

EDUCATION POLICY ANALYSIS ARCHIVES

A peer-reviewed scholarly journal
 Editor: Gene V Glass
 College of Education
 Arizona State University

[home](#) [abstracts](#) [complete](#) [editors](#) [submit](#) [comment](#) [notices](#) [search](#)

Copyright is retained by the first or sole author, who grants right of first publication to the **EDUCATION POLICY ANALYSIS ARCHIVES**. EPAA is a project of the [Education Policy Studies Laboratory](#).

Articles appearing in **EPAA** are abstracted in the *Current Index to Journals in Education* by the [ERIC Clearinghouse on Assessment and Evaluation](#) and are permanently archived in *Resources in Education*.

PDF file of this article available: 

This article has been retrieved [REDACTED] times since June 8, 2004

Volume 12 Number 24

June 8, 2004

ISSN 1068-2341

Effective Technological Delivery in Nigerian Polytechnics: Need for Academic Manpower Development Policy

J. K. Adeyemi
University of Benin (Nigeria)

E. E. Uko-Aviomoh
University of Benin (Nigeria)

Citation: Adeyemi, J., Uko-Aviomoh, E., (2004, June 8). Effective technological delivery in Nigerian polytechnics: Need for academic manpower development policy. *Education Policy Analysis Archives*, 12(24). Retrieved [Date] from <http://epaa.asu.edu/epaa/v12n24/>.

Abstract

Technical education, especially as provided in the Nigerian polytechnics, leads to the acquisition of practical and applied skills as well as basic scientific knowledge. The production function of the polytechnics in terms of producing quality middle-level manpower through effective teaching delivery depends largely on the quantity and quality of teachers available. However, teacher adequacy is a function of many factors, which include funding, student enrollment overtime, and staff turnover. This article, however, revealed a mismatch between enrollment and available teachers, with huge staff shortfall over the years when the student enrollment was matched with the available teachers, using the ideal teacher-student ratios. Student and teacher projections were carried out based on five-percent annual increase and average teacher-student ratio of 1:12, so as to meet the vision 2010 target year set by the Nigerian government for total development. The projection showed that the polytechnics would require a large additional number of teachers. An all-inclusive funding approach for the polytechnics was recommended so as to

increase their financial status, which would allow for improved facilities, workshops, equipment and also improved conditions of service of teachers. We believe that if this was done, more teachers would be attracted from across the world, those who left would return, and new and younger ones will be encouraged to join the teaching force. Such development would to a great extent meet and sustain the anticipated growth for the target year.

Introduction

Technical education is that aspect of education, which leads to the acquisition of practical and applied skills as well as basic scientific knowledge. Encyclopedia Britannica (2001) described it as the academic and vocational preparation of students for jobs involving applied science and modern technology. The general objectives are the preparation of graduates for occupations that are classed above the skilled craft but below the scientific or engineering profession. The National Policy on Education (FRN 1981, 1998) identified five types of technical education institutions outside the universities. They are pre-vocational and vocational schools at post-primary levels; technical colleges, polytechnics and colleges c technical teacher education at post-secondary school.

In Nigeria, technical education had a slow start and developed less quickly than other forms of education. In fact, the first technical college was established in 1948 at Yaba, Lagos (Fafunwa, 1992). This was partly due to the fact that the Europeans, who were the harbingers of western learning, were unable to popularize it on the same scale as literary, religious and pedagogical form of education when they colonized the sub-Sahara Africa, including Nigeria. Batagarawa (2001), who was a minister of state for education in Nigeria, however, adduced the low pace of technical education in the country to the fact that it is expensive to develop and sustain, partly because of its high resource requirements.

Nevertheless, the importance of technical education and technology to sustainable development cannot be overemphasized. This is because tomorrow's world will demand highly qualified specialists and increasingly flexible generalists (World Bank, 2000). No wonder the National Policy on Education believes that technical education would provide the technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic development through the provision of well trained sub-professional grade and middle-level manpower (NPE, section 6, sub section 49). In fact, recognising the technical education forms the basis of the nation's technological development, the Federal Government had substantially increased its expenditure in this field in the Third National Development Plan period (3 National Development Plan, 1975 – 1980).

Consequent upon the earlier neglect of technical education and sudden realization of this type of education by government as the panacea for technological emancipation and national development, the National Board for Technical Education was created in 1977 through decree number 9. The board is saddled with the responsibility of coordinating technical education by setting standards for schools in terms of facilities, teaching manpower and accrediting courses from time to time. It is also to advise government on all aspects of technical education that fall outside the universities. Nigerian government has finalized plan to establish the National Polytechnics Commission to manage only the polytechnics (The Guardian Tue, 18/3/2003).

Ever since, there has been a phenomenal expansion in technical institutions. From one technical college in 1948, the country now has 46 polytechnics, with various programmes for both the pre-National Diploma and Diploma students as of 1997/98 session. In addition, there are 89 monotechs, 8 colleges of Education (Technical) for training teachers for post-primary technical and vocational education programmes and 138 technical colleges (FOS 1999/2000, NBTE, 2000; Federal Ministry of Education, 2000, Yakubu, 2000; and Aina 2000). Enrollment has also witnessed a significant growth. For example, Polytechnic enrollment has risen from 17,485 in 1986/87 to 104,686 in 1990/91 and to 192,979 in 1997/98 and 237,775 in 1999/2000 (Joint Admission and Matriculation Board, 2000, Adegbile, 2000). There is no gainsaying that curriculum planning and physical expansion without adequate and sustainable human and material resources would definitely fail to produce the desired results. This brings us to the thrust of this discourse, which are the teaching manpower requirements for technical education especially in the country's polytechnics.

Teachers play great facilitative role in teaching-learning process. In spite of the advancement in science and technology, the teacher is not yet displaced in the classroom nor has his important role in education diminished (Aghenta, 1998). Even Fredenco Mayo, Director-General of UNESCO emphasized the important role of teachers in technical and vocational education programmes at the second international congress in Seoul, South Korea (26 April, 1999). Similarly Tarpeh (1994) remarked that academic staff are the mainstay of any institution and their number and quality affect the efficiency of teaching and learning process. He described them as a crucial input in the transformation of students and research in graduates and knowledge and solutions of societal problems.

Unfortunately, the situation with technical education teachers, especially in terms of quantity is highly precarious in Nigeria. In 1980, the Nigerian Educational Research Council (NERC) set an indicative targets for teaching staff and student enrollment for the nations polytechnics and technical colleges. The council's teaching staff target by 1997/98 was put at 66800, with about 1.3 million student enrollment; and for 2000 AD, teaching staff target was put at 72900, with about 1.4 million student enrollment with teacher-student ratio of 1:20. (NERC, 1980). Unfortunately the targets were far from being met. As of 1997/98, actual teaching staff in the polytechnics and technical colleges was 9370, student enrollment was 248080, given an average teacher: student ratio of 1:27. According to NERC, "the enormity of such venture is without question, but we have no choice in the matter if we must develop" (NERC, 1980:52). The situation on the ground is, however, not promising.

Corroborating the situation, (Ogunnowo, 1992; Nwaokolo, 1997; Olaitan, 1997; principals' annual report for Federal Technical Colleges, 1998; and Aina, 2000) all submitted that there is problem of inadequate qualified teachers at almost all levels and types of education in Nigeria. In fact the technical colleges' principals' annual report stated in the following words:

The picture of staffing depicts total weakness in all trade areas... This low level teaching faculty cannot formulate and deliver adequate skill training no matter the pretensions to the contrary ... the dearth of adequately qualified teachers for the technical colleges is already a national crisis.

The national policy on education seemed to have envisaged this problem. It is stated in section 6, sub-section 5 that "*government is aware that only limited facilities exist for technical teachers' education*" and that "*a conscious effort to expand the facilities for the training of technical teachers shall be made, particularly since the new structure ... will require many more teachers*". The extent to which this has been done is part of the thrust of this paper.

In a survey on teacher supply-demand carried out by the Nigerian Educational Research and Development Council (NERDC) as reported by Onugha (1997) revealed a high student: teacher ratios in all the technical disciplines - a pointer to inadequate teachers. Even the World education report by UNESCO (1995) identified the sub-Sahara Africa of which Nigeria is a part, as the worst in term of number of teachers available for the third level education, where we have the polytechnics. The report showed that in 1992, of the 5.19 million teachers available, the region shared 0.09 million; while Arab states, 0.14 million; Latin America/Caribbean, 0.67 million; Eastern Asia/Oceanic 0.77 million; China, 0.1 million; Southern Asia, 0.53 million; India, 0.42 million and so on. Not to mention the developed countries.

Many problems have be-deviled the educational system in recent past. The problem of under-funding has alone inhibited the development of teaching manpower programmes. According to Aina (2000), in the past, technical teachers were trained abroad, but this has ceased due to the fallen value of the country's currency and dwindling economy. There is problem of brain drain too, either to foreign countries to seek greener pastures or to lucrative industries within the country (NUC, 1995; and Adeyemi 2000). Sofolaha (1991) had expressed concern that many of the technical teachers sent abroad never returned, and those that returned found their ways into industrial and commercial sectors, in spite of the bond signed with government.

This portends a looming crisis that could definitely affect the quality of middle level manpower produced in the technical institutions, especially in the polytechnics, and consequently the nation's technological development. This paper is therefore premised on the contention that there is disequilibrium in the demand-supply of technical education teachers. Therefore the article analyzed the degree and pattern of

the dis-equilibrium; projected for future needs; and also made useful suggestions; making the nations polytechnics as reference point.

Teacher demand-supply mix for technical education

It is recognized that with the best of educational policy and design, and even high fiscal input to education, the ultimate achievement of educational objectives depend largely on the quantity and quality of teachers. The quality and quantity of graduates produced would also reflect the worth of the available teachers. Therefore to determine the demand-supply gap in the production and allocation of teachers to any institution, student enrollment trend must be ascertained. This is necessary for reasonable projectio for future development.

For this paper, teacher demand connotes the ideal number of teachers required for the polytechnics. Or the other hand, supply connotes the actual number of teachers available during the years of study. Two planning models are very relevant to this discourse. They are: Higbee's demand models (Higbee, 1981) and the Cobb-Douglas production function models used by Manga and Silver (1983). The Cobb-Dougl production function model suggested that in order to obtain an equilibrium state in any production syster the growth in output can be increased only by increasing either the number of its productive workforce o their powers. In the school system, to establish equilibrium, growth in student enrollment must be accompanied by a proportionate growth in staff strength (Osahon, 1997). This is because according to Zymelman (1993) and World Bank (1995), disequilibrium in the enrollment-staffing relationship weakens the efficacy and quality of the school system's production functions.

On the other hand, Higbee (1981) in his demand models for academic staff planning identified some for of formula for determining the number of academic staff required by an academic unit-college, faculty, school, department, etc. He divided these into two types: student/faculty ratios and work load formula. The student faculty/college ratios is adapted for this paper in determining the academic staff need of the nation's polytechnics. It consists of either simple ratio or more sophisticated ones containing weighting co-efficient for various types of students. This is simplified inform of student:teacher ratio as prescribed l World Bank (1995), which described the model as one overall measure of staff efficiency in schools.

By this model, there are ideal (demand) and actual (supply) ratios. Where the actual ratio is found to be greater than the approved ratio, which is statutorily recommended in most cases implies over-utilization academic staff, vise versa, with attendant consequences on production function.

According to National Board for Technical Education (NBTE) (1981), the following teacher: student ratio are recommended:

- for practice-oriented trade courses, such as woodwork, metalwork, electronics etc., the ideal ratio is 1:15 and 1:20 as the upper limit;
- for practice-oriented core courses in the general science department such as Biology, Chemistry, Physics, the lower limit of teacher: student ratio of 1:18 and upper limit of 1:25.
- For other courses in the general education department in which classes are held in classrooms, the normative teachers: student ratio of 1:40 is recommended.

The above is, however, for technical colleges. For the Monotechnics and Polytechnics, the ratios recommended are:

- 1:8 for technological-based disciplines and
- 1:16 for management and art disciplines: This gives a 1:12 average ratio.

Today, there is a phenomenal rise in student enrollment at all levels of education, which (Omoregie and Hartnett, 1995; UNESCO, 2000) observed could not be matched by the growth in the number of teacher

Table 1 shows the trend in student enrollment and teaching staff between 1993/94 and 1999/2000 sessions. The table reveals that the annual average percentage growth of 10.75 for student enrollment i higher than that of teaching staff, which is 7.3%. This is an indication of academic mismatch (Osahon,

1997).

Table 1. Trend in student enrollment and teaching staff in Nigerian Polytechnics:1993- 2000

Year	Enrollment	% Growth	Teaching staff	% Growth	Overall Teacher:student ratio
1993/94	124000	-	4960	-	1:25
1994/95	151247	21.9	5258	6.0	1:29
1995/96	150391	-0.7	5371	2.2	1:28
1996/97	178456	18.7	609	13.7	1:29
1997/98	192699	8.1	6483	6.1	1:30
1998/99	216159	12.0	6755	4.2	1:32
1999/2000	233612	8.00	7536	11.6	1:31
Average		10.75		7.3	

Source:

1. Federal Office of Statistics (1995, 1999, 2000) Annual Abstract of statistics, Abuja, FOS.
2. Federal Ministry of Education (2000) Statistics on Student Enrollment in Technical Colleges, Colleges of Education, Monotechnics and Polytechnics, Abuja, FME
3. National Board For Technical Education (1999) Digest of Statistics, Kaduna, NBTE.
4. Yakubu, N.A. (2000) "Identification and Assessment of Resource Requirements in Technical and Vocational Education in Nigeria" A Seminar paper.

Table 2 compares the ideal teacher: student ratios as recommended by the National Board for Technica Education for the science/technological-based and Management/Art-based courses (NBTE, 1981); The table shows a general wide gap between the recommended and actual ratios in most of the courses. Th gap is phenomenal with the management courses, such as Accountancy/Financial studies, Business Administration/Management; Banking and Finance and Insurance. Their ratios range between 1:33 for Insurance to as high as 1:119 for Accountancy/Financial studies as against the recommended ratio of 1:16. This implies a very high enrollment that is not matched with the required teaching staff. The implications of such development could be inimical to effective teaching-learning process. The same go for some technologically based disciplines, such as Chemical Engineering, Mining Engineering, Electrical/Electronics with average of about 1:28 teacher: student ratio. The pattern of observed ratios in most disciplines suggested an over-utilization of teachers in the polytechnics. No wonder, the academic union of the nation's polytechnics, like their university counterparts have demanded for the payment of excess workload allowance, which they are now earning. But the question is can one teacher perform th duty of two teachers effectively? This paper does not believe that there could be effective delivery.

Another problem traceable to high ratios observed for the management disciplines is the trend in the country today, whereby most applicants to polytechnics and even universities tend to prefer managemel disciplines so as to eventually work in banks, insurance companies, finance houses, oil companies, etc. which pay better than most other sectors. These institutions in most cases admit the students irrespectiv of the rules guiding admission and even the available resources, especially teachers. For instance, Adeyemi (2001) found that there was no Nigerian university that was complying with the 60:40 admissic ratio for science/technology and Art/Social Sciences/Humanities as recommended by the National Polic on Education (FGN, 1998). The ratio is 70:30 for the Polytechnics (FGN, 1998). The problem of compliance with the admission could be attributed to the low level of interest the post-primary students show for the science and technical education. This seemingly low interest can also be attributed to man; factors, such as inadequate science materials, poor laboratories, and inadequate and dysfunctional workshops. Such situation could have contributed to the tendency for most Nigerian school leavers to prefer management courses, social sciences and humanities.

Table 2. Teacher: student ratios by selected discipline for Nigeria Polytechnics

Discipline	(Ideal) Recommended NBTE ratios	Actual ratios						
		'93/94	'94/95	'95/96	'96/97	'97/98	'98/99	'99/200
Accounting/Financial studies	1:16	1:114	1:111	1:112	1:116	1:118	1:120	1:119
Agricultural Engineering	1:8	1:9	1:9	1:10	1:9	1:10	1:11	1:11
Architecture	:8	:13	:12	:14	:14	:16	..15	.17
Business Admin. /Management	1:16	1:67	1:73	1:78	1:51	1:83	1:80	1:81
Building Tech./Quantity surveying	1:8	1:12	1:12	1:13	1:75	1:17	1:17	1:16
Chemical Engineering	1:18	1:30	1:28	1:25	1:31	1:34	1:32	1:33
Catering/Hotel Management	1:16	1:19	1:21	1:23	1:23	1:25	1:25	1:26
Civil Engineering	:8	:10	:10	:9	:11	:12	:10	:11
Education (Technical)	1:16	1:38	1:36	1:36	1:39	1:43	1:43	1:44
Electrical/Electronics Engineering	1:8	1:20	1:25	1:24	1:28	1:32	1:32	1:31
Environmental Science	1:8	1:14	1:15	1:13	1:15	1:17.	1:17	1:18
Food Technology	:8	:26	:25	:25	:29	:34	:31	:33
Mass Communication	1:16	1:28	1:28	1:30	1:31	1:33	1:33	1:32
Marketing/Purchasing and Supply	1:16	1:23	1:27	1:29	1:31	1:31	1:30	1:31
Mining Engineering	1:8	1:31	1:35	1:37	1:40	1:41	1:41	1:42
Computer Science/Maths, Statistics	1:8	1:16	1:18	1:18	1:21	1:21	1:21	1:23
Printing Technology	1:8	1:4	1:4	1:3	1:5	1:3	1:4	1:4
Secretarial Studies	:8	:23	:25	:25	:30	:32	:32	:32
Social Development/Cooperatives	1:16	1:13	1:14	1:15	1:15	1:14	1:15	1:15
Textile Technology/Polymer Sc.	1:8	1:5	1:3	1:5	1:4	1.4	1:4.	1:5
Urban Planning	1:16	1:20	1:21	1:20	1:22	1:26	1:25	1:26
Banking & Finance	1:16	1:81	1.85	1:88	1:91	1:93	1:95	1:94
Arts & Design	1:16	1:4	1:4	1:5	1:6	1:6	1:6	1:7
Insurance	1:16	1:35	1:33	1:33	1:38	1:42	1:42	1:45
Music Technology	1:16	1:17	1:19	1:19	1:20	1:20	1:20	1:22

Sources:

1. Federal Office of Statistics (1995, 1999, 2000) Annual abstract of statistics, Abuja, Nigeria.
2. Olu Aina (Ed) (2000) "Technical and Vocational Education in Nigeria: Vision and mission, semina proceedings, Abuja, 50 – 53.
3. National Board for Technical Education (1990 – 2000) Digest of statistics, Kaduna, NBTE

However, table 2 also shows that few courses have very low ratios, thereby giving room to under-utilization of teachers. They include Textile technology, Arts & Design and Printing technology with ratios that are far less than the recommended ones.

The calculated ratios in table 2 reveal a high shortfall in the stock of the teaching staff available to the polytechnics for the years under review. This shortfall is shown in table 3, based on the average teacher student ratio of 1:12.

Table 3. Student enrollment, actual and ideal teaching staff difference

Year	Student enrollment	Actual teaching staff	Ideal teaching staff based on average teacher:student ratio of 1:12	Ideal/Actual difference (shortfall)
1993/94	124000	4960	10333	537
1994/95	151247	5258	12604	734
1995/96	150391	5371	12533	716
1996/97	178456	6109	14871	876
1997/98	192699	6483	16058	957
1998/99	216159	6755	18013	1125
1999/2000	233612	7536	19468	1193

- Calculated by the authors from Table 2.

Table 3 shows a huge shortfall for the years, ranging from 5373 teachers for 1993/94 to 11932 teachers for 1999/2000. In all the years, the shortfall is higher than the actual. This observation should be a serious concern to educational managers.

Causes of shortage of technical teachers

The adequacy of teaching staff to any level of education is strategic to the quality of instructional delivery. And in Nigeria the above data analysis has shown a drastic downward trend in respect to adequacy of polytechnic teachers. A lot of factors can be adduced. These include the admission explosion, under-funding of higher education and technical education in particular; dwindling national economy; issue of brain-drain and perception of technical education disciplines as tough.

The urge for admission into higher education in the country has phenomenally increased enrollment. Most institutions do not respect the admission guidelines and quotas. The income to be generated from certain fees paid seems to be over-riding the sense of judgement. This has led to situations where enrollment far outstrips the available resources, including teachers. It takes a long time to produce a teacher for this level of education.

Secondly, the downturn in the nation's economy has been identified as the major cause of all educational problems for the past one and half decades. Ten years ago, the country could only allocate about 1.4% of her GNP to education; while countries like Ghana, Zimbabwe and Malaysia allocated 4%, 8.5% and 7.1% respectively of their GNP to education. (Daily Times, 2-12-93). The situation still remains the same as of 2003. The country could only allocate 1.8% of the 2003 budget to education (Academic Staff Union of

Universities, 2003). This is why the union has been on strike to protest this near neglect of education by successive governments. The Academic Staff Union of Polytechnics has equally expressed its displeasure. The low allocation has seemingly affected all aspects of education in general and technical education in particular.

The poor allocation has led to under-funding of the polytechnics and other institutions. Facilities have degenerated and teaching equipment to the dissatisfaction of teaching staff. In addition the condition of service became unattractive to newcomers and repulsive to serving teachers. All these either discouraged brilliant young scholars from taking up teaching job or led to the “brain-drain” syndrome. Many teachers are either leaving the polytechnics for greener pasture outside the country or even lucrative industries that require in large number the skill and services of technological-oriented scholars within the country. In a study conducted on the phenomenon of brain-drain in two polytechnics in Nigeria by Giwa (2000), it was revealed that withdrawal/transfer of service and resignation of teaching staff were tested to be significant and that their directions were mainly to cross to universities, manufacturing industries, while some went on private business. Describing the pathetic picture of Nigeria’s higher education, polytechnics inclusive, Yesufu (1996) as cited in Opatola (2001:2002) stated:

“...the student: teacher ratios are worsening in virtually all disciplines. Laboratories are either non-existence or completely demanded of essential equipment and experimental consumables, libraries cry out for funding. Teachers are grossly underpaid and many have had to seek how to keep body and soul together. Many others have abandoned academics to the greener pastures of the private industry, the banks, and consultancies. Part-time jobs and moonlighting have become the rule than exception.”

Today, teachers in the tertiary institutions are moving out en-mass to join politics, which has been made so lucrative in the country.

The implications of under-funding on teaching staff turnover portend danger to the future of technical education in general and polytechnics in particular. The technological take-off of the country could be in disarray. The high rate of staff attrition is not good for quality assurance in the polytechnics. More experienced teachers are leaving, while brilliant young graduates are not encouraged by the situation. At the same time, less qualified people are being recruited to fill the gap. In this case, the delivery system of quality technological education would definitely be in jeopardy. Onokherhoraye and Nwoye (1995) corroborated this as they asserted that the attrition of quality and experienced academic staff could result in poor standard.

Another probable cause of shortage of teaching staff in the nation’s polytechnics could be attributed to the general notion that science and technological disciplines are tough to pursue right from secondary schools, not to mention of pursuing them to post-graduate level that could qualify one to be a teacher at this level. In addition, it is not an easy task to pursue post-graduate programs in Nigerian universities nowadays because of the poor state of laboratories and workshops. At the same time the poor state of the nation’s economy has affected overseas sponsorships.

Projecting for future teaching staff requirement for the polytechnics

From the above analysis, the dearth of technical teachers in the polytechnics seems to have reached a crisis proportion judging from the huge figures representing the shortfall for various years. The analysis also showed a steady yearly increase in student enrollment, which *ceteris paribus* is likely to continue. And bearing in mind the place of technical education in the transformation of a nation, it is important to project into the future needs of this type of education. For instance, the “**vision 2010 plan document**” that was prepared in 1997 by the Federal Government is aimed at putting the country on the path of radical future development. Its scope covers all sectors, including technological and educational sectors. On education, the document is mainly on students, increased funding and adequate teachers (FGN, 1997).

Based on the nation’s vision, the paper projected the yearly additional teachers that would be required in the nation’s polytechnics from 2000/2001 to 2009/2010. To achieve this, student enrollment during this

period was first projected, using UNESCO (1969) formula, as used by Osahon (1997) and Adeyemi (2001). The formula, states:

$$P^n = P^0 (1 + r),$$

Where, P^n = Enrollment in year n,

P^0 = Enrollment in year proceeding n

r = Annual rate of growth

For the higher education, r is held constant at 5% (Onokerhoraye and Nwoye, 1995:118). To project the number of additional teachers required for the period, the average teacher:student ratio of 1:12 recommended by the NBTE was used and held constant. The finding is shown in Table 4.

In Table 3, it is shown that the actual teaching staff as of 1999/2000 was 7536, while the ideal teaching staff was 19468, given a shortfall of 11932. From this situation, one can easily predict a very gloomy future with regard to teaching manpower in the nation's polytechnics and technological education in general if radical and aggressive approaches are not employed. The problems entail coping and filling the shortfall before dealing with the additional projected figure. As shown in table 4, to achieve optimal efficiency and effectiveness of technical education delivery in our polytechnics, it would require 31711 teachers for 380532 students by the target year, all things being equal, with average annual additional teachers required. This implies that an additional 12243 teachers plus the stock of 19468 in the base ye (1999/2000) will be required for year 2010, which is the target year.

Table 4. Student enrollment and teaching staff projection for Nigerian Polytechnics: 2000/01 to 2009/10

Year	Student Enrollment (Projection)	Ideal Teaching Staff (Projection)	Additional Teaching Staff required annually.
1999/2000	233612	19468	- (P ⁰)
2000/2001	245293	20441	97
2001/2002	257558	21463	102
2002/2003	270436	22536	107
2003/2004	283958	23663	112
2004/2005	298156	24846	124
2005/2006	313064	26089	124
2006/2007	328717	27393	130
2007/2008	345153	28763	137
2008/2009	362411	30201	143
2009/2010	380532	31711	151
		Average	122

Conclusion and recommendations

Human resource has been the hub on which other resources in any organization revolve. In any school system, especially the polytechnics, which are centres for technical and technological education, the

place of teaching manpower is very crucial in qualitative and quantitative production of middle-level manpower for the development of the nation. Incidentally, the country rests her hope on technology as a pad for developmental take-off. Unfortunately, one can conclude from the foregoing analysis that there is an overall gross inadequacy of teachers in the nation's polytechnics. This situation cannot be, however, divorced from the downturn in the nation's economy that has lowered financial allocation to education sector; especially technical education, thereby affected the training and re-training of teaching staff in all the polytechnics, both within and outside the country. This situation has created a high teacher:student ratios across most discipline, which could seriously jeopardize the effectiveness of technical education delivery, especially in the nearest future if urgent solution is not proffered.

It is therefore recommended that an all inclusive funding arrangement be made to solve the problem of under-funding of the polytechnics; since it seems that government allocation alone could no longer cope with the running of the polytechnic education. Reasonable school fees should be charged to augment government allocation. Private and public companies should be made to contribute certain percentage of their annual profit after tax to technical education in general, and polytechnics in particular because they are the primary beneficiaries of their products. In addition, government should increase its allocation to the polytechnics. With increased funding, the conditions of service of the teachers can be adequately improved and the teaching facilities, especially the workshops, equipment and laboratories would be well developed and modernized. Such development could attract teachers from other countries and those that have left the system. It will also encourage many brilliant young scholars to join the teaching staff, as well as retaining the ones on the ground. By this, the shortfall in the teaching staff of the polytechnics could be greatly reduced, while the hope of meeting the target for the first ten years of this century could be brightened.

References

- Adegbile, P.O. (2000) "Technical and vocational education in Nigeria: A critical analysis," in Aina, O (ed) *Technical and vocational education in Nigeria: Vision and action*, Abuja, seminar proceedings.
- Adeyemi, J.K. (2000) "Academic manpower needs of Nigerian universities", *Higher Education Review*, 32(2), Spring, 36 – 44.
- Adeyemi, J.K. (2001) "Equality of access and catchment area factor in university administrations in Nigeria" *Higher Education*, 42 (3), 307 – 332.
- Aghenta, J.A. (1998) "Teacher recruitment and retention: Issues and problems", in Nwagwu, N.A. (ed) *Teachers and Teaching in Nigeria* The Nigerian Academy of Education Yearbook 2, Benin City. FESTA Printing Press Ltd. 44 – 58.
- Aina, O. (2000) "Nigeria technical and vocational education in the near future" in Aina, O. (ed) *Technical and vocational education in Nigeria: Vision and action*, Abuja: Seminar proceedings, 5 – 14. ASUU (2003) "This government has failed us", *The Guardian* Wednesday, 6.
- Batagarawa, L. (2000) Ministerial address during a seminar organised on technical and vocational education in Nigeria, African peace missions Hall, Abuja, 30th October.
- Daily Times (1993) "Reforming higher education", News Report, 2 December.
- Encyclopaedia Britannica (1994 – 2001) "Technical education" Encyclopaedia Britannica Inc.
- Fafunwa, A. B. (1992) "Honourable minister of education's address at the inauguration of the advisory board for federal technical colleges", *Education Today*, 5(2), 2 – 4).
- Federal Ministry of Education (2000) *Statistics on students' enrollment in technical colleges, colleges of education, monotronics and polytechnics*. Abuja: FME.
- Federal Office of Statistics (1995) *Annual abstract of statistics*, Lagos: FOS
- Federal Office of Statistics (1999) *Annual abstract of statistics*, Abuja: FOS
- Federal Office of Statistics (2000) *Annual abstract of statistics*, Abuja: FOS

- Federal Republic of Nigeria (1980) *Third National development plan, 1975 – 1980*, Lagos: Government press.
- Federal Republic of Nigeria (1981) *National policy on education (revised)*, Lagos Federal Government press.
- Federal Republic of Nigeria (1997) Report of vision 2010 committee – A blue print, Abuja Federal Government press.
- Federal Republic of Nigeria (1998) *National policy on education (3rd edition)*, Lagos NERDC press.
- Giwa, E.O. (2000) "An analysis of brain-drain situation in polytechnics in Ekiti and Ondo States, 1990 – 1995", *JESRAD*, 4(2), 56 - 66.
- Higee, E.C. (1981) "University manpower planning from an institutional perspective" in Adesina, S. (ed) *Introduction to educational planning*, Ile-Ife; University of Ife press, 230 – 245.
- Manga, A. and Silver, M. (1983) "The demand for the supply of labour" in John Edwards et al (eds), *manpower planning, strategy and techniques in an organizational context*, New York: John Wiley.
- Maye, F. (1999) Reforms and innovation of technical and vocational education in Korea, Ministry of education (Republic of Korea) UNESCO.
- National Board for Technical Education (1981) *Technical teacher training annual report*, Kaduna; NBTE.
- National Board for Technical Education (2000) *Digest of statistic on technical education* Abuja: NBTE.
- National University Commission (1995) *Annual report*, Abuja: NUC.
- NERC (1980) Perspectives of quantities and qualities in Nigeria education. A synthetic report of the Baguoda seminar, Sept. 1 – 2.
- Nwaokolo, P.O.E. (1997) "Vocationalization of schools in Nigeria: The way forward" in Ali. A. (ed.) *Perspective on crucial issues in Nigerian and African education*, 2, 25 – 34.
- Ogunnowo, M.O. (1992) "Technical and vocational education in Nigerian schools": A re-appraisal in *National school curriculum review conference proceedings*, Lagos: Macmillan Nigeria Publishers Ltd., 233 – 249.
- Olaitan, S.O. (1997) "Strategies for improving implementation of pre-vocational and vocational programmes in Nigerian schools" in Ali, A. (ed.) *Perspectives on crucial issues on Nigeria and African education*, 2, 1 – 8.
- Omogrege, P.O. and Harnett, T (1995) *Financing trends and expenditure: Patterns in Nigerian Universities*, World Bank Report to NUC.
- Onokerhoraye, A.G. and Nwoye, M. I. (1995) *Mobilization and management of financial resources in Nigerian Universities*, Benin City: The Benin social science series for Africa.
- Onugha, D.C. (1997) "Director's report; *National survey of teacher supply and demand in secondary schools*, Lagos: NERDC press.
- Opatola, A. (2001), A (2001) "Management of higher education in Nigeria in the 21st century: Issues and challenges", proceeding of the 12th General Assembly of SSAN.
- Osahon, U.G. (1997) "Academic staff requirements for Nigeria Universities", a term paper.
- Principals' Annual Report (1998) "Annual report read to the annual meeting of principals of federal technical colleges", Abuja.
- Shofolahan, J.A.O. (1991) "Implementing the 6-3-3-4 system of education" in Ohuche, O (ed) *Moving education in Nigeria toward the year 2000*, Enugu: Optimal computer solutions Ltd. 1 – 7.
- Tarpeh, D. N.O. (1994) "Studies on cost effectiveness and efficiency in African universities", Phase II, An overview. AAU.
- The Guardian (2003) "FG to set up polytechnics commission" News report. Tuesday, 18th March.
- UNESCO (1969) *Methodologies of educational planning for developing countries*, Paris; UNESCO – 11EP

UNESCO, (1995) World education report, Oxford Unesco Publishing.

UNESCO (2000) *The state of education in Nigeria*, Abuja Office: UNESCO CO, chapter 7

World Bank (1995) *African development indicators*, Washington, D.C: The World Bank.

Yakubu, N.A. (2000) "Identification and assessment of resource requirements in technical and vocational education in Nigeria", in Aina, O (ed), *Technical and vocational education in Nigeria: Vision and action*, Abuja: Seminar proceedings.

Yesufu, Y.M. (1996) *The Nigerian economy: Growth without development*, Benin City: Benin social science series for Africa.

About the Authors

Dr. J. K. Adeyemi

Dept. of Educational Administration & Foundations
University of Benin
Benin City, Nigeria
E-mail: adeyemi@uniben.edu

Adeyemi is an Associate Professor in Educational Planning. He has published widely in reputable journals.

Dr. (Mrs) E. E. Uko-Aviomoh

Dept. of Vocational and Technical Education
University of Benin
Benin City, Nigeria

Uko-Aviomoh is a Senior Lecturer in Vocational-Technical Education. She has written many journal articles in her field.

The World Wide Web address for the *Education Policy Analysis Archives* is epaa.asu.edu

Editor: Gene V Glass, Arizona State University

Production Assistant: Chris Murrell, Arizona State University

General questions about appropriateness of topics or particular articles may be addressed to the Editor, Gene V Glass, glass@asu.edu or reach him at College of Education, Arizona State University, Tempe, AZ 85287-2411. The Commentary Editor is Casey D. Cobb: casey.cobb@unh.edu.

EPAA Editorial Board

[Michael W. Apple](#)

University of Wisconsin

[Greg Camilli](#)

Rutgers University

[Sherman Dorn](#)

University of South Florida

[Gustavo E. Fischman](#)

Arizona State University

[Thomas F. Green](#)

Syracuse University

[David C. Berliner](#)

Arizona State University

[Linda Darling-Hammond](#)

Stanford University

[Mark E. Fetler](#)

California Commission on Teacher Credentialing

[Richard Garlikov](#)

Birmingham, Alabama

[Aimee Howley](#)

Ohio University

[Craig B. Howley](#)
Appalachia Educational Laboratory

[Patricia Fey Jarvis](#)
Seattle, Washington

[Benjamin Levin](#)
University of Manitoba

[Les McLean](#)
University of Toronto

[Michele Moses](#)
Arizona State University

[Anthony G. Rud Jr.](#)
Purdue University

[Michael Scriven](#)
University of Auckland

[Robert E. Stake](#)
University of Illinois—UC

[Terrence G. Wiley](#)
Arizona State University

[William Hunter](#)
University of Ontario Institute of Technology

[Daniel Kallós](#)
Umeå University

[Thomas Mauhs-Pugh](#)
Green Mountain College

[Heinrich Mintrop](#)
University of California, Los Angeles

[Gary Orfield](#)
Harvard University

[Jay Paredes Scribner](#)
University of Missouri

[Lorrie A. Shepard](#)
University of Colorado, Boulder

[Kevin Welner](#)
University of Colorado, Boulder

[John Willinsky](#)
University of British Columbia

EPAA Spanish & Portuguese Language Editorial Board

Associate Editors

[Gustavo E. Fischman](#)
Arizona State University

&

[Pablo Gentili](#)
Laboratório de Políticas Públicas
Universidade do Estado do Rio de Janeiro

Founding Associate Editor for Spanish Language (1998—2003)

[Roberto Rodríguez Gómez](#)
Universidad Nacional Autónoma de México

Argentina

- [Alejandra Birgin](#)
Ministerio de Educación, Argentina
Email: abirgin@me.gov.ar
- [Mónica Pini](#)
Universidad Nacional de San Martín, Argentina
Email: mopinos@hotmail.com,
- [Mariano Narodowski](#)
Universidad Torcuato Di Tella, Argentina
Email:
- [Daniel Suarez](#)
Laboratorio de Políticas Públicas-Universidad de Buenos Aires, Argentina
Email: daniel@lpp-buenosaires.net
- [Marcela Mollis \(1998—2003\)](#)
Universidad de Buenos Aires

Brasil

- [Gaudêncio Frigotto](#)
Professor da Faculdade de Educação e do Programa de Pós-Graduação em Educação da Universidade Federal Fluminense, Brasil

- Email: gfrigotto@globo.com
- Vanilda Paiva
Email: vppaiva@terra.com.br
- Lilian do Valle
Universidade Estadual do Rio de Janeiro, Brasil
Email: lvalle@infolink.com.br
- Romualdo Portella do Oliveira
Universidade de São Paulo, Brasil
Email: romualdo@usp.br
- Roberto Leher
Universidade Estadual do Rio de Janeiro, Brasil
Email: rleher@uol.com.br
- Dalila Andrade de Oliveira
Universidade Federal de Minas Gerais, Belo Horizonte, Brasil
Email: dalila@fae.ufmg.br
- Nilma Limo Gomes
Universidade Federal de Minas Gerais, Belo Horizonte
Email: nilmagomes@uol.com.br
- Iolanda de Oliveira
Faculdade de Educação da Universidade Federal Fluminense, Brasil
Email: iolanda.eustaquio@globo.com
- Walter Kohan
Universidade Estadual do Rio de Janeiro, Brasil
Email: walterko@uol.com.br
- [María Beatriz Luce](#) (1998—2003)
Universidad Federal de Rio Grande do Sul-UFRGS
- [Simon Schwartzman](#) (1998—2003)
American Institutes for Resesarch–Brazil

Canadá

- [Daniel Schugurensky](#)
Ontario Institute for Studies in Education, University of Toronto, Canada
Email: dschugurensky@oise.utoronto.ca

Chile

- Claudio Almonacid Avila
Universidad Metropolitana de Ciencias de la Educación, Chile
Email: caa@rdc.cl
- María Loreto Egaña
Programa Interdisciplinario de Investigación en Educación (PIIE), Chile
Email: legana@academia.cl

España

- José Gimeno Sacristán
Catedrático en el Departamento de Didáctica y Organización Escolar de la Universidad de Valencia, España
Email: Jose.Gimeno@uv.es
- Mariano Fernández Enguita
Catedrático de Sociología en la Universidad de Salamanca. España
Email: enguita@usal.es
- Miguel Pereira
Catedrático Universidad de Granada, España
Email: mpereyra@aulae.es
- [Jurjo Torres Santomé](#)
Universidad de A Coruña
Email: jurjo@udc.es
- Angel Ignacio Pérez Gómez
Universidad de Málaga

Email: aiperez@uma.es

- [J. Félix Angulo Rasco](#) (1998—2003)
Universidad de Cádiz
- [José Contreras Domingo](#) (1998—2003)
Universitat de Barcelona

México

- Hugo Aboites
Universidad Autónoma Metropolitana-Xochimilco, México
Email: aavh4435@cueyatl.uam.mx
- Susan Street
Centro de Investigaciones y Estudios Superiores en Antropología Social Occidente,
Guadalajara, México
Email: slsn@mail.udg.mx
- [Adrián Acosta](#)
Universidad de Guadalajara
Email: adrianacosta@compuserve.com
- [Teresa Bracho](#)
Centro de Investigación y Docencia Económica-CIDE
Email: bracho dis1.cide.mx
- [Alejandro Canales](#)
Universidad Nacional Autónoma de México
Email: canalesa@servidor.unam.mx
- [Rollin Kent](#)
Universidad Autónoma de Puebla. Puebla, México
Email: rkent@puebla.megared.net.mx
- Javier Mendoza Rojas (1998—2003)
Universidad Nacional Autónoma de México
- [Humberto Muñoz García](#) (1998—2003)
Universidad Nacional Autónoma de México

Perú

- Sigfredo Chiroque
Instituto de Pedagogía Popular, Perú
Email: pedagogia@chavin.rcp.net.pe
- Grover Pango
Coordinador General del Foro Latinoamericano de Políticas Educativas, Perú
Email: grover-eduforo@terra.com.pe

Portugal

- Antonio Teodoro
Director da Licenciatura de Ciências da Educação e do Mestrado Universidade
Lusófona de Humanidades e Tecnologias, Lisboa, Portugal
Email: a.teodoro@netvisao.pt

USA

- Pia Lindquist Wong
California State University, Sacramento, California
Email: wongp@csus.edu
- Nelly P. Stromquist
University of Southern California, Los Angeles, California
Email: nellystromquist@juno.com
- Diana Rhoten
Social Science Research Council, New York, New York
Email: rhoten@ssrc.org
- Daniel C. Levy

University at Albany, SUNY, Albany, New York
Email: Dlevy@uamail.albany.edu

- [Ursula Casanova](#)
Arizona State University, Tempe, Arizona
Email: casanova@asu.edu
- [Erwin Epstein](#)
Loyola University, Chicago, Illinois
Email: eepstei@wpo.it.luc.edu
- [Carlos A. Torres](#)
University of California, Los Angeles
Email: torres@gseisucla.edu
- [Josué González \(1998—2003\)](#)
Arizona State University, Tempe, Arizona

[home](#) [abstracts](#) [complete](#) [editors](#) [submit](#) [comment](#) [notices](#) [search](#)

EPAA is published by the Education Policy Studies
Laboratory, Arizona State University