



# National Curricula and Training Needs of the Nigerian Petroleum Industry

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### **Abstract**

*This paper reviews Nigeria's past, where she is, where she ought to be and how to evolve an efficient and effective education and learning system – the type that will be able to meet the ever-changing demands of the petroleum industry in particular and the needs of a nation desirous of industrial and scientific breakthrough. The quality of technical and engineering education in Nigeria has been plagued by different curriculum-related challenges. These challenges have affected the quality, growth and development of the petroleum industry. The educational curriculum has become inadequate for the training of personnel for the industry. To a large extent the level of expertise in Nigeria lacks the dynamism required to match the pace of the ever-changing technology needed in the industry. Lack of appropriate investment in human capital development in the technical and engineering fields have contributed significantly to the failure of various National plans and development strategies. As a consequence Nigeria is experiencing serious human resources constraints in the petroleum industry. This paper evaluates knowledge acquisition, the constraints and the possibilities of creating new human-resources capacity for the industry. We submit that a re-orientation of existing training institutions in terms of skills-development strategy will help create the base for new careers and career opportunities for those working in, or aspiring for careers in the industry.*

**Keywords:** curriculum, training, petroleum industry, institutions.

### **Introduction**

The Nigerian petroleum industry needs to embark on an aggressive curriculum, training and development programme in order to increase the size and skill level of its national workforce. There is an acute local skill shortage in the petroleum industry. This can be attributed to years of reliance on foreign skills to prop up the country's energy sector. Today, the country lack mentors who would train the young and upcoming professionals in the industry. The nation also needs to extend the training to industry training providers.

Some of the serious challenges of the educational sector include the national curriculum, inadequate and ill-trained teaching staff, ill-equipped libraries, laboratory equipment and facilities, industrial training experience of staff and industrial training arrangement for students, and foundation level training. Students who aspire to acquire higher education and specialized skills should have a strong background in the fundamental subjects and language<sup>1</sup>. A solid foundation is required for successful educational knowledge and practice.

The Nigerian Petroleum Industry Local Content Development Act is the cumulative result of decades of attempts by the government and stakeholders in the petroleum industry to ensure that the industry provides local value and maximized benefits to

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Babalola J. B. and Okediran A. (1997) Functions of management. An Overview of Tertiary Education Institutions in Nigeria. Journal of Research in Education. 1(1):17-24.

Nigerians<sup>2</sup>. For fifty five years since the discovery of oil in Nigeria, the petroleum industry has functioned as an “enclave” economy, with very little linkages and contribution to the wider Nigerian economy. Previous efforts to give effect to the local content policy include establishment of various research, development, training, education and support funds; provisions in the Petroleum Act on mandatory employment and training of Nigerians by petroleum operators, provisions on technology transfer, local content utilization, recruitment and training of Nigerian personnel contained in various contractual arrangements with international oil companies (IOCs) and the establishment of a Nigerian Content Division (NCD) of the Nigerian National Petroleum Corporation (NNPC) to monitor and give effect to government’s Nigerian content policy.

### **National Curriculum**

The government of Nigeria has never had a sustained focus on the development and application of engineering and technology for transforming its national economy. Furthermore, the education curriculum was not designed to deliver leadership base in science and technology.<sup>3</sup> The result is deficiency at all levels of curriculum development both in terms of relevance and setting the foundation needed for technological advancement. It is a delight to note that in recent times, the National Education Research and Development Commission (NERDC), National Universities Commission (NUC), National Board for Technical Education (NBTE) and National Commission of Colleges of Education (NCCE) have started taking steps to update curricula for levels specific to their mandates.<sup>4</sup> These efforts need to be fast-tracked since the bureaucracy involved delay release of the revised curricula, making them obsolete at the time of approval. The expedient way to go is to load the curricula with enduring skills rather than contents which become outdated by the year.

### **Technical and Vocational Education**

Effort is made here to highlight the major issues and challenges of the Educational sector that should provide a “road map” for national policy dialogues and concerted action for the purposeful development of the sector, within the overall context of needs and the on-going reform agenda of the Federal government<sup>5</sup>. These issues and challenges are as follows:

1. While the National Policy on Education intends to make many students to be technologically literate, the two areas of concern here are that:
  - After the Junior Secondary School, most students have nothing more to do with technical education; and
  - At virtually all levels, technical and vocational education is not adequately backed up with enough human and material resources. These must be properly addressed.

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Tolulope A. (2010) A Review of the Nigerian Petroleum Industry Content Development Act, 2010. Columnist Weekly. The Nigeria Business.com

Egbogah O.E. (2010) The Role of Technology in National Development. SPE Talent and Technology. Society of Petroleum Engineers. [www.spe.org/spe-app/spe/tt/vol1/no2/tech.htm](http://www.spe.org/spe-app/spe/tt/vol1/no2/tech.htm)

Okebukola P. A. (2010) Whither Education in Nigeria? Nigerian

<sup>5</sup> Obanya P. A. I. (2005) Nigeria Education Sector Diagnosis. A Framework for Re-engineering the Education Sector. Education Sector Analysis Unit, Federal Ministry of Education. Nigeria.

2. On access, the very small proportion of students in the technical colleges, polytechnics and technical colleges of education should be squarely addressed.
3. Some special measures would need to be taken to promote female participation in technical and vocational education.
4. There is a need to enhance the place of Information and Computer Technology (ICT) on the Junior Secondary school (JSS) curriculum so that every student would be Information Technology (IT) competent for life.
5. The low status of technical and vocational education should be addressed through appropriate policy incentives.
6. The issue of little private sector involvement in technical and vocational education should be addressed.
7. Technical and vocational education is severely underfunded.

### **Higher Education**

**Minimum qualification for teaching:** The NUC minimum standard of a PhD for teaching in the Nigerian university system from the Lecturer Grade II position and above should be embraced and implemented with vigour. While a 2009 deadline was set, perhaps a slight shift to 2015 will allow those who are currently making efforts to upgrade to complete their doctoral programmes. In addition, the NUC programmes and those of the universities to support training of young academics for PhD would have sufficiently flowered from 2012. A shift for enforcement to 2015 should be the last since the minimum standard of PhD was agreed by the Nigerian university system as far back as 1989.<sup>6</sup>

**Training in Research Skills:** Research skills need to be continuously upgraded in the light of the flux in research techniques and modernity of equipment.<sup>7</sup> At least once every two years, all higher education academic staff should have an opportunity for research skill upgrading.

### **Poor Curricula Delivery**

Quality in education has been lowered by poor curriculum delivery. Harsh and intimidating classroom interactions engender fear in pupils and hatred for school. Over 40% of primary 4 pupils sampled in the Monitoring and Learning Achievement (MLA) study in 1996 adduced their dislike for school to poor teaching methods and intimidation by the teacher, including caning. Classroom transactions are usually in the form of four dimensions of interaction: teacher-pupil; pupil-pupil; teacher-material; and pupil-material. The four modes of interaction occurring simultaneously as teacher-pupil-material interactions are preferred in a constructivist learning setting. However, what predominates in most classrooms from primary through to postgraduate is the lecture, unidirectional mode. At the concrete operational stage of cognitive development where

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Adesoji A. O. and Alade I. A. (2010) Towards Improving the Status of Higher Education in Nigeria. Academic Leadership. The Online Journal. Volume 8 Issue.

Olafuyi O. A., Chukwuma M. C. and Adewole E. S. (2010) A Review of Petroleum Engineering Education Curriculum in Nigeria. Journal of Education and Sociology. Pp15-20.

most primary and secondary school students belong, this mode of instruction contraindicates meaningful learning.<sup>8</sup>

### **Teacher Quality**

There is an urgent need to double the current rate of teacher production at the basic and higher education levels. This is obviously a tall order given the aversion of candidates for certificates, diplomas and degrees in education. However, through a battery of incentives, enrolment into teacher training institutions at all levels can be bolstered. These incentives include:

- (a) Reducing by half the current tuition for training in education in colleges of education, polytechnics and universities;
- (b) Automatic bursary awards for all education students; and
- (c) Enhanced post-graduation salary package for teachers.

### **Student Intake**

***Avoid Admitting Students without five SSCE Credits:*** The admission requirements should be categorical in excluding candidates who do not have five credit-level passes in the Senior School Certificate Examination (SSCE). In some universities, consideration is given to candidates who have three SSCE credits and two Nigeria Certificate of Education (NCE) merits.<sup>9</sup> This consideration should be scrapped.

***Limiting the Number of Sandwich/Part-time Students:*** It has been found that over 60% of the poor quality teachers in the secondary school system are trained through Sandwich and Part-time programmes.<sup>10</sup> In order to improve quality, the number of such candidates admitted into Faculties of Education should be reduced drastically.

### **Access to University Education**

First, we must set a national goal indicating our higher education participation rate (HEPR). In simple terms, HEPR is the proportion of eligible population who have access to higher education. Africa's higher education participation rate is currently 10% while in the United States and Europe, it hovers around 50– 60%. South Africa is 18% with a plan to push it to 20% by 2012. Britain has set 50% as its HEPR. Data computed from UNESCO Institute of Statistics sources put Nigeria's HEPR at about 8%.<sup>11</sup>

Nigeria should set 20% as a target to be met by 2020. To meet the 20% target, we need to achieve at least 10% annual growth in enrolment. The solution, however, is not to admit many more students into the present under-resourced universities. By doing so, we shall end up with degree mills and depressed quality of graduates. The solution is a planned and phased expansion.

### **Social Vices**

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<sup>8</sup> Adesoji, Op. cit

<sup>9</sup> Ibid.

<sup>10</sup> Okebukola, 2010, Op. Cit

<sup>11</sup> Ibid

Examination malpractice, cultism, and sexual harassment are social vices that have crept from the larger society to our educational system. These vices, especially examination malpractice are exerting toll on the quality of products from the system.

### **The Way Forward**

The next important road to travel is the strategy to be adopted for achieving educational targets. The goal here is not to suggest solutions to all the problems bedevilling the educational system. The intention is to focus on those issues impacting more on quality delivery of education. Reforms are proposed in the following selected areas:

- Teacher Quality, Quantity, Certification and Welfare.
- Entrepreneurial education at all levels.
- Establishment of a National Quality Assurance System.
- Improving access to higher education.
- Combating degree mills.
- Reforms specific for the university system.
- Funding.
- Broaden the curriculum of research methodology to improve the research project writing skills.
- Strengthen and enforce higher weighting to practical to better equip science education graduates to carry out experimental research and simulations.
- Experienced professionals (teachers, principals, and inspectors) should be invited periodically to talk to teachers; this will stimulate and motivate their interest in teaching as a career.

### **Entrepreneurial Education at All Levels**

A key factor in propelling the economy is the promotion of entrepreneurial culture in the citizenry. The education sector provides the platform for inculcating entrepreneurial spirit and the learning experiences for entrepreneurial skill acquisition. While entrepreneurship should be a goal at the basic and higher education levels, it is only at the higher education level, especially the universities that attention is paid to entrepreneurial education. The NUC and NBTE have taken steps in promoting entrepreneurial education in the universities. While these efforts need to be strengthened, other levels of education should take cue from this lead.

### **Basic Training Needs of the Petroleum Industry**

For education, Nigeria spends an estimated 2.4% of its Gross National Product (GNP) while Sub-Saharan Africa as a whole spends 5.1%.<sup>12</sup> In Nigeria, primary education enrolls 81% of the relevant age group and graduates 69% of these. Therefore, just over half of all children complete primary school. School drop-out rates have been rising and educational standards have reportedly declined.<sup>13</sup> Secondary education enrolments grew at roughly

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Anieku N. and Ozochi C.A. (2010) Restructuring Education, Training and Human-Resource Development in the Nigerian Construction Industry. *Journal of Science and Technology Education Research* Vo. 1 (5) pp. 92-98.

Onweh V.E. (1997) Science and Technology Education in the Past Decade in Nigeria: Policy, Practice and Prospects. In: K.A. Salami et al. (eds), *Technology Education in Nigeria*. Lagos: Nigerian Association of Teachers of Technology.

10% yearly during 1990s, but access remained constrained (less than half of secondary school age children attend school) and significant regional disparities in access are evident.

Technical education is substantially neglected by policymakers and oriented to the teaching of traditional hand skills that are often divorced from labour market requirements. Higher education enrolls a very modest 4% of the relevant age cohort. This level compares poorly with economic competitors such as South Africa (17%), India (7%), Indonesia (11%) and Brazil (12%).<sup>14</sup>

Since the education of technical and professional staffs to operate in the petroleum industry can only take off beyond this point, it is apparent that the education of professionals to man the industry is seriously hampered. Three basic reasons can be adduced for this trend of things:

1. The need for basic subsistence as a pre-requisite instinctive to man. In 1985, Nigeria's poverty line was such that the rural, urban and national levels were respectively 49%, 31.7% and 43%. Seven years later, although there was an improvement of 13% and 7% respectively in the rural and national levels, the urban level's improvement was marginal at 1.2%.
2. By international assessment at 1997, Nigeria was considered really poor as over 70% of her population lived on less than \$1 per day and over 90% lived on less than \$2.0 per day. Consequently, a substantial percentage of the educable population drop out to focus on subsistence.
3. There is a chronic lack of facilities to offer adequate education to all deserving and qualified Nigerians and consequently, another substantial percentage of the qualified population drop off due to lack of appropriate institutions to accommodate their educational needs.
4. Funding of the educational system in Nigeria has been identified as one of the most pervasive and the greatest challenge to education and the training of all categories of professionals in the country. Experts agree that the most serious problem facing the Nigerian educational system is the manner in which the sector is funded, organized, planned and administered. The United Nations Educational and Scientific Commission (UNESCO) approved standard budgetary allocation to education is 26% of the national budget and in appreciation of the key role of that sector in economic development. Nigeria has not been able to meet this minimum standard in the last 16 years and indeed the budgetary allocation to education has not risen beyond 10% since 1999.

Successive Nigerian governments have shown low level of interest on education as indicated by previous budgetary allocations. Not only is the training of petroleum industry workers of little interest in the government of Nigeria, but so is any other kind of training. The low investment privately accorded to education implies that the basic ground upon which individuals, firms or institutions could stand to undertake the discrete training of petroleum workers is very weak and the existing educational factor cannot be

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World Bank (2006) The Global Education Challenge: A View from the World Bank. Global Seminar Series 1 February, 2006. Washington DC.

maintained. The long term implication of this situation is extremely disturbing because a time will come when the populations who have been so denied their opportunity of meaningful training will be directly responsible for the continued functioning of not only the petroleum industry, but the country in general. This will indeed be a disaster.

### **Nigerian Petroleum Industry Content (NOGIC)**

The concurrent establishment of the Nigerian Content Development and Monitoring Board (NCDMB) with a clear mandate to superintend over all matters pertaining to Nigerian Content (NC) development in petroleum industry provides unfettered impetus for addressing the challenges of promoting indigenous participation in industry activities.<sup>15</sup>

To appreciate the significance of the Board's mandate towards realization of government's economic reform agenda, developing the petroleum industry as launch pad, it is important to highlight these challenges under the following broad perspectives:

- Excessive importation of goods and services at the expense of local participation resulting in otherwise avoidable impoverishment and alienation of the people. A major contributor to the Niger Delta situation.
- Performing the mega-projects of the industry abroad eliminates opportunities to develop human and infrastructural capacity in Nigeria. Capacity constraints in turn, limit the industry's ability to perform sufficient work scope in Nigeria when designing, procuring and fabricating facilities, plants and assets or for after sales support in the operations and maintenance phase.
- It is estimated that over 150 times more jobs are created in other countries than in Nigeria on the back of Nigerian products at the expense of National development. Apart from the obvious negative impact of unemployment on the economy, the nation is denied opportunities for industrialization and technology transfer.
- In absolute terms, less than 20% of \$18b average annual industry spending is retained in Nigeria. Such prolonged capital plight is a major factor for low economic performance, insignificant impact of the sector on the nation's Gross Domestic Product (GDP) and poor levels in local infrastructure investment despite heavy government expenditure in the sector.

Therefore, the mandate to the board to ensure that Nigerian content counts in all industry activities is very instructive. There is high public expectation that the board's implementation programmes will translate into measurable impact to improve cost effectiveness, create genuine employment opportunities and prepare local capabilities for industry operation.

### **Enhancing Technological Strength**

It is imperative to look at the Malaysian example. In the early and mid-1990s, the E&P Subsidiary of PETRONAS, the national oil company of Malaysia, began rapid growth and expansion in domestic and international operations in line with the national

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<sup>15</sup>Tolulope, 2010, Op. Cit

development imperative.<sup>16</sup> It therefore became necessary to emphasize the role of technology in the company's core business. A long-range strategic technologic plan was drawn to ensure that the company was constantly and consistently applying selected new and proven technologies that could add value to the company's business.

Egbogah<sup>17</sup> reports that PETRONAS instituted formal training to upgrade the staff's expertise and encourage attendance at conferences and courses, while its preferred method of acquiring technology was through strategic alliances and technology partnerships. The company sought partners that could make its business more competitive by helping to improve the quality and efficiency of the company's base operations. Research and Development (R&D) involved collaboration between Petronas Carigali, the field operator, and PETRONAS Research and Scientific Services to define research problems and supervise the commercialization of results. All research projects from which new technologies resulted were driven entirely by Carigali's E&P requirements, and various company departments served as project sponsors. There was no room for any research that was not directed at solving a company performance problem and for which no value was readily apparent.<sup>18</sup>

A technology partnership was not a standard contract format by a philosophy; it is an attitude toward a relationship, and a system that could be structured into a wide range of formats. The philosophy was to create collaboration between Petronas Carigali and vendor service companies to work in integrated teams applying technology to a Carigali project. Instead of direct purchase of any purveyor's technology, PETRONAS proposed applying the technology to the project, during which time Petronas Carigali would pay for the cost of contractor's staff participation plus the cost of acquiring the technology, but only at the successful completion of the project. The process would allow PETRONAS staff who participated in the project to gradually learn the technology, which resulted in effective technology transfer.

The oil industry plan was integrated into the Malaysian National Business Plan in what is known as "Vision 2020", a roadmap to the country's transformation to a developed nation by the year 2020.<sup>19</sup> The plan also seeks to improve in-country technical and business skills by investing in technical and business education, encouraging international companies operating in the country to integrate qualified local personnel into all aspects of development and operations, and emphasizing proficiency in international business languages. The plan further tries to leverage expertise and capital from international organizations to transfer knowledge and build in-country capabilities.

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<sup>16</sup> Egbogah, Op. Cit

<sup>17</sup> Ibid

<sup>18</sup> Ibid

<sup>19</sup> Ibid

### **Creating the Missing Generation: Training New Pipeline Engineers**

We are missing a generation of pipeline engineers. We just haven't trained them-but we have the capability to fill this gap if we spend some of the earning from the industry effectively.<sup>20</sup>

The petroleum industry is booming and profits are soaring, yet companies in the industry are now suffering from past downsizing and lack of recruitment, and most are complaining of shortage of both skills and people. Combine an ageing workforce with a poor image associate with engineering in general, and the petroleum industry's contribution to environmental damage, and it is no surprise that young staffs are only attracted to the industry just for earnings.

The pipeline business has the same problems. To meet this challenge we need to both maintain our existing highly skilled workforce, and fill the skill gaps, otherwise both safety and profits will suffer. This is because the greatest challenge in the next decade will be the maintenance, replacement and management of ageing pipelines: most of our huge Petroleum pipeline system is more than 40 years old.

### **Conclusion**

The need for educated and skilled population in the Nigeria of the 21<sup>st</sup> century is not just a matter of change but acute necessity. Technical and Vocational and Engineering curricula in Nigeria institutions are growing. The enthusiasm of both government and other stakeholders is undoubtedly high. However, much is still desired to upgrade the standard of this area of education to match the demands of modern ways of exploration, production and processing of petroleum delivery in good time and quality. The interest of government in education must be resuscitated in other to provide a basic framework upon which other contributors to education can invest. Economic activities in all fields of endeavour have demonstrated the potentials of the local workforce. The level of funding and exchange programmes between higher institutions of learning should be increased. The petroleum industry should collaborate with heads of relevant fields' departments in Nigerian tertiary institutions to effect changes in curricula when necessary.

Enforceable guidelines making it mandatory for every company of a defined minimum category to accept students on industrial training from tertiary institutions should be formulated and issued. The most sustainable way of meeting national objectives for international integration and prosperity is to invest in Nigerians through higher education: and the best starting point is through genuine reforms of the underpinning policy systems constraining the institutions.

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<sup>20</sup> Phil Hopkins (2010) Creating the Missing Generation: Training New Pipeline Engineers. The Iploca Newsletter. [phil-hopkins@newcastle.ac.uk](mailto:phil-hopkins@newcastle.ac.uk)