

# Technical and Vocational Education and Training (Tvet): Model for Addressing Skills Shortage in Nigerian Oil and Gas Industry

AYONMIKE. CHINYERE SHIRLEY\*

DEPARTMENT OF TECHNICAL AND BUSINESS EDUCATION DELTA STATE UNIVERSITY ABRAKA, NIGERIA

\*Corresponding author: [chinyereshirley@gmail.com](mailto:chinyereshirley@gmail.com)

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**Abstract** The purpose of the study is to ascertain the role of TVET stakeholders and the oil and gas industry in addressing skills shortage in the Nigerian oil and gas industries. Survey research design was used in this study and 300 respondents were drawn from TVET departments in tertiary institutions and technical colleges in Delta State, Nigeria. Two research questions were asked and two Null hypotheses were stated. A questionnaire was used for data collection. The questionnaire was validated by three lecturers. Using test-retest method, Cronbach reliability coefficient of 0.81 was obtained. Data were analysed using mean for research questions and ANOVA at 0.05 level of significance for testing hypotheses. The study revealed amongst others that TVET stakeholders should identify the area of skills needs of oil and gas industry, review TVET curriculum content by integrating oil and gas courses into TVET programmes and the introduction of intensive oil and gas practical and training for TVET teachers and students through an effective partnership between TVET institutions and oil and gas industries in Nigeria. Hence it was recommended that there should be collaboration between TVET institutions and oil and gas industries.

**Keywords:** TVET, skills-shortage, oil and gas industry, & Nigeria

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## 1. Introduction

The Nigerian oil and gas industries have contributed immensely to the nation's economic development, due to the fact that the major source of revenue is from petroleum crude. According to Peek, Fenard, Gantes, and Theiler (2008b), oil exploration in Nigeria dates back to 1908 with the discovery of oil at Araromi in the present Ondo State. A German company (Butmen Corporation) started producing oil but this was short-lived because of the outbreak of the 1914 – 1918 First World War. The Anglo-Dutch Consortium later began to explore oil in the year 1937 and the company became the forerunner of the present day Shell D'Arcy. The company was awarded the sole concessional rights that covered the whole territory of Nigeria. It operated under the Mineral Oil Ordinance, Number 17 of 1914, and its amendments of 1925 and 1950, which allowed only companies registered in Britain, or any of its protectorates, the rights to prospect for oil in Nigeria. The Ordinance stipulated that the principal officers of such companies must all be British subjects. However, the (1939-45) Second World War interrupted the exploratory activities of Shell D'Arcy. But, after the War, Shell and British Petroleum (BP) carried out a preliminary geological reconnaissance and conducted

geographical surveys. It drilled its first wildcat well in the year 1951, which later dried up.

In the year 1956, Shell and British Petroleum (BP) discovered oil fields that were economically viable, in the tertiary sediment in the Delta basin in Oloibiri near Port-Harcourt. Production began in 1958 with 6,000 barrels per day. In order to increase oil exploration and to ensure that the country would not become dependent on one particular oil company or country, Shell's sole concessional rights over the country were reviewed and, as a result, exploration rights were granted to companies of other countries. Oil companies such as Mobil, Gulf, Agip, Safrap (ELF), Tenneco and Amoseas (Texaco/Chevron) were allowed to explore oil in both the onshore and offshore areas of Nigeria. Nevertheless, Shell has remained an important actor and today it still produces approximately forty (40) percent of the country's oil. (Peek, Fenard, Gantes, & Theiler, 2008b).

When Nigeria gained independence in 1960, it was exporting over 170,000 barrels per day. It was the Gulf Oil Company that first struck oil offshore, on the Okan Structure of Bendel State in 1964. Several licenses had been granted to companies for both offshore and onshore exploration and production. Oil production expanded and started to make an impact on the rest of the economy. However, with growing competition for the control of oil revenues, ethnic rivalries became more intense. Oil produced before the mid sixties were exported in crude

form because there were no local refineries. Domestic demand for petroleum products was met by imports. The indigenous Concession Programme was established with the aim of retaining ownership and control of indigenous concessions in Nigerian hands and thereby encouraged the growth of local expertise in the exploration, development and operations.

The first set of indigenous grants was handed out in the 1970s and 1980s to the Henry Stevens Company, Nigus Petroleum and Niger Delta Oil Co. Later in 1987, Dubril Oil acquired a concession by assignment from Philips Oil Company Ltd. However, the need to conserve foreign exchange and to create jobs prompted the government to establish a refinery in Port-Harcourt in 1965. Its processing capacity was initially 35,000 barrels per day (bpd), which later increased to 60,000 bpd (Peek, Fenard, Gantes, & Theiler, 2008b). In 1974, British Petroleum was nationalized by the Nigerian government. Its close commercial relation with Apartheid South Africa was cited as the sole reason. During the 1970s, local demand for oil rose and outstripped supply. This made the government to decide to open a new refinery in Warri in 1978. The Warri Refinery had a total capacity of 100,000 bpd. Today Nigeria's capacity to refine is 260,000 bpd, including the input from the third refinery at Kaduna.

So many reforms, policies, regulations and the recent Local Content Act have led to the establishment of various indigenous Oil and Gas Servicing and Exploration Companies in the country. Some of these include; Seplat Petroleum Development Company Ltd, Lonestar Drilling Company, Adadrill Ltd, Anadrill Ltd, Ariboil Company Ltd, Baker Hughes Nig. Ltd, Deutag Nig. Ltd. Ecodrill (Nig) Ltd, Global Offshore Drilling Ltd, Mallard Bay Drilling Nig Ltd and so on. The Federal Government participates in the oil industry through its Nigerian National Petroleum Company (NNPC) which was formed in 1977. It inherited the commercial activities of the Nigerian National Oil Corporation (NNOC) established in 1971, and developed a supervisory/regulation role through the Federal Ministry of Petroleum Resources. (Peek, Fenard, Gantes, & Theiler, 2008 b).

In the year 1991 Professor Jubril Aminu, the Minister of Petroleum at that time, awarded major concession blocks to Nigeria entrepreneurs, eleven in all. This was followed by another round of allocations in 1993, and eventually resulted in more than 40 indigenous Exploration and Production (E&P) companies holding Oil Prospecting Licenses (OPLs) under the programme. In 1999, OPLs for nine blocks were awarded and subsequently cancelled. Finally, during the year 2000, 22 blocks were offered to the entire industry, both onshore and offshore, through a process of competitive bidding (Peek et al, 2008b). According to Financial Times (2005), as cited in (Peek, Fenard, Gantes, & Theiler, 2008a), the oil and gas industry is enjoying a major boom because of an unprecedented rise in energy prices. At the same time, the industry is undergoing dramatic, if not unprecedented change (Cazalot, 2007). For example, geopolitical relationships are more rapid than ever before, new competitors are emerging with many new start-up companies on the horizon and a wave of acquisitions of companies and assets, environmental concerns are rising. Last but not the least, the industry is increasingly facing

shortages of skilled personnel (Peek, Fenard, Gantes, & Theiler, 2008a).

According to Peek, Fenard, Gantes, and Theiler (2008a) the causes of the skills shortage in oil and gas industry in Sub-Saharan Africa include;

- Lack of educational facilities.
- Lack of vocational and technical training
- School accreditation is not provided: Oil and gas companies require that local schools and universities are accredited internationally. As a result, graduates in geophysics, petroleum engineering, and petroleum chemistry from Nigerian universities and the Petroleum Training Institute in Warri are not deployed on oil rigs but, if they get hired, they work in back offices.
- Ever increasing demand for higher skilled workers: Another factor contributing to the skill shortage is that oil and gas production uses increasingly advanced technologies and production techniques which require a workforce with a continually increasing level of skills (UNCTAD, 2007). Demand for skilled workers at the higher end of the skills range is rising very fast. But these are the professions where the skills shortage is the largest. Employment of semi-skilled local workers, which is more readily available, has been declining as the demand for higher skills has increased.

More so, Ayonmike (2012) posited that the causes of skills shortage of oil and gas industries include;

- Curriculum content of educational institutions
- Poor review of educational curriculum to meet the skills needs of the oil and gas industries.
- Lack of qualified oil and gas instructors
- Low numbers of local oil and gas trainers and consultants.
- Lack of fund to attend oil and gas training seminars, workshops and courses because of the high registration fees.
- Mandatory acquisition of international oil and gas certificates by local job seekers.

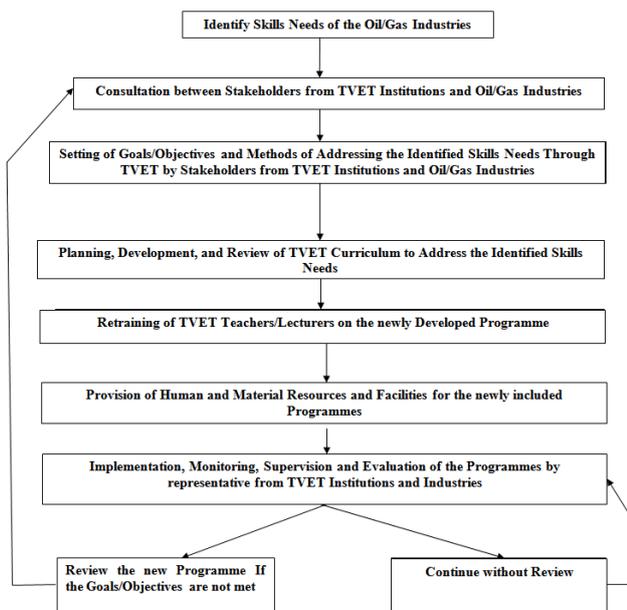
These skills shortage in oil and gas industries in Nigeria can be address through technical and vocational education and training (TVET). According to UNESCO and ILO (2002) TVET is that aspect of the educational process involving in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of the economic and social life. TVET is aim at producing semi skilled and technical manpower necessary to restore, revitalize, energize, operate and sustain the national economy and substantially reduce unemployment (Wodi, 2012). In support, Ayonmike (2012) posited that TVET can play an active role in addressing the skills shortages in the oil and gas industry in Nigeria through the following;

- Reviewing TVET curriculum by including oil and gas content in the curriculum.
- Retraining of TVET teachers and instructors on oil and gas courses.
- Provision of required and adequate oil and gas training facilities in Technical and Vocational Education and Training Institutions.

- Partnering oil and gas industries for co-operative and joint training of Prospective TVE graduates.
- Provision of adequate funds.
- Establishment of Oil and Gas TVET training centres across the nation.
- Intensive practical training and collaborative efforts of the state government, international organisations, national governments and oil and gas exploration and production companies across the globe, amongst others.

## 2. Conceptual Model

The Ayonmike proposed model (See Figure 1) was used to guide the study. This model has seven steps which are all vital to the success of the collaboration between TVET institutions and oil/gas industries in order to address the skills needs in the Nigerian oil/gas industries. A critical review of the proposed model suggested that both stakeholders from TVET institutions and oil/gas industries need to work together to address the identified skills needs through collaboration.



**Figure 1.** Proposed Ayonmike Conceptual Model for Addressing Skills Shortage in Nigerian Oil and Gas Industries (ACM-ASS-NOGI)

## 3. Statement of the Problem

Nigerian oil and gas industries have been the life wire of the nation's economy, since the major source of revenue is from petroleum resources. This sector needs highly skilled manpower in order to meet up with the global and increased demand for energy. The oil and gas industries have not been able to satisfy the global and increased demand for energy as a result of skills shortages in the national component of the oil and gas industries, particularly in Nigeria. Therefore, this study is set to ascertain the role of TVET in addressing the skills shortage in the Nigerian oil and gas industries.

## 4. Significance of the Study

This study will be significant to oil and gas industries, curriculum planners, technical and vocational education teachers, students, educational administrators, Federal and State Ministry of Education, National Board for Technical Education (NBTE), and the general public since the findings of the study will expose the various roles of TVET stakeholders and oil and gas industries in addressing the skills shortages in Nigerian oil and gas industry.

## Purpose of the Study

The purpose of this study is to ascertain the role of TVET stakeholders and the oil and gas industry in addressing the skills shortage in the Nigerian oil and gas industries.

## 5. Research Questions

The following research questions were raised to guide the study:

1. In what way can TVET stakeholders address the skills shortage in the Nigerian oil and gas industries?
2. In what way can oil and gas industries address the skills shortage in the Nigerian oil and gas industries?

## 6. Hypotheses

The following hypotheses were stated to guide the study:

1. There is no significant difference in the mean response of TVET lecturers from tertiary institutions and TVET teachers from technical colleges on what TVET stakeholders can do to address the skills shortage in the Nigerian oil and gas industries.
2. There is no significant difference in the mean response of TVET lecturers from tertiary institutions and TVET teachers from technical colleges on what oil and gas industries can do to address the skills shortage in the Nigerian oil and gas industries.

## 7. Methods and Procedure

The survey research design was used in this study. The researchers considered this design appropriate since no variable was manipulated in this study. The population comprised of all the technical and vocational education (TVE) lecturers in tertiary institutions and technical colleges in Delta State. One hundred TVE teachers from technical colleges and 200 TVE lecturers from tertiary institutions in Delta State were used as sample for the study. Data were collected using a structured questionnaire titled "Addressing the Skills Shortage in Nigerian Oil and Gas Industry Questionnaire" (ASSNOGIQ) developed by the researcher. The (ASSNOGIQ) was divided into two parts. The first part sought information on selected personal data of the respondents. The second part had sections A and B consisting of 14 items relevant for answering research questions posed in the study. The response format of (ASSNOGIQ) sections were based on a four-point scale

pattern of Strongly Agree (SA=4), Agree (A=3), Disagree (D=2) and Strongly Disagree (SD=1).

The instrument was content and face validated by three lecturers from the Department of Technical and Business Education, Delta State University, Abraka, Delta State of Nigeria. The experts agreed that the instrument was relevant and appropriate. As a result of their comments, some items were restricted to produce the final instrument. To determine the reliability of the instrument, twenty (20) copies of the questionnaire were administered twice with an interval of three weeks to vocational educators from technical colleges and tertiary institutions in Edo State, Nigeria who were not part of the sample of this study. The test retest method was used to ascertain the reliability of the instrument using Cronbach alpha technique. The correlation coefficient obtained was 0.81 which was high and above the recommended acceptable value of 0.7 for good reliability (Nunnally, 1978). Therefore, the instrument was regarded as reliable enough for use in data collection for the study. The researcher with the assistance of six research assistants administered the questionnaire on the respondents and collected the questionnaire on the spot, thus recording a hundred percent return rate. The

mean was used to analyze the research questions, while the Analysis of Variance (ANOVA) was used to test the hypotheses at 0.05 level of significance, the reason for using ANOVA is that the respondents used in this study are from three levels of TVET institutions, since ANOVA can be use to compare mean of three or more groups. Mean values of 2.50 and above were accepted while mean values below 2.50 were rejected. Also, it was decided that where the f-calculated value was equal or greater than the table f-value, it indicates significant difference; the null hypothesis is rejected but if otherwise, the null hypothesis is accepted. All statistical analyses were performed with statistical package for social sciences (SPSS) software

### 8. Results

The results are presented in the order of the research questions and hypotheses.

**Research Questions 1:** In what way can TVET stakeholders address the skills shortage in the Nigerian oil and gas industries?

**Table 1. Shows the responses of respondents from tvet departments in tertiary institutions and technical colleges on stakeholders roles in addressing the skills shortage in Nigerian oil and gas industries**

S/N	Item Statement	Universities N=100		Colleges of Education N=100		Technical Colleges N=100	
		Mean	Remark	Mean	Remark	Mean	Remark
1	Reviewing TVET curriculum by including oil and gas content in the curriculum.	3.00	Agree	3.34	Agree	3.80	Agree
2	Retraining of TVET teachers and instructors on oil and gas courses.	3.18	Agree	3.40	Agree	3.24	Agree
3	Provision of required and adequate oil and gas training facilities in TVET institutions.	3.39	Agree	3.25	Agree	3.53	Agree
4	Partnering oil and gas industries for co-operative and joint training of prospective TVE graduates.	2.82	Agree	3.18	Agree	3.46	Agree
5	Provision of adequate funds.	3.50	Agree	3.28	Agree	2.83	Agree
6	Establishment of oil and gas TVET training centres across the nation.	3.49	Agree	3.27	Agree	3.26	Agree
7	Intensive practical training in TVET institutions	3.35	Agree	3.43	Agree	3.05	Agree
8	Introduction of competency base training approach in TVET institutions	3.66	Agree	3.10	Agree	3.31	Agree

Table 1 revealed that TVET stakeholders can address the skills shortage in Nigerian oil and gas industries by reviewing TVET curriculum by including oil and gas content in the curriculum; retraining of TVET teachers and instructors on oil and gas courses; provision of required and adequate oil and gas training facilities in TVET institutions; partnering oil and gas industries for co-operative and joint training of prospective TVE

graduates; provision of adequate funds; establishment of oil and gas TVET training centres across the nation; intensive practical training in TVET institutions; and the introduction of competency base training approach in TVET institutions.

**Research Questions 2:** In what way can oil and gas industries address the skills shortage in the Nigerian oil and gas industries?

**Table 2. Shows the responses of respondents from tvet departments in tertiary institutions and technical colleges on oil and gas industries roles in addressing the skills shortage in Nigerian oil and gas industries**

S/N	Item Statement	Universities N=100		Colleges of Education N=100		Technical Colleges N=100	
		Mean	Remark	Mean	Remark	Mean	Remark
9	Provision of training facilities for TVET teachers and students	3.14	Agree	3.20	Agree	3.64	Agree
10	Provision of scholarship to TVET teachers and students	3.24	Agree	3.38	Agree	3.31	Agree
11	Provision of research grant to TVET teachers	3.28	Agree	3.30	Agree	3.45	Agree
12	Retraining of TVET teachers	2.88	Agree	3.20	Agree	2.98	Agree
13	Make the areas of skills needs known to TVET institutions	3.44	Agree	3.32	Agree	3.24	Agree
14	Establishment of special oil and gas TVET institution in all the states in Nigeria	3.29	Agree	3.49	Agree	3.02	Agree

Table 2 revealed that oil and gas industries can address the skills shortage in Nigerian oil and gas industries by provision of training facilities for TVET teachers and students; provision of scholarship to TVET teachers and students; provision of research grant to TVET teachers; retraining of TVET teachers; make the areas of skills

needs known to TVET institutions; and establishment of special oil and gas TVET institution in all the states in Nigeria.

**Hypothesis 1:** There is no significant difference in the mean response of TVET lecturers from tertiary institutions and TVET teachers from technical colleges on what

TVET stakeholders can do to address the skills shortage in the Nigerian oil and gas industries.

**Table 3. Shows the analysis of variance of responses of respondents from tvet departments in tertiary institutions and technical colleges on stakeholders roles in addressing the skills shortage in Nigerian oil and gas industries**

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig
Between People		.154	7	.022		
Within People	Between Items	.003	2	.002	.021	.979
	Residual	1.097	14	.078		
	Total	1.101	16	.069		
Total		1.255	23	.055		

Table 3 revealed that the f-calculated value was 0.021, while the f-critical value was 4.28 at 0.05 level of significance under degree of freedom 23. Therefore hypothesis 1 was accepted since f-calculated value is less than f-critical value. This implies that there was no significant difference in the mean response of TVET lecturers from tertiary institutions and TVET teachers from technical colleges on what TVET stakeholders can

do to address the skills shortage in the Nigerian oil and gas industries.

**Hypothesis 2:** There is no significant difference in the mean response of TVET lecturers from tertiary institutions and TVET teachers from technical colleges on what oil and gas industries can do to address the skills shortage in the Nigerian oil and gas industries.

**Table 4. Shows the analysis of variance of responses of respondents from tvet departments in tertiary institutions and technical colleges on oil and gas industries roles in addressing the skills shortage in Nigerian oil and gas industries**

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig
Between People		.230	5	.046		
Within People	Between Items	.032	2	.016	.493	.625
	Residual	.329	10	.033		
	Total	.361	12	.030		
Total		.591	17	.035		
Grand Mean = 3.2667						

Table 4 revealed that the f-calculated value was 0.493, while the f-critical value was 4.45 at 0.05 level of significance under degree of freedom 17. Therefore hypothesis 2 was accepted since f-calculated value is less than f-critical value. This implies that There was no significant difference in the mean response of TVET lecturers from tertiary institutions and TVET teachers from technical colleges on what oil and gas industries can do to address the skills shortage in the Nigerian oil and gas industries.

governments should adequately provide oil and gas training facilities for TVET training institutions.

- Retraining of TVET teachers and instructors on oil and gas courses by professionals in the oil and gas fields.
- Introduction of intensive oil and gas practical training through collaborative efforts of oil and gas industries and TVET training institutions in the country.

## 9. Conclusion and Recommendations

Based on the findings of the study, it was concluded that TVET stakeholders and oil and gas industries in Nigeria has a significant role to play in addressing the skills shortage in the Nigerian oil and gas industry by providing an enabling environment, resources, and dynamic TVET curriculum that embraces oil and gas exploration and production skills needs. These could be achieved through adequate funding of TVET institutions, retraining of TVET teachers, provision of scholarship for TVET teachers and students, resource sharing between TVET institutions and oil and gas industries, and collaboration between TVET stakeholders and oil and gas industries in addressing the skills needs in the oil and gas industries. It is, therefore, recommended that the following measures, if well articulated and implemented will help address the skills shortages in the oil and gas industries in Nigeria.

- TVET curriculum planners should identify the skills needs of oil and gas industries and review TVET curriculum to address the skills needs.
- The federal government, oil and gas industries, international organisations and various state

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