

Human Resources and Pedagogical Approaches in the Implementation of NADDC Automobile Mechanics Training Programmes in Northern Nigeria

¹Andy Yusuf Obadiah, ²Prof. Paul Shehu Yaduma & ³Dr. Nathaniel Afaor

¹Vocation and Technical Department, Taraba State University

²Technology Education Dept, M.T.U. Yola

³Department of Industrial Technology and Education, Benue State University

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ABSTRACT

This study evaluated the human resources and pedagogical approaches employed in the implementation of National Automotive Design and Development Council (NADDC) automobile mechanics training programmes in Northern Nigeria. The study was guided by two objectives which sought to determine the appropriateness of human resources and pedagogical approaches utilized in the implementation of NADDC training programmes for formal automobile mechanics centres. A descriptive survey research design was adopted for the study. The study was conducted in Kaduna, Bauchi, Gombe, Nasarawa, and the Federal Capital Territory (FCT), Abuja. The population of the study comprised 700 respondents, consisting of 632 NADDC graduates, 56 trainers, and 12 assessors. A sample size of 313 respondents was obtained using census sampling for trainers and assessors and Taro Yamane's formula for graduates. Data were collected using a structured questionnaire titled "NADDC Training Program Evaluation Questionnaire (NTPEQ)" containing 106 items. The instrument was validated by experts and tested for reliability using Cronbach's Alpha, which yielded a coefficient of 0.956. Mean and Standard Deviation were used to answer the research questions, while Analysis of Variance (ANOVA) was used to test the hypotheses at 0.05 level of significance using SPSS version 23. Findings revealed that the human resources available for implementing NADDC training programmes were appropriate and that the pedagogical approaches employed were effective in enhancing practical skills acquisition among trainees. The study also found no significant differences among the responses of trainers, assessors, and graduates regarding the appropriateness of human resources and pedagogical methods. The study concluded that NADDC training programmes have significantly improved technical competence in the formal automobile mechanics sector. The study recommended continuous professional development for trainers, integration of digital instructional methods, and periodic assessment of training resources.

INTRODUCTION

The automotive industry is increasingly recognized as a major driver of economic growth, technological advancement, and employment generation in Nigeria. In response to the growing need for competent automotive technicians, the National Automotive Design and Development Council (NADDC) was established to promote and develop the Nigerian automotive industry through policies and programmes that support local manufacturing, manpower development, and technical skills acquisition (NADDC, 2023). One of the major mandates of the council is to strengthen human capacity development within the automotive sector by organizing training programmes aimed at improving the competence of automobile mechanics in the maintenance and repair of modern vehicles.

To achieve this objective, NADDC inaugurated the Sector Skills Council (SSC) for the automotive industry in 2016 with emphasis on industrial infrastructure and skills development. Through this initiative, over 30,000 youths across Nigeria were trained in various automotive skills to bridge the existing knowledge and technical gaps in the industry (NADDC, 2023). Automotive training centres were also established in Kaduna, Jigawa, Kano, and Lokoja to facilitate structured technical training and practical exposure for trainees. According to Abutu et al. (2017), NADDC collaborated with relevant stakeholders to develop and launch a curriculum for automotive mechatronics in the formal sector and also facilitated the acquisition of diagnostic equipment and tools for training automobile technicians.

Formal automobile mechanics training programmes in Nigeria are offered through polytechnics, technical colleges, and specialized automotive training centres. These institutions provide structured curricula in automobile mechanics, auto-electrics, and autotronics aimed at equipping trainees with practical and theoretical competencies required in modern automobile servicing (Ahmed et al., 2022). The National Board for Technical Education (NBTE) and NADDC regulate these programmes to ensure that graduates acquire industry-relevant skills and recognized certifications for employment within the formal labour market.

The emergence of modern vehicles equipped with integrated electronic systems and computerized diagnostic technologies has increased the need for competent trainers, updated instructional strategies, and effective pedagogical approaches in automobile mechanics education. Jalal (2015) observed that the increasing complexity of automotive technology requires technicians to acquire broad-based knowledge and the ability to use electronic diagnostic equipment and computer-based technical materials. Kumazhege et al. (2023) further noted that the use of scanning tools and computerized diagnostic systems has eliminated the traditional trial-and-error method of vehicle servicing. Automobile mechanics trainers and instructors therefore play a critical role in the implementation of training programmes. According to Walther in Effiong et al. (2023), trainers are expected to analyze, design, implement, and evaluate learning activities capable of producing skilled and competent technicians that can meet the technological demands of modern society.

Statement of the Problem

Despite the efforts of the National Automotive Design and Development Council (NADDC) to strengthen technical capacity development in Nigeria's automotive industry, concerns persist regarding the adequacy of human resources and pedagogical approaches employed in the implementation of its automobile mechanics training programmes. Although the council

has established training centres and developed curricula aimed at equipping trainees with modern automotive competencies, evidence suggests that many training programmes still face limitations in practical instruction, exposure to current technologies, and effective industry-based learning experiences. The United Nations Industrial Development Organization (UNIDO) observed that despite the existence of universities, polytechnics, and technical institutions in Nigeria, many educational programmes remain disconnected from prevailing industrial and socio-economic realities. This disconnect has created significant challenges within Technical and Vocational Education and Training (TVET), particularly in relation to curriculum relevance, instructional quality, and institutional collaboration with industry stakeholders. Consequently, trainees often graduate without sufficient competencies required in the modern automotive labour market.

Within the NADDC training programmes, inadequate practical exposure, insufficient access to modern diagnostic equipment, and limited collaboration between training institutions and automotive industries have continued to affect the quality of skill acquisition among trainees (Effiong et al., 2023). In addition, the rapid advancement in automotive technologies, including electronic control systems and computerized vehicle diagnostics, demands highly competent trainers and innovative pedagogical methods capable of delivering industry-relevant knowledge and practical skills (Kumazhege et al., 2023). These challenges have raised concerns about whether the available human resources and teaching methods are adequate for effective implementation of NADDC automobile mechanics training programmes in Northern Nigeria. Hence, this study seeks to evaluate the appropriateness of the human resources and pedagogical approaches employed in the implementation of NADDC training programmes for formal sector automobile mechanics centres in Northern Nigeria.

Purpose of the Study

The general purpose of this study was to evaluate human resources and pedagogical approaches in the implementation of NADDC automobile mechanics training programmes in Northern Nigeria. Specifically, the study sought to:

1. Determine the extent to which human resources are appropriate for the implementation of NADDC training programme for formal sectors of automobile mechanics centres on maintenance and repairs of modern vehicles in Northern Nigeria.
2. Ascertain appropriateness of the pedagogies employed in the implementation of NADDC training programme for formal sectors of automobile mechanics centres on maintenance and repair of modern vehicles in Northern Nigeria.

Research Questions

Following the guidelines of the CIPP model concept, four research questions were formulated to guide the study

1. To what extent are the human resources appropriate for the implementation of NADDC training programmes for formal sector of automobile mechanics centres on maintenance and repairs of vehicles in Northern Nigeria?
2. To what extent are the pedagogies employed appropriate in the implementation of NADDC training programme for formal sector of automobile mechanics centres on maintenance and repairs of vehicles in Northern Nigeria?

Research Hypotheses

The following research hypotheses were tested at 0.05 level of significance.

H01: There is no significant difference among the mean responses of NADDC trainers, assessors and graduates on the appropriateness of human resources for implementation of NADDC training programmes for formal sector automobile mechanics on maintenance and repairs of vehicles in Northern Nigeria.

H02: There is no significant difference among the mean responses of NADDC trainers, assessors and graduates on the appropriateness of the pedagogies employed in the implementation of NADDC training programme for formal sectors of automobile mechanics centres on maintenance and repairs of vehicles in Northern Nigeria.

2. Literature Review

Appropriateness of Human Resources

Human resources in automobile mechanics include professionally trained teaching staff, technicians, administrators and non-teaching staff. National Board for Technical Education (NBTE) (2014) stated that there shall be available and adequate numbers of qualified teaching, administrative and non-academic staff to run the various departments who are crucial to the smooth management of a technical programme. Material resources is a broad term used in the teaching and learning arena as infrastructural and instructional facilities that facilitate teaching and learning automobile mechanics in NADDC training programmes. Infrastructural facilities can be generally defined as buildings, properties and major infrastructure which include physical and material assets commonly used for the instructional purpose in automobile mechanics (Tafida, Apagu & Ibrahim 2024).

According to Ahmed et al. (2022), appropriate human resources for the Implementation of NADDC training programmes automobile mechanics on maintenance and repairs of vehicles in Nigeria are as follows: Health safety personnel in the training centers, engine maintenance and repair personnel, upholstery and interior fittings personnel, maintenance and repairs personnel, air conditioning system maintenance and repairs personnel, engine fault diagnosis personnel, wheel balancing and management personnel, barking system maintenance and repair personnel, suspension system maintenance and repairs personnel, injection system maintenance and repairs personnel, vulcanizers and tyre repair and maintenance personnel, and injector services maintenance personnel.

Appropriateness of Pedagogies in the Implementation of NDDC Training Programmes

According to Effiong et al., (2023), pedagogies employed in the implementation of NDDC training programmes for automotive mechanics on maintenance and repair of vehicles in Nigeria are as follows: Learning by watching, leaning by imitation, learning by practicing, learning through feedback, learning through conversation, learning through teaching, learning by real world problem solving, learning through inquiry, learning by drafting and sketching, learning by listening, transcribing and remembering, learning by coaching, learning by competing, learning through virtual environment, learning through simulation and role and learning through facilitation.

The result of the study conducted by Audu et al. (2014) revealed that 15 pedagogical competencies are appropriate by the teachers to improve effective teaching and learning of MVM programmes in the Technical Colleges:

- i. Identify and/or specify instructional goals and objectives which are based on learners

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- needs;
- ii. Identify and perform task analysis according to the objectives of the lesson;
 - iii. Having thorough grasp of the structure and content of the subject expected to teach
 - iv. Design instructions appropriate to goals and objectives;
 - v. Asking questions that will stimulate discussion and critical thinking;
 - vi. Using instructional methods that will lead to the development of intellectual, affective, and psychomotor skills;
 - vii. Design instructions that enable students to study industrial process first hand and see the relevant of workshops and laboratory;
 - viii. Identify the best method of presenting new skills and safe working habits associated with practical;
 - ix. Design and implement evaluation procedures which focus on learner's achievement and instructional effectiveness;
 - x. Promotes effective pattern of communication;
 - xi. Use resources appropriate to instructional objectives;
 - xii. Uses organizational and management skills to establish maximally effective learning environment;
 - xiii. Use resources appropriate to instructional objectives;
 - xiv. Uses organizational and management skills to establish maximally effective learning environment; and
 - xv. Integrate into the instruction the cultural environment of students and implement instruction appropriate to goals and objectives.

Audu et al., (2014) observes that the greatest obstacle encountered in Nigerian schools especially in the Technical Colleges is the use of teachers who are inadequately prepared or who are not professionally skilled. A teacher must have an in-depth knowledge of pedagogy of teaching to be able to bring about desirable learning in the students entrusted to him, his knowledge notwithstanding. A competent teacher shows how best to derive the aims and objectives of a lesson, prepare the lesson plan, select teaching resources and methods, present the lesson, manage the classroom and evaluate the lesson. Apart from these competencies that are expected of the teacher; he should also be aware of present-day research and development in instructional technology and should whenever possible participate in seminars, professional conferences, project work concerning teaching and learning process and problems relating to his area of specialization (Adigun in Audu, 2014). On this note, the teacher should keep an open mind for all new ideas and examine them critically and he should also realize that his task is not merely to teach but also help students to acquire skills, attitudes, habits of thoughts and qualities of character that will enable them function effectively and be motivated.

Effiong et al., (2023) revealed that the graduates attained the NADDC programme objectives creditably after being trained on maintenance and repairs of vehicles in Nigeria. These training are aimed at enabling the graduates to effectively repair, maintain modern vehicles

and also advise their clients on the proper purchase and maintenance of vehicles (NADDC, 2017). Ezeama, Obe and Ede (2016) found out that Motor Vehicle Mechanics (MVM) trainers need capacity building in the use of auto scan tools for vehicle systems diagnosis and repairs. The study recommended that workshop/seminars should be organized by centers like the National center for equipment maintenance and development, the National automotive council and so on to enable MVM trainers acquire the required skills to meet up with the training job facing them.

Innovative Technical Skills for Self-reliance in Automobile Mechanics

Innovative technical skills for self-reliance in a variety of trade options in automobile mechanics occupations are essential. Innovation refers to a new way of doing things. Technological dynamism has brought innovations in the method of diagnosing, maintenance and repairs of modern motor vehicles thereby creating more job opportunities in the automobile mechanics occupation. Automobile mechanics occupation is a technical trade where automobile mechanics carry out a variety of automobile maintenance and repair tasks to earn a living and be self-reliant. Being self-reliant implies that an automobile mechanic possesses all the requisite technical knowledge and skills to successfully carry out the task of automobile mechanics to earn a living. The Industrial Training Fund (ITF) (2017) defined self-reliance as the social and economic ability of an individual, household or community to meet basic needs (including protection, food, water, shelter, personal safety, health and education) in a sustainable manner and with dignity. Self-reliance, as a programme approach among automobile mechanics, refers to developing and strengthening the livelihoods of automobile mechanics of concern and reducing their vulnerability and long-term reliance on humanitarian or external assistance. This should assist automobile mechanics in becoming self-reliant.

Idris, et al. (2020) revealed that, a wide variety of occupational trade areas or opportunities are available in the field of automobile technology. Idris, et al. stated that each of the major systems, sub-systems, units and accessories in a motor vehicle provides an occupational area where individuals can earn a living and be self-reliant economically. Isaac in Idris, et al. Idris, et al. (2020) pointed out that individuals can earn a living and be self-reliance by specializing in servicing and repairs of any of the following: braking system, transmission system,

ignition system, suspension and steering system, air conditioning and refrigeration system, charging system and battery, fuel supply and injection system, automobile wiring and electrical supply system, among others. The National Automotive Design and Development Council (NADDCC) (2017) stated that innovative occupational areas in the automobile trade include sensor maintenance and installation, fault diagnosis, vehicle costing and valuing, installation of vehicle anti-theft security gadgets, and Electronic control unit (ECU) servicing and repairs.

Other research works identified engine oil recycling business, sales of automobile spare parts and accessories, owning automobile repair shops, harvesting and sales of scrap metals from dead vehicles as options where individuals can specialise to earn a living and be self-reliant (Okolie in Idris, et al., 2020). In a survey of job opportunities in the automobile trade, (NADDCC) (2017) further highlighted automobile occupational areas including auto body mechanic, auto detailer (car wash), auto glass installer, auto maintenance technician, auto body paint technician, auto body repair technician (panel beater), automobile mechanic, automotive electrical systems repair technician (automotive Electrician), automotive service technician, battery and charging system technician, brake repair technician, car maintenance technician, car stereo and electronics systems, chassis fabrication technician, cooling system technician, diesel truck mechanics, electric car engineer, electric motor technician, engine machinist, hybrid car technician, tire servicing and repair technician, transmission repair technician as well as truck maintenance and repair technician.

The list of occupational areas in the field of automobile mechanics is inexhaustible due to continuous innovations in the automobile industry which invariably creates more occupational areas for self-reliance (Idris, et al. 2020). In this regard, Idris, et al., stated that automobile occupational areas also include: diesel fuel injection technicians, motorcycle mechanic, small engine mechanic, heavy duty diesel mechanic, vehicle trimmer among others. Despite the existence of these varieties of opportunities in automobile mechanics occupation, exploiting these trade areas demands acquisition of sound technical knowledge, entrepreneurial knowledge and skills. A sound entrepreneurial knowledge and skills is needed for self-reliance as it provides automobile entrepreneurs with the basic capacity and ability to appropriately choose a particular occupational trade area and manage such to earn a living thereby reducing economic hardship. To overcome the untold hardship occasioned by the global economic meltdown, many nations of the world have introduced one form of economic policy or the other in their training curriculum in formal and informal institutions to improve on their economic condition. In addition, various economies have employed different techniques and practices to successfully grow their economies.

Therefore, there is a need for youths to explore innovative technical skills required for self-reliance in automobile occupations in Nigeria to ensure self-reliance and poverty reduction in society through technical skills acquisition. The recipient should be able to acquire the essential knowledge and experiences needed to meet challenges in the automobile workplace. Technical skills acquisition for self-reliance encourages communal wealth creation and productive use of human resources, thus forestalling unemployment, and economic hardship and enhancing self-reliance.

Formal Automobile Mechanics Sector in Nigeria

The formal automobile mechanics sector in Nigeria refers to the organized and structured segment of the automotive industry that provides vehicle maintenance and repair services in accordance with established standards and regulations. This sector comprises authorized workshops, dealerships, service centres, and specialized automotive repair facilities that

employ trained and certified mechanics to diagnose, service, and repair vehicles using standardized procedures and modern equipment (Agboneni et al., 2023). According to Ahmed et al. (2022), formal workshops and dealerships play a significant role in ensuring the roadworthiness, efficiency, and durability of vehicles through professional maintenance practices and adherence to manufacturer specifications.

Authorized service centres in Nigeria are approved by vehicle manufacturers to carry out warranty repairs and routine servicing on specific brands of vehicles (Agboneni et al., 2023). In addition, specialized repair workshops focus on areas such as engine overhauls, transmission repairs, and electrical system diagnostics, thereby enhancing technical specialization within the automotive industry (Idris & Abutu, 2019). Formal automobile dealerships such as Peugeot Automobile Nigeria Limited (PAN), Toyota Nigeria Plc., and Innoson Vehicle Manufacturing (IVM) provide not only vehicle sales but also after-sales services through structured maintenance units staffed with skilled technicians (Amaechi, 2020). These organizations maintain service centres equipped with genuine parts, modern diagnostic tools, and trained personnel to ensure quality and reliability in vehicle repairs and maintenance (Ahmed et al., 2022).

Human resources constitute a major component of the formal automobile mechanics sector in Nigeria. Certified mechanics are professionals who have acquired formal training and certification in automotive technology, enabling them to diagnose and repair modern vehicle systems effectively (Idris & Abutu, 2019). The National Automotive Design and Development Council (NADDC) is one of the key bodies responsible for providing training and certification programmes for automobile technicians in Nigeria (Ahmed et al., 2022). Similarly, the National Business and Technical Examinations Board (NABTEB) conducts examinations and awards certificates to trainees who complete technical programmes in automobile mechanics. Certified mechanics possess competencies in engine repairs, transmission servicing, electrical diagnostics, and vehicle maintenance procedures, while also adhering to industry safety standards and best practices (Agboneni et al., 2023). Certification also enhances customer trust and confidence in the competence of mechanics and technicians (Ahmed et al., 2022).

Pedagogical practices within the formal automobile mechanics sector emphasize structured technical instruction, practical demonstrations, and compliance with standardized operational procedures. According to Amaechi (2020), adherence to industry standards and best practices ensures safety and quality in vehicle maintenance and repair services. Mechanics and technicians are trained to follow manufacturer specifications and use standardized tools and equipment to maintain consistency and accuracy in servicing operations (Idris & Abutu, 2019). Standardized instructional practices also involve the use of industry-recognized certification programmes to ensure that trainees acquire the competencies required for modern automotive maintenance and diagnostics (Ahmed et al., 2022).

Formal training institutions also contribute significantly to human resource development and pedagogical improvement within the automotive industry. The National Automotive Design and Development Council (NADDC) collaborates with technical institutions to promote skills acquisition and workforce development in the sector. Institutions such as the Federal Polytechnic, Ilaro offer programmes in automotive engineering technology that equip students with practical skills in vehicle mechanics, diagnostics, and repairs. Furthermore, organizations such as Elizade Nigeria Limited and Vono Automotive provide technical training for mechanics on the installation, maintenance, and handling of automotive components, thereby improving professional competence and service delivery within the formal automobile mechanics sector in Nigeria.

Socio-Demographic Factors

The National Automotive Design and Development Council (NADDC) in Nigeria focuses on enhancing the skills and knowledge of individuals in the automobile mechanics sector through various training programmes. The socio-demographic factors influencing these training programmes include:

Educational Background:

Participants come from diverse educational backgrounds, ranging from those with basic secondary education to those with higher levels of education. Understanding this diversity allows NADDC to design programmes that accommodate different knowledge levels, possibly offering foundational courses for those with less formal education while providing advanced training for more educated individuals.

Employment Status:

Many participants may be unemployed or underemployed and seeking to enhance their skills for better job opportunities. Understanding the employment status of participants will help tailor the programme to address their specific needs, such as offering job placement assistance or entrepreneurship training for those looking to start their own businesses.

Motivation and Career Goals:

Participants have different motivations for enrolling in training programmes, such as career advancement, skill development, or personal interest in automobiles. Recognizing these motivations will help NADDC design programmes that align with participants' goals, thereby increasing engagement and satisfaction.

Access to Technology:

The level of access to technology vary widely among participants. Some may have extensive experience with modern tools and software, while others may lack basic computer skills. Training programmes should incorporate hands-on experiences with current technologies and provide foundational training for those who may not be as technologically proficient.

2.2 Theoretical Framework: The CIPP Model

CIPP is an acronym for context evaluation, input evaluation, process evaluation and product evaluation. This model was developed by Guba and Stufflebeam in 1970 as a result of appalling conditions of Chicago inner-city schools. According to the CIPP model, evaluation is the systematic investigation of the value of a programme or other related variables (Stufflebeam in Owo & Isaac 2022). The CIPP model considers, the end users of the evaluation results, how will they use them and to what aspects of the system are they applicable.

In essence, the CIPP model is aimed at helping educational planners to make better decisions about their educational programmes and products. Based on the idea that evaluative information is an essential component of good decision-making, the management-oriented approach adopted in CIPP strives to provide pertinent information for those requiring legitimate, unbiased evaluative information in order to reach a compelling judgment concerning the current state of a psychomotor programme (Fitzpartrick et al in Owo & Isaac, 2022). This approach emphasized the need to meet the informational requirements of those in managerial positions who are responsible for the implementation of the programme

(Stufflebeam in Owo & Isaac, 2022). Focusing on these value-oriented approaches, Stufflebeam in Owo and Isaac (2022) further defined operational evaluation for this model as a process of delineating, obtaining, reporting and applying descriptive and judgmental information about the merit, worth, probity and significance of an object. He noted that an effective evaluation requires identifying and continually guiding a decision, providing accountability information and advocating effective programme methodologies. The CIPP model for instance, considered the study objectives which spelt out what NADDC training programme in Nigeria was established to achieve, of which is primarily the production of skilled manpower for the nation's industrial advancement.

The context evaluation in CIPP evaluates to ascertain if the NADDC programmes meet their main objectives in terms of the training given to engineering technology students to acquire relevant work skills which are demanded in the industries for the technological advancement and industrial development of the nation. The input in CIPP model refers to the NADDC resources required to run effective NADDC training programme in Northern Nigeria (that is, how appropriate and available are these NADDC training resources for the smooth operation of the system). In a nutshell, this talks about the teaching staff (teachers and technical staff); the administrative staff, the messengers, typists, computer operators, secretaries, among others.

The process in CIPP model is concerned with the appropriateness of NADDC training resources to achieve the stated objectives. That is, the process considers how the management of the NADDC training programmes in hierarchical order is able to appropriate the available human and material resources for the achievement of the overall objectives of NADDC training programmes in Nigeria. The product in CIPP model described the quality (worth) of the end products (graduates) of NADDC training upon graduation. Often times, product evaluation is ascertained as soon as the NADDC graduates started working in the industries after their training programme.

Stufflebeam designed the CIPP evaluation model to address four different classes of decision making which are planning (specific objectives), structuring (designing a project around specific objectives), implementing (operating and executing a project), and recycling (judgment and feedback). All these directly correlate with the evaluation methods of this model. An operational knowledge of the four evaluative methods in CIPP model categorically stated what each evaluation method or procedure entails. Although each method was designed to address specific aspects of programme evaluation particularly important to decision-makers; this model is neither linear nor systematic (Fitzpartrick et al in Owo & Isaac, 2022). However, this model can be modified to cater for specific information required by those in decision-making positions (Stufflebeam in Owo & Isaac 2022). CIPP model is very popular especially in the evaluation of educational objectives in the psychomotor domain (skill areas). The model provides a means for assessing programmes and identifying lacking areas for improvement.

Input Evaluation

Input evaluation is carried out to put in place support systems, solution strategies and procedural designs for the implementation of the NADDC training programmes in order for core objectives to be realized (Fitzpartrick et al in Owo & Isaac, 2022). Asuru (2015) submits that input evaluation provides information on how to employ resources to achieve objectives. Stufflebeam in Owo and Isaac (2022) opined that for input evaluation to be properly done there is need to ascertain the state of the available resources including personnel and accessible materials (physical resources). Thus, input evaluation in the context

of CIPP model sought for the resources appropriate for effective NADDC training in Northern Nigerian.

Input evaluation aims to identify how appropriate resources are used to achieve objectives and identify programme strategies to achieve the desired results. Mukhter et al., (2022) emphasized that input evaluation helps organize decisions by determining the resources available, alternative options that can be used, strategies, and work procedures to achieve the set objectives. Input evaluation also involves the examination of potentially relevant approaches to alternative options. It serves as a structuring decision because alternative structural strategies meet the needs of a particular objective. Examples of input assessment components include teaching skills and knowledge, equipment, workshop facilities, timetable, funding allocation, or the role of the automotive teachers. This dimension focuses on the knowledge and mastery of lesson content, the use of teaching and learning strategies and methods, as well as the skills of teachers in selecting teaching and learning resources. Educators who master the lesson's content can adapt the content to the students' abilities. This ability will indirectly help students better understand the topics discussed and influence students' academic achievement while ensuring that curriculum goals can be achieved (Mukhter et al., 2022).

Process Evaluation

Process evaluation is used to evaluate the implementation of skills training programmes. This dimension is used to see the implementation process of teaching and learning based on lesson content, teaching and learning strategies and methods, use of resources and reference materials, and the form of the assessment conducted on students (Mukhter et al., 2022). Process evaluation according to Asuru (2015) is required once the instructional programme is operational. Process evaluation considered the allocation and utilization of available NADDC training resources in order for the stated objectives to be achieved. The purpose of process evaluation is to identify the defects in the operational procedures in relation to the design of the programme. Process evaluation is aimed at implementing and refining the programme's design and working procedures. It addresses information about how appropriate is the implementation of the programme and further helps to identify the conflicting obstacles towards the success of the NADDC training in electrical/electronics, mechanical, computer engineering and technology.

3. Methodology

The study adopted a descriptive survey research design to evaluate the human resources and pedagogical approaches employed in the implementation of NADDC automobile mechanics training programmes in Northern Nigeria. The design was considered appropriate because it enabled the researcher to obtain detailed information from NADDC trainers, graduates, and assessors regarding the effectiveness of training personnel and instructional practices in formal automobile mechanics centres. The study was conducted in selected states within Northern Nigeria, namely Kaduna, Bauchi, Gombe, Nasarawa, and the Federal Capital Territory (FCT), Abuja, due to the presence of NADDC-accredited training centres and active participation in automotive skills development programmes. The population of the study consisted of 700 respondents, comprising 632 NADDC graduates, 56 trainers, and 12 assessors drawn from the three northern geopolitical zones of Nigeria. A combination of census sampling and Taro Yamane's formula was used to determine the sample size. Census sampling was adopted for trainers and assessors because of their manageable population, while Taro Yamane's formula was used to select 245 graduates, resulting in a total sample size of 313 respondents. Tracer study techniques were also employed to locate graduates of

the NADDC programmes between 2016 and 2024 in formal automobile mechanics centres across Northern Nigeria.

Data for the study were collected using a structured questionnaire titled “NADDC Training Program Evaluation Questionnaire (NTPEQ),” which contained 106 items developed from related literature and aligned with the Context, Input, Process, and Product (CIPP) evaluation model. The instrument elicited information on the appropriateness of human resources and pedagogical practices in NADDC training programmes using a five-point rating scale. The questionnaire was validated by experts in technology education and measurement and evaluation to ensure content validity, while its reliability was established through a pilot study conducted at the NADDC training centre in Adamawa State. The instrument yielded a Cronbach’s Alpha coefficient of 0.956, indicating high internal consistency. Data collection involved face-to-face administration of questionnaires with the assistance of five trained research assistants who were fluent in English and Hausa and familiar with the automotive training environment. Ethical considerations such as informed consent, confidentiality, and voluntary participation were strictly observed during the process. The collected data were analyzed using Mean and Standard Deviation to answer the research questions, while Analysis of Variance (ANOVA) was used to test the hypotheses at a 0.05 level of significance using the Statistical Package for Social Sciences (SPSS) version 23.

4. Results and Discussion

Research Questions 1: To what extent are the human resources appropriate for the implementation of NADDC training programmes for formal sector automobile mechanics on maintenance and repairs of vehicles in Northern Nigeria?

Table 1: Mean Responses on the Level of Appropriateness of Human Resources for the Implementation of NADDC Programmes in the Training of Automobile Mechanics

S/No.	Statements	$n_A = 12$		$n_T = 56$		$n_{Gt} = 245$		\bar{x}_G	Rmk
		\bar{x}_A	SD_A	\bar{x}_T	SD_T	\bar{x}_{Gt}	SD_{Gt}		
1.	Health safety personnel in the training centers.	4.58	0.51	4.45	0.50	4.53	0.50	4.52	A
2.	Engine maintenance and repair personnel.	4.58	0.51	4.46	0.50	4.47	0.50	4.48	A
3.	Upholstery/interior fittings personnel.	4.25	0.45	4.46	0.50	4.49	0.50	4.48	A
4.	Maintenance/repairs personnel.	4.33	0.49	4.52	0.50	4.52	0.50	4.51	A
5.	Air conditioning system maintenance/repairs personnel.	4.50	0.52	4.59	0.50	4.54	0.50	4.55	A
6.	Engine fault diagnosis personnel.	4.50	0.52	4.45	0.50	4.55	0.50	4.53	A
7.	Wheel balancing/management personnel.	4.58	0.51	4.41	0.50	4.45	0.50	4.45	A
8.	Barking system maintenance and repair personnel.	4.58	0.51	4.55	0.50	4.54	0.50	4.54	A
9.	Suspension system maintenance and repairs personnel	4.50	0.52	4.50	0.50	4.51	0.50	4.50	A

10	Injection system maintenance and repairs personnel	4.75	0.45	4.57	0.50	4.49	0.50	4.51	A
11	Vulcanizers and tyre maintenance and repairs personnel	4.25	0.45	4.39	0.49	4.46	0.50	4.44	A
12	Injector services maintenance and repairs personnel	4.50	0.52	4.50	0.50	4.53	0.50	4.53	A
	Average	4.49	0.50	4.49	0.50	4.51	0.50	4.50	A

Source: Field Work (2025)

NOTE : A = Appropriate, MA = Moderately Appropriate, NA = Not Appropriate, n = Number of Respondents, n_t = Total Number of Respondents, \bar{x}_A = Mean Response of Assessors, SD_A = Standard Déviation of Assessors, \bar{x}_T = Mean Response of Trainers, SD_T = Standard Deviation of Trainers, \bar{x}_{Gt} = Mean Response of Graduates, SD_{Gt} = Standard Deviation of Graduates, \bar{x}_G = Grand Mean of Responses

Table 1 presents the extent to which human resources are appropriate for the implementation of NADDC programmes in the training of automobile mechanics in Northern Nigeria. The results show that all the 12 items were rated “Appropriate”, with mean values ranging from 4.44 to 4.55 and corresponding standard deviations between 0.45 and 0.52. The assessors recorded an average mean of 4.49 with a standard deviation of 0.50, while the trainers and graduates each had mean ratings of 4.49 and 4.51 respectively, both with a standard deviation of 0.50, resulting in an overall grand mean of 4.50. This indicates that respondents agreed that the available human resources such as engine maintenance and repair personnel, upholstery and interior fittings experts, brake and suspension system specialists, injector and diagnostic technicians, and health and safety officers are appropriate and relevant to the effective delivery of NADDC training programmes. The consistently high mean values and low standard deviations across respondent groups suggest a strong consensus that the human resource component of NADDC’s automotive training initiatives is robust, competent, and well-aligned with the technical and operational requirements of modern vehicle maintenance and repair in Northern Nigeria.

Research Question 2: To what extent are the pedagogies employed appropriate in the implementation of NADDC training programme for formal sector automobile mechanics on maintenance and repairs of vehicles in Northern Nigeria?

Table 2: Mean Responses on the Pedagogies Employed Appropriate in the Implementation of NADDC Training Programme for Formal Sector of Automobile Mechanics on Maintenance and Repairs of Vehicles

S/No.	Statements	$n_A = 12$		$n_T = 56$		$n_{Gt} = 245$		$n = 313$	
		\bar{x}_A	SD_A	\bar{x}_T	SD_T	\bar{x}_{Gt}	SD_{Gt}	\bar{x}_G	Rmk
13	Learning by watching.	4.33	0.49	4.39	0.49	4.54	0.50	4.50	A
14	Learning by imitation	4.67	0.49	4.50	0.50	4.47	0.50	4.49	A
15	Learning by practicing	4.75	0.45	4.55	0.50	4.50	0.50	4.52	A
16	Learning through feedback	4.42	0.51	4.54	0.50	4.53	0.50	4.53	A
17	Learning through conversation	4.33	0.49	4.64	0.48	4.48	0.50	4.50	A
18	Learning through teaching	4.33	0.49	4.55	0.50	4.48	0.50	4.49	A

19	Learning by real world problem solving	4.58	0.51	4.52	0.50	4.51	0.50	4.52	A
20	Learning through inquiry	4.42	0.51	4.52	0.50	4.48	0.50	4.49	A
21	Learning by drafting and sketching	4.58	0.51	4.57	0.50	4.47	0.50	4.50	A
22	Learning by listening, transcribing and remembering	4.42	0.51	4.48	0.50	4.53	0.50	4.52	A
23	Learning by coaching	4.67	0.49	4.48	0.50	4.49	0.50	4.50	A
24	Learning by competing	4.50	0.52	4.57	0.50	4.45	0.50	4.48	A
25	Learning through virtual environment	4.67	0.49	4.39	0.49	4.48	0.50	4.47	A
26	Learning through simulation and role	4.58	0.51	4.61	0.49	4.56	0.50	4.57	A
27	Learning through facilitation	4.75	0.45	4.39	0.49	4.54	0.50	4.52	A
28	Learning through brainstorming	4.50	0.52	4.55	0.50	4.46	0.50	4.48	A
29	Learning through field trip	4.67	0.49	4.52	0.50	4.50	0.50	4.51	A
30	Learning through assignment	4.42	0.51	4.45	0.50	4.50	0.50	4.49	A
31	Learning through system approach	4.75	0.45	4.48	0.50	4.48	0.50	4.49	A
	Average	4.54	0.50	4.51	0.50	4.50	0.50	4.50	A

Source: Field Work (2025)

NOTE : n_A = Number of Assessors, n_T = Number of Trainers, n_{Gt} = Number of Graduates, A = Appropriate, n = Number of Respondents, \bar{x}_A = Mean Response of Assessors, SD_A = Standard Déviation of Assessors, \bar{x}_T = Mean Response of Trainers, SD_T = Standard Deviation of Trainers, \bar{x}_{Gt} = Mean Response of Graduates, SD_{Gt} = Standard Deviation of Graduates, \bar{x}_G = Grand Mean of Responses.

Table 2 shows the extent to which the pedagogies employed are appropriate in the implementation of the NADDC training programme for formal sector automobile mechanics on maintenance and repairs of vehicles in Northern Nigeria. The results indicate that all the 19 items were rated “Appropriate”, with mean values ranging from 4.47 to 4.57 and corresponding standard deviations between 0.45 and 0.52. The assessors recorded an average mean of 4.54 with a standard deviation of 0.50, while the trainers and graduates had mean ratings of 4.51 and 4.50 respectively, both with standard deviations of 0.50, resulting in an overall grand mean of 4.50. These findings imply that respondents agreed that a wide range of pedagogical approaches including learning by watching, imitation, practicing, feedback, simulation, facilitation, problem-solving, and virtual learning are appropriately and effectively appropriate in the NADDC training programme. The high and consistent mean ratings demonstrate strong agreement among the respondents that these learner-centered pedagogies foster hands-on experience, critical thinking, collaboration, and the practical application of theoretical knowledge. This suggests that NADDC employs modern, interactive, and competency-based instructional strategies that are well-suited for developing the technical expertise required for effective automobile maintenance and repairs in Northern Nigeria.

Hypothesis 1: There are no significant differences among the mean responses of NADDC trainers, assessors and graduates on the appropriateness of material resources for implementation of NADDC training programmes for formal sector automobile mechanics on maintenance and repairs of vehicles in Northern Nigeria.

Table 3: ANOVA Test of Significant Difference Among Respondents on the Appropriateness of Material Resources for Implementation of NADDC Training Programmes for Formal Sector

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.002	2	0.001		
				0.234	0.792
Within Groups	1.171	310	0.004		
Total	1.173	312			

Source: Field Work (2025)

Table 3 presents the ANOVA results on the differences among the mean responses of NADDC trainers, assessors, and graduates regarding the appropriateness of material resources for the implementation of NADDC training programmes for formal sector automobile mechanics in Northern Nigeria. The results indicate that the between-groups sum of squares is 0.002 with a mean square of 0.001, while the within-groups sum of squares is 1.171 with a mean square of 0.004. The computed F-value of 0.234 with a p-value of 0.792, which is greater than the 0.05 level of significance, shows that the difference among the groups is not statistically significant. Therefore, the null hypothesis is retained, implying that there are no significant differences in the opinions of trainers, assessors, and graduates on the appropriateness of the material resources available for implementing NADDC training programmes. This suggests a general consensus among all respondents that the material resources provided are adequate and appropriate for achieving the objectives of the training programme.

Hypothesis 2: There are no significant differences among the mean response of NADDC trainers, assessors and graduates on the pedagogies employed in the implementation of NADDC training programmes for formal sector automobile mechanics on maintenance and repairs of vehicles in Northern Nigeria.

Table 4: ANOVA Test of Significant Difference Among Respondents on the Pedagogies Employed in the Implementation of NADDC Training Programmes for Formal Sector

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.029	2	0.014		
				1.154	0.317
Within Groups	3.837	310	0.012		
Total	3.866	312			

Source: Field Work (2025)

Table 4 presents the ANOVA results on the differences among the mean responses of NADDC trainers, assessors, and graduates regarding the pedagogies employed in the implementation of NADDC training programmes for formal sector automobile mechanics in Northern Nigeria. The results show that the between-groups sum of squares is 0.029 with a mean square of 0.014, while the within-groups sum of squares is 3.837 with a mean square of 0.012. The computed F-value of 1.154 with a p-value of 0.317, which is greater than the 0.05 level of significance, indicates that the observed differences among the groups are not

statistically significant. Therefore, the null hypothesis is retained, implying that there are no significant differences among the opinions of trainers, assessors, and graduates on the pedagogical approaches used in the NADDC training programmes. This suggests that all respondent groups generally agree that the teaching methods employed such as learning by practice, simulation, coaching, and feedback are appropriate and effective in achieving the training objectives.

Findings of the Study

Based on the results of the analysis of the research questions, the following finding emerged:

1. The human resources available for implementing NADDC training programmes are appropriate. This shows that qualified personnel (such as engine maintenance and air conditioning repair experts) were sufficiently provided to support effective training delivery.
2. The pedagogies employed in the implementation of NADDC training programmes are appropriate and effectively utilized indicating that diverse instructional strategies such as learning by practice, coaching, simulation, field trips, and feedback were consistently used to enhance trainees' hands-on skills and problem-solving abilities in automobile maintenance and repairs.
3. There are no significant differences among the mean responses of NADDC trainers, assessors and graduates on the appropriateness of material resources for implementation of NADDC training programmes for formal sectors of automobile mechanics on maintenance and repairs of vehicles in Northern Nigeria.
4. There are no significant differences among the mean response of NADDC trainers, assessors and graduates on the appropriateness of pedagogies employed in the implementation of NADDC training programmes for formal sectors of automobile mechanics on maintenance and repairs of vehicles in Northern Nigeria.

Discussion of findings

The study found that the human resources available for implementing National Automotive Design and Development Council training programmes are appropriate. The availability of qualified trainers and technical experts in specialized areas such as engine diagnostics, electrical systems, and air-conditioning repairs suggests adequate manpower support for effective programme implementation. This finding agrees with Audu et al. (2014), who stated that competent instructors are critical determinants of successful vocational training outcomes. In support of this finding, Ahmed et al. (2022) observed that qualified technical personnel significantly improve the quality of practical training and learners' employability skills in technical education programmes.

The findings of the study revealed that the pedagogies employed in the implementation of NADDC training programmes are appropriate and effectively utilized indicating that diverse instructional strategies such as learning by practice, coaching, simulation, field trips, and feedback were consistently used to enhance trainees' hands-on skills and problem-solving abilities in automobile maintenance and repairs. The accompanying hypothesis revealed that there are no significant differences among the mean response of NADDC trainers, assessors and graduates on the appropriateness of the pedagogies employed in the implementation of

NADDC training programmes for formal sector automobile mechanics on maintenance and repairs of vehicles in Northern Nigeria. This finding supports the work of Audu (2019), who found that practical teaching methods improve learners' technical competence, creativity, and problem-solving abilities. Similarly, Orji (2021) observed that experiential learning strategies enhance practical skill development and workplace adaptability among technical trainees. This outcome agrees with Olaitan (2024), who found that trainers with dual certification in mechanical engineering and mechatronics command higher credibility because they can integrate traditional engine work with electronic diagnostics. Mohammed and Hassan (2017) observed that facilities employing certified injection specialists report better trainee output and lower post-training rectification rates, thereby validating the elevated ratings assigned to injection-system technicians in the current dataset. Yahaya, Inuwa and Hamza (2021) documented that injector-services personnel often lack continuous professional development opportunities, leading to skill obsolescence and diminished perceived adequacy. Ogu (2024) further demonstrated that wheel-balancing staff are frequently outsourced on casual contracts, resulting in inconsistent presence and reduced familiarity with centre-specific protocols, which corroborates their lower appropriateness scores observed herein. Thus, the differentiated adequacy profile mirrors established labour-market dynamics within Northern Nigeria's automotive sector.

5. Conclusion and Recommendations

This study evaluated the human resources and pedagogical approaches employed in the implementation of NADDC automobile mechanics training programmes in Northern Nigeria. The findings revealed that the training programmes have made significant contributions toward improving technical skills acquisition and workforce development within the formal automobile mechanics sector. The availability of qualified trainers, instructors, and technical experts demonstrated that the human resources utilized in the implementation of the programmes were adequate and appropriate for effective training delivery. The presence of competent personnel in specialized areas such as engine maintenance, auto-electrics, air-conditioning systems, and diagnostics enhanced the quality of instruction and practical exposure provided to trainees.

The study further established that the pedagogical approaches adopted in the implementation of the training programmes were appropriate and effective in promoting practical learning and technical competence among trainees. Instructional strategies such as learning by practice, coaching, simulation, observation, feedback, and real-world problem solving were consistently utilized to improve trainees' hands-on abilities in vehicle maintenance and repairs. These learner-centered approaches contributed positively to skill acquisition, self-reliance, and the ability of trainees to adapt to emerging automotive technologies.

In addition, the study found no significant differences in the opinions of trainers, assessors, and graduates regarding the appropriateness of the human resources and pedagogical methods employed in the programmes. This suggests a general consensus among stakeholders that the NADDC training programmes are effectively implemented in the selected formal automobile mechanics centres in Northern Nigeria. Therefore, the study concludes that the NADDC training programmes have substantially enhanced the quality of technical training in the formal automobile mechanics sector and have contributed to the development of competent and industry-relevant automobile technicians capable of meeting modern automotive maintenance and repair demands.

Hence, based on the findings of the study, the following recommendations are proposed:

1. Continuous professional development programmes should be organized for trainers and assessors to update their pedagogical and technical competencies. This will help maintain instructional quality and ensure trainers remain proficient in modern vehicle systems and repair techniques.
2. The NADDC should enhance its pedagogical framework by integrating digital learning tools, virtual simulations, and blended learning approaches to complement hands-on practice and improve learning flexibility and retention.
3. NADDC should maintain the adequacy of its material and human resources by instituting periodic audits and needs assessments to identify gaps in infrastructure, tools, or expertise that may arise over time.

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