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TVET AND LOCAL CONTENT DEVELOPMENT FOR SUSTAINABLE INDUSTRIALIZATION IN NIGERIA

The role of Autotronics' skills in technical vocational education and training for sustainable development in Nigeria

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Abstract

There is the need to address knowledge gap on autotronics skills in Nigeria, in order to rescue the nation from falling further behind with respect to technological advancements of the world. This paper looks at the role of autotronics skills in Technical vocational Education and Training (TVET) as a tool for industrialisation and promoting modern automotive technology for sustainable development in Nigeria. The paper highlights on the concept of TVET, the need for autotronics technology in TVET and the challenges of TVET in Nigeria. Conclusions were drawn and recommendations made amongst which are, that policy makers and curriculum developers in line with the nation's policies and programmes should adequately include autotronics technology in TVET programmes in order to address the challenges facing the nation's automobile servicing standardisation and to promote sustainable development in Nigeria.

Keywords: Autotronics, Skills, Technical Vocational Education and Training, Sustainable Development

Introduction

In advanced countries of the world, autotronics plays important role in the socio-economic development of their citizens. It has without doubt been at the heart of every meaningful automobile industrial breakthrough recorded in the last few decades and is continually transforming maintenance operations with the endless discovery of new techniques (El-Namaki, 2012). In Nigeria, there is the need to build effective industry and institution affiliations where autotronics skills can be acquired in order to reduce unemployment among the teeming youths and enhances the maintenance skills of mechanics. Ibeneme (2007) asserted that recent advances in technologies and their use in science and technology education provides an opportunity for educators to take a critical look at how these tools are being integrated into the classroom and workshop. Onifade (2005) also stated that most graduates are not properly prepared for work, especially for the industries. Onifade further maintained that there is growing concern among industrialists that products of technical institutions do not possess adequate

Concept of TVET in Nigeria

The term TVET has been defined differently by many authors. Some authors define separately while others defined the concept jointly. The Federal Republic of Nigeria (2004) through the National Policy on Education (NPE) (2013), Ayonmike, Okwelle and Okeke (2015) defined TVET as those aspects of educational processes involving in addition to general education, the study of technologies and related sciences and the acquisitions of the economy and social life. The NPE which came into existence as a result of the national curriculum conference of 1969 further stated that VTE is an integral part of general education and also a means of preparing people for occupational fields and for effective participation in the world of work. It is an aspect of life learning and a preparation for responsible citizenship, an instrument for promoting environmentally sound suitable development and a method of alleviating poverty. The TVET according to Adepoju, (2014) is an educational training which encompasses knowledge, skills, competencies, structural activities, abilities, capacities and all other structural experiences for securing jobs in the various sector of the economy or even enabling one to be self-dependent by being a job creator. Owodunni (2009) posited that technical education is the training of technically- oriented personnel who are to be initiators, facilitators, and implementers of technological literacy that would lead to self- reliant and sustainability. Years after the technical and vocational education training (TVET), it is used as a comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical, skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life (FRN, 2013). This definition fulfills the fourth goal of the technical colleges which is securing employment after or at the end of completing one or more modules of employable skills, set up their own business and become self-employed and be able to employ others and pursue further education in advanced technical programme and in tertiary technical institutions (FRN, 2013). In summary, TVET essentially develops in the individual the knowledge, skills, and desirable attitude for legitimate work.

Modern automobile and autotronics technology

According to Salami (2004), the modern automobile is a complex technical system employing subsystems with specific design functions. Salami further stated that some of these consist of thousands of component parts that have evolved from breakthroughs in existing technology or from new technologies such as electronic computers, high-strength plastics, and new alloys of steel and nonferrous metals. Some subsystems have come about as a result of factors such as air pollution, safety legislation, and foreign competition. Autotronics is referred to as modern automotive technology in the field of automobile engineering. Significantly, it has many applications

in motor vehicles technology. According to Hanguna, Usman & Tijani (2015) autotronics as an aspect of automobile engineering presents basics, advantages, layout and components and functional operation of various computer controlled motor vehicle systems. In addition, it clarifies how to use recent diagnostic tools and equipment for fault finding and analysis. It deals with computer controlled motor vehicle systems like; engine management, ABS (Anti Brake system), TCS (Traction Control system), SCS (Stability Control system) and others, were the self - diagnosis and fault finding codes are also included.

According to William (2004), autotronics could be described as an artificial word that combines automotive section and electronics content. It has without doubt been at the heart of every meaningful automobile industrial breakthrough recorded in the last two centuries and is continually transforming maintenance operations with the endless discovery of new techniques. The mechanics of autotronics constitutes the mixed mass that is posed towards the complexity of autotronics working operations and consequently a challenge to mechanics and auto electricians towards troubleshooting, finding faults and diagnosing automotive electronic problems (Maina, 2007). This has been as a result of the industrial revolution in the automobile industry with sophistication in car designs. The rapid changes and increased complexity in the automotive industry present new challenges and put new demands on the servicing skills required by automobile technicians. Generally, there has been a growing awareness of the necessity to explore and enhance the skill performances of technicians for productive functionality in the continually changing and highly demanding environment.

Autotronics technology in TVET for sustainable development

Scott (2003) defined Sustainable development as a process by which the needs of present generations can be satisfied without compromising the ability of future generations to satisfy their needs. Barbar (2001) stated that the economic and social trends suggest that the education and training of workers must promote an understanding of sustainability for the stewardship of resources, the environment, and health to become more effective. Trends in the productive and service sectors suggest that both basic and portable skills and competencies will be sustainable in the long term for job shifts and technological changes. Sustainable autotronics skills and programmes in TVET will involve the renewal of individual skills, labour market skill requirements, and the transformation of the world of work. According to UNESCO (2002), TVET takes on a complex and distinctive character with regard to sustainable development. This is because of both, directly and indirectly, TVET produces and consumes resources, as well as affects attitudes towards sustainability held by future workers in all nations. TVET has always included elements of sustainability, especially in the way scarce training materials were conserved and waste materials were disposed of.

this historical commitment gives TVET a foundation upon which to build future commitments to sustainable practices. The manner in which production and consumption are managed can either contribute to sustainability or to practices and conditions that are not sustainable. During education and training, the greater the exposure of trainees to sustainable concepts, practices and examples, the more likely the desired workplace culture change will take place in the future. Moreover, the delivery of sustainable practices must be universal, that is, encompassing not only pre-service TVET but also on-the-job training and worker upgrading and retraining. Continuing autotronics programme in TVET will continue to predominate in the future, in order to accommodate both technological and job change. Furthermore, the incorporation of autotronics programme in TVET will enhance proper skills acquisition by technicians in handling modern and sophisticated motor vehicles and hence making them self-reliant, reducing unemployment and fostering sustainable development in the automotive sector.

The importance of autotronics technology education in Nigeria

As is the case in all areas of industry, lifelong learning is essential for the workforce, in order to stay viable in markets over the long term. Ongoing car mechanics re-skilling is being pushed ahead in particular and the necessity for autotronics skills as a result of the following developments:

1. The introduction of electronic and communications components from different manufacturers, based on different standards.
2. Increasing technical complexity at the workplace in car garages (introduction of new machines, diagnostic technologies).
3. Increasing competitive pressure on limited brand-authorized car garages in the country.
4. The existence of unskilled mechanics in most of our car garages and as a consequence of this, the demand for garages to acquire basic knowledge of Autotronics that can be used for maintenance and troubleshooting for different brands.
5. While large car garages with exclusive contracts with major car brands are responding to the growing demands for employee qualification with more extensive training budgets and systematic continuing education courses, the small and medium size garages are at a structural disadvantage in terms of staff training and development, due to limited financial and staffing resources.

To address these challenges and to fill the gap between the current state of car servicing and the skill manpower requirements, the Autotronics course needs revitalising to meet up the skill manpower demand of small and medium sized car garages and so-called roadside car mechanics garages.

The challenges of TVET in Nigeria

There are numerous challenges facing TVET in Nigeria which has affected negative both our national life and development, among the challenges are:

- **Negative public perception to TVET:** The TVET in Nigeria has a very low image a there is the need for a turn around on its perception of public acceptance. Perso are still seeing TVET as a programme of dropouts or for people with low cogni ability in schools.
- **Government negative attitudes/poor funding:** The three tiers of Government Nigeria have not fully come to appreciate the contributions of TVET to nation economic development even though it is an indispensable tool for tackli unemployment and poverty in the society. This is because successive governmen have not found it necessary to adequately finance both the planning a implementation of standard and sustainable TVET programmes in the country. support of this statement, Okeke and Eze (2010) and Okorie (2001), stated th insufficient finance is a realistic and practical factor inhibiting the implementation TVET programmes.
- **Inadequate/shortage of TVET teachers:** Most tertiary institutions across the count are inadequately staffed both qualitatively and quantitatively. In most departmen especially in TVET programmes, the number of qualified TVET teachers for ea specialised area is in short supply. Oluwale, Jegede and Olamade (2013) stated th attracting qualified staff into teaching and teacher training in TVET was a proble for most countries including Nigeria.
- **Lack of adequate infrastructural facilities and equipment:** Most technical a vocational education departments in higher institutions do not have well-equipp laboratories, workshops and usable infrastructures. Where they exist, they a grossly inadequate, obsolete and in a dilapidated state. Oduma, (2007) posited th what is seen and referred to as TVET laboratories/workshops in various institutio today are eye sores as the laboratories/workshops only have items or equipme that were provided as at the point when the departments were established. Doku and Dokubo (2013) indicated that only 40% of tertiary institutions in Nigeria ha laboratories/workshop spaces for TVET. They further stated that 60% of oth institutions do not have laboratories/workshop spaces and this contributes to t low quality of TVET programmes in higher institutions.
- **Non-uniformity of course contents:** Most of the Nigerian universities and colleg that offer TVET programmes do not have uniform course contents. Non-uniform in the course contents usually creates problems for students who may wish transfer to another institution to complete their studies.

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