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Engineering Education and Sustainable Development in Nigeria

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Abstract

This paper examines Engineering Education (EE) in Nigeria as a suitable vehicle towards sustainable development of the socio-economic infrastructures necessary for the growth of enterprise, and for the maximization of social welfare. The state of EE in Nigerian Universities was examined using data derived from the database of the regulatory bodies. A data register was employed to capture the needed data and these were analyzed using statistical analysis. Results of the 1999/2000 accreditation exercise of the 17 Engineering disciplines available in 129 Engineering departments of Nigerian Universities, show that twenty-one (16.28%) got full accreditation, 69 (53.49%) got interim, while 39 (30.23%) got denied accreditation. Sadly, these figures are alarming and may be detrimental to the Nigerian thirst for national development and socioeconomic growth. Undoubtedly, the quest for sustainable development depends on the extent to which EE is revamped and transformed to compete globally. Research and technology development for sustainable national development must be encouraged and well funded. This will enable Nigeria to surmount present dependence on imported technologies, goods and services.

Keywords
Engineering education, engineering skill acquisition, research and technology development, Nigeria

1. Introduction

Modern nations show great concern for education, especially education in science, engineering and technology (SET) for obvious reasons. It provides the great needs of the nation through the development of the social and economic infrastructure necessary for the growth of enterprise (Gemade, 2009), an antidote to poverty and leveler in the knowledge emerging society (Ajimotokan et al., 2009). Today, education has evolved as the primary agent of transformation towards sustainable development, increasing human's capacities to transform their visions for society into reality (Oloyede, 2008; UNESCO, 2005). The literature is replete with numerous definitions of education based on philosophy of life, disciplines, past experiences, circumstances, environment among others. Education, therefore, is the aggregate of all process by which an individual develops values, attitudes, abilities and other forms of behavior that is of positive value to the society (Fafunwa, 1974). Also, it provides the theoretical knowledge in both basic and applied sciences, acquired through formal method designed for human capital development meant to serve national interest (Ibidapo-Obe, 2009). Based on these definitions, engineering education (EE) entails education in science, engineering and technology (SET) for capacity building in engineering towards sustainable development. Thus, the aim of EE should be the integration of knowledge, skills, understanding, and experience (Padmanabhan, 2000).

The Nigerian government has made frantic efforts to encourage engineering education. From the mid 1980s, the first remedy introduced was diversification and specialization of the universities with a view to increasing their scientific, technological and agricultural contribution to the transformation of the country (Ajimotokan et al., 2009; Ekeh, 2009). The development of a viable EE is an indispensable tool in the various sectors of the economy if the nation hopes to develop and sustain development to attain

its national vision and goals, be it Millennium Development Goals (MDGs), National Economic Empowerment and Development Strategy (NEEDS), Vision 20:2020, and the 7 - Point Agenda (Ekeh, 2009). Thus, this paper examines EE in Nigeria for sustainable national development and growth.

2. Materials and Methods

This study evaluated engineering education in Nigeria using a data register; employed to gather basic information from the database of the regulatory bodies - National Universities Commission (NUC) and the Council for the Regulation of Engineering in Nigeria (COREN). These data were than analyzed using descriptive statistics. The data required ranges from academic contents - philosophy and objectives of the programme, curriculum content, admission into the programme, academic regulations, evaluation of students work, practical/project work, standard of examination, and staffing; physical facilities - laboratories, classrooms, office, safety and environmental sanitation; funding of the programme by the university; library facilities; employers rating of the products of the programme and administration of college/school/faculty/department. Based on the performance of the programme according to the above criteria or performance indicators, the aggregate score is then used to determine the accreditation status as; *full, interim, or denied.*

3. Results and Discussion

Table 1 presents the collected data and the analyses of the results obtained. It reveals that only 21 (16.28%) of the engineering programmes got full accreditation. This figure is disturbing and hence not apt for a nation's thirst for development to surmount its present technological and scientific dependence. However, engineering education in Nigeria has great promises; it also has a lot of challenges. Some of these challenges and thus the dismal state of EE can be traced to the following: ill equipped laboratories and workshops, poor funding and thus poor educational infrastructures, deficiency in teaching and research equipment, paucity of quality teachers and poor learning environment, paucity of ideas, scarcity and prohibitive cost of books, challenges of relating the curricula to national manpower needs. Others include: incessant interruptions of academic calendar, epileptic power supply, deficiency in ICT, low industrial base, little or no industrial-universities collaborations, existing monolithic training programmes, etc. (Bako, 2005; Oloyede, 2008; Ekeh, 2008; Adetokunbo, 2009; Ekeh, 2009).

Table 1 NUC 1999/2000 Accreditation Status of Existing Engineering Programmes in Nigerian Universities

S/No	Engineering Disciplines	No. of Universities	Accreditation Status		
			Full	Interim	Denied
1	Agricultural Engineering	13	1	10	2
2	Chemical Engineering	12	3	7	2
3	Civil Engineering	22	2	14	6
4	Computer Engineering	6	Nil	1	5
5	Electrical & Electronics Engineering	14	3	5	6
6	Electrical Engineering	8	1	5	2
7	Electronics Engineering	1	Nil	1	Nil
8	Food Science Technology	13	2	7	4
9	Industrial Engineering	1	Nil	1	Nil
10	Marine Engineering	1	Nil	1	Nil
11	Mechanical Engineering	24	8	7	9
12	Metallurgical & Material Engineering	6	Nil	6	Nil
13	Metallurgical Engineering	1	Nil	Nil	1
14	Petroleum Engineering	4	1	2	1
15	Polymer & Textile Engineering	1	Nil	1	Nil
16	Production Engineering	1	Nil	Nil	1
17	Water & Environmental Engineering	1	Nil	1	Nil
Total (%)		129 (100)	21 (16.28)	69 (53.49)	39 (30.23)

Source: Extract of NUC (2002)

4. Conclusion

Engineering education (EE) is so momentous and should be spiritedly pursued, to fully exploit the available possibilities for promoting sound EE and sustain development. It is one thing to have an enabling environment and it is another to maximize the opportunities. The challenges to guarantee

quality EE seem overwhelming, however, they are attainable. Undoubtedly, the major obstacle to sustainable development is the lack of viable engineering education and training. Thus, the quest for the sustainable national development and growth as envisaged is dependent on the extent to which EE is revamped and transformed to compete globally.

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