Petroleum Engineering Education in Nigeria – The Way Forward

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Abstract

Nigeria, blessed with enormous oil and gas reserves, is yet to experience development in her petroleum engineering (PE) related researches. Most researches are done overseas, specifically in the universities in the home countries of oil companies operating in Nigeria. This can be attributed to low level of manpower and facilities required for qualitative research in Nigerian Universities to meet the demand of the oil and gas industry.

Presently, there are six Universities offering petroleum engineering education in about 40 recognized Universities. How have they fared in their statutory objectives?

This paper examines the history of Petroleum Engineering Education (PEE) in Nigeria. It compares the present state of Petroleum Engineering Education in the country with some other Universities of the world.

The problems facing the departments were identified. Some of these are inadequate funding, lack of equipments and facilities for researches, poor salary structure for academic staff and low level of support from the petroleum industry in Nigeria. Government is reacting through creation of Petroleum Technology Development Fund (PTDF) to equip petroleum engineering departments in Nigeria. But, so far much success has not been recorded. It is recommended that International Partnerships Development Programs (IPDP) and International Petroleum Engineering Departments Exchange Programs (IPEDEP) could be used to enhance the curricula manpower and infrastructural development required for the development of this important engineering education. Furthermore, support from National University Commission (NUC) and oil companies operating in Nigeria needs to be strengthened and sustained.

Introduction

Petroleum Engineering Education is concerned with the teaching of application of earth and physical sciences to the evaluation and exploitation of subsurface oil and gas resources[3]. Therefore, the need for petroleum engineering department in an oil-producing country like Nigeria cannot be overemphasized. It provides the manpower requirements of the oil and gas industry.

The University of Ibadan, (UI) pioneered the establishment of petroleum engineering department in 1971 with the assistance of the Canadian Overseas Development Agency. In 1975 the University of Ibadan graduated the first batch of Petroleum Engineers. Five other Universities have later established petroleum engineering departments; viz: University of Benin (UNIBEN), University of Port Harcourt (UNIPORT), Federal University of Technology Owerri (FUTO), University of Uyo (UNIUYO), Rivers State University of Science and Technology (RSUST), Abubakar Tafawa Balewa University (ATBU) and Petroleum Training Institute (PTI). The number of graduates has continued to be on the increase[1].

The table below shows the entry requirements and degrees offered.

Institution	Entry Requirements	Degree/Certificate Offered
UI	OND, HND, 5-Credits including English and Mathematics	B.Sc., M.Sc., Ph.D
UNIBEN	OND, HND, 5-Credits including English and Mathematics	B.Eng., PGD
UNIPORT	OND, HND, 5-Credits including English and Mathematics	B.Sc., M.Sc., Ph.D
FUTO	OND, HND, 5-Credits including English and Mathematics	B.Sc., M.Sc., Ph.D.
ATBU	OND, HND, 5-Credits including English and Mathematics	B.Sc.
RSUST	OND, HND, 5-Credits including English and Mathematics	B.Sc.
UNIUYO	OND, HND, 5-Credits including English and Mathematics	B.Sc.
PTI	4-Credits including English and Mathematics	OND, HND

Table 1: Entry Requirements and Degrees Offered in PED in Nigeria

The following are some of the aims and objective of petroleum engineering education in Nigeria

- To provide training of manpower for the oil and gas industry.
- To provide or form a base for research and development in petroleum engineering and technology.
- Organize and conduct seminars and workshops to update and appraise trends in research and development in petroleum engineering and technology.
- In collaboration with the petroleum industry invent, through research, new economic methods and ways of producing the oil and gas.

Achievements of PEE in Nigeria So Far

Efforts have been used to achieve the above objectives. So far PEE in Nigeria:

- Sufficiently meets with the manpower requirement of the oil and gas industry.
- Has produced many graduates which have been found useful outside the country.
- Is now preferred by many Nigerians.
- Is now very dear to the Government which derives over 90% revenue from oil and gas.
- Has led to the rise in the indigenization level of the oil and gas industry.

However, Petroleum Engineering Education standard is dependent on the following:

- Highly qualified academic staff
- Equipment and facilities for research
- Functional laboratory for experimental work
- Conducive academic environment
- Salary of academic staff
- Infrastructure development, lecture rooms, student hostels etc
- Adequate funding
- Relevant textbooks and other teaching aids.

Problems Facing Petroleum Engineering Education (PEE) in Nigeria

Finance

Petroleum engineering education is capital intensive; funds are needed to meet the cost of

- Acquiring and maintenance of equipments
- Building physical facilities
- Books, journals, audio/video tapes etc
- Acquiring computer hardware and software
- Competitive salary structure.
- Staff training and development.

Presently, the main source of funds is from the Federal Government, which is not enough to meet up the minimum UNESCO 26% of annual budget. Government therefore set up Petroleum Technology Development Fund (PTDF) to bridge the gap created by the inability of government to sufficiently finance petroleum engineering education[5].

The fund was established by Decree 25 of 1973 to train Nigerians as professionals, technicians and craftsmen in the field of Engineering, Geology, Sciences and Management in Petroleum technology both in Nigeria and abroad. Unfortunately this programme has not met its primary objectives and aims. Presently it is trying to refocus and reposition the fund to meet the challenges posed by rapid changes in the industry.

Equipments and Facilities

In all PEDs in Nigeria, there are inadequate facilities and equipments. Many of these equipments are obsolete. It is almost impossible for PEDs to procure new and modern equipments for practical purposes due to inadequate funding.

Administrative equipments like photocopier, scanning machines teaching aids are expensive to procure, maintain and replace.

Computers and computing facilities are important part of the educational process. Staffs are not privileged to own personal computers in their offices, and students are not adequately exposed to its use.

Library

This is an essential tool for effective teaching, learning and research. It is difficult to have a textbook per course, whereas four textbooks to a course is ideal. There is absolute need to equip PED libraries[1].

Staff Strength, Competence and Working Conditions

Staff inadequacy is a major problem in most PEDs. Even the few ones available are not encouraged in terms of remunerations. Staff development is poor; there are no avenues for further training, attending conferences, workshops and exchange programmes. This can be attributed to low level of funding.

Curriculum

The curriculum is the heart of training in any discipline, and in order to assess the quality of graduates trained in any discipline, knowledge of the curriculum is often required. As it is, the curriculum is not meeting up with the changing needs of the oil and gas industry. Petroleum engineering is dynamic and hence curriculum should be able to keep up with new technology for the students to be adequately trained and prepared.

Enrolment / Admission Requirements

The facilities and equipments in most departments are designed for few students (15-30) but presently most PEDs enroll between (100-150) yearly as shown in Figure 1.

Admission requirement into PED includes: five ordinary level credits including English Language, Mathematics, Physics and Chemistry, in as much as two sittings combinations. Hence a student has the chance of writing SSCE/GCE several times, eventually combining two of the results in order to meet this requirement; this is not good enough! We need to reduce enrolment through more stringent requirements. The need of the industry in terms of manpower requirements has to be taken into consideration[6].

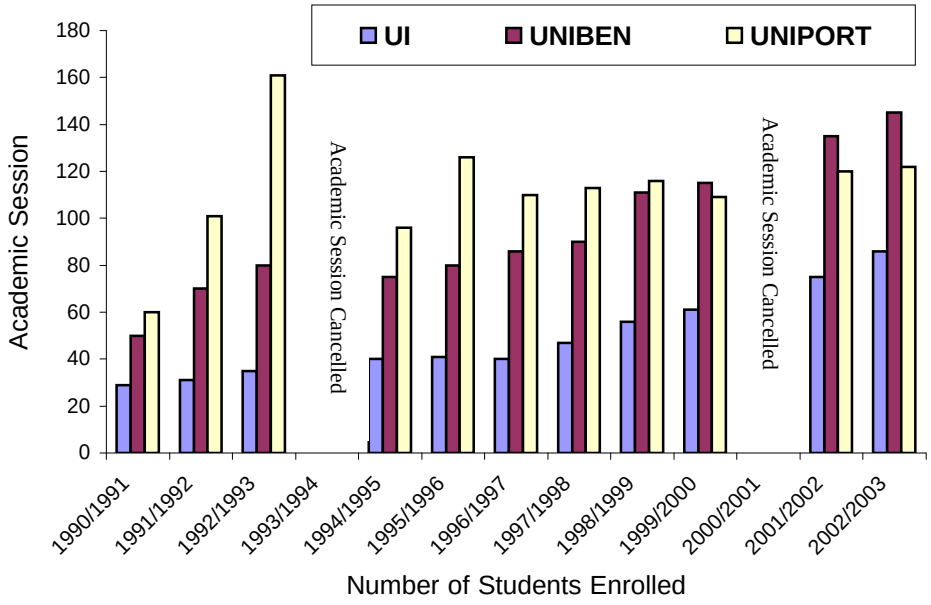

Figure 1: Sessional Enrolment of UI, UNIBEN AND UNIPORT.

Poor University / Industrial Relationship

Low level of interaction between the Universities and the oil industries is a major factor militating against the quality of PEE. Nigerian Oil industries are the major employers of Nigerian Petroleum Engineering Graduates but they do not show adequate concern as to what goes on in the departments. At the end of the day they pick the best of graduates they can and spend money retraining them to their own area of need. Worse still, from that there is no binding government policy on these industries as regards funding or any assistance to these Universities.

Attitude of the Students

This is one of the factors affecting the quality of PEE in Nigeria. Most students adopt a non-challant attitude towards the acquisition of new technical knowledge because over time the system has been static and dull. All they seem to be interested in is collecting their certificates. Also most of them do not really have the flair for engineering or the love for the course; since the graduates get employed in oil companies and earn fat pay they want to study the course, hence the increase in enrolment yearly[4].

Administration Policy of the Department

The department of PE has the Head of Department (HOD) as the chairman of the department. Unfortunately, only few HOD's are professors. In other departments, very few professorial seats have been instituted and are not enough to encourage and promote expertise in the area of Petroleum engineering. In some departments, where there are not many qualified persons, a Lecturer-in-Charge lesser than substantive HOD, is appointed to head the department. When the head is weak, then there is much to be desired. When the head of the department is qualified and has initiative there would certainly be a turn around and this will rub on the quality of graduates produced.

Effects of these Problems on PEE in Nigeria

Poor Quality Education

The immediate consequence of the present state is poor quality of PEE. The laboratories are inadequately equipped, the few equipments available are obsolete and non-functional just as teaching materials and books are not available. In this dilemma therefore, the teachers are inadequate in quality. The low international value of the Naira (Nigerian Currency) has compounded the situation in that even with government expatriate supplementary allowance, it has not been possible to recruit staff from outside our borders!

Brain Drain

In a situation where experienced lecturers cannot operate satisfactorily, either due to poor working conditions or poor salaries, there has been exodus of academicians from Nigeria to other countries.

Low Productivity

Most staff of PEDs in the country like other staff (academics) in the University community have very little motivation to do their best. As a result, the level of dedication and commitment on the part of engineering staff has continued to slide over the years and this has led to low productivity.

Non Accreditation

These deficiencies / problems are responsible for large percentage of engineering institutions and departments not being accredited by Council for Registration of Engineering in Nigeria (COREN) to run their programmes. Even the ones that are accredited stand the risk of loosing their accreditation if they are revisited because of the problems mentioned earlier.

Incessant Strike Actions

As a result of the poor salary structure, there are incessant strikes and work-to-rule embarked upon by the University lecturers, seeing it as the only way to awaken the government to its responsibility.

CONCLUSION

The following conclusions can easily be drawn from our studies:

- Re-organization of PTDF to refocus on the development of petroleum technology in PEDs is essential.
- The establishment of International Partnerships Development Program will achieve the needed partnership between the Nigerian petroleum engineering departments with those abroad.
- Oil companies should be encouraged do most of their researches at home by instituting chairs in petroleum engineering departments, this will boost local participation.
- Funds should be provided by the government and oil companies to sponsor lecturers to conferences and workshops.
- Each PED in Nigeria should be attached to at least one local oil and gas producing company for practical exposure and research oriented assistantship[2].

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