



Curriculum Reform in TVET for Mechanical/Automobile Technology Education Global Competitiveness

Abstract

The current state of Mechanical/Automobile Technology Education in tertiary institutions in Nigeria as regards the methodologies and practices leaves so much to be worried about. This situation has manifested in various dimensions, posing a glaring deviation from the rationale that necessitated the institutionalization of the programme as enshrined in the National Policy on Education. This, underscores that Mechanical/Automobile Technology Education was configured to produce professionals (technologists, artisans and craftsmen) with vast knowledge and requisite skills to successfully perform vital operations in motor vehicles and automotive engines. It is therefore, imperative to equip the recipients with sellable competencies to excel in their chosen vocations, improve their living standard as well as contribute to socio-economic development of the country. However, this lofty objective appears unattainable owing to the manner in which the programme was established and operationalized. In view of the foregoing, this paper highlighted apparent lacuna in knowledge-processing and optimization of skills inherent in the field, which seem to defile the potency of the programme toward human capital development. Whilst stressing the need to strengthen Automobile/Mechanical Trade through holistic curriculum reform, the paper advocated that adherence to standard evaluation among others are crucial for sustainable TVET curriculum.

Keywords: Curriculum Reform, TVET, Mechanical/Automobile Technology Education, Global Competitiveness

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Introduction

The quest for knowledge and experience that translates into development of human resources for overall technological and socio-economic transformation of a nation necessitates the establishment of technical and vocational education and training (TVET). This is because, TVET was configured to equip the recipients with requisite knowledge, skills and

competences to embark on vocations of their choices and advance successfully in them. Additionally, technical and vocational education and training encompasses a broad range of educational elements. This includes not only general education but also the exploration of technologies and associated sciences, as well as the development of practical skills, attitudes, knowledge, and understanding relevant

to various occupations across different economic and social sectors (Federal Republic of Nigeria, 2013).

Similarly, TVET could be perceived as a thoughtful and hands-on programme skillfully designed to facilitate the exploration and exploitation of requisite skills and expertise for optimal impartation of competences leading to advancement of creative and innovative potentials for sustainable enterprises. Simply put, TVET is that educational programme meant to expose learners irrespective of their age brackets and gender, the skills and in-depth understanding of how to do something which not only attracts economic gains but as well guarantees sustainable living (Okoye & Okoye; Okwelle, 2015). Hence, every recipient of the programme should in addition to being sufficiently employable, be adequately able to establish and manage their own enterprises as well as employ others. Substantiating the foregoing, FRN (2013) enumerated the major goals of TVET as follows:

- i. Supplying skilled personnel in applied sciences, technology, and business, especially at craft, advanced craft, and technical levels.
- ii. Offering technical knowledge and vocational skills essential for agricultural, commercial, and economic progress.
- iii. Training individuals and equipping them with the skills needed for economic self-reliance.

Based on these goals, TVET was structured into the following aspects: (i) Technical Colleges (ii) Vocational Enterprise Institutes (VEIs) and (iii)

National Vocational Qualifications Frameworks (NVQF). The main features of the curricula activities for technical colleges (TC) were structured in foundation and trade modules with each consisting of five components, namely: (i) General education (ii) Theory and related courses (iii) Workshop practice (iv) Industrial training/production work. (v) Entrepreneurial training. However, the trainee should at the end of the programme be able to secure employment, set up his own business and/or pursue further education in advance craft/technical institutions such as polytechnics or colleges of education and universities (FRN, 2013; Okoye & Nnajifor, 2017).

Similarly, vocational enterprise institutes (VEIs) were instituted with a view to inculcate in students the ability to think creatively and actively participate in activities that could engender technological advances, which could in turn foster wealth generation and economic emancipation. It provides training that enables students acquire specialized knowledge and craftsman skills that could empower them to not only become wealth creators but also to compete globally. In the same vein, national vocational qualification framework (NVQF) is a system designed for the development, classification and recognition of skills, knowledge and competencies acquired by individuals irrespective of where and how the training or skill was acquired. It gives a clear statement of what the learner must know or be able to do, whether the learning took place in a classroom, on-the-job, of non-formal (FRN, 2013). Consequently, NVQF deals

with the manner by which TVET goals are actualized through the acquisition and utilization of creative ingenuity in various fields of technology education, such as automobile/mechanical education.

In alignment with its objectives, Technical and Vocational Education and Training (TVET) is organized into three main components: Technical Colleges, (ii) Vocational Enterprise Institutes (VEIs), and (iii) National Vocational Qualifications Frameworks (NVQF). The curriculum for Technical Colleges (TC) is divided into foundational and trade modules, each comprising five key components: (i) General education, (ii) Theory and related courses, (iii) Workshop practice, (iv) Industrial training/production work and (v) entrepreneurial training. Upon completing the programme, the trainees should be equipped to secure employment, establish their own businesses or pursue further education in advanced craft or technical institutions, such as polytechnics, colleges of education or universities (FRN, 2013; Okoye & Nnajofofor, 2017).

Similarly, Vocational Enterprise Institutes (VEIs) aimed to foster creativity and active participation among students in activities that promote technological advancements, ultimately leading to wealth generation and economic empowerment (Okoye, Udemgba, Okonkwo, & Onwusa (2025). These institutes provide training that equip students with specialized knowledge and craftsmanship skills, enabling them to become wealth creator and compete on a global scale.

The National Vocational Qualifications Framework (NVQF) is designed to develop, classify, and recognize the skills, knowledge, and competencies acquired by individuals, regardless of the training context. It clearly outlines the expectations for learners, detailing what they must know or be able to do, whether their learning occurs in a classroom, on-the-job, or through non-formal education (FRN, 2013). The NVQF plays a crucial role in realizing TVET goals by facilitating the acquisition and application of creative ingenuity across various fields of technology education, including automobile and mechanical education.

Automobile/Mechanical Technology Education

This is one of the trades offered at both post-secondary and tertiary education levels which aimed at equipping learners with requisite skills and competences to accurately construct, operate, effectively maintain and render services in motor vehicles and other automotive devices/gadgets (FRN, 2013). In pursuance of this, the trade was split into various modules to ensure that instructions are not only systematically designed, but also appropriately delivered so as to yield the expected outcome from learners. Taking cognizance of the immense roles of automobile industry, which stretched across all sectors of the economy, it becomes imperative that the professionals are properly groomed to ensure that they would meet the expectations of the industry. It is quite worrisome that most of the mechanics in Nigeria, especially those who had formal education, are properly trained owing to lack of workshops and

enabling environment. As such, the environment where learning takes place should be a replica of the working environment (Prosser as cited in Okoye, 2015). It becomes apparent to underscore that, having a functional TVET in place could trigger rapid advancement of requisite knowledge and cutting-edge skills for sustainable engagement in Automobile Technology programme in the following dimensions:

1. Provision of requisite skills and competences to design, construct, operate and repair vehicles and other automotive devices to specifications.
2. Establishment of formidable enterprises that could guarantee efficient service delivery and technological advancement.
3. Revitalization of existing industries cum enterprises through enhanced skills for sustainable economic development and global competitiveness.
4. Facilitating a continuous reproduction of competent manpower/personnel who would drive the industry and as well diversify the economy.
5. Reducing small businesses' failure rate by equipping the graduates with employable skills and competences to successfully manage their enterprises.
6. Drastically reducing unemployment and other social menace by preparing the youths for sustainable employment and productive lifestyle.
7. Promoting strong but mutual relationships among schools, industries and communities to foster optimal utilization of their

resources for socio-economic advancement among others.

However, the way in which the programme operates in Nigerian education system seemed not to conform with the best practices and could invariably make the realization of the aforementioned goals extremely difficult, if not impossible. This could compel a scholar to further cogitate and imagine what behooves a system that is fraught with humongous of challenges, such as lack facilities, dearth of competent professionals, flagrant use of inappropriate teaching methods by teachers, extremely poor funding, students' inordinate attitudes to learning, nonchalant disposition of government to technical/technology education, ineffective/moribund curriculum inter alia (Makus, 2009; Eze & Okoye, 2016). These factors have evidently resulted in poor image of TVET, production of army of unemployable TVET graduates, continual depopulation of students offering the programme cum low enrolment into TVET programmes, weak institutional framework, and apathy for practical discourse among others. In view of the foregoing issues, some scholars advocate that, if the curriculum is reconfigured and holistically implemented in accordance with the 21st Century global best practices, every other militating factor would likely fall in place. Therefore, there is a pressing need to develop a practical curriculum aimed at addressing challenges and revitalizing education in Mechanical/Automobile Technology. This will provide learners with the opportunity to gain essential skills and competencies necessary for

sustainable participation and global competitiveness.

Methodology

This paper employed a systematic literature review (SLR) as a qualitative methodology to address the curriculum issue in automobile/mechanical technology education. The systematic literature review is a methodical and purposeful way to locate, evaluate, and summarize previous research relevant to a particular subject or inquiry. A comprehensive search is carried out across several databases, relevant academic journals, books, and other sources to find all pertinent research on the subject matter. The systematic review's plan or methodology is well stated, and the criteria fully specified before the study. This involves planning a thorough search strategy and clearly answering an identified question (Dewey & Drahota, as cited in Genesis, 2024).

Curriculum Reform in TVET

The concept of curriculum has been explored by various scholars, each emphasizing different aspects such as course content, teaching methods, evaluation, and achievement of instructional goals. According to the International Labour Organization (ILO, 2010), curriculum refers to the lessons and academic content taught within a school, course, or program. Umorah (2016) defines curriculum as a mechanism through which the educational system imparts prescribed knowledge, skills, and attitudes to learners, as defined by society. Mackus (2015) views it as the collection of activities and courses offered in schools,

encompassing the knowledge and skills students are expected to acquire to meet learning objectives. Umorah (2016) asserts that curriculum, while prescriptive, is based on a broader syllabus specifying required topics and attainment levels for grades or standards. Additionally, UNESCO (2017) perceives curriculum as: (i) a body of knowledge to be transmitted, (ii) an effort to achieve specific student outcomes, (iii) a process, and (iv) a practical application. These perspectives collectively highlight curriculum's role in guiding teachers to articulate learning objectives, lessons, assignments, and materials for effective course delivery. Thus, for a school curriculum to achieve desired outcomes, it must align with 21st-century best practices, characterized by the information era.

The dynamism of technological advances in the 21st Century as regards automobile industry demands a drastic change in the principles and operations employed in performing various tasks, whether in workplaces or institutions of learning. This implies that, the emergence of information technology (IT) has ushered in a lot of changes which demand exhaustive redefinition of ways of performing various functions or tasks to meet the yearnings of the society. Such changes can be construed as curriculum reform. Curriculum reform in TVET therefore aims at improving or modifying TVET programmes to address the needs of individuals as well as that of the society; which ultimately translates to nation development. Reforming TVET curriculum grapples with deliberate reconstruction, reconfiguration and updating the programme to reflect the

prevailing reality in respect of workplace skill sets that promote creative innovations and global competitiveness. Acknowledging the import of creativity towards the actualization of goals and objectives of Mechanical/Automobile Technology trades, the following are considered paramount:

- i. *Adherence to Standards:* When schools adopt new learning standards, teachers adjust their curriculum to align with these expectations (ILO, 2010). However, merely aligning curriculum technically with standards does not guarantee that teachers are effectively teaching to those standards or that students are meeting the intended learning outcomes. Learning standards serve as a tool for policymakers and school leaders to enhance curriculum and teaching quality, underscoring the need for careful consideration in this regard.
- ii. *Evaluation Standards:* Another reform approach that can impact curriculum indirectly is assessment. This is because the methods employed to assess student learning guide teachers in instructing the content and skills that will be evaluated. Standardized tests are one method through which assessment shapes curriculum reform, but schools also utilize rubrics and various strategies to enhance teaching quality by adjusting assessment strategies, requirements, and expectations within the curriculum.
- iii. *Curriculum Coherence:* Schools aim to enhance curriculum quality by aligning teaching methods and course expectations with learning standards and other school programs, a process often referred to as "curriculum mapping." The primary goal is to establish a more unified and cohesive academic program, ensuring that teachers cover essential content and address any gaps in learning that may occur between different courses and grade levels (Umorah, 2016). This strategy contends that the core knowledge and skills in a given course should dominate the curriculum so as to heighten learners' mastery of instructional content as well as employability after graduation.
- iv. *Curriculum Philosophy and Approach:* The structure and objectives of a curriculum mirror the educational philosophy of its developers. Therefore, curriculum reform can involve adopting a new teaching philosophy or methodology, such as constructivism, by a school or educator. Constructivism emphasizes student-centered learning. Conversely, schools that adhere to models like Expeditionary Learning embrace diverse teaching approaches, such as project-based learning (UNESCO, 2017), which includes strategies like community-based and authentic learning.
- v. *Curriculum Adoption:* In such cases, schools might choose to acquire or adopt a pre-packaged curriculum developed by another

institution. A widely recognized option in American public schools is the International Baccalaureate (ILO, 2010), which provides curriculum programs for elementary, middle, and high schools. Adopting a curriculum package typically involves specialized training for teachers to ensure effective implementation and delivery of the curriculum.

- vi. *Curriculum Support*: The resources supplied by schools to teachers play a crucial role in curriculum execution. For example, equipping all students with laptops and outfitting classrooms with interactive whiteboards prompts teachers to make substantial adjustments in both content and teaching methods to leverage these tools. Furthermore, the nature of professional development opportunities offered to teachers also profoundly impacts curriculum development and design.

Implications of TVET Curriculum Reform for Automobile/Mechanical Technology

The level of implementation and the conduct of Automobile/Mechanical Technology programme across the states of the federation is quite appalling. This has apparently made the attainment of its goals or prospects practically impossible following an overt shrinkage of the credence accorded to the programme, which makes a holistic curriculum reform imperative with following implications:

- i. *Youth Empowerment*: Studies have shown that youths constitute the

greater percentage of the population of the nation's work force. Incidentally, this category of the national population appears the most vulnerable and susceptible to various kinds of activities and crimes considered inimical to national development. Though, governments at various levels and periods have introduced certain policies and empowerment programmes to curtail the spate of youth restiveness but the results were grossly insignificant (Ogbuanya and Okoye, 2015). The reason for this failure may not be distanced from the inability of the government to systematically align the programmes with TVET; which could be due to lack of understanding of the fundamental principles guiding TVET. Until those initiatives are properly aligned with TVET, they would never succeed while the future of the youth are continually bastardized.

- ii. *Job Creation*: The capacity to create and sustain jobs is what drives the industrial sector as well as the economy of any progressive nation (Okoye, Okoye & Okwelle, 2015). Incidentally, high demand of competent professionals who would pilot automobile or motor vehicle industries in Nigeria suggests that a proactive approach be taken to bridge the gap using the instrumentality of TVET. This is simply because TVET provides the creative imagination as well as the

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- innovative acumen to generate jobs.
- iii. *Poverty Reduction*: The declaration by the British Prime minister, Theresa May (2019) which described Nigeria as the world's headquarters of poverty, was really a presupposed clarion call for the nation to embrace sustainably positive change that could transform the nation economically; otherwise, what another school of thought might obviously consider hate speech. Eventually, none of them either surfaced, leaving the minds bugling in the maze of reality whether the people to whom the comment was ascribed to actually discern or are nonchalant of their precarious socio-economic reality. That is why, Ukoh (2019) attributed the spate of insecurity ravaging the country to unemployment and abject poverty while the political elites coast in affluence of tax payers' money without recourse. However, a holistic reform could avert the situation.
- iv. *Optimization of Creative and Innovative Spirit*: Creativity and innovation is the intellectual vehicle that drives the world's technological advancement. Little wonder the erstwhile US President, Barack Obama in one of his public broadcasts affirmed that creativity is the currency which the present generation trades (Okoye, 2017). With this in view, it becomes glaring that the industrialized nations, like the US, China, etc. advanced technologically because they embraced TVET holistically; which availed them ample opportunity to explore and optimize their creative and innovative acumen extraordinarily. In acknowledgement of this claims, this paper canvasses for a genuinely structural curriculum reform in Automobile/Mechanical Technology Education in Nigeria that could spark impeccable zeal for originality, creativity and innovation for global competitiveness.
- v. *Technological Advancement*: The underling vision and intent that informed the establishment of TVET is technological advancement of the country. Obviously, motor vehicle industry is one of the major players of the economy where advances in technology have greatly impacted (Ogbuanya & Okoye, 2015). This is quite worrisome to scholars who ponder why the institutions and agencies charged with this responsibility have failed to up their game, while others blame it on governments' insensitivity to Nigerian education. But, for how long would this subsist, bearing in mind that that is one of the best ways to transform the nation. Hence, paper advocates for urgent review and repositioning of the programme in order to appropriately match theory and practice to optimize learners' potentials creatively. This would drastically reduce patronage to mediocre among the road side

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- mechanics and bring TVET graduates on board for rapid advancement of the economy.
- vi. *Institutional and Industrial Synergy*: Lack of effective synergy between industries and TVET institutions seems to be one of the major threats to advancement of Mechanical/Automobile Technology Education in the country. Although, the road map was elaborately emphasized in the education policy document, but there was no concrete and committed approach to implement it. This lacuna has not only denied both the industry and the institutions ample opportunity to mutually exchange their resources but also short-circuits their ability to collaborate in order to produce employable and competent workforce that would transform the industry to global reckoning (Onwusa, Oderhowho, Okoye, & Uyeri, 2025).
- vii. *Sustainable Problem-Solving-Based Education*: The underlining principle guiding the establishment of any modern institution or invention bothers on its ability to solving societal problems. Unfortunately, the manner in which Mechanical/Automobile Technology programmes operate in Nigeria left nothing to be desired as it could be best described as a mere tool for earning degrees and qualifications rather than solving societal problems. This situation calls for an informed curriculum reform with deliberate recourse to constructivist learning approach to inculcate in learners high-thinking ability, independence of opinion, and creative spirit needed to optimize their potentials (UNESCO, 2009).
- viii. *Inclusivity*: The manner in which the programme is currently run in this part of the globe apparently portrays Mechanical/Automobile Technology Education as masculine-oriented or educational programme solely designated for male gender. This phenomenon has invariably, posed some threats or limitations to the learning process and as such some female gender who were richly endowed with the potentials to advance in the profession/industry, often drop out or jettison it for career they lack the skill sets. This ugly occurrence is usually attributed to some factors, namely: bandwagon influence, convenience, believe system among others, which consequently makes them to struggle the rest of their lives, seeking for unrealistic opportunity (Okoye & Nnajofofor, 2017). In order to arrest this situation, the curriculum reform should take cognizance of inclusiveness by developing and integrating a workable template that could attract women to seek career in Mechanical/Automobile Technology Education. This could break the age long barrier of exclusion and ultimately

enhance women enrolment in the programme.

Conclusion

The paper affirmed that TVET is not only a prime mover that drives Mechanical/Automobile Technology Education to meeting its goals and expectations but substantiates the imperative to embark on urgent curriculum reform in order to redeem the values of the trade. Having underscored some of the challenges besetting the programme and encapsulated some plausible solutions, it is believed that if appropriately harnessed, it could revamp the programme from its near-state of extinction. The paper therefore, concludes that curriculum reform, if objectively pursued with recourse to TVET could foster acquisition of innovative skills which would invariably trigger technological advancement of the country.

Recommendations

Sequel to the above discussion, the following recommendations are made:

1. Ministry of Education in collaboration with School Authorities should expose Mechanical/Automobile technology teachers to modern techniques in carrying out requisite activities either practically or theoretically. This would enable them to actively make necessary adjustments in order to impart meaningfully in learners.
2. Government should intensify efforts towards meeting TVET needs as explicitly expressed in

the policy document by providing the required equipment and modern technologies for learning. This will foster smooth and successful engagements needed to produce competent manpower who would not only acquire the requisite skills but also successfully compete globally.

3. School Administrators should encourage TVET teachers and students to embrace student-centred learning approaches in teaching and learning. This would enable them to effectively learn and adopt the modern but technology-driven workplace methods of performing tasks.
4. School administrators, stakeholders in education and other relevant bodies should heighten their campaign for curriculum reform in TVET. This will help to revitalize some ailing TVET trades such as Mechanical/Automobile Technology Education.

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