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## CONTENTS

Educational Management Competence of Operating Management Personnel in Technological and Technical Institutions in Enugu State, Nigeria. U. G. Emetarom –	1 - 18
Educational Accountability, Network and School Effectiveness – G. O. Unachukwu	19 - 32
Effects of Computer Technology on the School Performance of Some Selected Private and Public Secondary School Students In Lagos State Bello, S. A. (PhD) & Adeoye, B. F. –	33 - 45
Enrolment Trends and Prospects of Technical Education in Oyo State College of Education – Jaiyeoba A.O, Ayeni A.O & Atanda A.I. –	47 - 60
Gender and Employment Aspirations of Vocational Students in Itu Local Government Area of Akwa Ibom State: Implication for Personnel Management under Globalization Grace Koko Etuk & Eno E. Eyo -	61 - 73
Gender Differences and Stereotypes in Access to Technical Education in the Federal Capital Territory, Abuja Hauwa Imam & Sunday Mathew Dada	75 - 86
Role of Information and Communication Technology in Enhancing Quality of Teacher Education in Nigeria State. Onuh, Uchenna R. & W. N. Ofojebu	87 - 96
Incentive Management and Job Involvement along Teachers in Technical Schools in Cross River State C. P. Akpan & Dr. W. E. Ekpiken	97 - 106
Increasing Teacher Efficiency through ICT Usage in Tertiary Education Omenyi, Ada, Agu, Ngozi N & Odimegwu, Christy O.	107 - 119

Impediments to Managerial Operations in two Technological Institutions in Lagos State S. C. Madumere, Chinwe N. Obikwelu & Blessing Uzoma Olisaemeka	121 - 131
The Labour Market and Skill Oriented Graduates in Port-Harcourt City, Rivers State. Uche, C.M. & Kpee, G. G.	133 - 142
Management of Students' Crisis in Higher Institution of learning in Nigeria Nwite Onuma	143 - 153
Managing the Teaching and Learning of Technical and Vocational Education: Determinants, Problems and Prospects A. A. Adeogun & G. I. Osifila	155 - 168
Adequacy of School Facilities in Nigerian Vocational and Technical Colleges: an Empirical Study Sunday O. Adegbesan	169 - 177
Training Techniques and Professional Development of Technical staff in the University of Lagos Onyene Irgy, Ikebude O. C. & Udume, Pat.	179 - 188
Technological Education and the Attainment of Vision 2020 for Nigeria: An Exploratory Approach Akinwumi E. S. & Isuku J. E.	189 - 200
Utilization of Management Information System in a University Administration Iniobong E. Nkang	201 - 210

## Technological Education and the Attainment of Vision 2020 for Nigeria: An Exploratory Approach

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### Introduction

One of the major policy challenges facing the Nigerian Government today, is the goal of making the country one of the twenty most developed countries in the world by the year 2020. However, economic development of any country (as it is now noticed among the emerging world fast-growing economics such as Brazil, India and China) depends critically to a large extent on the ability of that society to create and maintain technical change. This change requires the ability and capacity to acquire, adapt, generate, produce and apply technological knowledge to achieve the development goal of their society (Zymelman, 1993, Isuku, 2007)

The rationale of vision 2020 entertains at least three important advantages. (1) policy makers could be able to see and examine the larger picture; 2) discussions about the future entail overall positive enhancement of the culture of debate ; 3) the discussion will foster a sense of shared destiny in a community.

Moreover, the Nigerian visionaries have clearly anticipated that success on the political and socio-cultural fronts requires a long term orientation, and that the implementation of vision 2020 must be viewed in relation to a highly competitive world driven by the forces of globalization and technology. .It therefore behooves on technological education to provide a leeway in the attainment o this project.

It has been noted that technical education is designed to offer training to improve individuals' general proficiency, especially in relation to their present or future occupations. Although, technical education seem deficient in citizenship or leadership training (Friedman 1982) cited by Dike 2007, they could provide students the skills to become productive entrepreneurs and engender creative and innovative ideas that would enlarge the nations economic pie, and increase personal freedom.. Thus the neglect of technical

education is socially injurious to as it rubbing the nation of the contribution the graduates would make to national development (Dike 2007)

### Literature Review

According to the New Encyclopedia Britannica (1998), technological education is that form of education concerned with the acquisition and application of scientific knowledge to the practical aims of human life. While the Chambers 20th Century Dictionary (1983), sees vocational education on the other hand as that form of education pertaining to or concerned with the preparation of an individual for a trade or occupation. In other words, it is an instruction intended to equip persons for industrial and commercial occupation. Hence, vocational/technical education is therefore the most important mechanism for acquiring and developing the needed capacity for economic development of a country.

*In fact, various studies – Kuznet; Syrgin and Cokor (Adeleke, 2001) has long confirmed that advances in technical knowledge is a sine-qua-non for rapid and improve economic growth and development, and subsequently improved economic well being. Historically, this form of education has been the support for technological adaptation and innovation in today's developed economics of the world. With the growth of industrialization in the 19th century, several European countries notably Germany began to introduce vocational education in elementary and secondary schools. Today, Germany is certainly one of the leading industrialized country in the world with high per capital income and standard of living.*

According to the National Policy on education (FKN, 2006), the objectives of technical/vocational education include:

- (1) To provide trained manpower in applied technology and commerce particularly at sub-professionals grades.
- (2) To provide technical knowledge and vocational skill necessary for agricultural, commercial, industrial and economic development.
- (3) To provide people who can apply scientific knowledge to the improvement and solution of environmental problem for the use and convenience of mans.
- (4) To give an introduction to the professional studies in engineering and other technologies.
- (5) To give training and impart the necessary skills leading to the production of craftman, technicians and other skilled personnel who will be enterprising and self-reliant and
- (6) To enable our young men and women have an intelligent understanding of the increasing complexity of technology.

The last three policy objectives seems to emphasize the production and development of more highly skilled professionals such as engineers and technologists (usually produced from tertiary institutions) who will be employable and reliable in meeting the emerging demands of the labour market. According to Koso-Thomas (1993), the objectives of this type of knowledge include:

- (1) The provision of relevant technical and managerial skills, particularly for small industries.
- (2) The encouragement of entrepreneurship.
- (3) The importing of basic knowledge of local scientific and technological capacities and possibilities.
- (4) The development of an awareness of the social-cultural and environmental problems of selected areas of the region.
- (5) The provision of adequate communication skills.
- (6) The provision of adequate practical orientation and the development of an attitude to work which produces desirable results, and
- (7) The development of skills for problem identification and solution.

Walter and Grazt (Olumuyiwa *et al.*, 2005) highlighted the benefits, vocational education offers individual the opportunity to develop those skills, ability and understanding that will enable them to handle competently their personal affairs, beware of the vocational opportunities available in broad fields of human endeavours and assume their citizenship responsibilities.

It offers the student an opportunity to develop those skills/abilities and understanding that will enable them to enter, perform and progress in business/technical occupations after graduating from schools or to enter post-secondary, secondary school programmes, and provide them with the occupational intelligence to enable them fit into and find job satisfaction in the labour force of a complex and dynamic economy. Technical/vocational education also enables one to become a useful member of his community, contributing to the society because he can produce goods and services, e.g. wiring of houses, fitting of plumbing pipes etc.

In today's Nigeria, a lot of school leavers and graduates from our higher institutions of learning are roaming the streets due to lack of suitable skills. But with the availability of the relevant skills, people would be gainfully employed and thus improve their well being and that of the society at large. According to Mohammed (1989), people with technical/vocational skills had established private workshops and other craftsmanship businesses and subsequently earn their living and which sometimes surpasses those earned by university graduates. Ironically, while the traditional vocational programmes in the trades are drying up, industries are desperate for qualified people to fill



well-paying jobs. There are increasing demand for skilled trades in the area of plumbing, sheet metal works, masons, carpentry electrical works, roofers, iron workers and welders to name a few even today's America. These skilled labour are quite lucrative and can pay up to USD70,000 per annum, plus health and retirement benefits (see file://A:\CTACaliforniaEducator.htm). The implication is that vocational/technical education will not only enhance the economic well being of the individual, but will also help in advancing the economy and subsequently help in the realization of development goals of the country.

### Instructional and Institutional Strategies in the Provision of Vocational/ Technical Education for Nigeria Economic Development

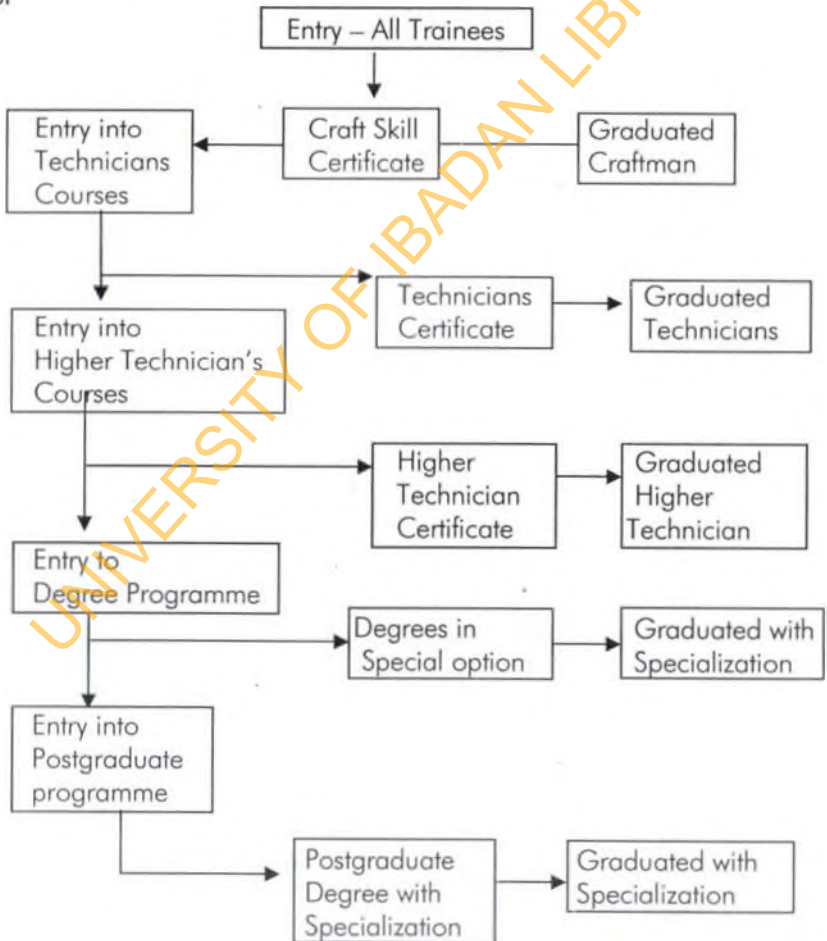
Both instructional and institutional systems and arrangement undoubtedly have to be compatible with the national development philosophies in order to achieve set goals and objectives. However, details of strategies, which have been developed for introducing innovation and creativity into the training and provision of the needed vocational/technical manpower has been linked to possible models of development (Koso-Thomas, 1985). Owing to the inherited foreign industrial/economic system from our colonialists, the development of model, which accepts the initial adoption of technologies developed outside the country has hitherto formed the basis for promoting economic and social change and progress in the country. Hence, the objectives of providing the relevant technical and managerial skills, the development of aesthetic and other values needed for stimulation of creativity and appreciation of indigenous system to economic development was undermined. This implies that there is an urgent need to re-orientate and focus attention to the indigenous technological needs suitable for the present economic need of the country. The development of courses, which emphasize the development of such required skills in the vocational/technical fields used to be encouraged. Alternative models aimed at protecting and enhancing existing traditional technologies at the expense of foreign technology as well as strengthen the traditional skill and upgrade the indigenous systems need to be considered. There should be courses, which involves and emphasizes the development of science and technology, innovation and craft training for the overall development of the society.

At the institutional level, technicians and vocational tradesmen and women could be trained to meet the diversified demands of the labour market. More vocational education centers should be established and furnished with the relevant human and material support to meet, the demand of the economy. While entry qualification into these centers should be free of very stringent qualification demands. This is to enable a trainees with weak

entry qualifications have the opportunity to move through the programme at their pace and to the limit of their intellect. Backward and forward linkages should also be provided to enhance the overall advancement of the trainees. The backward linkage is mainly to influence the supply base of these trainees and create an awareness of the importance of vocational/technical education, while the forward linkage is to prepare them for more advanced challenges.

The figure below is a possible model for a typical sub-sector speciality.

Fig. 1: A proposed vocational/technical education model for a typical sub-sector



## Training Needs Assessment of Technical Education

The assessment of training needs for technical education requires two major functional areas;

(i) Quantitative and (ii) Qualitative.

The Quantitative demand assessment needs involves the job description that determines the type of curricular, teachers, materials and equipment required for transforming a given type of second any school graduate into an entry level engineers. In assessing the needs qualitatively, it should be noted that the quality of performance on the job by the engineers, technicians or other related discipline; quality of education any quality of training are to be given serious consideration.

It is ironic that, contrary to conventional wisdom, to have an acceptable quality of engineering proficiency is low; engineering education has to be of a higher quality than engineering education in countries with highly developed technical services.

On the other hand, the quantitative training assessment emphasized on the size of the market as a determinant to the appropriateness of an engineering training institution. The market for technical education is both national and international. In some cases, technical education may cater for countries as demanded. In another dimension, the services of these technicians might be in serious demand for in some other countries, hence provision has to be made by placing special demand for them.

### The Status of Vocational/Technically Related Education in Nigeria

Obviously, the process of technical education is viewed from a system point of view. A system being a unit formed by many diverse parts that are subject to a common plan, or that serve a common purpose ( Zymelman, 1993). All things being equal, a system takes into consideration an input or input which passes through the system (process) into an output.



The technical education is made up of faculty, buildings, administrators and equipment. These parts are combined and directed by economic and social places. Going by the above, students are the input, the students in turn enters the system (process) and later graduates or drops out (output ). However,

systems are affected by some variables such as boundaries, environment and knowledge.

### **Statement of the problem**

Technological education and job training programme has been an integral part of national development strategies in many societies because of the impact on human resource development, productivity, and economic growth. Despite its proven contribution, Nigeria does not seem to give technical/vocational education the attention it deserves; and that appears one of the reasons for the rising unemployment and poverty in the society. The study therefore sought to examine the key roles of technical education in the amelioration of the above statement vices and more importantly to determine the place of technical education in the attainment of the vision 2020 for Nigeria.

### **Research Questions.**

The following research questions were designed for the study:

- (1) What is the graduate output of the technical education in Nigeria ?
- (2) What is the enrolment trend of the technical education in Nigeria ?
- (3) To what extent is the admission ratio for technical education being met?

### **Methodology**

Descriptive research design is adopted for the study.

**Population :** The population was made up of all students in tertiary institutions of learning offering technology, technical, engineering and all vocational courses .

**Method of data collection;** Data for the study were collected through the secondary source.

### **Analysis of findings and Discussions**

**Research Question 1:**What is the graduate output of the technical education in Nigeria ?

The table below shows the graduate output by field of study in Nigerian universities and polytechnics.

Table 1: Graduate Output by Field of Study and Type of Institution  
(1999/2000 – 2004/2005)

Field of Study	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05
<b>University</b>						
Sciences (Pure & Applied)	30,599 (40.6)	33,405 (40.6)	36,079 (41.0)	38,369 (41.0)	39,386 (41.0)	40,119 (41.2)
Arts and Management Studies	44,636 (59.4)	48,71 (59.4)	52,134 (59.0)	55,198 (59.0)	56,444 (59.0)	57,257 (58.8)
Total	75,,145	82,076	88,213	93,567	95,830	97,376
<b>Polytechnics</b>						
Science and Technology Related Courses	22,591 (36.4)	24,985 (37.8)	27,242 (38.6)	37,143 (39.7)	39,621 (41.0)	42,221 (41.9)
Management and Related Courses	39,472 (63.6)	41,112 (62.2)	43,151 (61.4)	56,182 (60.3)	56,884 (59.0)	58,545 (58.1)
Total	62,063	66,097	70,393	93,325	96,505	100,766

Source: Computed from National Manpower Board 2005

The figures in parenthesis are percentage

From the table, the ratio of science and engineering related disciplines falls when compared with those of the arts and management related fields. For instance, in all the years, considered the science and technology related disciplines maintained its low level of output at approximately 40 percent while the arts and management disciplines maintains its leads of approximately 60 percent at both the Polytechnic and University level.

Although the national policy on education document favoured the production of science and technology graduate at the expense of the arts and management related discipline on a ratio 60:40 scale, available data however, revealed that graduate output at the universities and polytechnics are still higher for the non-science and engineering disciplines. Therefore the above table negates the National policy on education (2006).

Research Question 2. What is the enrolment trend of the technical education in Nigeria ?

Table 2 shows the distribution of student from Nigeria pursuing different courses at the postgraduate level in Nigerian universities.

**Table 2:** Field of Study by Degree Year for all Ph.D.'s in Survey 1986 - 1996

Field of Study	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	Total
Education	22%	24%	19%	17%	20%	24%	18%	15%	16%	18%	14%	18%
Engineering	9%	16%	9%	14%	9%	7%	5%	7%	8%	7%	10%	9%
Humanities	15%	16%	11%	9%	8%	9%	19%	8%	6%	10%	8%	9%
Social Science	21%	17%	20%	14%	17%	14%	22%	19%	14%	11%	13%	16%

Source: Culled from Rate of Return Survey of Ph.D.'s Trained in Nigeria

The data on Ph.D. output of Nigerians trained in Nigerian Universities show that there is a preference for Social Science and Education disciplines with an average output of 16 and 18 percent respectively. Pursuit of engineering courses is just about half percentage of that of Education and Social Sciences. The implication is that except there is a redirection and re-orientation in favour of technically inclined disciplines, Africa and specifically Nigeria may not be able to achieve its development goals within the defined period.

Moreover, data showing the number of students from sub-Sahara Africa pursuing different postgraduate programmes in North America reveal that Nigeria has the highest with about 261 pursuing Ph.D. programmes in relation to South Africa with 223. However, available data reveal that course preference favoured humanity related disciplines rather than the engineering disciplines.

*Research Question 3: To what extent is the admission ratio for technical education being met?*

**Table 3:** Number of Application into Nigerian Universities by Discipline (1998/1999 – 2004/2005)

Discipline	1998/1999 No of Applicants	1999/2000 No of Applicants	2000/01 No of Applicants	2003/04 No of Applicants	2005/06 No of Applicants	Average Percentage
Administration	88,613 (27.57)	113,286 (27.04)	116,906 (25.01)	282,253 (27.00)	168,376 (18.42)	25.00
Engineering	55,907 (17.40)	72,518 (17.31)	83,065 (17.17)	163,945 (15.69)	142,394 (15.58)	16.63
Social Sciences	52,356 (16.29)	73,525 (17.35)	88,274 (18.88)	211,079 (20.19)	226,664 (24.80)	19.52

Source: (1) Extracted from Joint Admissions and Matriculation Board's Annual Report 2004, Appendix III

(2) The Punch Newspaper, Friday October, 14, 2005 Page 3.

In the three faculties considered in the table, it could be seen that the choice of engineering and engineering related course fell below such discipline as administration and the social sciences. While both administration and social science courses had average of 25 and 20 percent respectively, the choice of engineering courses by the successive applicant was 6.63 percent. There is likely to be some underpinning factors that were responsible for the abysmal low number of applicants. Some of these factors includes: phobia for technical courses, poor societal perception, and shortage of technical/vocational education textbooks, among others. The result here collaborated with the finding of (Adelabu,2001).

### Conclusion

To a greater extent, the level/type of education determines the nation's economic output. For any nation to develop economically, it requires the enhancement of the quantity and quality of resources or the efficiency with which they are used. To achieve the goal of vision 2020, education for technicians should give them some universality, and more particularly, the adaptability to practice both the modern and traditional sectors of life. Technological education would help the nation to be readily marketable in the labour environment and, above all, brings inspiration and hope to the nation now so desperate for a change and prosperity come year 2020.

*The continue provision of technical/vocational education is therefore necessary for creating the human resource base needed for economic development of the country. Nigeria has all it takes (human and material recourses) to become the strongest economy in Africa and of course one of the leading economies in the word in the long-term. In other words, the vision for Nigeria's development is derives from the country's history, endowment, experience and aspirations. The policy vision 2020 underscores the necessity and urgency of building a modern Nigeria that maximizes and utilizes the potential of every citizen, of becoming the largest and strongest economy in Africa, and of becoming a force to be reckoned with in the world before the middle of the twenty-first century.*

### Recommendation

Education in general and vocational/technical education in particular is critical to Nigeria meeting the set goal of becoming a leading economy by the year 2020. This is because vocational/technical education will help the recipients acquire specialized skills that would help improve the quality of life. The NEEDS document for instance, specifies that as an important tool for economic development, an expanded and increased access to vocational and entrepreneurial education was necessary. This is to ensure that at least 50 percent of Nigerian graduates both of the secondary and tertiary levels of

education acquire sufficient technical and entrepreneurial skills and knowledge to be self-employed and wealth creators (NEEDS, 2004).

The increasing technology-driven world economy demands the urgent need and imperativeness of technical/vocational education to meet the goal of economic development. The state of the labour market for vocational/technically skilled professionals suggests that the demand is for skills in operating system. There is the need to have personnel with the relevant specialized knowledge, training and skill to help the industries expand and be more productive.

Specifically, the content of vocational/technical education include such trades as architectural drawing, building construction, carpentry and joinery, plumbing, basic electronics, principles of electricity, metal works, auto-mechanic etc. Although, all of this may be relevant to the economic well being of the country, focus should be given to specialized area of knowledge demanded by the local situation or directly related to national development goals, such as those of agriculture, construction of buildings and highways, electricity generation, mechanical and metal works.

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