researchers around the world in engineering education fields, for instance (Vogt, 2008); (Streveler *et al.*, 2008); (Borrego *et al.*, 2008) and (Huntzinger *et al.*, 2007) have a common view that, if the main purpose of tertiary institutions is to generate and spread intellectual knowledge through teaching and learning, students' commitment, research and development, then automobile engineering specifically has the potential to provide the necessary support for actualizing this great goal. In

the aspect of students' commitment to learn, researchers (Kolmos and De Graaff, 2014); (Gomez Puente, 2015) and (Newstetter and Svinicki, 2014) described the rationale for tertiary institutions as a training environment to engage students in acquiring relevant knowledge, skills, and attitude that can empower them to sustain good living and contributes meaningfully to the development of society.

Unfortunately, researches as cited above have revealed that, one of the critical issues that contribute to the production of poor quality graduates is improper students' commitment in relevant academic activities that can facilitate students' effort to learn what is really required in the 21st century. According to Johri and Olds (2011), engineering prepares the mind of individuals to work through the acquisition of relevant knowledge and skills by giving paramount importance to successful experimental learning approach.

In recent years however, the current experimental learning approach in education system have been widely criticized for not yielding the desired result in teaching students the skills to meet the needs of the workplaces (Dhliwayo, 2008), yet this has been the regular practice in Nigeria. However, according to Gill (2004); Smit and Dafouz (2012); Puteh and Uum (2012), to enhance learning in any educational programme, medium of instruction is of paramount importance.

Although, the Nigerian language policy implementation in Southern part started as far back as 1977 after the Federal executive council approved the establishment of national language development agency (Akinaso, 1991); Emenanjo, 1991). However, the policy only emphasized offering national language as a course of study meant for the training of industrial training of engineers and scientists partially adopted in the Southern part of the country. It does not emphasize the incorporation of the language as a tool for teaching and learning and other administrative activities in tertiary institutions in the country at large, but English language (Fafunwa, 1990). This justifies the reason why medium of instruction still remain the challenging factor in Nigerian tertiary institutions offering AE especially, in the North-Eastern part of the country for the 21st century as advocated by Bruton (2011a).

1.3 Objectives

The main objective of this research is to develop a conceptual model for learning automobile transmission systems in Nigerian tertiary institutions offering AE. The study therefore sought and specifically determine the effect of medium of instruction and learning environment on ATS students' academic performance, and developed a conceptual model of the established areas of the four ATS topics identified as important for consideration through the assessment of the medium and through the environment in North-Eastern Nigeria. The ATS topics are gearbox, clutch, propeller shaft and axle drive. In order to facilitate the conduct of this study, the following specific objectives are developed.

- i. Determine the effect of Hausa medium of instruction on ATS students' academic performance in Nigerian tertiary institutions offering AE course.
- ii. Determine the effect of learning environment using Hausa as medium of instruction on ATS students' academic performance in Nigerian tertiary institutions offering AE course.
- iii. Determine the effect of English medium of instruction on ATS students' academic performance in Nigerian tertiary institutions offering AE course.
- iv. Determine the areas of ATS topics considered important in Nigerian tertiary institutions offering AE course?
- v. Determine the relationships between areas considered important in Nigerian tertiary institutions offering AE course.
- vi. Develop a conceptual model of ATS areas considered important in Nigerian tertiary institutions offering AE course

1.4 Research questions

Based on the specific objectives in section 1.3, the following research questions are formulated to guide the conduct of the research:

- i. Research Question 1: What is the effect of using Hausa as medium of instruction on students' academic performance in learning ATS topics in Nigerian tertiary institutions offering AE course?
- ii. Research Question 2: What is the effect of learning environment using Hausa as medium of instruction on students' academic performance in learning ATS topics in Nigerian tertiary institutions offering AE course?
- iii. Research Question 3: What is the effect of using English as medium of instruction on students' academic performance in learning ATS topics in Nigerian tertiary institutions offering AE course?
- iv. Research Question 4: What areas are considered important of ATS topics on students' academic performance in Nigerian tertiary institutions offering AE course?
- v. Research Question 5: What is the relationship between areas of each topic considered important on students' academic performance on ATS topics in Nigerian tertiary institutions offering AE course?
- vi. Research Question 6: What is the appropriate conceptual model based on the areas considered important on the four topics for learning ATS in Nigerian tertiary institutions offering AE course?

1.5 Hypothesis

The following hypotheses are formulated based on the research questions in section 1.4 above and are tested at 0.05 confidence level. The significant results of research questions 1, 2 and 3 are guided by hypotheses 1, 2 and 3 respectively, while significant result of research question 5 is guided by hypothesis 4.

- i. Hypothesis 1: There is no significant difference on the students' academic performance between controlled and treatment groups after introducing Hausa as medium of instruction in Nigerian tertiary institutions offering AE course.
- ii. Hypothesis 2: There is no significant difference on the students' academic performance between controlled and treatment groups of learning

environment after introducing Hausa as medium of instruction in Nigerian tertiary institutions offering AE course.

- iii. Hypothesis 3: There is no significant difference on the students' academic performance between controlled and treatment groups after introducing English as medium of instruction in Nigerian tertiary institutions offering AE course.
- iv. Hypothesis 4: There are no significant relationships between ATS areas considered important for learning ATS topics in Nigerian tertiary institutions offering AE course

1.6 Significances of the Study

The goal of automobile engineering in Nigerian tertiary institutions may not be achieved without a solid model and feasible strategies that may serve as a guide for the students, teachers, administrators, and stakeholders in Nigeria. In view of this, the outcome of the study can serve them in the following ways.

Students that are central to this study might find their studies timely. With the outcome of the study, important teaching and learning can be achieved. As a result, the students would be prepared to face the challenges in the changing world of work. Since the study has determine the students' academic performance in Hausa medium for instruction in conducive learning environment based on the ATS topics, and suggest principles and strategies in teaching and learning processes, engineering graduates could be prepared to perform better on their primary assignments if employed after successful completion of their training.

Furthermore, the findings of this research have also provided information to the automobile engineering teachers in tertiary institutions to be using Hausa medium for conducting their lessons. It could bring out the significant effect of the medium for instruction in favourable learning environment during teaching and learning process. It would in turn help the teachers to contribute in making students flexible

in teaching and learning of automobile engineering course to face labour market challenges.

In addition, the findings of the study provide significant information of using Hausa as medium of instruction in Nigerian tertiary institutions. Using the medium can also provide relationships between the administrators of higher institutions for training their engineering graduates to be competent for employment. It has pointed out some topics and areas of automobile transmission systems in the curriculum to be given priority in the process of teaching and learning in their schools.

The stakeholders such as the directors of education, executive secretaries that serve as heads of engineering departments and agencies under the Federal ministries of education and the national universities commission could find the results and suggestions of this study very useful. This could be in organizing and implementing good instructions for the institutions to educate and produce competent and employable engineering graduates, especially automobile engineers

1.7 Conceptual Content Framework of the Study

The main concern of the researcher is to develop a conceptual model for learning automobile transmission systems to improve on the students' academic performance in Nigerian tertiary institutions offering automobile engineering.

The conceptual content framework of the research is developed based on the ATS topics in which Hausa medium of instruction was applied. As indicated in the literature review, the topics of ATS that requires the use of medium of instruction include but not limited to gearbox, clutch, propeller shaft and drive axle, which was taught using Hausa medium of instruction.

Nowadays, students use their medium of communication for instruction to explore scientific phenomena as a data gathering technique (Smith and Dafouz, 2012; Puteh and Uum, 2012). Likewise for theories of sciences in conducive learning workshops

or laboratories, medium of instruction supports the connections between the materials and the learning objectives through simulation process (De Jong *et al.*, 2013). Same was done through Hausa medium of instruction during data collection for this study.

In addition, students' medium of communication for instruction can be used for improving academic performance in tertiary institutions (Mora *et al.*, 2001). Communication medium as a tool for collaboration and delivery is evidence on students' academic performance conducted in Pakistan (Mirza *et al.*, 2013). Therefore, the conceptual content framework of this research justifies the relationships between the ATS concepts that require the application of the medium and the conceptual model developed in this research. Figure 1.1 below shows that through successful medium of instruction implementation policy in conducive learning environment, students' academic performance and skill development would be enhanced in automobile engineering in Nigerian tertiary institutions. The model is therefore subject for Continuous Quality Improvement (CQI) based on the data driven approach for students' academic performance and skill development.

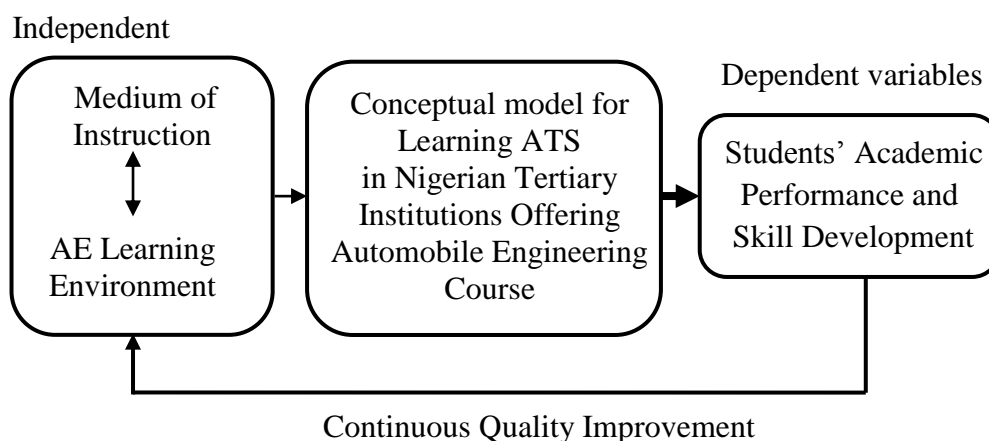


Figure 1.1 : Conceptual content framework of the study

1.8 Scope and Limitation of the Study

This research developed a conceptual model for learning automobile transmission systems in Nigerian tertiary institutions offering automobile engineering course. The model is developed based on the established ATS areas that are translated into Hausa medium of instruction that are considered important for learning ATS in the North-Eastern Nigeria. The research is carried out in tertiary institutions that awards Bachelor of Engineering (B. Eng.) and Bachelor of Technology in Engineering (B. Tech. Eng) degrees in North-Eastern geopolitical zone of Nigeria.

Although, the research intends to cover all tertiary institutions offering automobile engineering in Nigeria, but due to some social constraints such as the insecurity issues in the country, it is carried out in Federal institutions in the North-Eastern geo-political zone based on their characteristics in terms of curriculum, admission, teachers' conditions of service and graduation requirements are the same. The findings have some limitations due to the size of the sample used. However, the conceptual model might serve as a guiding document for students of AE during intervention through medium of instruction in other tertiary institutions that have similar characteristics with the institutions selected for this research, as well as to the lecturers and to the administrators of tertiary institution in Nigeria. Virtually, the propose model is validated by collecting data from students that are currently undergoing training in Nigerian tertiary institutions offering AE course

1.9 Outcome of the Study

The outcome of this research is essential, and the information regarding the field dependent variable, students' academic achievement and skills development base on the ATS topics is confirmed. A conceptual model for learning automobile transmission systems in Nigerian tertiary institutions is successfully developed base on the ATS areas that are considered important. In addition, through the conceptual

model, the AE graduate engineers can be trained for skilful employment opportunities.

1.10 Conceptual Definitions of Terms

Terms used in this study are defined precisely in order to avoid confusing readers. It includes the following:

1.10.1 Medium of Instruction

Medium of instruction in this study refers to the language of communication for instruction for the experimental groups during teaching and learning. It is the general language of communication in the areas of the study that the students are use to, communicates with fluently and understands better.

1.10.2 Learning Environments (LE)

Learning environments are the improvised locations or places such as classrooms and workshops equipped with the required learning equipments or tools (Hannafinet *al.*, 1999). It is where students receive the required knowledge and skills through Hausa medium of instruction.

1.10.3 Automobile Transmission System (ATS)

ATS is a pre-requisite course in which Hausa medium of instruction is use to teach. A student must have a good background in it before gaining an admission to

read automobile engineering in Nigeria tertiary institutions. It is a course that comprises of the ATS topics such as gearbox, clutch, propeller shaft, and axles drive through which students are taught on how power is transmitted from an engine to the road wheels through which students' academic performance and skill development is assessed.

1.10.4 Gearbox

Gearbox is a sub-transmission system through which medium of instruction is use to teach. It is the power source responsible for transmission and reduction of the power. It consists of many gears arranged in a case and is use for instruction

1.10.5 Clutch

This is a device or mechanism of a vehicle for engaging and disengaging gears. It is one of the transmission systems use for teaching and learning for the students through Hausa medium of instruction.

1.10.6 Propeller Shaft

Propeller shaft is one of the motor vehicle transmission systems. It connects the gearbox and the rear axle. It is use for transmitting power from the engine to the axle drive for propulsion through the power torque. On the device, teaching and learning through Hausa language is done for assessing the students' academic performance on conceptual understanding.

1.10.7 Drive axle

Drive axle is also one of the transmission systems that connect the road wheels of a vehicle by the constant velocity (CV) joint. It enables the rotation of the road wheels freely on which Hausa language was used to teach and the students' conceptual understandings is assessed.

1.10.8 Independent Variables

These are non measured concepts of ATS to which Hausa medium of instruction is used to teach such as: gearbox, clutch, propeller shaft and drive axle. In this study, each independent variable is represented or enclosed with an ellipse.

1.10.9 Dependent Variables

Dependent variables are measured areas to which medium of instruction is incorporated in each of the four ATS topics mentioned in subsection 1.10.8 above. Each dependent variable is represented or enclosed with a rectangle.

1.11 Summary of the Chapter

The objective of the study is to develop a conceptual model for learning ATS in Nigerian tertiary institutions offering AE course. This became feasible after assessing students' academic performance and skill development in ATS topics through Hausa medium of instruction. Teaching and learning is to help students learn what they are expected to learn. Six research objectives with six corresponding

research questions are stated that guided the conduct of the research. In addition, two hypotheses are stated and tested at 0.05 confidence levels.

Medium of instruction and learning environment have become the most discussed common educational tools in recent education history. Although some choose to criticize these determinants, this research is conducted under the assumption that the two, like other tools, are balanced. It is the perception of the researcher, guided by the various quality researches, which determine the end result these determinants had on the students in real learning situations.

The significance of the study could be vital for students and teachers in the area of automobile engineering. It has some implications on the administrators of higher institutions of automobile engineering to achieve considerable learning and for the stakeholders the required and qualified employable graduates.

The conceptual content framework of the study is conceptualize based on medium of instruction and concept maps learning theories specifically adapted from Navok and Cannas (2006); Smith and Dafouz (2012); Puteh and Uum (2012; Mora *et al*, 2001) as provided in the literature. The theories can be used in multidisciplinary areas that include automobile engineering for enhancing students' academic performances and skills development. This research is therefore limited collected from the students through the concept maps assessment test and the structured questionnaire after introducing Hausa as medium of instruction.

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